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Microsoft Interview Experience for SWE

- Difficulty Level :\nMedium
- Last Updated :\n27 Apr, 2022

Before we jump into interview exp, here\xe2\x80\x99s my brief intro:

I am a Software Engineer, I graduated in covid year-2020 with a bachelor\xe2\x80\x99s in Computer Science. Apart from the work I do, I love to curate, create & share ideas on Pinterest. So this was my second attempt at Microsoft. I had applied earlier for Software Engineer Intern in the 3rd year of BTech(rejected after tech interview II). I applied again for Software Engineer-I in Dec\xe2\x80\x9921 and here it goes:

Round 1: HR SCREENING: I applied through LinkedIn & my profile got shortlisted by HR. We had the call, where he tried to understand my career trajectory & gave me insights into the SWE interview process.

TIPS: Keep your LinkedIn profile updated, make sure your resume includes work exp, projects, and internships. Add your leetcode/Github profile on LinkedIn featured section. Be clear about the notice period policy while discussing the same with HR. Don\xe2\x80\x99t fake-out work exp.

NOTE: Each round from here was an elimination round.

Round 2: Online Assessment: This was scheduled after 15 days of HR Screening. OA had two questions of Easy-medium level. The first problem was based on Strings, where you have to eliminate three or greater than three same consecutive chars from the string and restructure it. The second problem was framed as a Stone-paper-scissor game, but you can relate it to the backtracking problem related to permutation. You will have to code the problem thinking of corner cases because you won\xe2\x80\x99t be able to see if you passed edge cases apart from the base.

TIPS: Stay in touch with DSA while managing a full-time job. Don\xe2\x80\x99t copy code/syntax from external resources, keep your basics clear.

Round 3: Tech Interview I: After a week, you will get the results of OA, you can also check with HR in the meantime. For tech Interview I, I got a week to prepare & I revisited graphs/heap/tree DS. I was asked to introduce myself, we discussed Drools Engine Development, SSO, and other work experience stuff. Next was two questions related to Belady\xe2\x80\x99s Anomaly from OS & BCNF Normalisation. Now we headed toward coding problems.

- I was asked to code a problem based on the matrix (compute before matrix given input as after matrix, where after matrix = function(before)). I came up with a brute force solution and upon checking various test cases with the interviewer, finally coded the space-optimized solution. Ques: https://stackoverflow.com/questions/65510354/matrix-summation-challenge
- Second Problem: Given n pairs of parentheses, write a function to generate all combinations of well-formed parentheses. The approach was the same, going from stack-based to storage-optimized solution. Ques: https://leetcode.com/problems/generate-parentheses/

Round 4: Tech Interview II: This round started with a discussion about Cloud services like Azure / AWS and integration for the same. It was scheduled on the same day as Tech Interview I. There was a couple of question-based on Singleton & Builder Design Pattern. Next, I was asked to code Employee Work Approval System. This was a scenario-based question, they expected the candidate to provide the correct data structure and give an algo for it. This problem was similar to the least common ancestral problem. https://leetcode.com/problems/lowest-common-ancestor-of-a-

binary-tree/. Once I coded the problem, I made sure to follow the SOLID Design Principle. I opted for Java as an Object-Oriented Programming Language. The interviewer will keep on adding constraints as you proceed towards an optimal solution.

Round 5: Tech Interview III: It was another coding round. Apart from questions based on work exp/DBMS/Networking, I was given Josephus\xe2\x80\x99s puzzle which had to be coded in O(1) time complexity. My brute force approach was to solve using a Circular linked list. Please find the O(1) solution here: https://medium.com/@shiwani2626/josephus-problem-in-o-1-time-b246f74775a2

Round 6: Techno Managerial Round: The last interview was scheduled with the Hiring Manager. This round started with the Word ladder problem, where I had to give the approach and explain why BFS was suitable for it. Problem link: https://leetcode.com/problems/word-ladder/

There were a series of managerial questions, and I will write about them separately. But FYI, I referred to this article a night ago: https://igotanoffer.com/blogs/tech/microsoft-engineering-manager-interview

After 3 days, I got a selection call from the recruiter and was more than happy \xf0\x9f\x99\x82

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Microsoft Interview Experience for SDE-1 (Hyderabad)

- Difficulty Level :\nHard
- Last Updated :\n28 Mar, 2022

I have around 1.5 years of experience and received a call from a recruiter through LinkedIn.

Round 1 (Difficulty Level \xe2\x80\x93 Medium): Codility test of 90minutes comprising 3 coding questions.

- **First question:** Minimum number of parentheses required to make the string a valid parenthesis.
  This question is expected to be solved in a single traversal else it gives TLE.
- **Second question:** Smallest substring occurring only once in a given string
  https://www.geeksforgeeks.org/smallest-substring-occurring-only-once-in-a-given-string/
- **Third question:** Related to matrix and DP, was hard and time-consuming
- Required to solve 50% to reach the next round

Round 2: (Technical Interview Round-1) Difficulty Level \xe2\x80\x93 Medium: The interviewer has provided a codility link and asked me to solve a single problem.

- **Question**: Given a BST, find two incorrectly placed nodes in the tree.\xc2\xa0
  \xc2\xa0**Note** \xe2\x80\x93 First solve it using a brute force approach and then provide an optimized solution. I solved it using simple inorder traversal and have given the required output.
- The interviewer was very friendly and helped me whenever I got stuck.

Round 3: (Difficulty Level \xe2\x80\x93 Hard): The interviewer has given a codility link with two problems and asked me to solve them.

- **First Question:\xc2\xa0** https://www.geeksforgeeks.org/program-generate-possible-valid-ip-addresses-given-string/
- **Second Question:** Given 2 cities A and B and given an array of pairs (costA, costB) where costA = cost of moving people to city A and costB = cost of moving people to city B. Write a program to move 2N people into both cities A and B such that N people are in A and N people are in B and the cost is minimum.
  Approach: I sorted the array based on the difference in the cost of both cities. Sorting can be done using a comparator interface in Java.

Round 4: (Difficulty Level \xe2\x80\x93 Medium): This round was taken by the project manager.

- Asked to design a tiny URL system, considering my years of experience, the interviewer has helped me with the basic design problem of getting the requirements and calculating the throughput.
  https://www.geeksforgeeks.org/system-design-url-shortening-service/
  \xc2\xa0

Round 5: (Difficulty Level \xe2\x80\x93 Hard): This round was taken by Software Engineering Manager. Provided a codility link with 1 problem to solve

- **Question:** Given 2 values N, Sprint all combinations of N numbers such that their sum is S.
  Example: Input \xe2\x80\x93 N=2, S=6\xc2\xa0
  Output : [0,6],[1,5],[2,4],[3,3],[4,2],[5,1],[6,0].
- The problem could have been simple if N = 2, but \xc2\xa0N varies and repetitions are allowed

and all combinations are allowed. I solved it using a recursion approach where one number is kept constant and started filling other numbers such that sum equals S.

Round 6: AA round (Difficulty Level \xe2\x80\x93 Medium): This is the final round called AA (As Appropriate) . The interviewer has given a codility link with 1 problem to solve.

- **Question:** Given an array of 2N numbers, rearrange the array such that even numbers are in even indexes and odd numbers are in odd indexes. No extra space to be used.
- Solved it using a single traversal, and the interviewer has tested the code against multiple test cases and all corner cases\xc2\xa0

Suggestion: Primary focus in Microsoft is on problem-solving and system design skills. Practicing LeetCode and Microsoft tagged questions on gfg helps a lot.

- \xc2\xa0https://www.geeksforgeeks.org/microsoft-interview-preparation/

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Microsoft Interview Experience for SDE-1 (Noida)

- Last Updated :\n28 Mar, 2022

I have around 3 years of experience working as an iOS developer. The interview was conducted as part of their hiring drive and all the interview rounds were online and were completed on a single day. The interviewers were very polite and helpful.

Round 1:\xc2\xa0

- Given the following array of strings. We need to remove the proper suffix.

Ex:

```
[abcdef,def,cd,cde, defg, ghi, asdfghi]
```

In the above array, \xe2\x80\x98def\xe2\x80\x99 is the proper suffix of string \xe2\x80\x98abcdef\xe2\x80\x99. So we will not add \xe2\x80\x98def\xe2\x80\x99 in the output array.

\xc2\xa0 \xc2\xa0 Output: [abcdef,cd,cd, defrag, asdfghi]

- \xc2\xa0https://www.geeksforgeeks.org/next-greater-element-in-the-linked-list/

Round 2: Consider a scenario where a list of Analyzers with their dependencies is given. An Analyzer may have a dependency on another analyzer also. We need to design a system which can run all the Analyzers efficiently. [Hint: Topological Sort]

- \xc2\xa0https://www.geeksforgeeks.org/connect-nodes-at-same-level-with-o1-extra-space/

Round 3: Design a logging system that can log various kinds of events such as errors, events. etc.

Round 4: Design a contacts application in mobile where the user can search the required contact and their information (Design should be time and memory-efficient). [Hint: Try Data Structure]\xc2\xa0

All the very best folks. Keep Learning !!

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Microsoft Interview Experience for SE-2

- Difficulty Level :\nHard
- Last Updated :\n21 Mar, 2022

After flooding the Microsoft careers page with more than 20 applications I finally got lucky to interview with them. There were a total of 5 rounds of interviews. The first four rounds were technical and were about 70 to 80 minutes long. The last round was techno-managerial and it went for about 40 minutes.

Round 1: The interview started with the introduction and resume discussion for about 10 minutes and then 2 problem-solving questions were discussed.

- https://www.geeksforgeeks.org/strobogrammatic-number/
- The second question was around Binary search where we need to find the least number of API calls to achieve a certain result.

Round 2: The interview started with a detailed resume discussion and discussion on the architecture of frameworks like React, Elastic Search, the difference between SQL and NoSQL databases as these were the few terms on my resume, this went for about 20 minutes and then 1 problem was discussed.

- Problem \xe2\x80\x93 We have a 2D room with infinite points and we are given a list of points of motion sensors (x, y, r) where x and y represent the location and r represent the radius in which the motion sensor is capable of detection. We have to find whether it is possible to start from one end of the room and reach the other end without being detected by the motion sensor.

I came up with a BFS solution after discussing it for about 20 minutes and then time complexity and space complexity was discussed.

Round 3: The interview again started with the introduction and discussion on previous projects and questions like the most challenging project so far, learnings from the previous projects and then 1 DS related and 1 design related question was discussed.

- https://www.geeksforgeeks.org/lru-cache-implementation/
- Design a logging system \xe2\x80\x93 This was an open-ended low-level design question where the interviewer was interested in discussing more about the OOPs concepts and design patterns. I created the classes and common functions of the system and I discussed about the singleton pattern to keep a centralized logging system.

After this, the interviewer took 10 minutes time to discuss about the team that I was getting hired for and the kind of learning experiences I can expect.

Round 4: The interview again started with the introduction, resume discussion and discussion on previous projects, questions like the most challenging project, the problems I faced during that project and what solution I came up with. Heavy discussion around SQL and NoSQL databases followed by a High-level Design related question.

- Design a reminder app \xe2\x80\x93 It was an open-ended design question where we both discussed the requirements and basic design components that should be in place. Design should be such if mobile is offline then the notification should be posted on other connected devices like laptops, speakers, smart-watches etc. I discussed concepts like long polling, message queue systems to solve the problem.

Round 5: This was the last round. It was short and precise. Like other rounds, it also started with the introduction and some discussion on previous projects. Then encryption techniques were asked followed by a design-related question.

- Design a search autocomplete system for windows file search \xe2\x80\x93 I discussed it with Trie data structure and then the interviewer asked questions around optimizing the updates and insertion of trie nodes.

The entire process took around 20 days time. All the interviewers were very friendly and comforting and they give you hints if you are stuck somewhere, so it is very important to listen carefully and catch those hints. I got the offer letter from them 2 days after the 5th round.

That\xe2\x80\x99s all about my dreamy experience with Microsoft. All the very best guys for your dream interview!!

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Microsoft Interview Experience for Fresher

- Last Updated :\n17 Mar, 2022

Web Coding Interview: Difficulty level: moderate. It happened at around 10 AM. There were 3 coding issues. Likewise, settling all three with the corner cases was huge. The outright time was 90 minutes. 47 out of 880 students passed this round.

Min Efforts Required: The Ultimate Ninja Ankush, right after getting ready hard, goes for a nice supper at the ninja bistro, for that he follows how given on the aide, which might lead him to the ninja bistro. The aide is a planned outline. Since he is in like manner particularly dormant, he wants to restrict the work to travel. The work is described as the consequence of all the distance it expects to reach from the dojo (source) to the ninja bistro (objective). Could you have the option to help him with noticing the way with the base effort it could take The Ultimate Ninja Ankush to show up at the goal? Even more Formally, you are given an organized outline with \xe2\x80\x98N\xe2\x80\x99 centers and \xe2\x80\x98M\xe2\x80\x99 edges where the distance of each edge is more conspicuous than 0, similarly given a source \xe2\x80\x98src\xe2\x80\x99 and a target \xe2\x80\x98dest\xe2\x80\x99. The task is to find the base consequence of edges from src\xe2\x80\x99 to \xe2\x80\x98dest\xe2\x80\x99. If there is no chance from \xe2\x80\x98src\xe2\x80\x99 to \xe2\x80\x98dest\xe2\x80\x99, return \xe2\x80\x93 1.

For example:

Given: \xe2\x80\x98N\xe2\x80\x99 = 3, \xe2\x80\x98M\xe2\x80\x99 = 3. \xe2\x80\x98edges\xe2\x80\x99 = \xc2\xa0[[0 1 1], [1 2 1], [0 2 3]] \xe2\x80\x98src\xe2\x80\x99 = 0, \xe2\x80\x98dest\xe2\x80\x99 = 2.

There are two expected ways, that is to go from center point 0 to center 2 directly, which will require 2 units of effort, or go from center point 0 to center point 1 and subsequently center 1 to center point 2, which will require 1 unit of effort.

Input Format: The primary line of information contains a number \xe2\x80\x98T\xe2\x80\x99 showing the number of investigations. The essential line of each trial contains two space-disconnected entire numbers, \xe2\x80\x98N,\xe2\x80\x99 where \xe2\x80\x98N\xe2\x80\x99 is the number of center points in the graph, and \xe2\x80\x98M\xe2\x80\x99 where \xe2\x80\x98M\xe2\x80\x99 is the number of edges. The accompanying \xe2\x80\x98M\xe2\x80\x99 line contains 3 space-secluded numbers \xe2\x80\x98U\xe2\x80\x99, \xe2\x80\x98V\xe2\x80\x99, and \xe2\x80\x98WT\xe2\x80\x99, \xe2\x80\x98U\xe2\x80\x99 is the parent center, \xe2\x80\x98V\xe2\x80\x99 is the youth center point and \xe2\x80\x98WT\xe2\x80\x99 is the weight of that edge. The last line contains 2 space-segregated entire numbers, \xe2\x80\x98src\xe2\x80\x99 and \xe2\x80\x98dest\xe2\x80\x99.

Yield Format: For each trial, You should return an entire number that shows the base effort required.

Note: You are not relied upon to print the ordinary outcome; it has proactively been managed. Just execute the limit.

Objectives:

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 1 <= \xe2\x80\x98T\xe2\x80\x99 <= 10

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 1 <= \xe2\x80\x98N\xe2\x80\x99 <= 100

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 1 <= \xe2\x80\x98M\xe2\x80\x99 <= (N*(N + 1))/2

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 0 <= \xe2\x80\x98src\xe2\x80\x99,\xe2\x80\x99dest\xe2\x80\x99 <= N

Time Limit: 1sec.

Least Number of Platforms. You have been given two shows, \xe2\x80\x98AT\xe2\x80\x99 and \xe2\x80\x98DT\xe2\x80\x99, tending to the appearance and flight periods of all readies that show up at a railroad station. You endeavor to notice the base number of stages expected for the railroad station so that no train needs to stop.

Note :

1. Each train will leave around a similar time and the departure time will commonly be more conspicuous than the appearance time. For example, A train with appearance time 2240 and departure time 1930 is unbelievable.
2. Time will be given in 24H setup and colons will be barred for convenience. For example, 9:05 AM will be given as \xe2\x80\x9c905\xe2\x80\x9d, or 9:10 PM will be given as \xe2\x80\x9c2110\xe2\x80\x9d.
3. Moreover, there will be no driving zeroes in the given times. For example, 12:10 AM will be given as \xe2\x80\x9c10\xe2\x80\x9d and not as \xe2\x80\x9c0010\xe2\x80\x9d.

Input Format:

- The essential line of data contains a number \xe2\x80\x98T\xe2\x80\x99 tending to the number of trials.
- The primary line of each test contains an entire number \xe2\x80\x98N\xe2\x80\x99, tending to the total number of trains.
- The second line of each trial contains \xe2\x80\x98N\xe2\x80\x99 single-partitioned detached parts of the show \xe2\x80\x98AT\xe2\x80\x99, tending to the appearance periods of a large number of trains.
- The third line of each examination contains \xe2\x80\x98N\xe2\x80\x99 single-scattered separated parts of the bunch \xe2\x80\x98DT\xe2\x80\x99, tending to the departure periods of a large number of trains.

Yield Format: For each trial, return the base number of stages expected for the rail course station so that no train needs to hold on readiness Rate In A Maze: You are given a beginning situation for a rodent that is caught in a labyrinth at an I point (0, 0) (the labyrinth can be considered a 2-layered plane). The labyrinth would be given as a square grid of request \xe2\x80\x98N\xe2\x80\x99 * \xe2\x80\x98N\xe2\x80\x99 where the cells with esteem 0 address the maze \xc3\xa2\xe2\x82\xac\xe2\x84\xa2s impeded areas while esteem 1 is the open/accessible way that the rodent can take to arrive at its objective. The rodent\xe2\x80\x99s objective is at (\xe2\x80\x98N\xe2\x80\x99 \xe2\x80\x93 1, \xe2\x80\x98N\xe2\x80\x99 \xe2\x80\x93 1). Your errand is to observe every one of the potential ways that the rodent can take to reach from source to objective in the labyrinth. The potential headings that it can take to move in the labyrinth are \xe2\x80\x98U\'(up) for example (x, y \xe2\x80\x93 1) , \xe2\x80\x98D\'(down) for example (x, y + 1), \xe2\x80\x98L\xe2\x80\x99 (left) i.e. (x \xe2\x80\x93 1, y),\xe2\x80\x99R\xe2\x80\x99 (right) i.e. (x + 1, y).

Note: Here, arranged ways imply that the normal result should be in sequential request.

For Example: Given a square grid of size 4*4(for example here \xe2\x80\x98N\xe2\x80\x99 = 4): AOA) el)\xc2\xa0

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 10\xc2\xa0

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 11

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 11

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 01

Anticipated Output: DDRDRR DRDDRR

for example : DDRDRR and Path-2: DRDDRR The rodent can arrive at the objective at (3, 3) from (0, 0) in two ways, for example, DRDDRR and DDRDRR when imprinted in arranged request, we get DDRDRR DRDDRR.

Input Format: The mainline contains a whole number \xe2\x80\x9c\xe2\x80\x98N\xe2\x80\x99, which signifies the components of the square framework (labyrinth). Then, at that point, \xe2\x80\x98N\xe2\x80\x99 lines follow. Each line contains \xe2\x80\x98N\xe2\x80\x99 space-isolated numbers meaning the qualities which would by the same token be 0 meaning an impeded way of 1 meaning the accessible way in the labyrinth, separately.

Yield Format: For the given labyrinth, print the vector/rundown of strings addressing every one of the potential ways that the rodent can take to reach from source to objective in the labyrinth in arranged request. The yield for each experiment will be imprinted in a different line.

Note: You don\xe2\x80\x99t have to print anything. It has proactively been dealt with. Just execute the given capacity.

Limitations:

- 2< NaS
- O <= MATRIX[i][j] <= 1

Where N is the size of the square framework.

Preparation: 12 Months

Points: Data Structures and Algorithms, DBMS, OS, Android Development, Web Development, C++, OOPS

Some Tips:

- Become Pro in at least one programming language (ideally Java/C ++)
- Master DSA and take care of a ton of issues on different stages
- (leetcode, hackerrank, codechef, etc)
- Make a few decent undertakings connected with your main subject area, and do it all alone and
- send it.
- Use a few decent Templates (I utilized a Novo resume to fabricate my resume)
- Don\xe2\x80\x99t put unimportant things
- Highlights the advances utilized in your activities and temporary positions

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Microsoft Interview Experience for SDE-1 (Off-Campus)

- Last Updated :\n25 Feb, 2022

Round 1 (Online Assessment Round) \xe2\x80\x93 2 coding questions had to be solved within 90 minutes. The platform for the test was codility. Remember that in the codility platform system\xe2\x80\x99s test cases are hidden. You can test the code against your test cases.

- There are N points given (numbered from 0 to N-1) on one plan. The point kth is at the coordinates (X[k], Y[k]), and the tag of the point is S[k]. We want to make a circle with a center at (0,0). The circle should not have two points with the same tag. What is the maximum number of possible points within the circle?
- Given a tree having N nodes, numbered from 0 to N-1. Each node can contain only one of the letters \xe2\x80\x98a\xe2\x80\x99 or \xe2\x80\x98b\xe2\x80\x99. An array A of length N is used to represent the tree. A[k] (for K from 0 to N-1) represents the parent of the kth node. Letters are represented as a string S[k]. You need to find the number of vertices on the longest path in the tree, such that no pair of adjacent vertices on the path would contain the same letter.

Fortunately, I could run both the codes. After a couple of days, I received a mail that I got selected for further interview rounds.

Interview Process: There were 3 interviews in total.

Interview Round 1 (Technical Interview): She introduced herself and asked me to introduce myself. Then she directly shifted to the data structures. She asked me two questions-

1. Given a tree (which has left, right, and previous pointers), you need to populate each previous pointer to point to its previous left node. If there is no previous left node, the previous pointer should be set to NULL.
2. Spiral print of a matrix.

In the end, she asked me if I had any questions. I asked her to share her experience and the team she is currently working with.

After a week, I got a call that I got shortlisted for the next round.

Interview Round 2 (Technical Interview): He introduced himself. Then, he asked me some questions about my project (around 5-10 minutes).\xc2\xa0

He then asked me if I was comfortable in solving questions on multi-threading. I told him that I had not learned multi-threading as a subject. So, he moved on to questions about data structures:

- Print all the possible permutations of a string. Then he asked me to modify my code so that there were no duplicates.
- To print all the subsequences of a string.

Since we had some time left, he asked another question. It was a scheduling question. He only wanted to know which data structure would fit best in the situation. I told priority queue, and he seemed satisfied. I don\xe2\x80\x99t remember the exact question.

Luckily, I got selected for the next and the last round.

Interview Round 3 (Final AA Round): AA stands for \xe2\x80\x9cas appropriate\xe2\x80\x9d. This round was a mix of technical and managerial questions.

He started the interview with questions regarding definitions of **time complexity** and **space complexity.**\xc2\xa0

- What is the best time complexity?
- What is the best space complexity?

He then gave me a coding question.\xc2\xa0

- There are n gas stations along a circular route, where the amount of gas at the ith station is gas[i]. It costs cost[i] of gas to travel from the station to its next (i + 1) station. Given two integer arrays of gas and cost, return the starting gas station\xe2\x80\x99s index if you can travel around the circuit once in the clockwise direction with enough gas, otherwise, return -1. He wanted an O(n) approach.
- He then asked me some questions about my projects, like why **MongoDB**? Advantages of it.
- He went on to ask about any product like Alexa, Google Home, etc. that I like. I said Google Home. Then he asked questions like how it knows what action to perform taking input as voice.
- Why Microsoft?

My interview ended 15 minutes earlier.

Final Verdict: After a week, I received a mail that I got **selected** for the full-time software engineer position.

Suggestions:

- Communicate well with the interviewer.
- Be honest. If you\xe2\x80\x99re not good at any topic, be very clear in the first place.
- Show willingness to the interviewer about the opportunity.
- Keep coding.

I hope you enjoyed reading this. **Happy learning and all the best!**

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Microsoft Future Ready Talent Internship

- Difficulty Level :\nBasic
- Last Updated :\n20 Jan, 2022

Microsoft has launched a dream virtual internship program for undergraduate students passing in 2022, 2023, 2024 academic years. This internship is learn-apply-implement based. So, it excites more and aim to skill students in fields like data science, AI, cybersecurity, cloud computing and so on. Along with Microsoft other platforms like All India Council for Technical Education (AICTE), Future Skills\xc2\xa0Prime\xe2\x80\x94a\xc2\xa0NASSCOM and Ministry of Electronics and Information Technology (MeitY) digital skilling initiative, Ernst & Young (EY), GitHub and Quess Corp provide opportunity to learn skills. Registrations are open on https://futurereadytalent.in/. You can go and register now for this exciting internship opportunity.

About Program:

Program is divide into four segments as follows:

1. **Orientation**:- After registering and filling require details for program you can attend or watch recorded session of orientation program. In that session you will get the information in brief about internship program.
2. **Self Learning**:-In this session you are provided with \xe2\x80\x98Microsoft Learn\xe2\x80\x99 platform and you need to complete all the required tracks before deadline date. Here, you can also get hands-on experience.
3. **Industry-Sessions**:-Industry sessions gives you exactly problems faced by industry and way to have solution of it. All sessions are given by industry experts.
4. **Project**:-After completing above course we need to do a project using tools we learned in program. First you need to submit Project Synopsis and after that your final project. Which, is mandatory for completion of internship.

Program also provides GitHub Student Developer Pack, Interactive Session for doubt solving, GitHub Discussion Group and opportunity to attend Virtual Career Fair.

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Microsoft Fix-a-thon

- Last Updated :\n20 Jan, 2022

Microsoft conducts Fix-a-thon for hiring final year college students for the role of Support Engineering interns. Support engineers are part of Microsoft\xe2\x80\x99s Customer Experience & Success (CE&S) team.

What is Customer Experience and Success (CE&S)?

Microsoft Customer Experience and Success (CE&S) is the company\xe2\x80\x99s technical support division, formerly known as Microsoft Customer Service and Support (CSS). Support engineers, managers, technical advisors, and a variety of other professions make up the team, all of whom are dedicated to improving the customer experience and assisting customers with a variety of issues.

Who are Support Engineers?

Support Engineers (SE) provide technical support to Microsoft\xe2\x80\x99s customers and partners via phone, email, and the web. They add value by collectively and reactively resolving customer issues, offering proactive support advice, contributing to product quality and enhancements, and developing self-help assets to reach a wider audience. They are a member of a team that is responsible for providing exceptional technical assistance to our commercial customers. They own and control the client experience via the phone and on the web, from problem detection to complete resolution. When necessary, they work with others to enlist the help of subject matter experts, engineers, or management.

Eligibility Criteria for Fix-a-thon :\xc2\xa0

1. Students who are pursuing BE/B.Tech in CSE/IT/other quantitative branches.
2. CGPA above 8 in the current degree.
3. Degree Completion year should be current year(last year of Graduation).
4. Candidate should not have participated in any Microsoft hiring event in the last 12 months.

Recruitment Process :

1. Resume Screening
2. Online assessment and Video Submission
3. Training modules and break-fix challenge
4. Team hackathon
5. Interview Rounds

Resume Screening round: Incorporates basic information about you and your skills, achievements and extra-curriculars. Because this is the initial step in the shortlisting process, make sure you prepare it as well as you can. Students are shortlisted for the next phase based on their application forms. There were around 11000+ candidates from different colleges across India.

Online assessment and Video Submission: Online assessment was based upon core Computer Science subjects like Operating Systems, Database Management System, Computer networks, data structures and algorithm and aptitude(Quantitative + Verbal + Logical Reasoning). You can also expect some questions pertaining to Microsoft products as well. There were only MCQs and no coding questions. The questions were of easy to medium standard of difficulty. Candidates who were selected for the assessment were required to upload a video explaining who they are, why they want to intern with Microsoft, and why they would be a good fit for Microsoft\xe2\x80\x99s support engineering role. Out of 11000 applicants around 100 were shortlisted for the next phase.

Training modules and break-fix challenge: This is the most unique and interesting phase of the whole recruitment journey. The 100 shortlisted candidates went through learning modules over a 5 day period. We were trained on windows as an operating system, computer networks, cloud computing and Microsoft Azure. Unlike a typical college curriculum these learning modules dealt with the practical approach of the concepts. The best part of these trainings were that the non-CS students could also get deep insights on the CS fundamentals. The trainings were provided by highly experienced Subject Matter Experts(SMEs) of Microsoft. Now comes the most interesting part- the break-fix challenge. This round was conducted via Microsoft Teams. Every candidate was aligned to an interviewer who had a set of tasks that we needed to perform on our virtual machines created on Azure while sharing the screen. The tasks mainly revolved around basic troubleshooting on some common issues. For example, the internet on our virtual machine is not working due to some issue. So we needed to explain and carry out the steps we needed to perform to remove the problem. Around 50 qualified for the next round.

Team hackathon: 50 students were split into ten groups of five students each. Each team was given a problem statement based on current events, which we had to solve. A mentor was appointed to each team to guide them through their concept and answer any questions they had. For a week, five of us collaborated to find a solution. Our mentor provided invaluable help and guidance throughout the entire process. We had to present our ideas to a panel and based on our presentation 5 out of the 10 teams qualified for the finals of the hackathon. Unfortunately our team didn\xe2\x80\x99t qualify for the finals.

Interview Rounds: Every 50 candidate qualified for the hackathon round was judged on various factors throughout the whole journey. So it didn\xe2\x80\x99t mean end of road for one\xe2\x80\x99s whose team didn\xe2\x80\x99t qualify for finals. Out of 50 candidates around 31 got a chance to sit for the PPO interviews and I was one of them. There were two rounds of interviews. Both were of managerial type. It mainly revolved around basic introduction of myself, my hobbies, the experience so far with Microsoft, how can I contribute to the role being offered, etc.

At the end, candidates selected for internship were notified through emails and fortunately I was among the selected ones. Overall the whole recruitment process was really exciting and one very important thing to remember is, do not make up stuff and answer. Be honest and admit it if you do not have an idea about the question asked.\xc2\xa0

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Microsoft Interview Experience for SWE Intern

- Last Updated :\n19 Jan, 2022

Department: Information Technology\xc2\xa0

- Batch: 2023\xc2\xa0
- Company Name: Microsoft\xc2\xa0
- Internship Role: SWE Intern\xc2\xa0
- Domain of Your Role*(Software/Consulting/Core Electronics, etc)*: Software Cut-off: CGPA >= 7.5\xc2\xa0

Interview Process*(How many rounds were there and what were the rounds)*: 1 coding round and 3 interview rounds(2 technical and 1 HR round)\xc2\xa0

Questions asked in the each stage of the process: In the online assessment, we were asked 2 DSA or Competitive Programming type questions, out of which one was greedy and another was dp.\xc2\xa0

First Technical Round:\xc2\xa0

- How will you transfer a tree from one program to another? (I answered using file handling and indexing in a tree)\xc2\xa0
- And a few follow-up questions on the above one(like more efficiency, ease of computation, different scenarios, time and space complexities.)\xc2\xa0
- Validating a string expression that may contain numbers, \xe2\x80\x98*\xe2\x80\x99 for multiplication, \xe2\x80\x98/\xe2\x80\x99 for division, \xe2\x80\x98+\xe2\x80\x99 for addition, \xe2\x80\x98-\xe2\x80\x99 for division, and some brackets. I came up with a stack approach. Then he asked me to code the same(need not run it). I have coded it, he was satisfied but just ran it to test and it was working fine, but failed for a corner case. He then asked me to debug. It took 2-3 mins but found the bug. I just changed the code and it worked well. However, it was not necessary to run the code. You can write the code in a text editor or doc file too\xc2\xa0

Second Technical Round: (for me it was technical+HR)\xc2\xa0

- (started with an HR question) What did you learn in these 2 years of college?\xc2\xa0
- How will you check whether a tree is balanced or not?\xc2\xa0
- I know the concept but never coded it before. I told my approach, he was OK with that. And asked me to code. I did it but in a brute force manner. He asked me if it was the optimal way. Then I came up with a DP approach with O(n) time, O(n) space. He was more than satisfied when I applied dp in that question. However, the most optimal solution has O(n) time and O(1) space. He asked me to think of such a solution. I asked for a hint. Then I came up with the most optimal approach.
- Reason behind selection results*(Which skills helped you the most to get the job?)*: Data Structures and Algorithms(DSA), Competitive Programming(CP), Communication skills\xc2\xa0
- Preparation Strategy*(How did you prepare for the non-interview rounds? How did your preparation evolve for the interview rounds?)*:\xc2\xa0

Coding Round:\xc2\xa0

- I did not prepare for the coding round separately because I regularly do Competitive Programming(CP) contests which have given me enough confidence for the coding round.\xc2\xa0

- Because of regularly doing Competitive Programming, I was good at debugging which helped me a lot in the coding round.\xc2\xa0

Technical Interviews:\xc2\xa0

- For the technical interviews, I have practiced (kind of revision at the same time) DSA questions from Leetcode and GfG for almost a month before the interview.\xc2\xa0
- I have revised the whole Object Oriented Programming(OOPs) because some companies do ask questions on that. While preparing for the internship season, I did pair programming with a few of my friends which helped me learn faster and effectively.\xc2\xa0
- Even today I do pair programming most of the time instead of just practicing alone. Pair programming is very much useful and a very effective mode of coding. I learned a few topics including Dynamic Programming(DP) just 1 month before the interview. Since I had less time, whatever the DP question I solved, I did it in both ways(i.e. top-down and bottom-up). This helped me to become good at it in less time.\xc2\xa0

HR Round: Coming to HR round. I have watched some mock interviews available on youtube which gave me an idea about the HR round. I was prepared to be confident and speak in a structured manner. But I didn\xe2\x80\x99t go through the HR round. I got selected after 2nd technical interview itself.\xc2\xa0

- However, my interviewer asked 1 or 2 HR questions.\xc2\xa0
- He asked me \xe2\x80\x9cWhat did you learn in these 2 years of college?\xe2\x80\x9d.\xc2\xa0
- I was also well prepared for HR questions like \xe2\x80\x9cTell me about yourself\xe2\x80\x9d, \xe2\x80\x9cWhy should we hire you?\xe2\x80\x9d, \xe2\x80\x9cWhat are your Strengths and Weaknesses?\xe2\x80\x9d, \xe2\x80\x9cWhy do you want to join our company?\xe2\x80\x9d etc.\xc2\xa0
- I have made a portfolio website and 2 ML projects.\xc2\xa0
- Resources to prepare from \xe2\x80\x93\xc2\xa0
- Necessary Resources*(Must Do)*:\xc2\xa0
- Leetcode and GFG(for DSA),\xc2\xa0
- Javatpoint.com(for OOPs),\xc2\xa0
- Advanced Resources*(Can Do)*: Codeforces,
- Internship Experience*(If Completed)*:\xc2\xa0

Anything else that you\xe2\x80\x99d like to share with the students: Focus on DSA and your communication skills. some companies also ask OOPs questions. Consistency matters the most while learning anything. Pair programming is very much effective. Competitive Programming helps a lot in coding rounds, DSA, pressure handling, Problem Solving, and debugging.\xc2\xa0

Other Suggestions:\xc2\xa0

1. Communicate well with the interviewer\xc2\xa0
2. Be confident\xc2\xa0
3. Proper planning and dedication is helpful in cracking any company\xc2\xa0
4. Don\xe2\x80\x99t neglect CGPA and Sem exams. Many good students are not able to apply for many companies due to a CGPA cut-off(on-campus internships). Try to have a CGPA above 8.\xc2\xa0

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Microsoft Interview Experience for SDE-I (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n21 Dec, 2021

Online Assessment \xc2\xa0\xe2\x80\x93 There were 2 coding question.

1. There are N cities. Cities are connected by roads .(Basically given a graph). K of the cities has a hospital(Given an array of size K). Time taken to reach a hospital from a city is no of edges to the nearest city which contains a hospital. Find the maximum time taken to reach a hospital from all the N cities. Ans \xe2\x80\x93 (Just do a normal multi-point BFS and store the distance of every city and return the maximum one).
2. Given a tree of N nodes(0 as the root). Each node contains either \xe2\x80\x98A\xe2\x80\x99 or \xe2\x80\x98B\xe2\x80\x99. Return the longest path of the tree such that no to consecutive letter of that path is same.(Either \xe2\x80\x9cABABA..\xe2\x80\x9d OR \xe2\x80\x9cBABABA\xe2\x80\x9d) . \xc2\xa0Ans \xe2\x80\x93 Pretty standard DFS question . Calculate answer for each node as a root (sum of 2 best child subtree+1) and return the longest path (longest child subtree+1). Maximize the answer.

Luckily, Microsoft gave weightage to the time in which candidates solved the questions, rather than the gpa unlike some other companies. Around 40 were shortlisted for interview.

Interview Round 1 \xe2\x80\x93 He introduced himself and asked me for introduction and 1 of my project(mine was an e-commerce website) and asked some questions about it. (Ex-How would you handle multiple request at the same time for the e-commerce website . How much load can your website take .)We had a discussion around 20mins and then he asked me a coding question.

1. Given a 2D grid and there is a value present in each grid. 1 means this index is vaccinated . 0 means this index is not affected till now but not vaccinated . \xc2\xa0-1 means this index is affected by the virus. \xc2\xa0(Virus will spread from -1 to 0, in 4 directions) .Find the last day when virus spreading will stop.
2. I gave him the solution by multipoint bfs. He was quite satisfied with it and asked me to code it. After that he asked me some questions like count the number of indices which are not going to be affected at all(but not by this approach. I gave him the approach of doing a dfs from each indices having 0 value and if we find a 1 we will just return but if we find a -1 this index is surely going to be affected at some time. He was satisfied with it.)
3. Then he asked me to write some good \xc2\xa0test cases for the original question , so that it will cover all the possibilities of the solution. At the end he was satisfied and asked me to wait in the call for next round.

Interview Round 2- After the introduction, he asked me about my internship experience and what work i have done there, the tech stack I have worked on.\xc2\xa0

- Then he asked me some oops concept (polymorphism, abstract classes).
- After some time of discussion, he gave me a coding question. https://www.geeksforgeeks.org/find-pair-given-sum-bst/
- But I had to code for the input as well(the whole bst and how i will take the input) and find all the pairs. He was satisfied with my code and asked me to stay on the call for next round.

Interview Round 3 \xe2\x80\x93 It was an HR round.\xc2\xa0

- He asked me different questions about my internship and what challenges I have faced during that. Why I want to join Microsoft and what I have to offer to the company and some other HR

questions.\xc2\xa0
- Then he talked about the goal of Microsoft as a company and what is the work culture there etc. This round lasted around 35mins and my interview was done.

Verdict- Next day I got to know that I was selected for the role.\xc2\xa0

Tips:

- For the preparation point of view, my advice would be study all the CS fundamentals(oops, OS, DBMS, CN), practice as much as u can in GFG and Leetcode, know all of your project (like what technologies you have used and why you chose that).\xc2\xa0
- Also, some of my friends were asked System Design questions. So you should be prepared for that as well(e-commerce design, twitter design, lift design, parking lot design etc.).\xc2\xa0
- Also, I would like to thank the GFG community, I got benefited from it a lot and it is my responsibility to give something back. I hope you guys enjoyed reading this. Keep faith in your abilities, prepare as hard as you can, hope for the best, good days are coming.\xc2\xa0

Happy Coding!!

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Microsoft Interview Experience for Software Engineer | 1 Year Experienced

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2021

Applied via employee referral. Got a call for interview rounds after 1.5 months from date of applying on portal.

Round 1(Codility Screening Round): 2 questions to be solved within 60 minutes.

1. Basic string question.>
2. https://www.geeksforgeeks.org/lexicographically-smallest-string-formed-by-removing-at-most-one-character/

Got confirmation within a day that I have been shortlisted for further rounds

Round 2(Technical Interview 1): Taken by Software Engineer with around 2-3 years experience.\xc2\xa0

1. All 4 pillars of OOPS
2. Difference between Linked List and Arrays
3. Reverse a Linked List
4. Difference between Queue and Priority Queue
5. Given a few tables which have some values linking few rows across tables, write a functional code to print the entry with highest priority. (Main focus here was on creating classes with modular and well defined structures, usage of correct data structures at right point [HashMap, ArrayList, PriorityQueue] and clean coding)

Round 3(Technical Interview 2): Taken by Software Engineer with 5+ years of experience.

1. Detailed discussion about current work and tech stack.
2. Add two binary strings that have been represented using Linked Lists (variation of https://www.geeksforgeeks.org/add-two-numbers-represented-by-linked-lists/)
3. Search for a word. (Trie based approach. Only asked for approach, did not ask to code)
4. Discussion on Multi-Threading, Mutual Exclusion, Design Patterns in Java, Inheritance vs Interfaces, Synchronization, Producer-Consumer problem

Got call from recruiter that I had cleared both technical interviews and that my final round would be conducted in a couple of days.

Round 4(Manager Round): Taken by Engineering Manager with 20+ years of experience. After a quick introduction about myself, I was asked about

1. Reason for changing job
2. A time when you took feedback from peers constructively
3. Toughest assignment you have been involved in
4. Discussion about current projects and tech stack
5. https://www.geeksforgeeks.org/check-for-balanced-parentheses-in-an-expression/ (only asked about choice of data structure and time complexity)
6. https://www.geeksforgeeks.org/length-of-the-longest-substring-without-repeating-characters/ (only asked about choice of data structure and time complexity)

Got a call from recruiter the same day saying that I had been selected for the role.\xc2\xa0

Tips:

1. Focus on basics. DSA, OOPS, OS
2. Show willingness and eagerness to learn and collaborate in technical interviews.
3. Don\xe2\x80\x99t lose faith and trust your preparation. I had previously been rejected by multiple product-based companies during campus placement and also during my off-campus attempts.
4. Maintain a good connection with your assigned recruiter/HR. This shows an eagerness from your side and he/she can really guide you through the ins and outs of the process very well.

Above all, believe in yourself.\xc2\xa0

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Microsoft Associate Consultant Summer Internship Experience (On-Campus)

- Last Updated :\n14 Dec, 2021

Shortlisting criteria: Resume and CGPA based (students were asked to fill a google form and 9 students were shortlisted). Each round was an elimination round and the interview happened on the Microsoft teams application.

Round 1: Technical round (1 hour)

- The interviewer was very friendly. She introduced herself and then asked me to give a self-introduction. I mentioned that I was the school pupil leader during my 12th grade so, she asked me if I faced any challenges during that period. Then, she moved on to technical concepts.
- \xc2\xa0DBMS is my area of interest and so she asked me to provide a query for a database. Then, she asked me a question on arrays where I was asked to use sorting algorithms to sort the array in descending order.\xc2\xa0
- I was asked to add a few conditions on the algorithm by inserting and deleting an element from the array. Finally, she asked me to explain the Object-Oriented Programming concepts (Class, objects, four pillars of OOPS). She asked if I had any questions for her.\xc2\xa0
- I asked her for feedback and she gave positive feedback.
- 6 students were shortlisted after this round and I was one among them.

Round 2: Managerial round (40 minutes)

- The interviewer introduced himself and asked me to give a self-introduction. I included machine learning projects in my resume.\xc2\xa0
- He asked me to explain the projects. I explained the projects and the challenges faced. Then he asked me to explain the concept of inheritance by relating it to a real-life scenario. He asked me about bitcoin and cryptocurrency. Then, he asked a few situation-based questions like:
- How will you solve conflicts among team members while doing a group project?
- \xc2\xa0If your best friend is working in your team in Microsoft and he is into malpractice by going against the company policies, how will you handle it?
- \xc2\xa0There are two armies belonging to kingdom 1 planning to attack a kingdom 2. Those armies are placed on either sides of the kingdom and in order to attack the kingdom 2 on the same day at the same time, how will they communicate among themselves if the spies must go through the kingdom 2? Consider that there were no phones and internet during that time.
- The interviewer then asked if I had any questions for him.
- 6 students were shortlisted for the final round.

Round 3: HR round (15 minutes)

- The interviewer asked me for a self-introduction. He then asked about my machine learning project. He asked me to explain the biggest challenge I encountered while doing that project.
- Results were announced after 2 days. 4 students were selected for the internship and I was one among them.

Tips:

- Be thorough on the projects mentioned in your resume.
- Be confident while answering the questions.
- While answering technical questions, ask doubts to them to make sure that you are on the right

track.

- Think out loud while devising the solution.
- Go through basic data structures, OOPS and DBMS concepts.
- Relate to real-life examples while answering the OOPS concepts.
- Mention the challenges faced while explaining a project.
- Do a thorough research on the company, job role and current technologies.

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Microsoft Interview Experience | 4.5 Years Experienced

- Difficulty Level :\nMedium
- Last Updated :\n09 Dec, 2021

Recently Got call from Microsoft. HR asked about my current work and experience and provided me update of the procedure for Microsoft Hiring. The process consist of 5 rounds(1 coding round, 3 technical discussions, 1 managerial discussion).
\xc2\xa0**Coding Round**:- This round consist of 2 questions on codility platform. Questions are of easy level, one is debug and for one you have to write code.

After this round, I got a call that there is one day process for Microsoft will happen, 4 rounds of interview on one day.

Round 1\xe2\x80\x93 This round consist of 2 questions

1. I will be given a timeslot availability of calendar for 24 hours, random time slots will come, I have to write a API, that will book the slot if it is available and return -1 if slot is not available. API should look like:-\xc2\xa0int checkAvailability(int start, int end)
   I have to check the overlapping conditions also, after a certain period of time, the data will be sent to another api, that will return available time slot in 24 hour time. One part of question was this:- https://www.geeksforgeeks.org/merging-intervals/. Define data type of time(this is the enhancement of previous question).
2. Find all the nodes in a binary tree which are at k distance from leaves.
   https://www.geeksforgeeks.org/print-nodes-distance-k-leaf-node/

   \xc2\xa0

Round 2 \xe2\x80\x93 This round started with my discussion of projects(15 minutes discussion). After that we proceed to design a Notepad type of editor. This editor consists of following API:-
\xc2\xa0

- **a**\xe2\x80\x93 Insert(Insert the word)
- **b**-delete(string word)
- **c**-copy(int pointer)
- **d**-paste(int pointer)
- **e**-undo(10 operations allowed)
- **f**-redo(10 operations allowed)

Need to design the class diagram, compositon and funtionalities.

Round 3 -This round consists of technical discussion about the tech involved in my projects.\xc2\xa0

- Later on we moved to binary tree, he asked me to write down code for level order traversal, skew order traversal.\xc2\xa0
- After that he asked to reduce the space complexity. I had proceed to solve it and code it also. Please check link of question for reference.
  https://stackoverflow.com/questions/59582406/level-order-tree-traversal-without-using-additional-memory

Round 4 \xe2\x80\x93 This round was more of a behaviorial+ technical round. I was asked HR questions mostly and also 2 technical question to code.

1. (maximum continuous sub array)https://www.geeksforgeeks.org/largest-sum-contiguous-subarray/
2. print occurrence of duplicate element in reverse order. Input:- 1 2 3 3 2 1 4 4., output:- 4 1 2 3

Verdict:- Selected.

Be confident and be active, don\xe2\x80\x99t jump to solve the question, ask for more inputs from interviewer, ask valid questions. Be polite.

Practice a lot! All the best!

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Microsoft Internship Interview Experience (Off-Campus)

- Last Updated :\n29 Nov, 2021

Round 1(Written Test held\xc2\xa0Online at mettl.com): The first round was an online coding round comprising of three questions which were to be solved.\xc2\xa0

- The questions ranged from easy to medium level, and the total time given was 90 minutes, to solve the questions.\xc2\xa0
- After this round I received a confirmation email within a few days, stating that I had been shortlisted for the next round which were to be a virtual interview round. I had been given a date and time for the interview at which I had to connect to a certain link mentioned in the email.\xc2\xa0

  \xc2\xa0

Round 2(Virtual Interview Round Over Teams): The second round was a virtual interview round over Microsoft Teams App, it was a video call with one of the Microsoft Interviewers. The interview started at its scheduled time, and the interviewer gave a brief introduction about himself followed by mine. He then without wasting any time gave me a question to solve and asked me to share my screen and code the solution on an IDE.\xc2\xa0

- The question that I was asked was\xc2\xa0https://www.geeksforgeeks.org/check-binary-tree-subtree-another-binary-tree-set-2/\xc2\xa0
- It took me about 15-20 minutes to completely code my solution and dry run some test cases. The interviewer was monitoring me continuously and to my approach.\xc2\xa0
- After I finished coding he asked my about the Time Complexity of my solution, and also if my solution would fail some edge case, I told him the time complexity and tried a few of the edge cases, but could find none at the moment.The Interviewer then asked me about my projects if I had any, and some basics concepts of OOPs.\xc2\xa0The entire interview lasted about 40 minutes and the interviewer was friendly and helpful.\xc2\xa0
- I got an email stating that I had cleared this round and will be called for an onsite Interview at one of Microsoft\xe2\x80\x99s Campus soon.\xc2\xa0

After a few days to that mail, I received another mail stating that the interview was to be held at their Hyderabad Campus the coming Sunday itself. (It was on Monday that I received the email).\xc2\xa0

Round 3(Onsite Personal Interview): We were told to report at their Hyderabad Campus for the personal interview rounds, by 8:30 in the morning, I reached on time, and we were escorted to their conference room, There were 25/30 students, who were selected for this personal interview round on to be held that day, We were briefed about the Interview process, and were told that we would be having two rounds in total, however only the one selected after the first round would get selected for the second round.\xc2\xa0
\xc2\xa0

First Technical Interview Round:\xc2\xa0 The first round was a technical round where the interviewer greeted me and he started with some basic simple questions on arrays.

- The question he asked me was Given an array with equal difference between each element, there is one missing element in the series, find the missing element. I solved it using the AP series sum formula, He then told me to assume that the array was arranged in increasing order and told me to find the index of missing element in O(1) time. I found out the missing element

using a formula(add formula). He then gave me a question regarding right shifting an array \xe2\x80\x98n\xe2\x80\x99 times and find the new index of the kth element.\xc2\xa0
- I explained him a O(1) solution by calculating the new index using the formula (Add formula). He then asked me a question similar to this-\xc2\xa0https://www.geeksforgeeks.org/given-a-sequence-of-words-print-all-anagrams-together/, initially I solved it using hash maps, which was ineffcient, but after a few hints from the interviewer, I was able to finally solve this question. He then asked me this question https://www.geeksforgeeks.org/inorder-tree-traversal-without-recursion/.\xc2\xa0
- I was able to solve this right away without much thinking. After this he asked me about Page Scheduling Algorithms In Operationg Systems, after I explained him all the algorithms, he asked me how would I aid these algorithms with the help of Machine Learning (as I had mentioned Machine Learning in my CV), I told him how I would first prepare a dataset and what factors would I consider while collecting the data, and then how I would train a model to predict how long should a particular page be kept in main memory based on its specific characteristics (will not get into details as this article will get too long). He then asked me about concepts of OOPs and asked me to state real life examples for those. After this he told me that he was done and asked me to wait outside. This Interview had lasted about an hour and the interviewer was really helpful and helped me at several times during the interview.

Tips:\xc2\xa0 Please try to be clear and have a habit of writing code on paper, one of the remarks the interviewer gave me was to present the solution neatly as I was explaining it to him in a very untidy way, and he was having trouble understanding my solution because of that.\xc2\xa0
\xc2\xa0

Second HR+Technical Round:\xc2\xa0 After about 5 minutes I was called for another round, This was to be more of a HR round than a technical round.

- I was greeted very warmly upon entering the Interviewer\xe2\x80\x99s cabin, The Interviewer was the Senior Director of the SAP Department of Microsoft. He gave me a detailed introduction of himself, and then he asked me **to tell him something about myself**, I gave him a detailed Introduction of me.\xc2\xa0
- He then asked me **What qualities make you fit for Microsoft?\xc2\xa0**I focussed on all my strengths and explained it to him, He then asked me about my projects and about technology, We also talked about Ideologies that Microsoft follows. He then asked me if I had any questions. And then he told me to wait outside as he would see the previous interviewer\xe2\x80\x99s feedback and I would be told the result soon.

After Some time I was told by them that I was selected and I would be getting an interim offer letter regarding the same in a month.\xc2\xa0

Tips: Be calm and composed and do not worry about the results, If you have worked hard enough it is certain that you will be selected, also I would like to suggest you to practice from sites like LeetCode and GeeksforGeeks, and focus on Data Structures and Algorithms, especially on Linked Lists and Trees if you are targeting Microsoft.
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Microsoft Internship Interview Experience (On-Campus)

- Last Updated :\n23 Nov, 2021

Round 1(Online Coding Round \xe2\x80\x93 90 mins): The online test was conducted on https://mettl.com/. There was 90 minutes to solve and code 3 Problems. The questions were based on basic Implementation Problems (Commonly found in CodeChef, Codeforces, GeeksforGeeks and other online platforms). Among the three questions, two were easy and one was of mediocre difficulty.\xc2\xa0

1. You are given n passwords. You have to print total number of distinct password. On each password you can perform operation any number of times possibly zero. The operation is defined as you can swap data present on any 2 index of a string if the difference of index number is even i.e. swap(a[i], a[j]) if (j-i)%2==0.

   ```
   Test Case: Input:  n=5 and \r\npasswords are=[\xe2\x80\x9cabcd\xe2\x80\x9d, \xe2\x80\x9ccdab\xe2\x80\x9d, \xe2\x80\x
   ```

   Explanation: as \xe2\x80\x9ccdab\xe2\x80\x9d can be converted to \xe2\x80\x9cabcd \xe2\x80\x9d and \xe2\x80\x9cbdca\xe2\x80\x9d, \xe2\x80\x9ccdba\xe2\x80\x9d can be converted to \xe2\x80\x9cbacd\xe2\x80\x9d so you can get only 2 distinct password.

2. Today is Anshul\xe2\x80\x99s birthday so he brought n chocolates and he had k friends. He has to distribute all the chocolates to friends in the following way. The first child gets 1 second gets 2 third gets 3 and so on so if there are enough chocolates then kth child gets k chocolates. Now if chocolates are still remaining then he gives again k+1 chocolate to first child k+2 to second child and so on till he distributes all the chocolate. So you have to print k integers defining which child got how many chocolates.

   ```
   Test Case: \r\nInput: n=25 and k=5   \r\nOutput: [7  6  3  4  5]
   ```

   Explanation: so in first go the chocolate distribution would be as [1 \xc2\xa02 \xc2\xa03 \xc2\xa04 \xc2\xa0 5] so total 15 chocolates are used now in second go 1st child will get 6 more candies so his total candies would be 7 now we are just left with 4 more candies so that would be given to second child as he can get more as much as 7 chocolates but \xc2\xa0we have only 4 left. So the final answer would be [1 2 3 4 5] + [6 4 0 0 0] = [7 6 3 4 5]

3. You are given M for modulo and N number of layers. Now in first layer you have 1 ship of power v=2. Now for every ship in layer i with power v there are distinct ships of power 0 to v*(v+1)%M-1 in in its next layer. Now you are given M and N. You have to find total number ships in all layer % M. \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0

   ```
   Test Case: \r\nInput: M=4 N=2  \r\nOutput: 3
   ```

66 students were selected for the next round.\xc2\xa0

Round 2(Group Fly Round): 45 mins: In this round, we all were given one question to solve within 45 minutes. We had to write functions on A4 paper (in any programming language or pseudocode) returning the answer and their Time and Space Complexity. We were advised to write as many solutions as possible for the problem but the most optimal solution would be considered.\xc2\xa0
\xc2\xa0

Coding questions asked was:

1. Given an array of size \xe2\x80\x98n\xe2\x80\x99.The question was to shift all the zeros present in the array to the right of the array maintaining the order of non-zero elements.\xc2\xa0

   Examples:\xc2\xa0

   ```
   Input : \r\narray : [0, 10, 7, 0, 0, 0, 8, 0, 3, 6]   \r\nn: 10  \r\nOutput : \r\narray : [10, 7, 8, 3, 6, 0, 0, 0,
   ```

42 students were selected for the next round.\xc2\xa0
\xc2\xa0

Round 3(Technical Interview 1 \xe2\x80\x93 Around 45 mins): The Interviewer asked questions about Concepts of Object-Oriented Programming, Data Structures and Algorithms. The Interviewer described some scenarios and asked how to tackle them with OOP concepts like Virtual Function, Multiple Inheritance, Operator Overriding etc.\xc2\xa0

Coding questions asked were:

1. Given two strings P and Q, the question was to check if the two strings are a permutation of each other or not.\xc2\xa0

   Examples:\xc2\xa0

   ```
   Input : \r\nstring P: \xe2\x80\x98aBca\xe2\x80\x99 and string Q: \xe2\x80\x98Baac\xe2\x80\x99 \r\nOutput : \r\nP and
   ```

2. There are \xe2\x80\x98n\xe2\x80\x99 buildings in a street. A monkey can cross one or two buildings in one jump. In how many possible ways the monkey can reach from the first building to the last building?\xc2\xa0

   Examples:\xc2\xa0
   \xc2\xa0

   ```
   Input : \r\nn = 4 \r\nOutput : \r\nno. of possible ways: 3\r\nExplanation : \r\nThe possible ways can be\r\n(1->2->3
   ```

For each question, I wrote C++ functions on paper and he asked me to explain the time and space complexity of my solutions and the possible corner cases. He also discussed other possible approaches to solve the problems.\xc2\xa0
\xc2\xa0

Round 4 (Technical Interview 2 \xe2\x80\x93 Around 30 mins): In this round, I was asked to solve some Real-life problems using DS and Algorithms Concepts and some puzzles.\xc2\xa0
\xc2\xa0

- Given a hyperlink of a website Homepage, my task was to print all the \xe2\x80\x98dead links\xe2\x80\x99 present on that website. A list of links present in each webpage was also given for each page of the website.\xc2\xa0
- Then the interviewer asked to solve and explain some mathematical and logical puzzles.\xc2\xa0
  \xc2\xa0

Round 5(HR Interview \xe2\x80\x93 Around 20 mins): At first, the interviewer asked me to introduce myself and my journey from my school to my College.\xc2\xa0

- Then he went through my CV and asked about my project and skills. He asked me some logic based Questions.\xc2\xa0
- Then he asked me what I liked in their Pre-Placement Talk and why I wanted to join the Company.\xc2\xa0

  The result was published within two hours and I was selected along with 9 other students (my batchmates).\xc2\xa0

Verdict: Selected

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Microsoft Interview Experience (Off-Campus)

- Difficulty Level :\nHard
- Last Updated :\n16 Nov, 2021

Microsoft off-campus hiring interview experience, I got this opportunity through the Microsoft engage program 2021.

Round1 (Coding Round on Codility): There were two questions to be solved in 120 mins. Questions were medium-hard level.

1. This question was based on multi-source BFS. A graph was given and an array of hospitals, now for all non \xe2\x80\x93 hospital nodes, we need to find the max time an ambulance may take to reach them. (medium-hard)
2. This question was based on Graph DFS + DP. Don\xe2\x80\x99t remember the question exactly, but it was to apply the inclusion-exclusion principle on graph nodes using DFS. (hard)

I was able to solve both the questions and passed all the given test cases within 60 mins. It was mentioned that code would be judged after submission for hidden test cases as well.\xc2\xa0

Round 2 (Interview Round 1 on Teams): This round lasted for about 45 mins. I was asked 2 coding problems.\xc2\xa0

1. Zero Subarray sum, earlier he asked for a bool value, then he asked me to return starting and ending indices of all such subarrays.
2. A binary tree is given, node value can be either 0 or 1. Now moving from root to a leaf forms a decimal number in binary representation. I was asked to find the sum of all such possible decimal numbers. All such possible numbers would be equal to the number of leaf nodes present in the binary tree.

I was able to solve the first one quickly, then the second one with some hints from the interviewer. I was asked to write code in my favorite editor and run the code for some test cases. The interviewer was satisfied at the end and he asked whether I had any questions for him. Within half an hour I received the call for my second round.

Round 3 (Interview Round 2 on Teams): This round lasted for about 50 mins. I was asked 2 coding problems.

1. Cutting a rod problem was asked, I explained the overlapping subproblems first and the optimized using DP. I was asked to run the code and check for many test cases(including the edge cases). The interviewer was satisfied with the code, then he said we have time so let\xe2\x80\x99s solve another question.
2. String question DP + Rabin Karp Hashing. Given a vector of strings, and a target string, find whether a subset of the array of strings could concatenate to target string, if more than one possible way, return the one with minimum elements in the subset. I explained to him first how hashing would help in comparing then overlapping subproblems while making the target string. Then I was asked to write the code for the same.

The interviewer looked happy after I solved both the questions, So I was pretty sure that I would qualify for the next round.

Rond 4 (Interview Round 3 on Teams): This round was conducted after 4 days of the previous two rounds.\xc2\xa0

- The interview began with my introduction, I was asked to brief about my internship and project experience. Then he asked me the potential problems that would occur if my project (web dev) was used by million users. It took the direction of system design, we discussed how to decrease the latency time in detail.
- Then after 20 min discussion, he asked me a coding problem to code quickly. The problem was based on a string. A string is valid if all the characters have the same frequency or at most two different frequencies. Example \xe2\x80\x93 aabb is valid, aabbccdd is valid, aabbccd is also valid, but aabcddd is not valid. The question was pretty simple, but it took time for me to understand it. I wrote the code and then the interviewer asked me to run it on some test cases.

In the evening time on the same day, I got the mail that I have been selected. I was so happy and started celebrating.

Tips for Coding Round \xe2\x80\x93\xc2\xa0

- Practice Graph-based questions and their variations. Try to write print/cout statements along with your code, this helps you to debug faster.
- Try commenting on your code as well and with meaningful function names.
- Make sure to check for edge cases (very imp).

Tips for Interviews \xe2\x80\x93\xc2\xa0

- Listen to the question carefully and clarify the question first, before prompting for your solution.
- If you are stuck, discuss what you know and where you are facing issues, this helps the interviewer to provide a directed hint.
- After you discuss your approach, don\xe2\x80\x99t forget to explain the time and space complexities.
- Be confident in your answers and think out loud.

I hope this helps !!\xc2\xa0

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Microsoft Internship Interview Experience | On-Campus 2021

- Last Updated :\n09 Nov, 2021

Microsoft visited our campus in month of August 2021 for the role of Summer Intern. Branches allowed were: **CSE, IT, ECE and EE**.
At last, 18 students were extended the offers.

ONLINE ASSESSMENT: Online test comprised of two questions to be solved in a span of 90 min.\xc2\xa0

Website used: **Codility,** you should be aware that on this platform there is no message for whether your solution was correct or not. You just simply can run various test cases to be sure that the solution is correct. So, one should think of all corner cases for the problem before finally submitting it.

1. Given an array of numbers ranging from 1-6 you have to merge add K elements [in the range 1-6] in the array such that the mean of the array after adding elements become F, we need to return an array of K elements if it was not possible, we need to return an empty array.\xc2\xa0
2. Given a string of \xe2\x80\x98a\xe2\x80\x99, \xe2\x80\x98b\xe2\x80\x99, and/or \xe2\x80\x98? \xe2\x80\x99 You can replace it? with a or b. task is to replace all? such that no three consecutive a or b occur in the string. it is given that such string will always exist we needed to return the modified string.\xc2\xa0

Those who did solve both questions were shortlisted for Interviews

INTERVIEW ROUNDS: The Interview rounds were held on MS teams and for coding was done on their codility platform.

Round 1: Interviewer introduced himself as soon as I joined the meeting. Then he straightaway provided me the link to codility where question was already written.

Questions:\xc2\xa0

1. It was same question as this one with one twist that we also had to find out the area of largest island. https://leetcode.com/problems/number-of-islands/. I explained everything in detail about the solution and at the end he was quite satisfied with it.
2. What is MongoDB? (As in my resume there was projects based on this).

At the end he asked if I have any questions for him. This round lasted about 50 min.

I was shortly called for round 2 after this round.

Round 2: Interviewer introduced himself as soon as I joined the meeting. Then he asked me some casual questions such as how am I and how\xe2\x80\x99s my college life etc. Then he inquired with me that since I was from EE so, he asked whether I had been taught any of the CSE subjects or if I am prepared with the same. I replied that I have only been taught DSA in my 3rd semester. So, he finally said OK and he asked only from DSA part.

Question:

1. He named one of the projects from my resume and asked me to explain it to him. There was no cross-question from him regarding this.
2. I have been given two binary trees and I has to return whether they both are mirror images or

not. In this question, I have to create the Node class and also generate my own binary tree so as to check the code for the mirror tree.

This round lasted about 55 min.

I was shortly called for round 3 after this round.

Round 3: Interviewer introduced himself as I joined the meeting and then he explained the agenda of that interview that what we will be doing in the coming 50-60 min.

- He was going through my resume and then asked me to tell him some things about me that is not mentioned in the resume. Based on my answer he cross-questioned me.
- Then he asked me to explain any one of my projects. In this also he asked me several question such as, what where difficulties faced by me during the project, how I handed them, why this project is different, have I done anything in this project that was above and beyond the requirement, what was my contribution in the project, why only this project? etc.
- Then he asked what have I done in this past year of pandemic.
- At last, he told me that now he will be giving me a coding question. He also said that the question was just to see my thought process and approach towards the correct solution. So, he might or might not ask me to code in the end.

Question: I have been given an array of strings **S** which contains all the valid words that are in oxford dictionary. Also, I have been given a set of alphabetic characters **C**. So, I have to return a list of all strings which are only made of characters given in the set C. I have to solve it in minimal time complexity possible.

So, after this we had a lengthy discussion on this problem where I put forward my various approaches and he also provided me a hint on the midway. At last, he asked me to code my one of the approaches. Then he said to me that my interview is over I can leave.

This Round lasted for around 70 mins.

Verdict: Selected.

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Microsoft Interview Experience

- Difficulty Level :\nMedium
- Last Updated :\n27 Jan, 2022

Note: It was through **Off-Campus Microsoft Engage Program**. After the coding assessment, you will be assigned a mentor where you will have to show your work case in a period of 3 weeks. If you do not perform well during the mentorship program, you may not be called for the interviews.

Rounds: 1 round on CV selection, 1 coding round, 3 weeks mentorship program (similar to an internship), and based on your performance in the mentorship, there would be interview rounds (normal \xe2\x80\x93 3 Technical rounds). Lucky me, I got a direct interview call after the coding round. All rounds (including interviews) were conducted on the **Codility** platform.

Coding Round (90 minutes): Two questions were there ranging between medium-hard types. I solved both of them within 40 minutes

1. Problem very similar to this one: https://codeforces.com/problemset/problem/1027/F

   Concept: Use DSU or Graph.
   \xc2\xa0

2. Given N points (can be collinear) in the 2D plane. We are required to find 3 points such that the triangle formed by choosing these 3 points should not contain any other points inside the triangle.

   Concept: You have to find the 3 closest points. Consider any point as a 1st point, then find the 2nd one which is closest to it using the DISTANCE FORMULA. Now you have 2 points, find the 3rd one which is closest to both of them (using the same concept), and also keep in mind that points should not be collinear (you can easily do this by checking that the slope of points 1 and 3 should not be equal to the slope of points 2 and 3).

Technical Round 1(based on DSA \xe2\x80\x93 1 hr): The round was completed in 20 minutes only

- Find the cousins in a binary tree: https://www.geeksforgeeks.org/check-two-nodes-cousins-binary-tree/
- The concept was same: https://practice.geeksforgeeks.org/problems/minimum-platforms-1587115620/1

Technical Round 2(DSA round \xe2\x80\x93 1 hr): Took me almost 1 hour to write the full working code

- Find the next permutation: https://practice.geeksforgeeks.org/problems/next-permutation5226/1
- Find words in the matrix (for harder version, use Trie):
  Word Search 1: https://practice.geeksforgeeks.org/problems/word-search/1 \xc2\xa0(or https://leetcode.com/problems/word-search/)
  Word Search 2: https://leetcode.com/problems/word-search-ii/

Technical Round 3(Project and DSA round \xe2\x80\x93 1 hr): 40 \xe2\x80\x93 45 minutes for the project and rest for the coding problem

- Detailed discussion on any one of the projects: Stacks and techs used, why you made this app,

the problem faced, how did you manage to make your app efficient, database structure and schemas, functional and non-functional requirements, security, scalability, etc.
- https://binarysearch.com/problems/Prefix-with-Equivalent-Frequencies.

Note: Even if you are not able to write the complete and working code, show your approach. They tell you to write the code to see if you are able to write what you think.

Be positive and aloud during interviews. Don\xe2\x80\x99t be nervous and in rush to answer the question. Take your time. Interviewers will help you whenever you will get stuck. Believe in yourself and always in God.

Thanks to GfG, Leetcode, CodeChef, CodeForces, etc.

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Microsoft Interview Experience for Internship (Via Engage)

- Difficulty Level :\nHard
- Last Updated :\n01 Nov, 2021

Last year as Covid-19 hit India, Microsoft launched Engage mentorship Program to hire interns. We had received a mail via our HR regarding the program. The selection criterions given were-

1. Year of Graduation -2022
2. CGPA >= 7
3. No backlogs
4. Pursuing B.Tech/M.Tech/MS in CS/Circuit branches

It was a mentorship program for those at end of 4th Semester of their Bachelor\xe2\x80\x99s or 1st semester of Masters.\xc2\xa0

MS Engage

Selection Process: For the first round, you had to fill up a form(this year you had to apply in the MS career portal), If you fulfill the criterions, you will receive a link for a selection test.

The selection Test consisted of **10 MCQ questions to be solved in 30 minutes.**

There are multiple question sets and scores are normalized accordingly. The topic for the questions were-

- Basic DSA \xe2\x80\x93 Stack, Queue, Graph(mainly traversal algorithms), Sorting, Binary Search
- Some theoretical questions on AI

There is no negative marking. My tips for this test would be-

- Solve all the questions positively, do not leave out any.
- Try to submit early(before the midpoint mark if possible), as per my observation, they use time as a tie breaker since a lot of people score nearly full.

Mentorship: The selection mail was sent within a week or so. After that there was an introductory session following which the selected people were divided into groups of around 12 people, they try to group based on college. Each of such groups was assigned a mentor, who is a software developer working at Microsoft.\xc2\xa0

We were given two sample projects-

1. Tic-Tac-Toe \xe2\x80\x93 Sample repo(https://github.com/alialaa/js-tic-tac-toe)
2. Path Finding Algorithm Visualizer \xe2\x80\x93 Sample Repo(https://github.com/qiao/PathFinding.js)

Our objective was to choose one of the projects and innovate it based on a new technical stack, AI, ML or so to make it more user-friendly, accessible, and professional. I had taken up the 2nd Project with one of my college friend who was in the same group.

We could either work solo or form a team with maximum 4 members within the selected group for this purpose.\xc2\xa0

The mentor held two types of weekly sessions to interact with us

1. Group Discussion
2. 1:1

One type of discussion was held every week and changed alternatingly.\xc2\xa0

The GD was mainly focused on discussion about the project and progress, issues that a person might have faced, whereas the 1:1 session was closer to that of an interview. In 1:1 session, some of the questions that I was asked were-

1. Questions on the Project Plan.
2. Detailed discussion on Dijkstra\xe2\x80\x99s Algorithm.
3. Detailed discussion on implementation, technicalities of the project.
4. Definition of Tree and binary tree. Can a single node form a binary tree?
5. What is balanced binary tree? Why is it required?
6. Given some numbers, construct a balanced binary tree, and show how it would differ from non-balanced option.
7. Do you know any balanced BSTs? Explain insertion process in AVL Trees.
8. Prove that in balanced BST, the search operation has O(logn) time complexity.
9. How does binary search work? Explain its Time Complexity.
10. What is heap? Explain the algorithm for minheapify along with time complexity. Can you prove it?

Along with the mentor interactions and project, weekly sessions were held on different topics like git, AI, cracking interviews, culture at Microsoft and so on. One weekly assignment was given. Some of them were-

1. Propose a method or discuss regarding how racial and other biases can be removed from AI systems.
2. There are n coins in a line, heads and tails in random order. On each move, one can turn over any number of coins laying in succession. Design an algorithm to turn all the coins heads up in minimum number of moves. How many moves are required in worst case?
3. A Timed MCQ Test on Git.

The selection for the Internship next summer was based on 3 criterions-

1. **Mentor Feedback \xe2\x80\x93 High Priority**
2. **Project**
3. **Assignments**

Based on these 3 criterions, you might receive a direct internship offer or one might be required to go through more rounds of interviews. In my case, I had to appear for another round of interview taken by a principal engineering manager, the same level as the manager that you will be interning with.

Final Interview: I received a mail concerning the interview about a month after the engage. It was held for 30 minutes on MS Teams. The questions that were asked-

1. Tell me about yourself.
2. What was your project in Engage? What did you learn from it?
3. Then we discussed about my other projects and my role, technicalities in it, algorithms used.
4. What is your area of interest? I had answered IoT then he went on to ask questions like-
5. In what range is the data transferred over IoT devices? How can you proceed to hack a IoT device. How would you secure it if a vulnerability is found?
6. In a supermarket, there is an annual list of sales receipts, which contains Id, Amount, Price and

other details. They have hired you to improvise their overall sales. design a system for that purpose.
7. Given two unsorted arrays and a value X, Find all pairs which sum up to X. One from first array, other from second in each pair.

For the last one I was asked to write code and run in local IDE, then we discussed different possible approaches, corner cases etc. and the time was up by then.

About a week later they sent a list of 10 students selected for internship and I was one of them.

Tips

- For the mentorship project, form a proper plan and put strict deadlines to each of the smaller targets.
- Keep your mentor updated about the targets. Don\xe2\x80\x99t be late for meetings.
- Keep the basics of DSA clear. Practice problems on Strings, Arrays, DP and stack, queue, recursion on Leetcode.
- For Intro, keep projects and some experience in hand. Have detailed idea about your projects.
- Don\xe2\x80\x99t rely too much on sessions as you would be mostly required to do self-study.

Wishing you good luck!

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Microsoft Interview Experience for Associate Consultant

- Difficulty Level :\nMedium
- Last Updated :\n29 Sep, 2021

Due to the Covid Pandemic, this year the entire process was conducted Online. The eligibility criteria this year was as below:

1. **Department \xe2\x80\x93 CS/IT**
2. **Undergraduate CGPA \xe2\x80\x93 8**
3. **Class XII \xe2\x80\x93 8 CGPA or equivalent percentage (71-80)**
4. **Class X \xe2\x80\x93 8 CGPA or equivalent percentage (71-80)**

So until last year, Microsoft\xe2\x80\x99s recruitment process included an Online Aptitude Test as Round 1, however, this year there was a slight change in the process and the rounds. The process included:

- Resume Screening
- Technical Interview
- HM Round Interview
- AA Round Interview

Resume Screening: In this round basically the resume of the applicants is reviewed and accordingly the shortlisting happens.\xc2\xa0

- A strong resume includes a good amount of Internship experience, at least one Volunteer Experience and Additional Certifications are a must. Make sure that your resume highlights your Experiences, Projects, and skills properly.\xc2\xa0
- Another thing to remember is, DO NOT add any internship experience or project that you lack clarity about or did not contribute much in because in the further rounds you will be tested over your resume wherein you need to have detailed knowledge about everything you mention in the Resume. In our college out of the 43 eligible applicants, 10 were selected after this round.
- Next up, we had our Interview Rounds. One thing I have learnt from these rounds is that Microsoft Interview process is one of the most fun process to be a part of and the amount of learning is extremely high. They do not focus on how good you are at a particular domain or subject but on how well your basic knowledge about everything you have studied or explored is. \xc2\xa0

Technical Interview(Time \xe2\x80\x93 1 hour): \xc2\xa0 So all the shortlisted candidates for the Interview process were asked to attend a Pre-Placement Talk and an Ask me Anything session with the previous Campus Hires.\xc2\xa0

- Get all your doubts cleared in these two sessions especially in the Ask me Anything session. We were informed in the PPT that our basic knowledge about every subject we have studied so far will be tested.\xc2\xa0
- My technical interview went on for 55 mins and it started off with a brief introduction to my profile and further, I was asked to tell about my Internships. The questions I was asked were based on concepts of DBMS, DSA, Big Data, AI, Cloud Computing, Web Development, DevOps, SDLC, Testing and OOP (Each and every concept of OOP was asked, study the subject thoroughly).\xc2\xa0
- We were also asked to code but they were basic ones and the focus was on whether we could explain the logic and perform addition to the code if asked. It would be a bonus point if you know about Azure and its services.\xc2\xa0

- Questions about the projects done will also be asked and whether optimizations in some areas of the project can be done. In some cases, Puzzles are asked as well.
- While you answer the questions in this round, make sure you give appropriate examples and in case you haven\xe2\x80\x99t implemented the concept but only know about it, be honest. 4 candidates qualified in this round for the HM round.

HM Round(Time \xe2\x80\x93 1 hour): The HM round at Microsoft is a mix of Technical, Resume Based, Situation-Based Behavioural questions, Guesstimates and Puzzles.\xc2\xa0

- This interview is generally taken by a Manager and one\xe2\x80\x99s Analytical skills, Ability to handle pressure and respond are tested. The interview started with a discussion on my profile and I was asked about a few of my projects and Internships in detail (You must know the implementation really well, even your teammates\xe2\x80\x99 parts).\xc2\xa0
- The technical questions asked were based on AI, Cloud Computing, and DBMS. A tip to handle this interview well is, follow the STAR (Situation, Task, Action, Result) method to answer the questions. Be updated with the latest advancements of Microsoft and read thoroughly about Microsoft products and services. In case of situation-based questions, think and answer and cite your previous experiences if any.\xc2\xa0

All the 4 candidates who appeared for the HM round, qualified for the next round.

AA Round(Time \xe2\x80\x93 30 mins): The AA (As-Appropriate) round is the final round of the process and it mainly focuses on testing if you are a Cultural fit.\xc2\xa0

- This round like every other round covers Technical questions as well but the main focus is on understanding your values and approach. So read the Microsoft Corporate Values and goals properly.\xc2\xa0
- You might get asked about the Microsoft products you have used and what you found unique about it. This interview is shorter than the first two but is the most crucial out of all and it is taken by a very experienced interviewer. Be calm and respond with honesty.\xc2\xa0

After this round, 2 candidates got selected and fortunately, I was one of them. Overall the interviews are really exhilarating and one very important thing to remember is, do not makeup stuff and answer. Be honest and admit it if you do not have an idea about the question asked.\xc2\xa0

Hope this helps and All the Best!

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Microsoft Internship Interview Experience | On-Campus 2021

- Difficulty Level :\nMedium
- Last Updated :\n04 Oct, 2021

Microsoft visited our campus in month of July 2021 for the role of Summer Intern

ONLINE ASSESSMENT:

1. Given an array of numbers ranging from 1-6 you have to merge add K elements[in the range 1-6] in the array such that the mean of the array after adding elements become F, we need to return an array of K elements if it was not possible we need to return an empty array.\xc2\xa0

```
example\n1.a)input->arr=[1,2,3,4] k=2 f=3.0\noutput->[1,2,3,4,5,3] \n//since the mean of the new array is 3\n1.b)input-
```

2. Given a string of a,b, and/or? You can replace it? with a or b. task is to replace all? such that no three consecutive a or b occurs in the string. it is given that such string will always exist we needed to return the modified string.\xc2\xa0

```
example\n2.a) input->b?aa?\noutput->bbaab
```

The test was conducted on their platform cordiality, unlike other OA you can submit your code only once ie once submitted you can not edit your code

Those who did solve both questions were shortlisted for Interviews

INTERVIEW ROUNDS: The Interview rounds were held on MS teams and for coding was done on their codility platform similar to codepair hackerrank.

ROUND 1: We exchanged greetings then the interviewer asked me the challenges that we were facing in online mode.

Then she gave me a question:

- Given a string, we need to find whether the string satisfies the following condition:
- for each character at ith positon(where 0<=i<n) there should not be same character in the window i/2 to the left and i/2 to right
- expected time complexity-O(n), space complexity-O(1)
- After trying out brute force, then binary search methods
- I asked for the hint, with help of hint I was able to do it code it using hashmap
- This Round lasted for around 40 mins

I was shortly called for round 2 after this round.

ROUND 2: We exchanged greetings and the interviewer asked for my introduction.

He then gave a question.

1. Given an array of n numbers ranging from 1-255, I needed to design a class to compress it to reduce the size of array and decompress to get back original array. Unlike the previous round expected time and space complexity was not specified. (Soln: 1 declared an array of unsigned int (32 bits)of size n/4 and each number can be can store 4 numbers since in the original array max number of bits are 8(255=11111111 in binary)

The interviewer seemed satisfied with my approach and asked me to code it out.

After that we had a discussion on some follow-up questions given below

1. What will change if number would range from 0-255 instead of 1-255 .
2. Where this algorithm can be applied.

This Round lasted for around 1 hour 20 mins.

I was shortly called for round 3.

ROUND 3: It was HR cum coding round. It was taken by a very senior person,

Coding Questions

1. Kadane\xe2\x80\x99s Algorithm.
2. Given an array, print unique elements in decreasing order of their frequency.

HR Questions:

1. Why did you take CSE?
2. Why did you choose this college?
3. Your strengths and weaknesses.
4. Name any recent techstack which had impressed me a lot.
5. Future Goals
6. Why Microsoft?
7. Elaborate one team project experience. What were the challenges you faced and how did you overcome it?
8. Name any product/techstack which you think had most important impact in the pandemic.

This Round lasted for around 50 mins.

Verdict: Selected.

NOTE/TIPS:

1. All interviewers were very experienced and friendly. They gave helpful hints whenever I was going in wrong direction. So whenever you are stuck make sure to ask for hints.
2. Microsoft focuses more on basics but in all three interviews and OA the emphasis was made that code should be correct with minimum number of corrections.
3. In all three interviews, I was expected to think all edge cases where my code may fail.
4. At the end of every round make sure you ask something about profile from interview when they ask \xe2\x80\x9cdo you have any questions for me? \xe2\x80\x9d.
5. While writing code be sure to be interactive and discussing each and every line that you are writing with the interviewer.

6. At last but not least, be confident and believe in yourself.

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Microsoft Interview Experience for Support Engineer

- Difficulty Level :\nMedium
- Last Updated :\n27 Sep, 2021

Round 1: GD Round

For this round students were shortlisted based on their college CGPA and their CV. Around 100 students were shortlisted for this round. This round was a GD round. Here we were given a topic and then we were given 10 mins to search about the topic and then we had to speak for 3 minutes about it.

Note: Search about the topics well in the given 10 mins, just note down basic points about it and speak confidently.

Round 2: Technical Round

- In this round, around 45 students were selected. In this round, I was asked questions on OOPS (like with real-life examples explain the basics of OOPS), networking, DBMS, and also general questions on a CV like projects, internship, etc. Also, some general questions about my background were asked and two puzzles were asked (water jug problem and 3 bulbs 3 switch puzzle).

Note: The interviewer was very cool and helped me whenever I was stuck.

Round 3: Managerial Round

- General HR questions were asked along with some situation-based questions. Also, some questions were asked on the CV (projects, internship, achievements), etc.
- Note: Do a general analysis of the latest Microsoft works and products and prepare some general HR questions.

Round 4: HR Round

- General questions were asked like why Microsoft, relocation, why support engineer role, etc, and some personal questions like family background, hobbies, etc. In the end, 10 students were selected for this role.
- I would like to say to all the students to prepare, believe in their hard work, and remember hard work always pays off. Enjoy this placement process as you will always remember the ups and downs of this period. Don\xe2\x80\x99t take too much stress, God will always lead you to your desired destination. And remember to take breaks and take care of your health during this time too.

Hope everyone gets into their desired company. Cheers !!!!

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Microsoft Interview Experience for Associate Consultant (ACON) | On-Campus 2022

- Last Updated :\n26 Sep, 2021

The eligibility criteria for this role was as follows:

- CGPA or % in X and XII \xe2\x80\x93 60% or 6.0 CGPA
- CGPA or % in Pursuing Degree \xe2\x80\x93 80% or 8.0 CGPA
- No Standing Arrears
- In my college all CSE and ECE branch students were eligible

12 students were shortlisted for the Selection process.

There were 3 interview rounds \xe2\x80\x93

- **Technical Interview**
- **HM Round**
- **AA Round**

Round 1(Technical Round): The first round of the selection process was the Tech Round.

- The interviewer asked questions based on the projects I have done and basic OOPs, Java, DBMS, OS questions, etc. He asked two puzzles out of which one was very easy and the other one was a little tricky.
- We had a discussion about the latest trends in technology and since my project was done using Deep Learning the interviewer asked me how that concept can be used to help in the pandemic situation.
- I was asked about some technologies which were used during pandemic and what projects/ideas can I think of to help people in this COVID -19 situation.
- I had mentioned about SQL and competitive programming hence the interviewer asked me 2 java coding questions.
- The first question involved string manipulation and arrays which was easy. The second question was little lengthy . I had to perform different operations on a BST *(https://www.geeksforgeeks.org/must-do-coding-questions-for-companies-like-amazon-microsoft-adobe/#trees)* . Here the interviewer wanted the most optimized solution and was asking me the time and space complexity in the end of the code and wanted to know how to improvise the solution.
- Then the interviewer gave me 2 -3 tables and I had to write SQL queries for the different outputs which the interviewer wanted and then similarly the interviewer gave me different queries and I had to guess the output which will be produced and rectify the query to produce a particular output . Some theory questions based on Sql were asked. This interview lasted for about an hour , the interviewer was very helpful and had helped me when I was stuck .

Out of the 12 people who were shortlisted, 7 qualified for the HM Round.

Round 2(HM Round): The second interview round was the Hiring Manager round and was purely resume-oriented.

- The interviewer asked me to explain all the projects which I had mentioned in my resume in detail.
- Then a few questions related to those projects were asked.

- Then we had a discussion about the internships which I have done and some HR questions based on the team projects done. The interviewer asked me few Cloud Computing questions and some very basic Azure questions.
- I was also asked if I had worked with any Microsoft products (Azure or .Net). And some basic AI and ML questions were asked because it was mentioned in my resume. In the end, the interviewer asked me 4-5 management questions(similar to HR round).

This interview lasted for around 45 to 50 mins and later 5 people qualified for the final round.

Round 3(AA \xe2\x80\x93 \xe2\x80\x9cAs Appropriate \xe2\x80\x9d Round): The final round was the AA, it\xe2\x80\x99s like the HR round where the interviewer already had a clear idea about my previous rounds and hence it started with a discussion about my projects and internships.

- Then the interviewer asked me those questions which I couldn\xe2\x80\x99t answer properly in first-round ie. technical round 1, it was to test if I read those topics again (recent trends).
- The interviewer then asked me typical HR questions, why Microsoft? , where do you see yourself in 5 years, etc., and some technical questions (OOPs, OS, DBMS).
- Then in the end situation based question to see how I would react in certain situations and how I would work in a team.

2 people were selected for the Role as Full Time Employees and I was one of the two.

Tips:

- Read about Azure, .Net, cloud computing, and whatever is mentioned in the job description of the role.
- Don\xe2\x80\x99t lie in the resume and during the interview process.
- Basic OOPs, OS, Network and Communications, DBMS questions will be definitely asked.
- Always be honest and for the HR questions you need to convince the interviewer that you can not only work as a team leader but also under someone and in case there is a situation that cannot be handled or you have less time to complete a task the first thing which you have to do is inform your boss /colleague (ie. be transparent).

Don\xe2\x80\x99t get nervous and be confident, All the best!!

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Microsoft Interview Experience for SDE-2

- Difficulty Level :\nBasic
- Last Updated :\n21 Sep, 2021

Online Coding test

- One problem with a bug, I need to find the bug and solve the problem
- Problem on overlapping intervals.

Round 1:

- Given 4 arrays, find the total number of different tuples whose sum = 0
- Print all the paths from the root to leaf for the given binary tree

Round 2:

- Given a sorted array that is shifted right by K places. Find the minimum element in the array.
- Design a Logger (LLD)

Round 3:

- Design Cric info website (HLD & LLD)

Round 4:

- A tricky trie question
- About my project and challenges faced

Verdict: Selected

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Microsoft Interview Experience for Software Engineer Internship | On-Campus 2021

- Difficulty Level :\nHard
- Last Updated :\n02 Sep, 2021

A Short Overview: Microsoft came to our campus to select candidates for Summer Internship in August 2021. Out of the 200+ candidates (from CSE + ECE + EEE + ENI) who applied for the position of SWE Intern, only 13 students were selected finally. The entire process was virtual and was conducted in 4 (1 coding round + 3 interview rounds) rounds.

Coding Round: It was conducted on the Codility Platform and consisted of 2 problems supposed to be solved in 90 minutes. The description of problems is as follows:

1. This problem was an easy variant of the standard merge intervals problem. This was doable in 15-20 minutes.
2. This problem was an interesting one and the most optimal solution was not so easy to figure out. A 2D binary array(an array of 0s and 1s) of size N*M is given. And the distance between any two cells is taken as their manhattan distance(Manhattan distance between two points (x1, y1) and (x2, y2) is |x1 \xe2\x80\x93 x2| + |y1 \xe2\x80\x93 y2|). \xc2\xa0Also, you are given an integer \xe2\x80\x98K\xe2\x80\x99. We were supposed to find the total number of cells with value 0 such that the distance of every cell with value 1 is not more than k units from it. Constraints: 2 <= N,M <= 400; 1 <= K <=800; There is atleast one cell with value 1. I actually came up with a not-so-intuitive O(n*m) solution. It took me almost the whole of the remaining 70 minutes to code up my solution and submit it, more because your code runs just on sample cases and you never know the correctness of hidden cases until you are fully confident in your solution.

In the end, I along with 25 other candidates was selected for interview rounds.

Total Interview Rounds : 3

Platform: Microsoft Teams, Codility

Round 1: This round went on for nearly 60 minutes for me. The interviewer was very friendly and firstly asked me to introduce myself. After that, we dwelled directly on coding questions. He shared a codility link with me and I was supposed to use it to code it up. I was asked one DSA question and one puzzle.

- The DSA question was to find the second largest element of the BST. I coded it up well in time by discussing some edge cases and approaches first. Then, he generalized the question to the kth largest element of the BST. It took a hint from the interviewer for me to finally come up with the most optimal approach, but he was very satisfied with the overall solution. This took around 35-40 minutes.
- Then he asked me a puzzle which was to come up with an optimal strategy to win the game irrespective of opponents\xe2\x80\x99 moves. The description of the game is as follows: You are supposed to select a starting number \xe2\x80\x98x\xe2\x80\x99 between [1,9]. Then you and your opponent take chances turn-by-turn. If a player chose the number \xe2\x80\x98n\xe2\x80\x99 in the last turn then the other player can choose any number between [n+1, n+10]. The game goes on till one of the players reaches number 75. Select \xe2\x80\x98x\xe2\x80\x99 in such a way that you win every time. I came up with a faulty approach at first but then after rigorous thinking, I came up with a solution, and luckily it was the

correct one. (P.S.: The answer is \xe2\x80\x93 x should be 9. Figure out the reasoning :p) This took me around 15-20 minutes and finally, the interview was wrapped up with a question for the interviewer.

Round 2:\xc2\xa0 This round started within 5 minutes of the completion of my first round and was supposed to be 30 minutes long. And, it was the easiest of all three rounds. The interviewer started formally by asking me to introduce myself and then went straight to the DSA question.\xc2\xa0

- The question was pretty standard. It was a variant of checking valid parenthesis. I coded it up and explained my approach to the interviewer within 15-20 minutes and that marks the end of my second round.

Round 3: Final Round

- This round too started within 5 minutes of the completion of my second round (and by this time I was kinda feeling tired speaking for more than 90 minutes straight). This was the round I enjoyed the most and went on for almost an hour. The interviewer was very friendly and started by asking me to introduce myself and how my day went till then along with few other questions from my resume. He then asked me to share details about my previous internship experience. He then asked about my previous rounds and my detailed approach in the same. Then asked about my favorite code editor (which obviously is VSC <3) and asked me to open it up and present the screen. Then he shared a DSA question which was a standard variant of boundary traversal of BST (My question was to print the traversal in a clockwise fashion rather than an anticlockwise one). We then went on the discuss various approaches, corner cases, and methods of implementing the most optimal approach (in single traversal, rather than three separate traversals). Evidently, I was asked to code up one special case and that marks the end of the problem-solving part of the interview. He was pretty impressed with my approach, code, and communication and shared positive feedback on the same. Then we talked a bit about the process of project and campus allocation after getting an internship offer. And finally wrapped up the round.
- In the evening, I got to hear good news from our Placement Unit and I along with 12 other candidates was offered an internship offer from Microsoft India.

Tips for interviews:

- Read a lot and a lot of interview experiences a day before the interview (irrespective of the company being Microsoft or not).
- Stay calm and composed during the interview. The person interviewing you is there to select you and not reject you!
- Always keep communicating your thought process and approach, because that\xe2\x80\x99s what the interviewer is looking for.
- Always ask about the results on cases that you are unsure of, and once you come up with a solution dry run it on a test case before actually coding it up.
- Try to write well-commented and readable code.

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Microsoft Interview Experience Internship | On-Campus

- Last Updated :\n26 Aug, 2021

Process: Online Test followed by 2 Rounds of interviews

Online Test: Platform Codility

2 coding problems in 90 minutes (1 Easy + 1 Medium)

Shortlisting criteria: Students who solved 2 problems completely, and had CGPA 9+(for boys) and 8+(for girls) were called for interviews. The cutoff for CGPA depends on the students in the college.

Platform for interviews- MS teams + Codility

Round: 1 Interview Technical

Time\xe2\x80\x93 45 minutes

1. Firstly, the interviewer asked the approaches of both the problems in the online test
2. Next, he gave a coding Problem: https://leetcode.com/problems/restore-ip-addresses/
3. Next to the coding problem-

Given an array with elements that can be positive, negative, or zero. Find the maximum subset-sum of elements that you can make from the given array such that for every two consecutive elements in the array, at least one of the elements is present in our subset.

Solution :\xc2\xa0

> Take dp[i][0]=maximum subset sum that can be made till ith index, such that I don\xe2\x80\x99t take the ith element
>
> \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 dp[i][1]=maximum subset sum that can be made till ith index, such that I take the ith element
>
> Recurrence- dp[i][0]=dp[i-1][1]
>
> \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 dp[i][1]=max(dp[i-1][0],dp[i-1][1])+A[i]
>
> Final answer= max(dp[n][0],dp[n][1])

Proof of why greedy fails, and why you are applying DP, has to be provided.

Suggestion:\xc2\xa0

- Make clarifications regarding all corner cases, or conditions, well in advance.
- Focus on writing clean, and correct code, as the interviewer asks to run the code for various test-cases on the Codility platform.
- Was asked to shorten the code, so that it looks much cleaner.
- Your way and structured style of programming are judged.
- The interviewer told me at the beginning of the interview only that I needed to solve atleast 2 problems in the given time to be eligible for selection, and doing more problems would be a bonus. So make use of the time wisely!

Round 2: Interview [Technical+ HR]

- The interview was taken by a senior Principal Group Eng Manager at Microsoft.
- Introduction followed by a discussion about the most challenging project/work you have done.
- The discussion about the project went for about 15 minutes.
- Next, he asked about a coding problem, and I was asked to code it to the Codility platform.

Problem:\xc2\xa0 Given a binary tree, find the number of same-value subtrees in the given binary tree. A same-value subtree is a subtree in which all nodes have the same value.

- Next, he asked about Threads and Processes, and semaphores in Operating Systems.
- The interview ended with some basic questions about myself, which one has to answer confidently.

Suggestion :

- Try to make eye contact and interact well with the interviewer. He has come to hire you and not to reject you.
- Even if you don\xe2\x80\x99t know something, an honest try, with confidence is what the interviewer wants.
- Your attitude and confidence while handling questions are what matters the most.

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Microsoft Interview Experience for FTE

- Difficulty Level :\nHard
- Last Updated :\n24 Aug, 2021

Coding Round(60-65 mins): 2 Questions

1. Given an array, select the largest subset such that an operation for all elements is non-zero.
2. Given a string and a cost array associated with each index of the string. Remove elements from the string such that no two adjacent characters are the same and find the min-cost for building that string.

40 people were shortlisted after the coding round for interviews.

All the interview rounds were on Microsoft Teams

Interview Round 1(Medium): The interviewer was helpful. First, he introduced himself and told me about his work at Microsoft, and then I was told to introduce myself.

Then he started with a simple ques:

1. Given an array of n integers, all numbers are unique exception one of them.
   - The repeating number repeats n/2 times if n is even
   - The repeating number repeats (n-1)/2 or (n+1)/2 times if n is odd
   - The repeating number is not adjacent to itself in the array

   Write a program to find the repeating number without using extra space

   I solved the problem in O(n). Then he asked me to solve it in O(1) I did the same and he was happy with the solution.

2. Transport the materials

   Some materials need to be transported from place A to place B. For transporting the materials, two trucks have been provided. Assume that each truck has enough capacity to carry all the materials in one go from place A to B. Unfortunately, some materials have restrictions on being stacked with the other materials in the same truck. The materials which cannot go together are provided as pairs.

   Write a program to find out whether all materials can be sent using the two trucks in one go.

   Also, if it is feasible to send in one go, list the materials that are being sent in each truck.

   Please note that there are only 2 trucks.

   Reading the ques, I just told him that I am feeling graph implementation with materials as nodes and restriction pairs as edges.

   Then we just need to check if the graph is bipartite or not.

   He asked me the complexity and I told since we will be using DFS time complexity will be O(n+m), n are nodes and m are edges

The interviewer was happy because I gave the solution just after 1-2 mins of reading the question.

Interview Round 2(Medium): After my introduction, he started with questions

1. First, he asked me about virtual memory and its advantages.

   I answered it correctly and then he further asked with an example of how we can run a 1.5GB game on a device with 1GB RAM.

   The answer was \xe2\x80\x9cyes\xe2\x80\x9d and the reason is virtual memory advantage but lagging

might occur because of the page faults.

Then he asked me a coding ques.

2. Level order traversal of a binary tree but in inverse form i.e from the last level to first.

   `Eg:\r\n  1\r\n  2  3\r\n 4  5 6  7\r\n\r\nOutput:\r\n4 5 6 7\r\n2 3\r\n1`

   He wanted me to use a data structure for the same. We can run BFS using Queue and for storing the nodes in the inverse form we can use stack

3. The last ques for this round was the string interleaving problem (standard DP ques). I was told to write the DP relation and the tabular approach.

   I explained to him properly and he was happy with the final solution.

Interview Round 3(Medium): This round/final round was easy but the interviewer was strict. The interviewer was helpful but he wanted me to write the code efficiently without redundancies and in a proper format. First, he asked me about how was my day and how has the learning remotely going on.

Coding Ques:

1. Find the least common ancestor of 2 nodes in a BST.

   Simple question but there were many conditions we need to clarify with the interviewer.

   Like what if both nodes are the same? in this case, return the parent of that node

   what if both nodes are the same but the node is the root? return NULL for this case

   what if one node is the parent of another? return parent of the node who was the parent of other

   With proper discussion, I was able to code it properly.

Final Verdict: Selected

Tips: Be confident and ask questions to the interviewer when asked.

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Microsoft Interview Experience for Internship | On-Campus

- Difficulty Level :\nExpert
- Last Updated :\n18 Aug, 2021

A Short Overview: Microsoft came to our campus to select candidates for Summer Intern in July 2021. Out of the 244 candidates (from CSE + ECE + EE) who applied for the position of SWE Intern, only 18 students were selected finally. The entire process was virtual and was conducted in 1+3 (1\xe2\x86\x92 coding round + 3 \xe2\x86\x92interview rounds) rounds.

Coding Rond(Total -1): The coding round was conducted on the Codility Platform and consisted of 2 questions and had to be solved in 90 minutes. There were 2 Questions and both of them were of very standard topics like array and string. You can find those questions here:-\xc2\xa0

1. 1st question link (based on the array): https://stackoverflow.com/questions/63132225/maximum-distance-two-frogs-can-create-by-starting-at-any-index-in-a-list-in-on
2. 2nd question link (based on string): https://www.geeksforgeeks.org/generate-a-string-consisting-of-characters-a-and-b-that-satisfy-the-given-conditions/

Interview/Technical Rounds(Total \xe2\x80\x93 3):

Round 1: This round went on for nearly 80 minutes for me. The interviewer was very friendly and helpful and he first asked me to introduce myself. Then he asked me the topics that I like most in coding. After all this, he started with a basic 1st question based on the array(below is the link)

- https://www.geeksforgeeks.org/find-maximum-minimum-sum-subarray-size-k/. He also asked me to suggest some test cases and write the code for the same and then asked me to dry run a test case.
- https://massivealgorithms.blogspot.com/2016/06/leetcode-364-nested-list-weight-sum-ii.html2nd Question was based on Queue(below is the link):\xc2\xa0
- After that he slightly made changes in the 2nd question he told instead of nested lists, he will provide me with a graph of the same.
- I discussed my approach and some edge cases and wrote the code. He was quite happy with my approach (dfs). After all the coding stuff he asked me do you have any questions and after that, the interview ended.

Round 2(Coding + OOPs Concept):\xe2\x80\x93 After the long wait I was called for my 2nd round on Day-2. This round went on for nearly 45 minutes for me. The interviewer was very friendly and helpful and he first asked me to introduce myself and he also asked about my academics(Courses, CGPA).\xc2\xa0

After all this, he asked me: What is a static variable, and where it is stored in my memory (based on the OOPs concept)?

Coding Part:-\xc2\xa0

1. He first asked me two write the frequency of each element in the array (link is below). https://www.geeksforgeeks.org/counting-frequencies-of-array-elements/
2. He asked one question based on bit manipulation based on the AND(&) operator(I don\xe2\x80\x99t exactly remember the question ^_^).
3. The 3rd question was based on the Z-algorithm (link is below)\xe2\x86\x92 https://www.geeksforgeeks.org/remove-all-occurrences-of-a-word-from-a-given-string-using-z-

algorithm/

After all this stuff the interview ended.

Round 3(HR): This round went about for nearly 30 minutes. He asked many HR related questions like:-\xc2\xa0

1. Introduce yourself\xc2\xa0
2. Your Goal\xc2\xa0
3. Your inspiration\xc2\xa0
4. My projects\xc2\xa0
5. Why do you want to join Microsoft
6. Future plans
7. How were my previous rounds
8. My hobbies, skills etc.

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Microsoft Interview Experience for Software Engineering Intern 2022

- Last Updated :\n07 Oct, 2021

Hey there! I recently went through the internship process at Microsoft for the SDE Intern role. Through this blog, I would like to share my experience of the entire interview process. This was an on-campus opportunity, for which I applied through the Microsoft Careers portal for the respective job post(https://careers.microsoft.com/us/en/job/1081612/Software-Engineering-Intern).

Getting rejected from Oracle after an almost perfect interview was definitely a devastating experience. Oracle interview was important for me, as I spent quite some time preparing for it. The first rejection is always difficult to cope with. As the internship/placement season progresses, we eventually get used to it. But the first rejection destroys mental harmony, especially when you expect a positive result. The icing on the cake was the Microsoft shortlist, which was released on the same day. My name was not there. It was heartbreaking. I did well in the Microsoft test and completed both the questions in under 15 mins. Well, it turned out the questions were too easy, and almost everyone else had completed the test fairly quickly.

I am a part of the Placement Committee Core team. To distract my mind from overthinking, I took the morning duty for the Microsoft Intern interview process.

I woke up the next morning to attend to my duty. My friend Dev informed me that a new list had been mailed to us by the placement committee for Microsoft Intern, and luckily my name was there. I had zero expectations from this interview, as I still couldn\xe2\x80\x99t digest that Oracle has rejected me. Well, this attitude actually helped me calm myself down. Today, I was not at all afraid of rejection. I felt like I had rare chances of making it through. Still, I promised myself to give it my best shot.

Round 1(Technical Interview): My first interview started on time. As this was an online interview, I had to join a Microsoft Teams meeting link.\xc2\xa0

- The interviewer asked me to introduce myself. The interviewer made sure I\xe2\x80\x99m sure comfortable by asking a couple of rapport-building questions. I had already gone through multiple interviews the previous day, so I was quite comfortable. After this, the interviewer asked me a coding question.
- Question 1: Convert a given number to words (Range 999 crores)
- The question was pretty straightforward. I\xe2\x80\x99ve never done this problem before, but it looked fairly simple to me. I gave a quick approach to solve this problem. I was quite confident about my approach, and I saw a ray of hope actually to make it through.
- Tip: Well, no matter how simple the question is, never get overconfident. Please spend some time thinking about how you\xe2\x80\x99ll implement it before actually starting to code the solution.
- Well, this question looks quite simple. But unfortunately, it turns out the implementation is not so straightforward. You have to take care of a lot of special cases. I got overconfident and didn\xe2\x80\x99t think about the special cases. Because I hadn\xe2\x80\x99t given enough time to think about the implementation, I was having a hard time coding it on the fly. However, I completed my code fairly quickly.
- Now came the time to run the code. It was giving some wrong output. I knew I was close, but I was really embarrassed that I cannot solve this simple question. A lot of thoughts came up to my mind, and I panicked. Here, I would really appreciate the efforts of my interviewer. He was convinced that my approach and code were correct and actually started helping me debug the

code. After spending some time, he pointed out that I had missed \xe2\x80\x9cseventeen\xe2\x80\x9d in one of the arrays of strings, which was being used to output the final answer. Thus, it was giving unexpected output. It was a silly mistake but difficult to debug in the environment with a million thoughts running through my mind.
- My code finally ran perfectly. The interviewer told me that I had crossed the time limits by 10 mins. I apologized for it. He appreciated my efforts. When I asked for feedback, he said that think about the implementation before actually starting to code. It would save a lot of time. I realized my mistake and thanked him for his feedback before leaving.

Round 2(Technical Interview): I was not at all expecting a call for the second round. However, it turned out that they were calling everyone for the second round. I was probably watching some chess stream when I got a call for 2nd round. It was a perfect chance to cover up my mistakes from Round 1. I felt like I\xe2\x80\x99ve got a 2nd chance.

- The 2nd interview was quite delayed. The gap between two successive interviews is filled with a lot of emotions. It\xe2\x80\x99s easy to lose focus during this time.
- Tip: In the gap between two successive interviews, take some time off. Do something that you like, and try to take your mind off the interviews.
- If you feel confident about yourself, you look at some notes or practice questions before the next interview. Otherwise, try to take your mind off the interviews.
- The second interviewer joined the meeting after quite a long time and apologized for the delay. This time we had no time for rapport building. He introduced himself and proceeded with the first question.
- Question 1: Set Matrix Zeroes (https://www.geeksforgeeks.org/a-boolean-matrix-question/)
- The question was quite straightforward. I was familiar with the question. I was confident that I would be able to solve this question. This time I didn\xe2\x80\x99t lose my cool. I started with the naive approach and then told him the problem with it. I then proceeded towards a correct solution, which was not the optimal approach. He was convinced of the correctness of my approach. Next, he asked me to solve it in constant space. I took some time to think about it. He gave a hint to reuse space. I immediately got the idea, as I was already close to it. However, I was still missing a corner case. The interviewer asked me to check my approach once. I immediately realized my mistake and proposed a solution to correct it. He was convinced with my idea.
- As I was already confident about my approach, I took time and wrote neat code with proper variable naming.
- Tip: Use proper variable naming. Follow indentation strictly. Make your code as readable as possible.
- Microsoft focused a lot on code quality. I made sure I follow all the good practices of writing code. I was able to code it out very quickly.
- Since enough time was left, the interviewer asked me another coding question. He asked me to explain the approach only and not to code this time.
- Question 2: Implement LRU cache using suitable data structures (https://www.geeksforgeeks.org/lru-cache-implementation/)
- I was pretty confident about the theory on working of LRU cache. I explained to him the idea behind the LRU cache. I was able to come up with a solution pretty quickly. However, due to some misconception, I assumed that I could not use any dynamic memory. So, I suggested using an array-based queue implementation and a hashmap. The idea was correct, but here I was fixing the maximum size of the cache. In all practical purposes, the size of cache memory is fixed. But he wanted a more flexible solution. He suggested using a linked list-based implementation. I improved upon my solution and explained to him the full working of my solution model. The interviewer was quite impressed. In conclusion, he asked me if I had any doubts. I availed this opportunity to ask him how teams would be assigned to the interns. He answered that we would be allotted to random teams based on the requirement of the teams. In the end, I thanked him and left the room.

Round 3(Projects Discussion + Technical Interview): I was called for the AA (As Appropriate) round. This is the round where it is decided whether to extend an offer to the candidate or not. My first interview was at 10 AM, and the last interview started at around 5 PM. I was completely exhausted.

- The interviewer introduced himself as the \xe2\x80\x98Team Lead of Edge PDF viewer. The interview began with a formal introduction. He asked me about my hobbies. I told him about my sports journey. Next, he asked me about my favorite courses. I told him about all the challenging courses that I\xe2\x80\x99ve done. After this started the project discussion. I was very confident about my projects. I explained to him my GSoC project, Independent Project with MIDAS, and Color Switch Game project. He was impressed and didn\xe2\x80\x99t ask any further questions about my projects.
- Questions 1: Given calendar for N people, arrange a meeting of duration d between working hours, say s \xe2\x80\x93 t
- The problem in the link above is a similar problem that I found online. I explained to him an approach that immediately came to my mind. Of course, he wanted a better way to do it. He dropped a few hints, and I came up with a very optimized solution for this problem. He pointed out a mistake in my approach, which needs to be handled separately. I was unable to get it, so I asked him to repeat it. He explained the problem again, but I was not able to get it. After a few moments of silence, I told him that I could not understand what he said.
- The interviewer concluded the interview and asked me if I have any questions. I thanked him and left the room.
- I was not confident about my selection. But, later on, I realized he gave me just 10 \xe2\x80\x93 15 mins to solve this problem. In other interviews, I got much more time to solve the coding problems. Maybe he intended to get full code for this problem.
- The results were not announced until the next morning. I was unable to sleep. I asked my other friends, who appeared for the interview that day. All of them had a similar reaction.
- The next morning, I had an interview scheduled for a Qualcomm intern. I was hoping that I don\xe2\x80\x99t have to sit for this. I texted my placement coordinator that I have to appear for an interview right now. If she can tell me the result for Microsoft, it would be beneficial for me. She replied with a congratulations message! I was not able to believe my eyes! After a few mins, I received an email from the placement committee. I accepted the offer by mail, and the party began.

Thanks for reading!

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Microsoft IDC Internship Experience | On-Campus 2021

- Difficulty Level :\nHard
- Last Updated :\n17 Aug, 2021

Microsoft was the very first company to visit our campus. All CS, IT, ETC students with 7.5CGPA till 4th sem with no current backlogs were eligible for the profile.

Round 1(Online Coding Test): The first round was comprised of 2 coding questions, held on the Codility platform, total time given 90mins.

1. The main idea of the question was, In an array, some outcomes of dice rolls will be given and some outcomes are not there. A Mean value was given for all the outcomes (including which are not in the given array) and the number of outcomes not present in that array is also given. So we had to find out any combination for those missing outcomes of dice such that all the above condition satisfies properly. If no such combination is possible, just return an empty array.

   Example

   ```
   arr = [ 1, 2, 3, 3 ],  Mean = 2, \r\nNumber not present in array = 2\r\nso a possible combination of outcomes\r\nnot
   ```

2. There was a story around the question but the main idea was a string was given consisting of 3 characters only, \xe2\x80\x9ca\xe2\x80\x9d, \xe2\x80\x9cb\xe2\x80\x9d, and \xe2\x80\x9c?\xe2\x80\x9d. We had to replace the \xe2\x80\x9c?\xe2\x80\x9d with either \xe2\x80\x9ca\xe2\x80\x9d or \xe2\x80\x9cb\xe2\x80\x9d such that no 3 contiguous characters become the same, i.e there won\xe2\x80\x99t be any substring \xe2\x80\x9caaa\xe2\x80\x9d or \xe2\x80\x9cbbb\xe2\x80\x9d.
   \xc2\xa0

Total 38 students were shortlisted in this round.

Round 2(Technical Interview): It was a technical interview, I had a very friendly interaction with the interviewer. After a few word exchange, he asked my what is my favorite data structure, I told him I am familiar with all the data structures. Then he gave me a question on string.

1. The main idea was we have to decrypt a string, like 2(a)3(b) will be written as \xe2\x80\x9caabbb\xe2\x80\x9d, 1(a)2(1(c)2(d)) will be written as \xe2\x80\x9cacddcdd\xe2\x80\x9d. He first asked me to explain the logic on Notepad, I explained my logic with Stack, he was pretty happy with the logic and told me to code it.\xc2\xa0

It was a one hour interview and at the end, he asked my if I had any question for him.

I was selected for subsequent rounds of interviews.

Round 3 (Technical Interview): It was also a technical round, I was given two questions.

- In this question, There was a given text and a given pattern. I had to find all the indexes (starting index of the substring) where any substring of the text is the anagram of the pattern. It was a sliding window problem and initially, I gave my brute force solution, later he asked me to optimize it, although I could not do it very well because I became a bit nervous at that moment. He realized that and gave me another question.
- In a file system, 1 billion lines were written, I had to find out the K most repeating lines in that file. I gave my solution with hashmaps and heap data structure, he was pretty impressed with that solution and asked me if I could find any edge cases there.

It was also a one-hour interview and I got selected for the next HR round.

Round 4(Technical + HR Interview): The interview started with a very common question, \xe2\x80\x9cTell me about yourself\xe2\x80\x9d. Then he asked me about my college, my hobbies, and my projects.

- I had 4 projects on my resume and he asked me to explain anyone. I explained one of my projects with all the details like what I\xe2\x80\x99ve learned from the project, what were the difficulties that I faced. He was impressed with that and moved to a technical question.
- The main idea was about building a child game, where a kid will input randoms characters and we have to say if it is possible to generate any valid word by rearranging those letters in the input. A valid word list was also given. I told my solution with sorting and hashmaps. He was impressed with the solution, and further modified the problem and asked me to check for all the subsequence of the input also. I was approaching with brute force and asked me to optimize it. I couldn\xe2\x80\x99t do that very well at that moment and after a few discussions, the interview was ended.

After 4-5 Hours, results were declared.

Verdict: SELECTED

My Advice

- Know the basics of every Data structure, and have a great understanding of time and space complexity.
- Always provide the brute force solution first, even if you know the optimized solution, as it reflects the way you approach a problem and also implies that you are well aware of time and space complexity.
- Always Interact with the interviewer, whatever you are thinking, think out loud.
- Sometimes interviewer may want to see how do you start a problem, if no test case is provided, always ask for at least 2 test cases and discuss all the corner cases.
- Just be what you actually are, don\xe2\x80\x99t try to be over-smart during an interview, and be humble.
- Don\xe2\x80\x99t copy projects from your seniors, just put those that you have actually done because there will be a lot of cross-questions.
- The interviewer will always ask at the end of the interview that \xe2\x80\x9cDo you have any question for me ?\xe2\x80\x9d and NEVER give \xe2\x80\x9cNO\xe2\x80\x9d as an answer to this question, if you ask questions it implies you are interested in the company.
- Be confident during an interview and have a little smile on your face.
  \xc2\xa0

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Microsoft Internship Interview Experience | On-Campus 2021

- Difficulty Level :\nMedium
- Last Updated :\n04 Aug, 2021

Round 1(Online Coding Test): Round 1 was an online coding test held on Codility. It had two coding questions as follows:

1. The first question was an easy problem based on dice rolling. You are given a total number of dice rolls *T* and a total sum *TotalSum* to achieve. *K* of those *T* rolls have been performed and the sum is *CurrentSum*. Your goal is to return the values of the remaining rolls such that your net sum is *TotalSum*.
2. The second question was similar to https://www.geeksforgeeks.org/count-minimum-number-of-fountains-to-be-activated-to-cover-the-entire-garden/.

About 40 students were shortlisted for the face-to-face interviews. All the rounds were mostly DSA based.

Round \xc2\xa02(Coding Interview): Round 2 was a 45-minute coding interview with two coding questions. I had to first explain my approach before coding out my solution. The questions are as follows:

1. https://www.geeksforgeeks.org/diameter-of-a-binary-tree/. I was able to code out the optimal solution. We discussed the possible test cases and the interviewer was satisfied with my answer.
2. Given a string of alphabets, find the Kth smallest lexicographic character in it. I discussed the sorting approach and then explained my O(n) solution using Hashmaps. He asked me a follow-up question to find the Kth smallest character in between various L and R positions. The expected solution was preprocessing in O(n) and O(1) to fetch solutions for each L, R pair. (I was unable to code this solution due to insufficient time.)

About 30 people were shortlisted for the next round.

Round 3(Coding Interview): Round 3 was a coding interview similar to Round 2.

1. https://www.geeksforgeeks.org/search-element-sorted-matrix/. I was able to implement and code out my binary search solution.
2. https://leetcode.com/problems/regular-expression-matching/. I discussed my DP solution and explained the approach for various test cases. (Did not code this solution due to time constraints.)

About 20 people were shortlisted for the next round.

Round 4(HR and Technical Interview): The interview began with a brief discussion on my projects and the challenges faced.

- I was asked a question on OS which I attempted but informed him that I have not learned it yet. He then asked me to design a phone log given phone numbers and their timestamps. The features were: Add a new call detail; Retrieve the top X most frequent calls in the past Y hours.
- I did not have much idea and came up with a solution but it wasn\xe2\x80\x99t very optimal. This interview is just to judge how you think and your approach to complex problems.

The results were announced after 4 hours and 16 people were selected for a summer internship at

Microsoft.

Verdict: Selected

Some tips for preparation:

1. Be familiar with every concept and ensure you code the solution and not just read it.
2. Check out company-based questions on platforms like GeeksforGeeks and Interviewbit and try to solve them before looking at the solution.
3. Use a combination of sources like Leetcode, GeeksforGeeks, Hackerrank, etc, and set a 30-45 minute time limit to solve each question.
4. Have some good coding projects on your resume and ensure you can explain your contribution to it properly.
5. Try to keep talking to your interviewer and explain your thought process clearly.
6. Stay calm before and during the interview.

All the best and happy coding!!

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Microsoft Internship Interview Experience | On-Campus 2021

- Difficulty Level :\nEasy
- Last Updated :\n07 Oct, 2021

Round 1: This was an online coding test held on the codility platform.\xc2\xa0

- It had two questions.
- One question was from string and one question was from greedy.

Round \xc2\xa02: 48 students were shortlisted for the face-to-face interviews. All the rounds were mostly DSA based. Question asked:\xc2\xa0

1. Divide the LinkedList into k segments and print the segments in reverse order. First I gave him the brute force approach and then he told me to optimize the space complexity of the code and finally code the solution. He also asked me to dry run on few test cases. eg:1-2-3-4 k=2 output:3-4-1-2 (https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/)

Round 3: After 2 hours I was called for the next round. The interviewer gave me a problem:\xc2\xa0

1. There are n cities and there are roads between the pair of cities. Find if there is a path between the two given cities. This was a simple graph-based question I just needed to find if source and destination lie in the same component or not. He was satisfied with my solution and asked me to code out. Then he extended the problem and told me to find the path if it exists and asked to dry run for few test cases. (https://www.geeksforgeeks.org/find-if-there-is-a-path-between-two-vertices-in-an-undirected-graph/)

Round 4: After 3 hours I was called for the final round.\xc2\xa0

- The interview began with a brief discussion on my projects.
- Then he gave me a problem that there are two rectangles in the x-y plane with given dimension and coordinate of one vertex given you have to find the dimension of the overlapped rectangle if there is an overlap I had to explain all the conditions when there will be partial overlap, complete overlap, no overlap and finally code out the solution.

My Advice

- Know the basics of every DS- implementation, complexity, etc.
- Start with brute force and then build the optimal solution.
- Practice writing entire programs, not just functions.
- Keep interacting with the interviewer. Think out loud.
- Have some good projects on your resume.

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Microsoft Internship Interview Experience | On-Campus 2021

- Difficulty Level :\nHard
- Last Updated :\n29 Jul, 2021

Microsoft came to our college to select candidates for the roles of FTE \xc2\xa0as well as Summer Intern in July 2021. Out of the 230 candidates who applied for the position of an intern, only 18 students were selected finally. The entire process was virtual and was conducted in 2 rounds mainly.

CODING ROUND: The coding round was conducted on the Codility Platform and consisted of 2 questions to be solved in 90 minutes. The questions were quite easy but one couldn\xe2\x80\x99t resubmit their answers after the first submission, so we had to check out all corner cases before submitting.

1. 2 frogs can start on any index in the given input array. The function should return the maximum possible distance these frogs can create between them (difference between the index values of both) by having them jump farther away from each other. Frogs can only jump on higher-valued elements or some of the same height and they can not skip any elements. The full question in detail is given here.
2. A string consisting of characters \xe2\x80\x98a\xe2\x80\x99 and \xe2\x80\x98b\xe2\x80\x99 can be broken down into blocks of similar consecutive letters. Determine the minimum number of characters to be added to make all blocks of equal length. (https://www.geeksforgeeks.org/generate-a-string-consisting-of-characters-a-and-b-that-satisfy-the-given-conditions/)

Only 44 students from here were shortlisted for the next rounds.

INTERVIEW ROUNDS

Round 1(Technical Interview): This round went about for nearly 45 minutes and it was quite smooth. The interviewer was quite friendly and asked me one coding question and told me to explain my approach. The question was Maximum Sum Paths and I explained a brute force solution first and we had a 30-minute discussion about other approaches. Finally, he gave me a hint and told me to code my approach.

Round 2(Technical Interview): The next round went on for about 1 hour and was again, mostly a coding round. The interviewer asked me 3 questions and I had to present my screen and run the programs for him.\xc2\xa0

1. The first question was to remove every 5th element from a map. The program was simple but he checked for edge test cases and after a few modifications, it was running properly and he moved on to the net question.
2. Detect loop in a Linked List. I told him about two approaches \xe2\x80\x93 using a set of Nodes and using Floyd\xe2\x80\x99s Cycle Detection Algorithm but ended but coding only the former approach. (Tip: Practice coding the entire program, not just the functions)
3. The 3rd question was a variation of the classic pattern searching in a string. I told him the brute force solution and then the most optimized approach (i.e. using KMP Algorithm). However, since I wasn\xe2\x80\x99t very familiar with the entire code for KMP, I conveyed the same to my interviewer. He said to go ahead and write how much ever I could. Finally, with some help from my interviewer, I completed the program mostly. Due to a shortage of time, I didn\xe2\x80\x99t have to run the program, instead, the interviewer told me he\xe2\x80\x99ll review the code afterward.

After this, he asked me if I had any questions for him and concluded the round.

Round 3(Technical + HR): The interviewer asked for a small introduction and then started with my resume and asked me how much I know about current trends in the technical market.\xc2\xa0

- Then he started asking system design questions and I was mostly clueless about those. Seeing my confusion he asked me if I had System Design in my syllabus and I replied in the negative.\xc2\xa0
- Then he moved to OOPs and asked me the difference between interface and abstract class and when we would use an interface.\xc2\xa0
- Lastly, he asked me a simple coding question \xe2\x80\x93 Given an array \xe2\x80\x98Arr\xe2\x80\x99, shift n elements from a starting index (say start) to another index (say destination), with no extra space.
- I wrote the entire code in a short time but he basically wanted to check my ability to find various edge test cases and cover all of them in my code. After we had checked and run all edge cases, he asked me if I had any questions for him and gave me feedback about my performance, and concluded the round.

The results were declared within a few hours and I was elated to find out I was one of the 18 students selected.

Tips:

- My advice to all the candidates who are going to appear for an interview in the coming weeks or months is to stay calm and confident during the entire process.\xc2\xa0
- Never stop interacting with the interviewer even if they are not very interactive themselves.\xc2\xa0
- From my experience, the companies not only test you on your technical knowledge but also on, how you interact during the interview and handle a difficult situation. If you\xe2\x80\x99re stuck on a problem, do not be shy to ask the interviewer\xe2\x80\x99s help because that shows you can work well in a team.
- For the on-campus round, preparing topics like OOPs, DS/Algo will be enough but if you have time, also prepare System Design and remain updated with current technological trends.\xc2\xa0

Verdict: Selected

Thank you for reading the post. Hope this will help you in your own interviews. Cheers!

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Microsoft Interview Experience | 3 Years Experienced

- Difficulty Level :\nHard
- Last Updated :\n19 Aug, 2021

Round-1(Online Coding Round):

- The recruiter sent me the link for the test on Monday and asked me to complete it by Tuesday if I wanted to get an invite for the drive on Friday.
- Codility Platform, 2 Coding Questions, 70 minutes
- It was just an eligibility round. Anyone who scored more than 50% was invited for the placement drive.

Placement Drive

- The interviews started at 9AM on a Friday. Each round was an elimination round.
- After each round, I got a call from the Recruiter with the details of the next round.
- Each Interviewer will give some time in the end to ask questions. Try to be prepared with some questions.

Round-2(Technical Interview Round-1):

1. Is given array a Mountain Array
   - https://leetcode.com/problems/valid-mountain-array/
   - Coded a simple O(n) solution.
   - The interviewer was satisfied and quickly moved ahead as he wanted to start with an easy question.
2. Median of 2 sorted arrays of different sizes
   - https://practice.geeksforgeeks.org/problems/median-of-two-sorted-arrays1618/1/
   - Told him both approaches of this question.
   - He asked me code the first approach with time complexity O(m+n)
   - He then gave me a few examples and asked me to dry run the code with those.
   - After some optimizations during the dry run, he was satisfied with the code.

Round-3(Technical Interview Round-2):

1. Discussed about the projects which I\xe2\x80\x99ve worked on in my current company. Asked me to do a HLD of my current project, along with the requirements and the architectural diagram.
2. Design an API for the Front End Service.
   - Used Java and Spring JPA.
   - Coded the Entity, Repository, Service, BusinessService and Controller Layer.
   - Also, wrote a snippet for yml connection configuration and the dependencies required.
   - She asked some follow on questions and was eventually satisfied with the entire code.
3. There is a Windows Service running in Production. It polls the DB for the top 10 records (tasks) according to the priority and pushes those records in the queue for processing. The Priority values of the tasks can be P1, P2, and P3. Due to some reason, the queue is blocked. An adhoc request comes from the client to process a lower priority task(say, P2)
   - What steps can be taken to handle such adhoc requests when no such mechanism is built in and the queue is also blocked?
   - What other modifications can be made in this system for making it ready for any such further adhoc requests and dealing with the blocked queue?
   - We had a long discussion on the approaches. She had counter questions for all my

suggestions.
    - From this question, she wanted to check my overall understanding of the design for failure and other system design concepts.

Round-4(Technical Interview Round-3)

1. Find repeating element in a sorted array
    - https://www.geeksforgeeks.org/find-repeating-element-sorted-array-size-n/
    - Coded a O(log n) approach using Binary Search
    - He had some examples with which he wanted to dry run the code.
    - He was satisfied with the approach and moved to second question quickly.
2. Design a Special Logger System (LLD). This system receives a Log Message and a Timestamp. The requirement is to discard the message if the same message is received within the 10 second time frame. But every time a message is received, its timer should reset and that timer should remain valid for the next 10 seconds of the last request.
    - For example, if a msg M1 was received at t=1. Now if same msg M1 is received at t = 9, it should be discarded, as it is within 10 sec. But now, this window should be valid upto t=19, as last M1 msg was received at t = 9.
    - We had a lot of discussion on the data structures which we can use.
    - He finally agreed for me to use a combination of MaxHeap(PriorityQueue) and HashMap.
    - I finally coded the entire solution and we discussed all the edge cases.
    - After a lot of discussion and modifications, he was finally satisfied with the final code.

Round-5(Hiring Manager Round):

- The first 3 technical interviews completed on Friday as part of the drive.
- This interview was scheduled on Tuesday evening.
- This is the person who will have a final word in deciding if they want to roll out an offer for you or not.
- He had a detailed feedback of all my previous rounds, including the questions which were asked and how I had performed.
- He was satisfied with my overall performance in the previous rounds and we had some discussion about the tech stack that I\xe2\x80\x99m comfortable in.

Design Question (LLD):

- Design a Phonebook Application
- I listed all the features/requirement that I could think of.
- We went ahead and discussed each of these features and how we can achieve that.
- Finally, he asked me to focus on just 3 features \xe2\x80\x93 listContacts(), searchContacts(), displayFavourite()
- I suggested InMemory-DB (SQLite) for listContacts(), Trie for searchContacts() and MaxHeap for displayFavourite(), and then explained him the approach using each of these data structures.
- After a lot of discussion, he was finally satisfied with my approach.

He gave me the last few minutes to ask some questions. After he answered, he hinted that I\xe2\x80\x99ll be hearing from HR for further process.

Next day, I got a call from the recruiter that I\xe2\x80\x99ve been selected and the HR contacted me the same day for the documents. \xc2\xa0

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Microsoft Azure \xe2\x80\x93 Introduction to Azure Data Factory

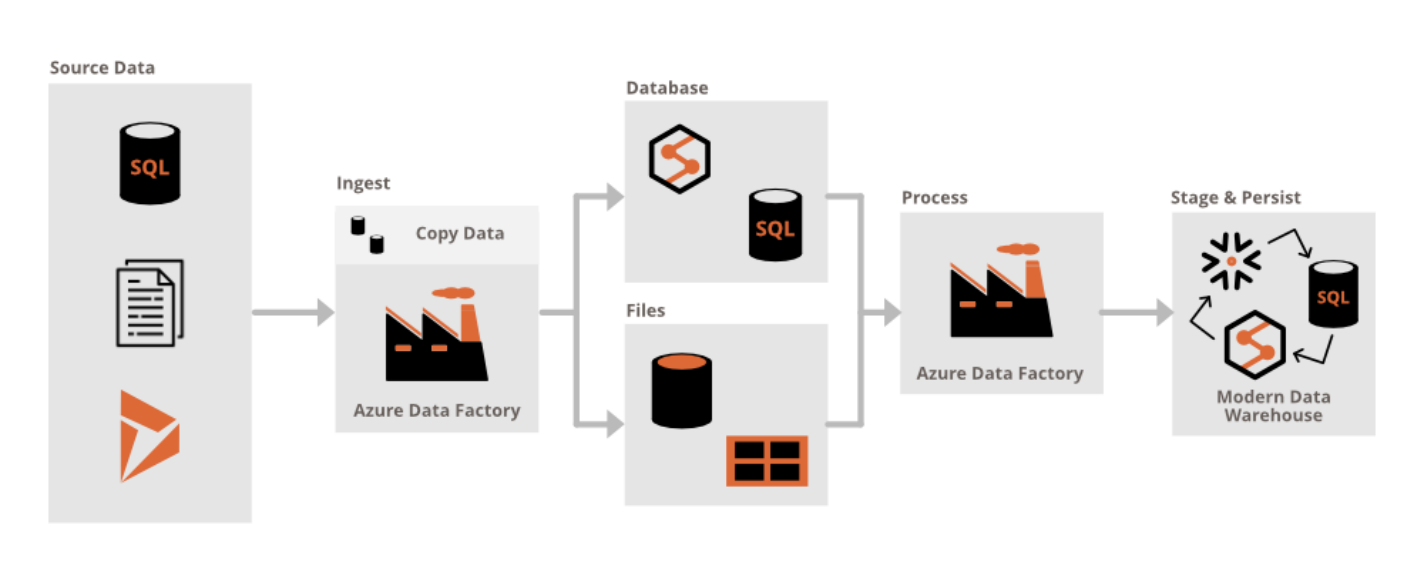
- Last Updated :\n09 Jul, 2021

Azure data factory as commonly known as ADF is a ETL(Extract-Transform- load) Tool to integrate data from various sources of various formats and sizes together, in other words, It is a fully managed, server less data integration solution for ingesting, preparing, and transforming all your data at scale.

As the data is increasing day by day around the world many enterprises and businesses are shifting towards the usage of cloud-based technology to make their business scalable. Because of the increase in cloud adaption, there is a need for reliable ETL tools in the cloud to make the integration. The Azure data factory stands out when compared to other ETL tools because of **features** such as **Easy to Use,** Cost-Effective **solution , Powerful and intelligent code free service.**

The architecture of Azure data Factory:

The figure below describes the Architecture of the data engineering flow using the Azure data factory



Azure data Factory

The various components of the Azure data factory are as follows:

1. Activities
2. Pipelines
3. Linked Services
4. Datasets
5. Data Flows
6. Integration Runtimes

All these components work together in runtime to help extract and transform the source data.

Before understanding what a pipeline is it is necessary to understand what an activity is.\xc2\xa0

- **Activity :** Activities in a pipeline define actions to perform on data. For example, copy data activity can read from one location of Blob storage and loads it to another location on Blob storage
- **Pipeline :** Pipeline is a logical grouping of activities that together perform a task. For example, Pipeline can have a set of activities that take data from ADLS and perform some transformation of data using U-SQL and load data in SQL DB\xc2\xa0
- **Linked Services:** Linked services are used to connect to other sources with the Azure data factory. Linked services act as connection strings for resources to connect. For example, Connecting an AWS S3 to the Azure Data Factory

- **Datasets:** Datasets are simply points or reference the data, which we want to use in our activities as input or output
- **Dataflows:** Data flows feature in the Azure data factory will allow users to develop graphical data transformation logic that can be executed as activities in ADF pipelines
- **Integration Runtimes:** The Integration Runtime(IR) is to compute infrastructure used by ADF to provide capabilities such as \xc2\xa0Data Flow, Data Movement, Activity Dispatch, and SSIS Package Execution across different network environments.

Pricing Of Azure Data Factory:

- No upfront cost
- No termination fees
- Pay only for what you use

1. **Data Pipelines:** Helps to Integrate data from cloud and hybrid data sources, at scale. \xc2\xa0\xe2\x80\x93 Pricing starts from \xe2\x82\xb972.046 / 1,000 activity runs per month
2. **SQL Server Integration Services:\xc2\xa0** Helps to easily move your existing on-premises SQL Server Integration Services projects to a fully-managed environment in the cloud. -Pricing for SQL Server Integration Services integration runtime nodes start from \xe2\x82\xb960.498 /hour

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Microsoft Interview Experience | 4 Years Experienced

- Difficulty Level :\nMedium
- Last Updated :\n30 Jun, 2021

Online Coding Round:

1. N factories are producing pollution. Given pollution amount in terms of integers. Count mini. no. of filters required to reduce total pollution by atleast half. One filter reduces pollution by half.

   Solved using priority queue

2. There are N cars, each having some of M features. A car feature list is given as binary string. for ex: 0000111, 0 means feature not supported.

   Two cars are similar if their feature description differs by atmost one feature. for ex: 11001, 11000 are similar for every car, find count of similar cars.

   Solved with XOR operator

Face to face interviews scheduled after 1 week

Coding Round: (~40 mins)

1. https://www.geeksforgeeks.org/search-in-an-array-of-strings-where-non-empty-strings-are-sorted/
2. Similar to problem: https://www.geeksforgeeks.org/anagram-substring-search-search-permutations/

   In my case, interviewer mentioned that freq. of characters is not considered for anagrams.

   Ex: str1:aabb str2:aaaa \xc2\xa0it should return true

Coding and Design Round: 1 hr

1. Given an image in form of 2-D pixels. Write module to rotate image clockwise and anticlockwise.

   Also tell test cases for testing code

Design Round: 1 hr

1. Design chess Game
2. Design Gallery App for features like scrolling, opening image by clicking thumbnail

Hiring Manager Round: (~1 hr)

1. Work done during professional experience and Technologies
2. Why looking for change
3. What kind of work you want to do
4. What will you bring on the table if we hire you
5. Given expression in infix notation. Evaluate that. for ex: 12*21 \xe2\x80\x93 323/21 + 3

Solved using 2 stacks

Got Selected.

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Microsoft Interview Experience | 8 Years Experienced

- Difficulty Level :\nExpert
- Last Updated :\n23 May, 2021

I had a total of 4 rounds. Focus was more on algorithms, problem-solving, system design, and few behavioural questions. Interview process took 15 days from first interview to offer letter.

Round 1:

1. Rotate 2d array clockwise and anti clock wise 90 degrees.2d array need not be square

Round 2:

- Few questions on projects I worked on.
- How do you implement throttling for your website?
- An attacker is constantly hitting your service api. You should send the response as \xe2\x80\x9ctry after sometime\xe2\x80\x9d if threshold exceeds certain requests(Slinging window algorithm based time slots)

Round 3(Principle Software Engineer)

1. Implement N-tree collapse(anynode) and decollapse(anyNode).when called get childnodes(sequence of collapse and decollates should be considered and should return the child nodes).discussions on extra space vs extra time. recursion vs iteration

Round 4(Hiring manager interview) 1.5 hours: I found this interview interesting. Mix of tech and behavioural

Tech Questions:

Steps

1. Read a row which has username, amount,
2. Apply discount and write same to table
3. Call rest api to update respective user\xe2\x80\x99s credit service

We need to process records in batches. He is looking into failure handling cases.

Behavioral Questions:

- How much time you spend on coding.
- What are your career goals.
- What critical problem you solved in your career.
- Last question, current ctc

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Microsoft Interview Experience

- Difficulty Level :\nMedium
- Last Updated :\n19 Aug, 2021

Round 0(Codility Round): \xc2\xa0

1. Given buckets of size 1..N, find the minimum number of buckets required to fill K liters of water.
2. Given a string, find the minimum number of substrings that it needs to be split so that there won\xe2\x80\x99t be any duplicate character in each of the substrings.

Round 1:

1. Some questions on current work.
2. Find K most frequently used elements in an array(did it using hashmap + maxHeap, \xc2\xa0asked if there is any data structure, then he suggested treeMap would do that)
3. Sort array with only 0s,1s,2s(explained counter approach, asked to do it without any extra space, told some approach similar to quicksort using 2 partitions) https://practice.geeksforgeeks.org/problems/sort-an-array-of-0s-1s-and-2s4231/1
4. Count number of islands in a 2d matrix. (told approach, he asked if its some traversal. Then he asked if it\xe2\x80\x99s a bfs or dfs) https://practice.geeksforgeeks.org/problems/find-the-number-of-islands/1\xc2\xa0

Round 2:

1. Expression evaluation 2a[3b] = 2a [bbb] -> abbb abbb
2. Suggest words with a given prefix.(explained Trie based approach)
3. Bfs vs dfs
   \xc2\xa0

Round 3:

1. Design an intelligent elevator system for a very secure building with multiple constraints like max_capacity for floor & lift, it should be easily extendable if a new lift or new lobby or new floor gets added. (classes created: lift, liftlobby, floor, floormonitor, user, building. Wrote it in a way that it\xe2\x80\x99ll be easy to scale when new lift/building or new lift lobby or new floor comes)

Round 4(Techno \xe2\x80\x93 Managerial):

1. How did previous rounds go? (Explained where I went wrong in previous rounds)
2. He gave an explanation about MS & Azure team\xe2\x80\x99s work culture.
3. How do you make sure that your service won\xe2\x80\x99t have any issues after sending it live?
4. How will you test your features?
5. Design a system that blocks unsafe websites from browsing. High level, network protocol, low-level class design for Server. he also asked how about synchronization of deleteword & checkisSafe word. \xc2\xa0
   \xc2\xa0

Result: Offer rolledout.

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Microsoft Interview Experience for SDE-2

- Difficulty Level :\nMedium
- Last Updated :\n12 May, 2021

Microsoft interview Experience for SDE-2 for Noida location, 2021. I\xe2\x80\x99ll share my experience in this post and I hope it will be beneficial for some of you. I have around 5 \xc2\xa0years of experience working as a Java Developer(Backend). The interview was conducted as part of their hiring drive and all the interview rounds were online and were completed on a single day. The interviewers were very polite and helpful.

Round 1:

1. Design a global Iterator over n sorted Lists. \xc2\xa0(should have hasNext() and next() functions)

   ```
   eg:  arr1= {1,4,89,100}\r\n     arr2= {2,67,90}\r\n     arr3= {0,49,88}\r\nop: The calls to the Iterator.next() shou
   ```

2. Given a binary Tree. You are at a particular Node and your friend is at another Node. Your friend\xe2\x80\x99s node catches fire and the fire spreads to all its neighbors at 1 unit time. find the time in which the fire reaches your position.

Round 2:

1. Design a logging system which can log various kinds of events such as errors, events ..etc.

Round 3:

1. Design a Service that accepts an input String from user and returns all the anagrams of the String which are present in our input Dictionary. We are already provided an English dictionary in which all the words are present in the sorted order and this dictionary is very huge to keep it in the main memory.
2. You are given a third-party service called Spellcheck Service which accepts list of words and can give the list of suggestions/correct words for each wrongly spelled word in the input list of words. Suppose, that you have a grid server that contains a huge excel workbook having many pages and our browser loads a part of the grid(ie: we see that browser first loads an initial chunk, and when user calls/scrolls it will load further pages). Design an approach showing the data flow, where we give a functionality in the browser for spell check which processes the grid data row by row and stops at a word having the wrongly spelled word along with the list of suggestions for that word. When the user now clicks on the next button, it should be able to stop at the next spelling error.

Round 4:

1. Consider the case of OneDrive. Suppose you have a user who has uploaded some files to the drive and also some files to this user might have been shared by other users.

   Now, we have to design a service that will list the files in the following order:

   Show some x number of files on top which have been recently modified/accessed.

   and then, list all the files in alphabetical order(own files+ shared files)

Result: I received mail from Microsoft saying I was selected and asked for all the details and supporting documents.

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Microsoft Interview Experience | 4+ Years Experienced

- Difficulty Level :\nMedium
- Last Updated :\n11 May, 2021

Round 1:-

- Started with an introduction about projects and Education.
- Then he asks me a question about my project which I had done previously(questions related to the synchronization of the transaction, if multiple transactions on multiple servers happen same time how do you handle it)
- Then he asks me a question which is (you have given the array of non-negative Integer, the problem to solve is you have to reverse the array but all zeros which exist in the array should be move to the right side)

  For Example

  ```
  Array = {0, 4, 2, 3, 0, 9, 10, 0, 34,\r\n 8, 0, 23, 56, 12} \r\nResulted array = {12, 56, 23, 8, 34, 10, 9, \r\n3, 2
  ```

  You have to solve this problem in O(n) time complexity and you should use constant space O(1) he ask me to write the code for the same to pass all edge case and write the all edge case possible for this problem.

Round 2:-

- He introduce himself and about the project he working on then he started asking about my experience and what i have done
- Asking questions on Java as Java is my primary Language and working of HashMap, how does it works.
- Then he ask me to design the data structure such we can perform operation
  - insertFirst(value):- value inserted head of the list Time Complexity O(1)
  - insertLast(value):- value inserted last of the list Time Complexity O(1)
  - deleteValue(val):- delete the value from the list if the list contains multiple values then it should delete only first occurrence expected time complexity O(1).
  - isExist(value):- return the true if value exist in the data structure otherwise false, expected time complexity O(1)
- Write the code for the above problem using the best data structure and cover all test case, almost 1 hrs. Complete to solve this problem

Round 3:-

- I introduce my self and we both are from the same college (NITK)
- Then he move to the programing question which is you have given two singly linked list and you have to add these two linked list the constraints you can\xe2\x80\x99t modify the input linked list list1 => \xc2\xa09->5->4 list2 => 8->0->7 resulted list => 1->7->6->1 **you can\xe2\x80\x99t modify the input linked list**
- then he ask me to develop the programing language which has a maximum throughput, we have discussion on this problem to what data structure we can use.

Round 4:-

- This is hiring manager round but not looks like hiring manager round \xf0\x9f\x99\x82
- He started with the problem and the problem was you have given the matrix of n*n which contains the small character only and you have given the dictionary as well which contain the English valid word, you have to find the how many word can be formed using this matrix, the word must contain in dictionary, you can move in matrix to left, right, top, bottom and diagonal
- t o p
- a g i
- b r g
- the possible Words are:- 1. top 2. tab 3. bat 4. pig 5. bag 6. gip
- discussion about what data structure you have to use for Dictionary and i have solve this problem by using of DFS. and for dictionary i have used the Trie data structure.

After 2 days of all round complete, I got a call from HR and I got **Selected** in Microsoft, Dreams Come True.

Be focus on codding and all edge case passes.

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Microsoft Interview Experience for Software Engineer

- Difficulty Level :\nMedium
- Last Updated :\n09 May, 2021

On 3rd April 2021, I got a mail that I have been referred by some employee and so they are sending me a test link with a one-day window.

Round 1(1 hr 30 mins): The test was conducted on Mettl platform. There were a total of three questions. Two of them were based on Trie and one from the Segment tree

1. https://www.geeksforgeeks.org/longest-common-prefix-using-trie/?ref=rp
2. Given an array and q queries with range L and R. Find the count numbers such that the absolute difference between the highest and lowest (in a range) is less than given k.
3. Don\xe2\x80\x99t remember.

On 6th April, I got the mail that I have cleared my online test and will be having my interview on 8th.

Round 2(45 mins): My interview started around 12:15 pm. It started with a brief introduction. And then just one coding problem. He asked to open any compiler and share my screen. https://www.geeksforgeeks.org/sum-leaf-nodes-minimum-level/ First I had to explain my approach and then write the complete code. He then gave a few test cases to check my code.

Within five minutes after completion of this round, I got the mail that I\xe2\x80\x99ll be having my round 2 interview from 3:30.

Round 3(1 hr): The interviewer briefly gave his introduction and then started with the ques.

1. What is the critical section ? Give any example.
2. What do you mean by race condition ?
3. How steps you take to solve critical section problem ?
4. Concept of Virtual memory.
5. Write and explain code for the Producer Consumer Problem.
6. Explain approach and then write complete code for\xc2\xa0 https://www.geeksforgeeks.org/represent-the-fraction-of-two-numbers-in-the-string-format/. With some help from the interviewer, I was able to solve this completely.
7. Do you have any ques for me?

In the evening I got the mail that I have cleared this round too and they\xe2\x80\x99ll be scheduling my next round on coming Monday.

Round 4 (AA Discussion): (45-50 mins)

- This round is the final and the deciding round. This person would only say a final yes or no for your selection. The interviewer was extremely humble. nice and soft spoken. He had all the details of my previous interview.
- It started with a normal introduction. I saw that he was noting down my projects\xe2\x80\x99 name and previous experience. Then he started discussion about my project and extremely detailed discussion.
- Then we started talking about my current internship and the project I am doing currently. That was all from his side. And he asked me to ask ques now. Then we had a very detailed conversation. He was from the Microsoft Edge team and had been working for 10 years.
- We talked for around 30 mins and then my part was done.

- Then two days later, on the 14th I got a call from HR that they have scheduled a 15 mins HR discussion for me. I was all nervous as this round was never mentioned. The meeting started with a normal introduction and then he asked my college\xe2\x80\x99s name. I told him and he said \xe2\x80\x9cOk, then we\xe2\x80\x99ll be sending them the mail that I have been offered FTE SWE Role\xe2\x80\x9d. Oh my God! On hearing this I was cloud nine. He then told me about the detailed salary compensation and it was done \xf0\x9f\x99\x82

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Microsoft Interview Experience for ML Engineer 2020

- Difficulty Level :\nMedium
- Last Updated :\n04 May, 2021

Microsoft Recruitment Team for Machine Learning Engineer confirmed my application for Machine Learning Engineer in India. In this post, I\xe2\x80\x99ll share my experience in the hopes that it will be useful to some of you. I have 2+ years of experience working as a Machine Learning Engineer at startups.

Interview Process:

1. Week1(Wednesday)\xc2\xa0

I received an email from a Microsoft Recruiter about a position in Software Engineering and Machine Learning at Microsoft. I gave her my resume, and within an hour, I received a call to explain the process. I was told that my resume would be forwarded to the hiring manager, that if I was chosen, another recruiter from the staffing team would contact me, and that I would have an interview the following Saturday (Week2 \xe2\x80\x93 Saturday).

2. Week2(Wednesday)\xc2\xa0

I received a call from another recruiter informing me that my profile had been shortlisted for an interview. On Saturday, I\xe2\x80\x99ll have three rounds of interviews (week2 \xe2\x80\x93 Saturday). The interview will cover topics such as data structure and algorithm, design, and machine learning. I was contacted on a regular basis to confirm my availability for an interview. The recruiter is simply amazing for ensuring that I have a very smooth interview experience.

3. Week2(Saturday): The Interview Day\xc2\xa0

Round 1:\xc2\xa0

- Data Structure & Algorithm Questions (1 hour).
- Question1: A larger string is followed by a list of smaller strings. I was instructed to include the opening and closing xml tags (say italic). Remove the pair of tags that is closest to the longest pair of tags. It is a more advanced version of merging intersecting intervals. I was asked to write test cases, so I wrote three to test edge cases. https://www.geeksforgeeks.org/merging-intervals/.
- Question2: Two arrays are provided, with each index representing a free and busy slot for two different people. When both slots are free, I was asked to find the maximum contiguous slot size.

Follow-up: What is the maximum available slot if I am only allowed to change one busy slot to free?

Solution: With the help of two busy (and free) arrays of two people, extract all (start, end) pairs for intersecting slots and slightly modify the merge interval to find the maximum slot size.

I quickly solved both problems. But I asked many clarifying questions, and I began with brute force and built on top of it with logical progression.

Round 2:

- Low Level Design (1 hour).
- (a)Design LRU from scratch: I used a Double Linked List and a Hash Map to solve the problem.

I just knew this, built it from the bottom up, and as I moved, I kept getting logical progression to solve the problem. https://www.geeksforgeeks.org/lru-cache-implementation/
- (b)How to enable Multiple user simultaneously use (or block) using LRU to ensure consistency.

Round 3:

- Hiring Manager (1.5 hour).
- My resume and experience are heavily debated. All of my projects (ML projects) are thoroughly discussed, including the approach I took, my role in the project, how I solved a few challenges, and much more.
- The team for which I was hired is explained to me.
- When I inquired about my potential role if chosen, it was clearly explained with all details.

4. Week4(Tuesday)

I received mail from Microsoft, I was selected and asked for all the details and supporting documents.

My Preparation:

1. Coding: In general, I use GeeksforGeeks, leetcode, and Codechef to do a lot of coding. GeeksforGeeks is a great help to me.https://www.geeksforgeeks.org/practice-for-cracking-any-coding-interview/
2. I learned data structure and algorithms from GeeksforGeeks. All the concepts are clearly mentioned here.https://www.geeksforgeeks.org/data-structures/.
3. Our behavior should be good throughout the interview process because it is the main point that all of the interviewers will notice.

Finally, I was searched when I was prepared, and I am now overjoyed. I\xe2\x80\x99d like to thank GeeksforGeeks and the community for assisting me in obtaining this opportunity. I hope this post has been of some assistance to some of you.

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Microsoft Interview Experience | Off-Campus 2021 | OFFER

- Difficulty Level :\nMedium
- Last Updated :\n19 Aug, 2021

STATUS: Final Year [2021], B.E. Computer Science and Engineering, Tier-3

POSITION: University Graduate, FTE

LOCATION: Hyderabad, India

DATE: April 10, 2021

Note: I have done a two months remote internship at a startup and am I working as a web developer with a cybersecurity community since July 2020.

Timeline [Application -> Interview]

- Applied via, Microsoft Careers Portal. (No referral, all credit to ATS-friendly resume design and talent acquisition department).
- Received **online test link** on April 2, 2021
- Received **Interview Invitation** on April 6, 2021.
- Interview Communication mentioned **2 technical rounds** and **1 AA discussion**. Each round is an elimination round and AA discussion happens only if the first two go well.
- Completed First round at noon (April 8, 2021). Received an update the same afternoon that they will be **jumping to the final round (AA discussion).**
- AA discussion, initially scheduled for April 9, **got rescheduled** to April 10 due to the unavailability of the interviewer.
- Waiting to hear back!

Online Test

- 90 mins test with 3 questions. 2 easy, 1 medium-hard (got stuck with this one).
- First two related to strings and pattern matching (solved).
- 3rd related to puzzle solving. [hint: Goat, Grass, Lion] (tried but TLE)

Round 1

- The interviewer had some trouble with his system. He informed me humbly. Started after 20 mins.
- He introduced himself. Asked me about myself and my work (as it was mentioned in my resume)
- Asked to mention any challenges I faced while working on my project.
- Shared Link to codility and shared the first question.
- **Question 1** \xe2\x80\x93 Again related to string, anagrams. Discussed optimizing and adding conditions to test the code.
- **Question 2** \xe2\x80\x93 Related to arrays, I used an approach similar to the priority queue approach in this question to solve it.
- Was asked to code both the solutions.
- Talked a bit more about my work, and then he asked if I had paid any attention to the security part of the website or actually implemented any. I explained what parts I had focused on and implemented on my website.
- He repeated them and asked me to explain a specific term.

- He asked if I have ever implemented authentication and does my website needs it. I said I had implemented it but only using built-in Django Auth Models.
- After all that talk, he asked if I had any questions for him.
- I asked, he explained. END

Round 2

- Received an Update later during noon that the team has decided to jump to the final round.

AA Discussion

- The interviewer introduced himself and asked me to tell a bit about myself.
- Asked me to dwell more into information about my internship.
- I hadn\xe2\x80\x99t given him any details about the product we were building and started explaining my role. After I finished, he asked me to explain first what kind of problem I was solving there. So (I mocked myself first for not starting by explaining the product) and then explained in detail.
- He then asked me **\xe2\x80\x9chow can you make your website more troubleshootable? \xe2\x80\x9d** This is the question I struggled most with. Somehow I was not getting what the interviewer meant by that question. I gave him a couple of answers, but they were not accurate.
- I admitted that I was not able to understand what he was looking for, and he said, \xe2\x80\x98we can move on from this.
- After 20 mins of me struggling over the word **troubleshooting** He shared the codility link.
- He shared the question verbally. It was related to **Binary Search Tree**. Pretty Simple.
- I discussed a few approaches, and he asked me to go ahead with the coding.
- I coded the whole solution. **Modular and Structured**.
- He asked me to run it. I got **3-4 errors**. Silly mistakes like forgetting to pass variables in method calls. He didn\xe2\x80\x99t seem to care as I got hold of them in a second.
- He seemed satisfied and asked if I had any questions for him. I did.
- He asked me about **how I got into this interview loop** i.e, the process I followed until this AA round.
- Then he asked me **about my university** and **how did I compare as a student** to other students at my university.

Feedback from Interviewer

- After all this, he gave me some feedback and mentioned I had very good coding skills. He **appreciated that the code was structured and modular**.
- He pointed out that he asked me an ambiguous question (about troubleshooting) just to see how I handle it and **I got a little agitated** at the point when I was unable to answer it.
- He suggested that I **should be more calm and open** in situations like this.
- I agreed and said something in acknowledgment. He continued and said that the company looks for **candidates who can handle ambiguous situations** but at the same time they also look for **people who don\xe2\x80\x99t give up easily** which he said was reflected by later part of our conversation, (conversation about my university projects).
- We summed up.

Result

Heard back after a long (really long) wait of 18 days!
Got an offer though (????)

Some Points To Remember

- Don\xe2\x80\x99t stress yourself if your interviews get rescheduled or your interviewers join late

for the meeting. These interviewers are generally seniors whose schedules remain rather busy.

- My round 1 interviewer has been with Microsoft for over 10 years and the interviewer for the AA discussion has been with Microsoft since before I was **BORN!** (21 years!!!)

Hope this helps. All the best!

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Microsoft Internship Interview Experience | Summer\xe2\x80\x9921

- Difficulty Level :\nEasy
- Last Updated :\n21 Apr, 2021

I hope whosoever is reading this is safe and in good health. The past year has been really bumpy, but good things always find a way out. So, I am here to share my experience of the selection process for Microsoft Summer Internship Program. Well, the lockdown made it impossible for companies to visit our campus but our placement committee worked really hard to make everything possible, be it virtual. The criteria to be eligible for the process is a minimum CG of 7.5 and no UR subjects or backlogs.

Let\xe2\x80\x99s talk about the actual process now.\xc2\xa0

It consisted of 4 rounds.

ROUND 1(Coding Test): The first round is an online coding test.\xc2\xa0

The coding environment is really good and easy to work with. You get a dropdown menu with all the programming languages for you to choose from. Now you have two coding questions and 90 minutes. One of them is pretty easy and takes 15-20 mins to solve, given that you are really proficient with the language you use to code, so be wise. I have a flair in Python so I went for it. The other question can be complicated in many ways. It might look easy but will take a lot of time to code. It could also be a trick question. I don\xe2\x80\x99t remember my questions that well but I do remember the basic idea behind them.

Questions:

1. Implement a function with a binary number as input and return the bitwise XOR value of the input as output of the function.
2. I basically had to implement the evaluation of a postorder expression using stacks.

Things to take note of:-

- Practice well. Take 5 coding questions every day from the interview corner tagged with the company\xe2\x80\x99s name and always aim for learning something from each question.
- Make sure you have that one programming language that makes coding easier for you.
- The test is highly proctored so don\xe2\x80\x99t waste a second thinking about how to cheat. It\xe2\x80\x99s not gonna help anyway.
- Do not panic if you fall short of time. Just make sure you have at least one question with no errors and no failed test cases.\xc2\xa0

ROUND 2,3,4:

I was impressed with the idea of having all the interview rounds in just one day. We were informed about this earlier and were warned to stay alert and look forward to getting our meeting link for our interview.\xc2\xa0

Round 2: For my round 2, I was only asked theoretical questions on concepts of OOPS, DBMS, and DSA. The ones I remember are:-

1. What do you understand by overloading?

2. What is the difference between polymorphism and method overloading?
3. What is different in object-oriented programming?
4. What is the time complexity of BST?

Round 3(Coding): Round 3 was a coding round again. The only difference was that I had my interviewer on a call and I had to share my screen so he could judge me while I code. I remember the question really well because I had fun solving it to be honest.

1. I was asked to implement a stack from scratch with all its functions like peek(), pop(), push(), etc. I was then asked to modify some functions. For instance, the peek() function which returns the top of the stack should now return the maximum value present in the stack. The interviewer was a big help. I was kinda confused at first about how to start, his hints helped me figure that out. We had an hour-long discussion over this one question, hunting for new ways to implement different ways. The constant exchange of ideas made it fun to code.

Round 4(HR): This was the final round. It was an HR round.\xc2\xa0

1. The very first thing my interviewer told me was that he wants the interview to be a normal conversation between two people and nothing technical. Well, I did have some questions to ask but now I had to think of a few more. He started the conversation by asking me some questions about the projects I had mentioned in my resume. It was my turn now so I asked him about the projects that were presently going on at Microsoft R&D Center. This went on for an hour approximately, and we came to the end of the round and the process.

Things to take a note of:-

- Do not shy away from asking or speaking or explaining your ideas, be it the theoretical round or the coding round, or the HR round.
- You are planning to get an internship here, it\xe2\x80\x99s pretty normal to have questions about the work, the projects, the company, etc. Make a list of all such questions if it helps. Never reply, \xe2\x80\x9cI am sorry, I have no questions\xe2\x80\x9d. All your time and practice goes in vain after this.
- Be confident. Ask doubts.\xc2\xa0

To wrap this up, keep practicing. Even if you are interested in areas other than software development, do not stop coding. Solving a minimum of 5 questions every day really helps, and you can then focus on the theory section when the interview day is close. Having a good hold over the concepts of DBMS, OOPS, COA and DSA are enough to prepare for theoretical questions. With that, good luck and stay safe.

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Microsoft Interview Experience 2020 | 2.5 Years Experienced

- Last Updated :\n12 Apr, 2021

I appeared for an Online Interview of the Microsoft E+D team around October 2020. There were three rounds, two of them were DS Algo rounds and the third was a design round. All the rounds happened on the same day.

Round 1: It was conducted on an MS Teams video call and codility link to share the screen as well. The interviewer was 10 mins late but was quite calm and helpful. It was a binary tree question to be coded entirely from scratch like create the tree/node class and everything else. This was the question: https://www.geeksforgeeks.org/longest-consecutive-sequence-binary-tree/.

\xc2\xa0Once I was done in approximately 15-20 minutes, he tried few straightforward test cases. Then he moved on to the corner cases for which I had to modify my code a bit. One hour after the interview ended, I got a call from the recruiter that they will be going ahead for round two.

Round 2: The interviewer asked me few questions about my CV. Later on, he moved on to a similar question like this: https://www.geeksforgeeks.org/minimum-number-platforms-required-railwaybus-station/. I had not prepared much till then for interviews, so, I gave him a solution with space complexity O(t) where t \xe2\x80\x93 maximum value of departure time. Since it was not optimal he guided me towards the optimal greedy solution. However, later on, when I couldn\xe2\x80\x99t get it, he asked me to code my approach which I did, and it worked for the test cases he gave.

Round 3: The interviewer was an old VP or director-level person who was quite rude and irritated. Also, I was taking the interviews in Teams using the browser as my spare laptop wasn\xe2\x80\x99t available to me. I was using the teams to share video and codility to share screen. He asked me why I was using Teams in the browser instead of Teams app. I explained the reason. He got quite fussy and even called HR to which HR replied that it\xe2\x80\x99s okay and told him to go ahead with the same. He wasted 15 mins in all this drama instead of conducting the interview. He asked me this design question: https://www.geeksforgeeks.org/design-snake-game/. I explained the approach and then started creating the basic method signatures and classes. He didn\xe2\x80\x99t explain the question clearly. I guess he expected me to have already practiced it or something. In addition, he was not very welcoming on questions. This went on for half an hour when we discussed the approach with different data structures. After this, we moved on to the multiprogramming aspect of the game like which resource would be shared by the threads and so on.

I got a call after two hours that I wasn\xe2\x80\x99t selected. It all panned out for the best as I got a better opportunity after few more months of rigorous practice and many more interviews. For Microsoft, it\xe2\x80\x99s like a ritual that they will be asking linked list/Tree question in the first round and greedy/implementation or some other topic in the second, but this is from my personal experience and my friends. The interviewers are quite helpful, apart from few conventional oldies. Even if you don\xe2\x80\x99t have the optimal approach they will be guiding you towards the same.

Best of luck!!

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Microsoft Interview Experience | On-Campus (Virtual)

- Difficulty Level :\nMedium
- Last Updated :\n05 Apr, 2021

Microsoft conducted entire process virtually due to COVID.

Round 1: (Date 29.11.20)

Online test:(90 min)

\xc2\xa0 \xc2\xa0CGPA criteria is 7.50 and open for CSE/MnC/EEE/ECE

There were different sets with varied difficulties. Some sets were easy and some were difficult. There are 3 coding questions.

My set consisted of following questions

1. Longest Common Prefix of all given strings

```
Input:{"geeksforgeeks", "geeks", "geek", "geezer"}\r\n       Output:"gee"\r\n       \r\n       Input:{"apple"
```

2. \xc2\xa0Given an array and a number x. Find minimum length subarray whose sum is x.

```
Input:  A={1,2,3,4,5},x=3\r\n      Output: 1\r\n   There are 2 subarrays with sum 3 out of \r\n   which {3} is
```

3. \xc2\xa0 Given an array of strings and a string x. Find no of strings in array which have prefix as x.

```
Input: A={"Cisco","Citrix","Cipla"} ,x="Cit"\r\n      Output: 1\r\n     There is only 1 string "Citrix" \r\n
```

Few more questions which my friends got are

1. Find LIS in given string of lowercase english letters

Around 40 were shortlisted out of 170 students for interviews. Interviews were scheduled on Dec 1st 2020.

Interview Round 1: \xc2\xa0(74 min)

There was only 1 interviewer which is held on MS teams . After a quick introduction of both of us he straightaway gave me a coding question

1. There are N days. Given the dates and temperatures on all the N days in form of a tuple sorted based on temperature. Find k closest dates to a given temperature from the tuple.

I started solving and explained him a O(n) solution. After he seemed satisfied I told him the optimization involved and told him O(log n) solution using Binary Search. \xc2\xa0 \xc2\xa0 \xc2\xa0 He asked me of several corner cases and verified code on all of them. Finally he seemed satisfied and he asked me for some questions. I asked him about the work \xc2\xa0 \xc2\xa0culture and profile he is currently in.

I was shortlisted for Round 2 within 5 min

\xc2\xa0Interview Round 2: \xc2\xa0(64 min)

There was only 1 interviewer which is held on MS teams.He asked me the famous problem of LRU Cache in a different way but finally it means the same. I explained \xc2\xa0 \xc2\xa0him \xc2\xa0all the approaches that I remember and the interviewer is also giving me tips in between when he feels I am stuck.

There is No **HR Round.**

Finally the official results were declared by our Placement cell after 9 hours \xc2\xa0and to my surprise \xc2\xa0I was one of the 20 candidates shortlisted for Microsoft SDE.

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Microsoft Interview Experience for SDE (Off-Campus)

- Difficulty Level :\nBasic
- Last Updated :\n01 Apr, 2021

I applied to Microsoft\xe2\x80\x99s Off-Campus full-time SDE drive on their career website. After a week I received a link for the exam.\xc2\xa0

Round 1(Online test): This round consisted of three questions for 90 mins.\xc2\xa0

1. Basic string question based on encoding decoding.
2. Find the length of longest sub-sequence of a given sequence such that all the elements of the sub-sequence are sorted.
3. A dp problem (I don\xe2\x80\x99t remember).

Round 2 (WIT Hackathon): In this round, I was asked to pick a topic from a list, and I was asked to develop a web application based on the topic I picked. An employee from Microsoft was assigned a mentor. There was an initial doubt clearing session then a small meeting with a mentor to discuss my idea and implementation and a final meeting to demonstrate our final product. I used HTML, CSS, and python (flask) to build the application. \xc2\xa0 \xc2\xa0\xc2\xa0

Round 3 (Technical Round):

1. Tell me about yourself.
2. Then some questions related to my projects.\xc2\xa0
3. How to reverse a stack. (First I came up with a solution using an extra array. But, the interviewer wanted me to not use any extra space. Then I came up with a solution using two recursive functions. I was asked to implement this. Then after a short discussion about its time and space complexity interviewer asked me to come up with implementation such that it uses o(1) extra space and its time complexity is o(n) to reverse a stack. I came up with a solution using a linked list and implemented it.)
4. Do you have any questions for me?

Round 4 (Technical Round):

1. Tell me about yourself.
2. Then some questions related to my projects.\xc2\xa0
3. What are deadlocks and how to prevent them?
4. What is the difference between mutex and semaphore?
5. Given time find the angle between the minute and hour hand.
6. How will you implement undo and redo option using the data structure? \xc2\xa0
7. Do you have any questions for me?

The next day HR called me and told me that I was selected \xf0\x9f\x99\x82

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Microsoft Interview Experience for SDE-I (1+ Year Experienced)

- Difficulty Level :\nEasy
- Last Updated :\n31 Mar, 2021

Hiring for Azure Networking team

Round 1(1 hr): This is a coding round that happened on Microsoft teams with SDE-II. In this round, two coding questions and few cs fundamental questions were asked about which I have mentioned below.\xc2\xa0

1. https://www.geeksforgeeks.org/find-maximum-path-sum-two-leaves-binary-tree/. Follow up on the same question, find the path also.
2. https://www.geeksforgeeks.org/length-longest-palindrome-list-linked-list-using-o1-extra-space/

CS Fundamental Questions:

1. What is thrashing?
2. What are semaphore and mutex?
3. What is the page fault?
4. What are process and thread and their difference?

They mostly focus on your thinking approach and how you\xe2\x80\x99re solving a given problem and the optimal solution is expected. Answering CS Fundamentals is a plus point.

Round 2(1 hr): This is also a coding round that happened on Microsoft teams with SDE-II In this round also two coding questions and few cs fundamentals were asked about which I have mentioned below.

1. https://www.geeksforgeeks.org/find-number-of-islands/
2. https://www.geeksforgeeks.org/a-product-array-puzzle/

\xc2\xa0CS Fundamental Questions:

1. Can two infinite loops run parallelly on a single core machine?
2. How you detect a memory leak in an application?

Round 3(1 hr): This is also a coding round which is supposed to happen but my previous two rounds went well so they skipped this round and directly send it to the hiring manager round.

Hiring Manager Round(1 hr): This is the hiring manager round and this is the last round.

1. Asked about work I have done in my previous organization grilled a lot about same.
2. Design a cache system mostly concentrated on low-level design but also asked few questions regarding high-level design too

Result: After two days I called HR and I got selected.\xc2\xa0

My Approach to solving Coding Questions: For each question,

1. First I have gone through the question and cross-checked whether I have understood the question properly or not If I find any disconnect then I asked the interviewer and got clarified.

2. While thinking about the logic I used to think loud so that he can come to know what I\xe2\x80\x99m thinking.
3. Once I got the logic I used to check for the given Input.
4. Then I used to discuss the same with the Interviewer and once he got satisfied with the logic then he asked to code the same.

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Microsoft Interview Experience for FTE | Off-Campus 2021

- Difficulty Level :\nHard
- Last Updated :\n07 Oct, 2021

I got an email from **Microsoft University Hiring** team to apply for a particular Job Id. I applied for that through the Microsoft Careers Page. There were a total of six rounds. I will be sharing a detailed explanation of all the rounds. This was the off-campus hiring so I am unaware of the total number of people who participated and who got the offer.

Round 1(Online Round): 6th Feb 2021

The test was conducted on the Mettl Platform. There were 3 coding questions and the duration of the test was 90 mins. I completed all three of them.

Results of this round were out on 8th Feb 2021.

Round 2(Hackathon): 9th Feb 2021 11:00 am IST to 11th Feb 2021 10:00 pm IST

For the next steps we have to submit a working prototype of a website/app based on any one of the following themes:

1. Women Safety App
2. Women Health and Fitness App
3. Job Search App
4. The Family App
5. Personal Assistant to the working professional

This was individual participation and not in a team. We were assigned a mentor who was guiding us about what they were looking for and saw the progress we are making throughout the program. The idea was judged based on:

1. Uniqueness of Solution
2. Technical Achievement
3. Code Quality
4. Relevance to Theme.

I opted for the Job Search App. I made a dedicated Job Portal for Blue Collared Workers to which I added some unique ideas (tutorial for basic work done by blue-collar about collar about workers). They basically wanted to judge how innovative our solution is and how we are implementing it. How we plan it in 3 days and how much we achieve our planning. I completed my work in time and submitted it with documentation (presentation explaining each section, demo video, flow chart showing flow of the website).

Round 3(Hackathon Interview): 16th Feb 2021: 1hr \xe2\x80\x93 1.5hr

This interview was regarding the prototype we submitted. The interviewer was working in Microsoft for 2 years and had a total experience of 6 years in the IT industry. \xc2\xa0I was asked about the tech stack used and why that particular tech stack. We also discussed the difficulty I faced while progressing with the app. I showed him the demo through the hosted website which I built as part of the hackathon. After that, he saw all the documentation. I used Reducer in my hackathon website. He discussed it.

He then asked me if I ever worked as a team to which I answered a YES. He then asked me:

\xe2\x80\x9cWas there any point while working in a team where one or more of the teammate(s) was not working? What steps did you take as a team member?\xe2\x80\x9d I answered this using the STAR method.

He then asked how prepared I was for the DSA Interview. I rated my preparation to 9/10. He asked me some DSA questions:

1. Detect the middle element of Linked List.
2. Detect loop in a Linked List.
3. Hashing and Collision.
4. Binary Tree and Binary Search Tree difference.
5. Types of traversals in trees.
6. LCA in a Binary Tree.
7. LCA in Binary Search Tree.
8. Inorder Successor of the Tree.

I was asked about approaches to all the problems and was asked to code some of them.

The result of this round came on 23 Feb 2021.

Round 4: Tech Interview (25 Feb 2021: 45min)

1. The interviewer was working in Microsoft for 4 years and had a total of 10 years of experience in the IT industry. The interviewer had a glance at my resume and asked about my internship. Then he asked me to explain any one of the projects. I told him about my Smart India Hackathon Finale project. This discussion went on for 15mins.
2. He then asked me a question: Write to Rearrange characters in a string such that no two adjacents are the same.(https://www.geeksforgeeks.org/rearrange-characters-string-no-two-adjacent/)
3. I first explained to him the approach using 2 to 3 test cases. I was asked to code it. He asked me about the space and time complexity of the solution. If I got stuck at any point the Interviewer was helpful and gave hints. My solution used a priority queue so he asked me why there is an overhead of O(log n) in the priority queue (C++ STL). I answered telling him that it heapifies the heap every time we insert or delete the element in the priority queue.
4. In the end, he asked me if I had any questions for him. I asked him 2-3 questions.

The result for this round came on 11 March 2021.

Round 5(Design Round): 17 March 2021: 30min

The round started with a brief introduction about me and the interviewer too. The interviewer was a senior person and was working with Microsoft for more than 25 years. As I mentioned my experience in web development he asked me a question:

1. When we go to any e-commerce website and view a particular item that similar items appear as ads when we browse through our social media account. How does this happen? Design a scalable system for it. I answered this question using machine learning algorithms and how these algorithms work in the background. He was not satisfied with my answer as he was expecting how data was collected using cookies etc. I didn\xe2\x80\x99t know this in-depth.
2. He gave me the next question: If you go to the IRCTC website for ticket booking it sometimes shows a timed-out. What does this mean? I explained to him why and how time out occurs. He asked me to design a system to overcome this problem. I answered him that we will do horizontal partitioning. He then asked what problems we can face in this. Then moved to consistent hashing and why it\xe2\x80\x99s not an optimal approach. I gave a final solution that we will use microservices architecture. He seemed satisfied and asked in detail what microservices architecture is.

He asked if I had any questions for him. During this, he told me he is an avid reader. Our discussion went to what kind of books we have been reading so far. He suggested two books to me to read.

Round 6(HR Discussion): 22 March 2021-15min

1. HR called me in the afternoon to set up a meeting in the evening to which I agreed. I was nervous a bit. We started the call with how our day was. She introduced herself and then I introduced myself. She then asked me about my family background. Then she asked me my college name. I told her. She said we will be sending an email to them about my offer as Full Time SWE at Microsoft and then congratulated me (I wanted to jump off my chair and dance but for time being I had a big smile on my face). She discussed the compensation and told me about the next process.

Preparation and Tips:

1. DSA: GfG and Leetcode. Before the interview, I read 6-7 pages of interview experiences in Microsoft archives in geeks for geeks.
2. System Design: Gaurav Sen videos and Leetcode article.
3. Have a clear understanding of the programming language and Data Structures. Know the internal implementation of library functions (in my case it was STL in CPP).
4. Be confident about yourself and your resume.

All the very best.

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Microsoft Interview Experience for Software Engineer-2

- Difficulty Level :\nMedium
- Last Updated :\n24 Mar, 2021

Round 1:

1. Implement a Delay Queue.

Round 2:

1. Given an array with integer elements(zeroes and non-zeroes included). Push zeroes to the end of the array (in-place).
2. Explain ACID with real-life examples.

Round 3:

1. Perform matrices multiplication.

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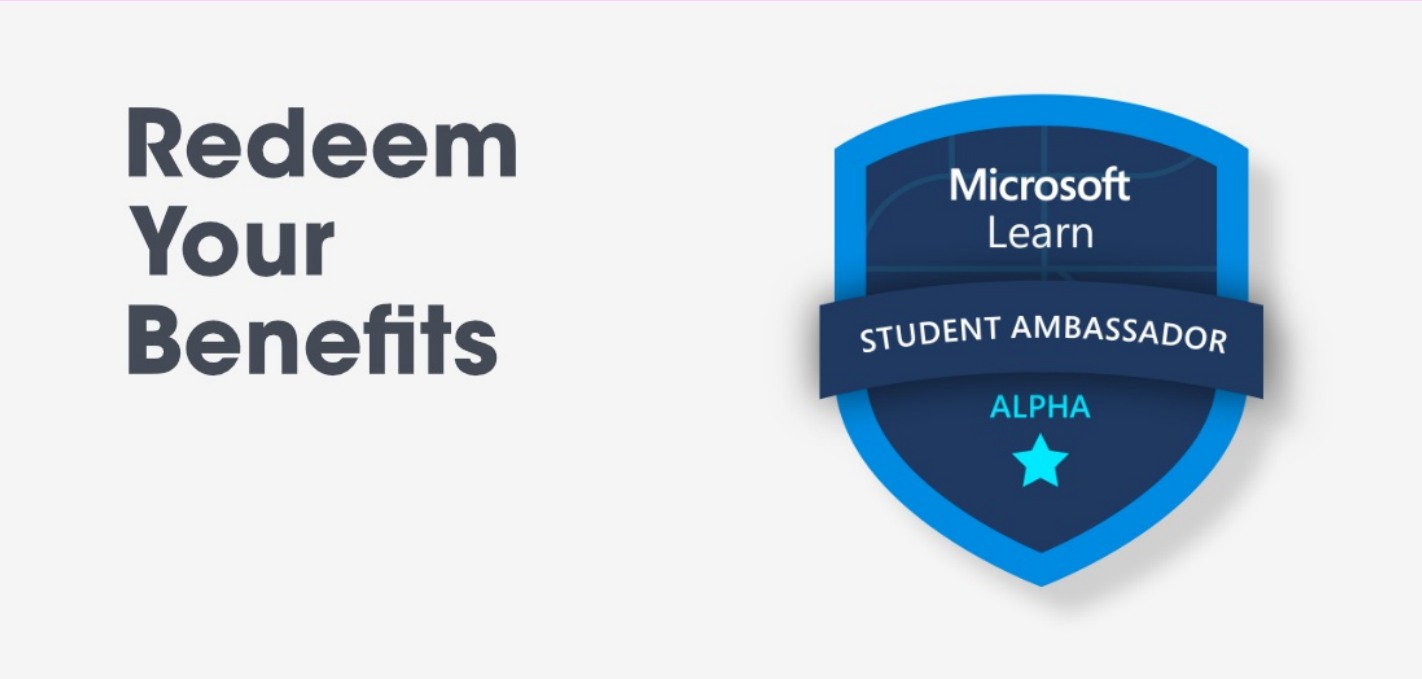
Microsoft Learn Student Ambassador \xe2\x80\x93 Redeem Your Benefits At Alpha Level

- Last Updated :\n22 Mar, 2021

Microsoft Student Partners who complete a Microsoft Learn path can unlock Azure credits with Visual Studio Enterprise subscription benefits. Also, LinkedIn learning is activated. In the following article, we will discuss both the benefits along with the process to redeem those benefits.



Many students don\xe2\x80\x99t know about the procedure to redeem their benefits. First of all, an MSP or MLSP (Microsoft Learn Student Ambassador) should always check his/her Student Ambassadors Outlook email account for all kinds of updates. Now, this Outlook email is new to many students but all they have to do is check for Outlook email on any search engine and log in using their Microsoft Learn student ambassador account only.

Now, let\xe2\x80\x99s discuss all the benefits an Alpha Microsoft Learn Student Ambassador gets. Also, let\xe2\x80\x99s analyze how one can use these benefits.

1. \xc2\xa0They get USD 150 monthly azure credits and a Visual Studio Enterprise subscription. Benefits of that are listed below:

- You will have your azure storage where you can host your own static website in a cost-effective and scalable way.
- You can even deploy your first ASP.NET web app to Azure App Service which is a scalable and self-patching web hosting platform.
- You can even customize and control every aspect of your web server with a secure, compliant, and reliable Linux or Windows Virtual Machine because it\xe2\x80\x99s independent of the OS you are using.
- Make sure to take advantage of azure to execute your heaviest Python queries in seconds using PostgreSQL.
- **Please make sure you check your outlook inbox as it contains all the necessary information to start with the subscription.**

2. Microsoft Technology Certification exam voucher. Benefits of that are listed below:

MTC exams are the starting point for students who are looking to start a career in artificial intelligence, data science, and cloud computing. MTC includes AZ-900 Microsoft Azure Fundamentals, MS-900 Microsoft 365 Fundamentals, MB-901 Microsoft Dynamics 365 Fundamentals, and AI-900 Microsoft Azure AI Fundamentals, DP-900 Microsoft Azure Data Fundamentals, and PL-900 Microsoft Power Perform Fundamentals.

When you would reach alpha level then after 7 to 14 days you would get a mail-in which you will get your voucher code through which you will register for the exam which is absolutely free for you.

The exam center address would be provided after registering for the exam.

Note: Redeem your voucher before it gets expired and make sure you check the dates provided on the official mail.

3. StudentAmbassadors.com domain name. Benefits of that are listed below:

Domain names can be used to establish a unique identity in cyberspace. It helps to build credibility on the web and enhances your promotion chances and therefore your site\xe2\x80\x99s \xe2\x80\x9cvisibility\xe2\x80\x9d on the Web. Domain names produce a feeling of professionalism.

When you would reach alpha level then after 7 to 14 days you would get a mail-in in which you will get the information required to create your domain name. Make sure you click on the link provided inside the mail and for reference please visit the following link: *https://www.name.com/microsoft*

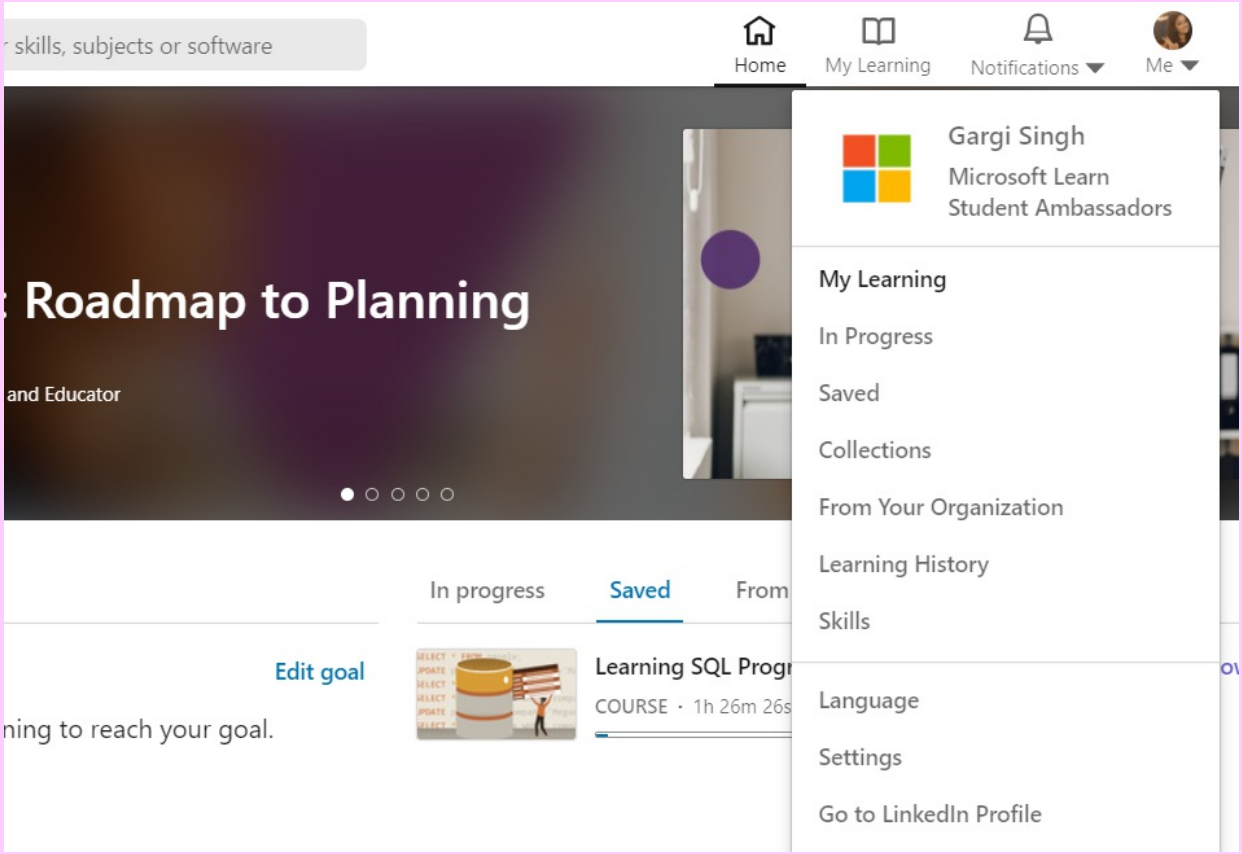
4. Techsmith Snagit and Camtasia software. Benefits of that are listed below:

- TechSmith screen capture software and solutions are perfect for anyone who wants to create and share images and videos for better training, tutorials, lessons, and everyday communication \xc2\xa0\xe2\x80\x93 so make sure to use this gift as many ambassadors don\xe2\x80\x99t even know about this advantage.
- Camtasia records your screen and edits videos with a powerful, yet easy-to-use video editor to create professional-looking videos.

5. LinkedIn Learning Subscription. Steps to activate LinkedIn Learning subscription are listed below

Now here comes the benefit which is very much beneficial to all the students and learners and most of the MSPs eagerly wait for this benefit.

- After the LinkedIn Learning workflow is triggered, you will receive an email from Microsoft via LinkedIn Learning messages-noreply@linkedin.com. The subject of the email will be **\xe2\x80\x9cUnlock access to your LinkedIn Learning account benefit\xe2\x80\x9d**.
- The email will be sent to your @studentambassadors account and the activation link in the email will be valid for 30 days from the send date.
- In the email, click the blue button ***Get Started***. If you are not already signed in LinkedIn, you will be prompted to enter your sign-in credentials.
- On the right side of the page, click From your org to display the material (collections) recommended by the Student Ambassadors program.
- Please activate your account within 30 days of the email received for LinkedIn learning.



If you are stuck with any of the steps above please feel free to reach out to any ambassador across the globe using Microsoft Teams. Everyone will try to help you and it\xe2\x80\x99s a really good platform to resolve all your queries.

Make sure you redeem all your benefits before they get expire because most of the benefits have a certain time associated with them for activation\xe2\x80\xa6!!

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Technical Overview of Microsoft Mesh

- Last Updated :\n22 Mar, 2021

Mesh is Microsoft\xe2\x80\x99s vision for the future of mixed reality. Mesh is a team platform that allows you to have shared virtual experiences on a variety of devices which was launched on March 2, 2021, during the Microsoft Ignite 2021 event.

Why is there a need for Mixed reality?

Mixed Reality is a blend of physical and digital worlds, unlocking the links between human, computer, and environment interaction. In simple terms, it allows users to create a new environment where there is co-existence of both digital and physical objects.

The applications of MR are growing widely day by day from being applied to remotely provide support to construction workers to act as a tool for virtual testing for engineers. One of the popular examples that proves why we need MR is in Healthcare. In this sector, MR can be used by doctors to practice surgeries and gain better data visuals without any harm or risk to human life. Another example of MR is acting as a key tool for rendering physical objects of the real-world in the form of 3d holograms thereby reducing the cost of resource acquirement and utilization.

MR is needed mainly in the manufacturing sector where it allows users to view types of equipment in their digital version by pointing their devices accordingly.
Technical training can also be provided by using *holoportation* supporting devices or headsets. Thereby MR is needed to provide training and manufacturing solutions at reduced repair times and low-cost solutions.

To brief it up, MR bridges the gap between AR and VR. Its unique concept pushes the industries for the betterment of their solutions in all dimensions.\xc2\xa0

What are the underlying problems while creating mixed reality and the role of Mesh in it?\xc2\xa0

Some underlying hard problems that prevent developers from creating these immersive experiences are notably:

- A lot of time and resources are needed to represent users in MR with pertinent realism.
- A non-trivial problem is to keep a stable hologram in a shared MR space.
- Bringing hi-fi 3D models to support file formats is a pretty tough task.
- A complex job in geographically distributed MR sessions is to synchronize actions and expression.

These are some challenges developers face for enabling MR experiences which Microsoft Mesh aims to unravel.
The biggest application of Mesh is in Education. This tech furthers our ability to demonstrate conceptual models in STEM far better to casual audiences. Bridging that scientific literacy gap is crucial nowadays.

Furthermore, while learning medicine advanced *visuospatial* perception is often required\xe2\x80\x94be it for assessing organ placement during surgery, or understanding physiology at the cellular level.

To quote Langston, \xe2\x80\x9cEngineering or medical students learning about electric car engines

or human anatomy could gather as avatars around a holographic model and remove parts of the engine or peel back muscles to see what\xe2\x80\x99s underneath. Colleagues could simply get together and chat in a shared virtual space, or companies could use Microsoft Mesh-enabled apps to offer virtual all-hands meetings or training to employees around the world.\xe2\x80\x9d \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0\xc2\xa0

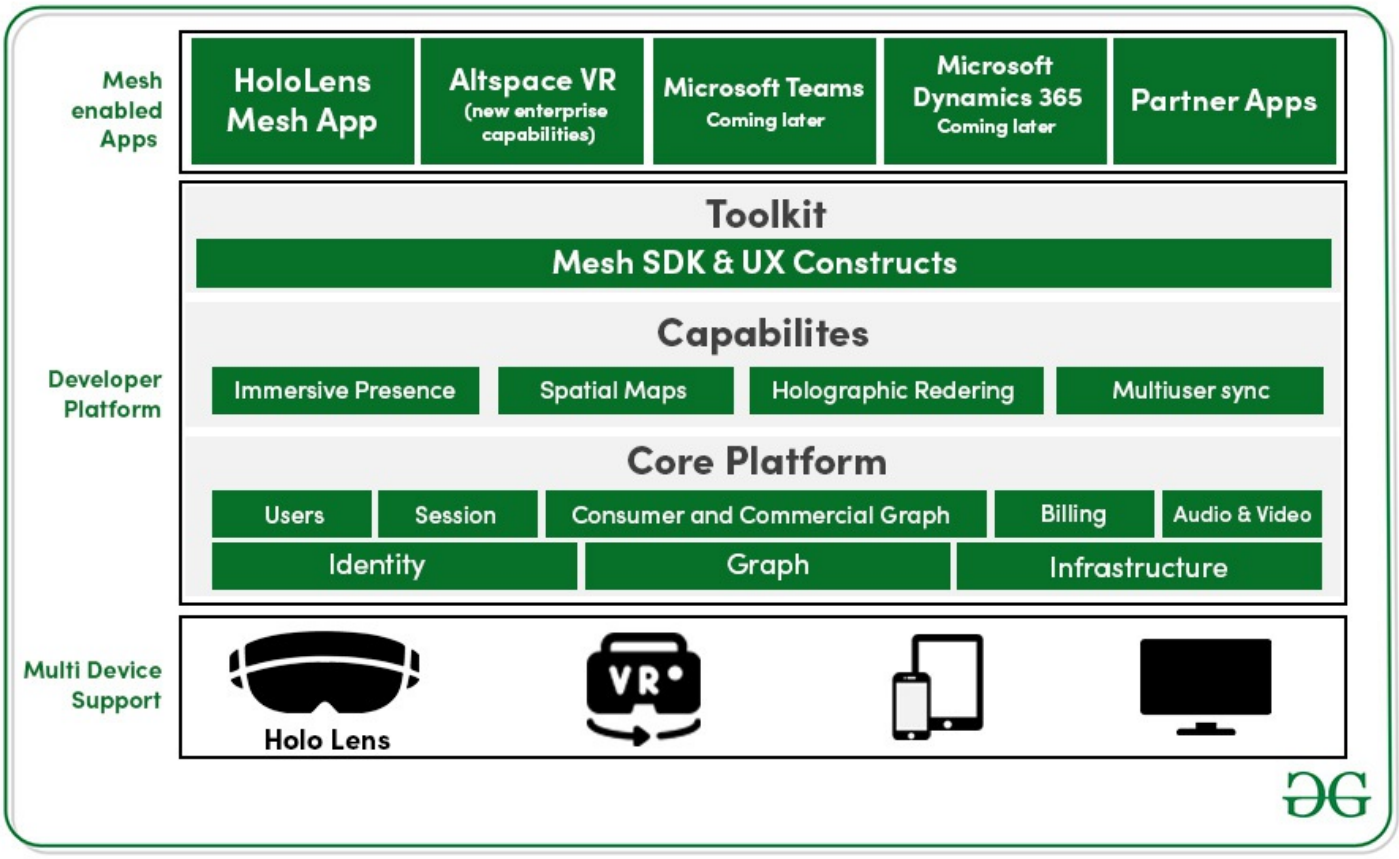
Excluding the technical jargon, What actually is Microsoft Mesh?

A mesh proof-of-concept version of Pok\xc3\xa9mon Go (Image Source: Microsoft/Niantic)

\xe2\x80\x9cYou can actually feel like you\xe2\x80\x99re in the same place with someone sharing content, or you can teleport from different mixed reality devices and be present with people even when you\xe2\x80\x99re not physically together,\xe2\x80\x9d explains Microsoft\xe2\x80\x99s Alex Kipman, the inventor of Kinect and HoloLens.
If you have been waiting for a science fiction tech or mixed reality product like Tony Stark has, then Mesh is the one you need to keep your eyes on.

According to Microsoft, **Holoportation** is a technique that allows users to appear as avatars of themselves in space. Microsoft Mesh is said to support *holoportation*. Though *holoportation* allows only the creation of avatars, Microsoft promises communication between people in their photorealistic forms.

Mesh has been regarded as the greatest and most innovative product in the field of AR and VR. Let\xe2\x80\x99s check out the core components of Microsoft Mesh.



Mesh-enabled Apps:\xc2\xa0

- **HoloLens2:** With its immersive mixed reality capabilities, HoloLens 2 and its Mesh App can connect and co-create with others from the comfort of wherever you\xe2\x80\x99re working.
- **VR Headsets:** Using VR Headsets, you can meet, share, and work with other users in virtual spaces with Mesh.
- **PCs and Mobiles:** You can join Mesh-powered meetings and design sessions using your very own PCs and smartphones.
- **Mesh-enabled apps:** On top of the development platform, Microsoft Mesh also delivers some app experiences that bring the platform alive.\xc2\xa0

  \xc2\xa0

Developer platform:

Mesh is enabled by a comprehensive platform and a collection of tools. The heart of this developer platform is Azure.
\xc2\xa0The *HoloLens 2 Mesh* app and *AltspaceVR* are instantiations of the collaborative experience Mesh can light up for immersive headsets.\xc2\xa0

\xc2\xa0As a developer, you don\xe2\x80\x99t need to worry about core infrastructure around billing, audio/video transmission, and the underlying live-state management capabilities because of the presence of services like Azure Active Directory and Microsoft Graph.\xc2\xa0 The following are the capabilities of Microsoft Mesh:

1. **Immersive presence:** The Mesh platform, with its AI-powered motion models to capture motion and expressions, comes with an avatar rig and a customization studio, so you can use the out-of-the-box avatars that represent participants depending on devices they\xe2\x80\x99re joining from. It also enables the most photorealistic 360o *holoportation* with outside-in sensors for life-like representations.
   \xc2\xa0

2. **Spatial maps:** This framework enables content to be anchored, device point-of-views to be shared, and 3D models to be collaborated on thereby enabling Mesh to have a global understanding of the space/environment the user is in.
   \xc2\xa0
3. **Holographic rendering:** This gives the flexibility to design apps that can optimize for latency vs fidelity depending on the device and natively rendering 3D file formats in Mesh-enabled apps.
   \xc2\xa0
4. **Multi-user sync:** Creating a common perspective of the hologram and each other within a collaborative session is augmented with spatial audio in Mesh that creates a sense of being in the same physical space in a multi-user scenario.
   A **cross-platform developer SDK** by Mesh to leverage the capabilities and core platform feature thereby providing the developers the freedom to work on platforms of their choice like \xc2\xa0Unity alongside native C++ and C#, and upcoming support for Unreal, Babylon, and React Native.

   \xc2\xa0

Multi-device support:

This product is built on Microsoft Azure, enabling developers to build immersive, multi-user, cross-platform mixed reality apps.

Mixed Reality is going mainstream across consumers and commercial, liberating screen-bound experiences into instinctual interactions in your space, among your things, with your people. Microsoft Mesh feels like a science fiction movie come to life with its mind-blowing design. While a lot many product-based companies are working on innovations MR solutions, Mesh has proven to be the next big thing.
\xc2\xa0Mesh uses AltSpace VR, a social network that came out back in 2017, to help create virtual avatars for users. Mesh will soon be integrated with Teams thereby providing a far more futuristic call than any other team meeting platform.
To experience the Mesh MR, all you have to do is wear a HOLOLENS 2 headset, enter a virtual meeting, and you\xe2\x80\x99re in for the ride!
All the participants in the virtual meeting can take up a virtual avatar, and it would feel like you all are in the same room together. The pandemic has resulted in enforcing tech innovations to greater heights and mesh was one of them. Microsoft is also making Mesh available on a variety of devices, including the HoloLens 2, most virtual reality headsets, tablets, smartphones, and PCs.

Mesh Virtual avatar in \xc2\xa0MR meeting (Image Source: Microsoft)

Powered by the computing and AI capabilities of Azure, Mesh is also designed to allow architects, designers, and engineers that handle 3D modeling and design to work together across the globe. Despite the advancement, Mesh has its own set of difficulties like the cost of VR headsets, HOLOLENS 2.Another thing is that actions like jumping from a 2D screen are possible, the experience isn\xe2\x80\x99t immersive enough in the headset.
From having a virtual MR meeting on Teams to a virtual concert to an MR gaming experience, the possibilities are limitless. But the reality and success of Mesh depend on the way Microsoft markets its technology and overcome the limitations mesh currently faces.
\xc2\xa0

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Microsoft Interview Experience for SDE-2

- Difficulty Level :\nHard
- Last Updated :\n17 Mar, 2021

Round 1(Problem-Solving Round): Questions

1. Linked list
2. Render
3. Dispatcher
4. Aggregation and composition
5. GPU Programming
6. Trees, Binary tree, BST
7. Convert a Binary Tree into its Mirror Tree \xe2\x80\x93 Complexity, test cases
8. Boundary Traversal of binary tree \xe2\x80\x93 Complexity, test cases
9. Threads
10. Semaphore
11. Mutex \xc2\xa0
12. Challenges faced while coding
13. Rest my current project related questions

Round 2(Design Round): Questions\xc2\xa0

1. Visitor Pattern
2. Singleton
3. Static
4. Singleton vs Static \xc2\xa0
5. Any other approach for logging other than singleton and static
6. How singleton is tightly coupled
7. Inheritance vs Association class \xe2\x80\x93 which one to choose \xe2\x80\x93 IS-A relationship choose inheritance, HAS-A choose association
8. Events
9. Logger design \xc2\xa0
10. Db Design \xe2\x80\x93 He gave me different scenarios and asked me to design for the same
11. No sql based db design
12. Challenges faced while designing
13. UML association
14. Rest my current project related questions

Round 3(Managerial Round): Questions

1. Strengths
2. Weakness
3. Challenges faced
4. Willing to relocate
5. What kind of work are you looking for
6. Why do you want to switch? If you will get similar work then what will you do
7. Swap linked list in pairs
8. MOQ, NUnit
9. Challenges faced, Complexity handled
10. Rest my current project related questions

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Microsoft Azure \xe2\x80\x93 Working with PowerShell in Cosmos DB

- Last Updated :\n26 Jan, 2021

Azure Cosmos DB is a fully managed NoSQL database for build applications designed by Microsoft. It is highly responsive, scalable, and fully automated. **Azure Cloud Shell** is an in-browser terminal used to manage cloud instances in Azure. The **PowerShell** is an application used for the same purpose but is installed locally.

In this article, we will look into Azure Cosmos DB with PowerShell where we will create a new Cosmos DB account, a database, and a container with PowerShell. Here we\xe2\x80\x99ll use the Azure Cloud Shell, and you can also use a local installation of **PowerShell**.Some of the operations that you can perform using PowerShell in Cosmos DB are listed below:

- Create a Cosmos DB database
- Update Cosmos DB database
- Delete Cosmos DB database

To create a Cosmos DB database with Powershell/ Cloud Shell follow the below steps:

- **Step 1:** Before we can start, we need to install the Cosmos DB PowerShell module like with the below command:

```
Install-Module -Name Az.CosmosDB
```

At the end of the installation you need to verify again if to install the same as shown below:

```
PS /home> Install-Module -Name Az.CosmosDB

Untrusted repository
You are installing the modules from an untrusted repository. If you trust this repository, change its InstallationPolicy value by
running the Set-PSRepository cmdlet. Are you sure you want to install the modules from 'PSGallery'?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "N"): A
PS /home>
```

- **Step 2:** First, to see if it works, we will run the below command to list all Cosmos DB accounts in this resource group:

```
Get-AzCosmosDBAccount -ResourceGroupName "RESOURCE NAME"
```

This will list the accounts as shown below:

```
Tags                                : {[defaultExperience, Core (SQL)], [hidden-cosmos-mmspecial, ], [CosmosAccountType,
                                      Non-Production]}
EnableCassandraConnector            :
EnableMultipleWriteLocations        : False
VirtualNetworkRules                 : {}
FailoverPolicies                    : {cosmosdbtips-westus}
Locations                           : {cosmosdbtips-westus}
ReadLocations                       : {cosmosdbtips-westus}
WriteLocations                      : {cosmosdbtips-westus}
Capabilities                        : {}
ConsistencyPolicy                   : Microsoft.Azure.Management.CosmosDB.Models.ConsistencyPolicy
EnableAutomaticFailover             : False
IsVirtualNetworkFilterEnabled       : False
IpRules                             : {}
DatabaseAccountOfferType            : Standard
DocumentEndpoint                    : https://cosmosdbtips.documents.azure.com:443/
ProvisioningState                   : Succeeded
Kind                                : GlobalDocumentDB
ConnectorOffer                      :
DisableKeyBasedMetadataWriteAccess  : False
PublicNetworkAccess                 : Enabled
KeyVaultKeyUri                      :
PrivateEndpointConnections          :
EnableFreeTier                      : True
ApiProperties                       : Microsoft.Azure.Commands.CosmosDB.Models.PSApiProperties
EnableAnalyticalStorage             : False
```

And we can see that there is one in this resource group.

- **Step 3:** Now, let\xe2\x80\x99s create a new Azure Cosmos DB account. This will contain a database that will contain containers with documents in it. This will be an account that uses the **SQL API** to work with data. This can take a while. At this stage, the Cosmos DB account is created.
- **Step 4:** Now we need a database for the account. To do so use the below command:

```
New-AzCosmosDBSqlDatabase
```

It would result in something like below after completion:

```
PS /home> New-AzCosmosDBSqlDatabase `
>>     -ResourceGroupName $resourceGroupName `
>>     -AccountName $accountName `
>>     -Name $databaseName
```

This creates a database, and it is done.\xc2\xa0

- **Step 5:** Now, we can add a container to the database with the below command:

```
New-AzCosmosDBSqlContainer
```

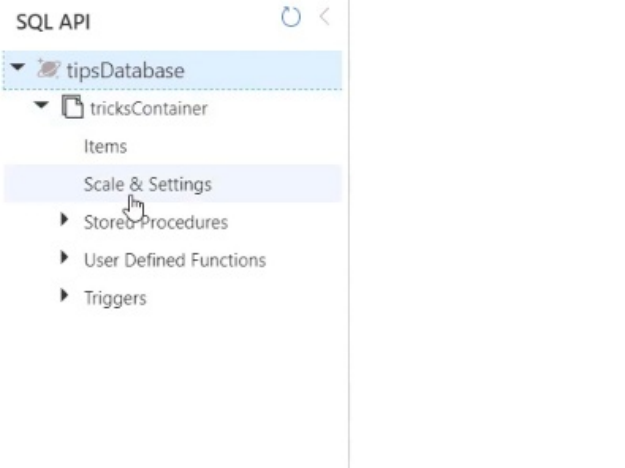
This will result in the following:

```
PS /home> New-AzCosmosDBSqlContainer `
>>     -ResourceGroupName $resourceGroupName `
>>     -AccountName $accountName `
>>     -DatabaseName $databaseName `
>>     -Name $containerName `
>>     -PartitionKeyKind Hash `
>>     -PartitionKeyPath $partitionKeyPath `
>>     -AutoscaleMaxThroughput $autoscaleMaxThroughput
```

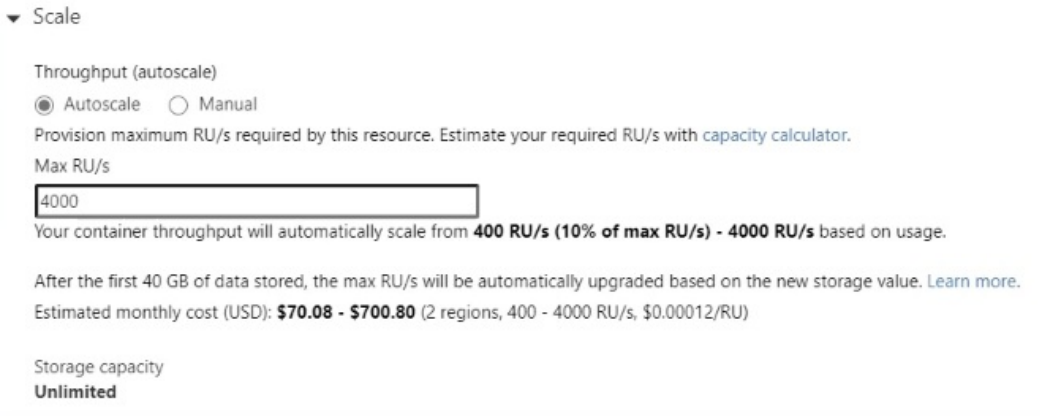
\xc2\xa0You can create multiple containers in a database, and this one would use the **Autoscale feature** as shown in the above image:

```
$ autoscaleMaxThroughput = 4000 #minimum = 4000
```

Now let\xe2\x80\x99s go to the Azure portal to look at the result. We are in the Azure Cosmos DB account in the Data Explorer. Here is the database, and under that is the container.



It also has autoscale enabled.\xc2\xa0



We\xe2\x80\x99ve used PowerShell to list Azure Cosmos DB accounts and create a new one with a database and autoscale container.

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Microsoft Interview Experience for Internship | On-Campus 2020

- Last Updated :\n18 Jan, 2021

Microsoft came for hiring in August 2019 on our campus for a 2-month Internship. I had a total of 3 rounds (1 online + 1 group coding + 1 technical Interview). Here is my interview experience for the same.

Round 1 (Coding) 90 minutes: 3 easy implementation problems based on arrays were asked out which I could solve 2 out of 3 which proved to be sufficient to be qualified for the next round.

Round 2 (Group Coding) 30 minutes: All the candidates were given two questions Multiply Large Numbers represented as Strings and a standard question related to trees which were supposed to write on paper within 30 minutes. Out of the 150 candidates, 30 candidates were qualified for the next round.

Round 3 (Technical Round) 30 minutes: I was asked about my resume and projects. And one question was asked about tree traversal and the other was A Program to check if strings are rotations of each other or not.

I could not able to give an optimal approach to the problems.

Result: Rejected, I could not get to give the next rounds.\xc2\xa0

At the Tech Round I struggled a lot and also my resume didn\xe2\x80\x99t have any exciting projects or achievements to attract, that may be the reason I was not considered for the further rounds.

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Microsoft Interview Experience for SDE-1

- Difficulty Level :\nMedium
- Last Updated :\n11 Dec, 2020

One of my colleagues from a previous company at Microsoft has referred me for the SDE-1 position. And a month later they have called me and asked if I was available for an interview, and they scheduled 3 rounds of interviews on the same day with a week gap. On that day, I had 3 interviews of 1 hour long with some breaks in between. All the interviews happened online due to the pandemic situation.

1st Round: Had some small chit-chat regarding how Work from Home is going on for him and me. Later he introduced himself and asked the same.

Coming to technical questions, he asked me the algorithm and also asked me to code both this and this. Discussed the time complexities and edge cases.\xc2\xa0

Then he gave me the last 5 mins to ask any questions to him.

2nd Round: This round started without any introduction, and he directly jumped into the question. Asked me about the algorithm, and later coded it and ran it. And then he asked me to optimize it. Finally, he asked me if I had any questions.

3rd Round: This was the last round of the day. He introduced himself and asked how I reduced API response times(which I mentioned in my resume). We discussed it for 5-10 min. Then he asked about the project(can\xe2\x80\x99t share those details here) which I worked on in my prev company. Discussed use cases and complete design of the implementation. Then, he asked me a question which is similar to System Design. Finally, he asked me if I had any questions.

After these 3 interviews, that night, HR called and informed me that I was selected for the 4th and final round. He scheduled a meeting for 4 days later.

Final Round: He started off by asking me to open my mobile phone and told me to open any messaging application and type something. Then, he pointed out to look at the suggestions after and while typing a word. Then, he asked me to design that functionality for a newly bought mobile. There are multiple ways to do it using Tries and Ternary Search Tree, we discussed some of them and one in-depth. Later, he asked me about Distributed File Systems and why and when they are used. And also about how the Single Point of Failure issue handled. By this time almost 50 min was completed. Then, he asked me to write the code for Sudoku solver. I explained the algorithm and gave a walkthrough, and he was convinced. But, when I ran it the test cases were not passing due to a very small bug. This round happened for around 1 and a half hours.

Almost a week later, I received a call from Microsoft telling me that I was selected. I was more than happy. This is like dream come true for me.

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Microsoft SWE Interview Experience

- Difficulty Level :\nEasy
- Last Updated :\n10 Dec, 2020

Round 1 (Shortlisting): Had three coding questions. The level of difficulty was easy-moderate. The first question was on maps, the second on the Coin change problem but with prime numbers instead of coin values, and the third was repeated from last year.\xc2\xa0

Interview Round(December 2020): I had a single interview. The interviewer was from Redmond, having 22 years of experience. He asked me one question :\xc2\xa0

- Given an unsorted array, find the binary searchable elements in it. Binary search works for sorted arrays because the middle element is always greater than all elements on the left of it and smaller than all elements on the right of it (for arrays having distinct elements). Therefore, finding the leftmax and rightmin arrays and elements that are on positions where the leftmax and rightmin coincide with the array elements would give binary searchable elements.\xc2\xa0

The Experience and thinking process: I was lucky to have an interviewer who was really calm when explaining the question. He gave me a codility link, which is the platform on which Microsoft usually asks questions. I asked him some clarifications on the range of numbers, the number of elements in the array, and whether they can be negative or not. I proceeded to give him a trivial solution, telling him the time and space complexity for it. He then told me he wanted a O(n) solution. This is when I opened a notepad window and shared it on teams(the interview was virtual). While thinking about a solution, I made sure I was saying everything that I was thinking upon. That way he would stop me if my train of thought steered in the wrong direction. I started with how binary search works and as this was the first time I came across that question, I tried to be as basic in my start as possible. I tried telling him that elements can be searched when the partition(the middle element) is in the right position. I was typing all this on my notepad as I spoke about it. Then I took an example and showed him how it works, making separate rows for the given array, the leftmax and the rightmin, and a bool array representing the elements that are searchable. At this point, he was really impressed with my thought process and the structure with which I built my solution. I told him that now I will code it on the platform. They also want clean codes, so I started with taking the input, defining arrays with good variable names, not just \xe2\x80\x9cA\xe2\x80\x9d or \xe2\x80\x9carr\xe2\x80\x9d. Naming helped me ignore the comments as everything was clear from the code. I made the leftmax first, then the rightmin array, and finally counted the number of elements. The interviewer told me he loved my coding style. I told him all that could be done in a single loop but making three helped the code be clear to anyone seeing it for the first time. After this, he told me that running the code wasn\xe2\x80\x99t needed because he knew it looks correct. I ran it anyway and it was accepted in the first go.\xc2\xa0

Further, he asked me if I had any questions, and I asked him if he was happy at Microsoft and what factor enabled him to work for 22 years at a single place. He gave a very long answer to it. Try to be interested when the interviewer says something. After this, he told me he was done for the interview. 7 anxious hours later, I directly had my offer. Overall, a very positive experience.

TLDR? It is essential to tell the interviewer about the thinking process and your approach to the problem as clearly as possible. Solving isn\xe2\x80\x99t enough.

Preparation: I hadn\xe2\x80\x99t done a single coding problem before August 2020. I had done a basic data structure course in July 2018, and that was all. I started coding, first on **GeeksforGeeks**, then on **leetcode** and **interviewbit**. The first month was a mess. I couldn\xe2\x80\x99t do a single

question in the first week. I started with the easy questions, then to medium, and then to hard level problems. Even after the first month, I could only do some easy questions. I continued coding, looking at solutions for most questions in the beginning. I started off with top \xe2\x80\x9cmust do\xe2\x80\x9d questions on GFG, completed all of them, did some more, and then switched to leetcode. I was able to solve some easy questions, some medium ones, but the hard ones were still challenging, even after 2 months. In the third month, I gave it my all, coding from the morning till night. I tried to think about the way others approached similar problems, in the discuss section of leetcode and in the comments of GFG. Slowly, I could see myself getting better at solving. I preferred C++. My friends from CSE helped me a lot. I used to ask every small thing I couldn\xe2\x80\x99t understand, read about data structures again, and looked at solutions over and over again until I was able to do problems on my own. Finally, in the end, from August to November I had solved a total of around 800 questions, many of them over twice.

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Microsoft Interview Experience for Internship

- Difficulty Level :\nMedium
- Last Updated :\n01 Nov, 2020

Recently Microsoft has visited our campus for hiring pre-final year students for 6 months software developer internship roles. There were not so many strict eligibility criteria.

CS, IT, ECE, EE branch students having c.g.p.a more than 8 with no active backlogs were allowed to sit in the online test.

- Around 260 students sat for the first round that was an online coding challenge on mettl platform(one of the most secure platforms for taking the online tests).

Online Test(90 min): Conducted on https://tests.mettl.com/ and contains 3 coding questions with different difficulty levels \xe2\x80\x93 Basic, Easy, and Medium and carrying marks accordingly. Every student got a different set of questions, mine was:

- It was a very easy and known question of finding the nth term in a Fibonacci series.\xc2\xa0
- It was like an encoding question where we have to change every alphabet of a string to an alphabet which is 3 places ahead in alphabetical order. The question was easy having a slight tricky corner case when we encounter alphabets like x, y, and z.
- It was based on to validate a given IP Address.

Since the test was so easy so those were able to solve all three questions and having c.g.p.a greater than 9 were promoted to the next round, around 40 students were selected for face-to-face interviews.

1st Technical Interview(60-90 min): Since due to covid whole process happened virtually so our interviews took place on Microsoft Teams app, mine started at sharp 9 a.m. in the morning, Interview began with a formal introduction about me and my interviewer, then he started discussing my resume, where I have written a lot of things.

He started talking about my projects, recently I participated in the Grand Finale of Smart India Hackathon, so I have a good project to explain which benefited me a lot. He asked a lot about tech-stack used in developing the project that was React.js for client interface and Django for server interface and python for ML model, he was well impressed with the way I overcome the problems faced during the course of the project, then without wasting more time on projects he shifted to the languages and new technologies that I mentioned my resume like blockchain, this whole conversation lasted for about 20-25 min.

Then he asked me to code some standard coding questions, He asked me to share my screen and write code on any editor of my choice and language as well, I chose VS Code and c++ language.

Questions were quite easy but you have to keep on discussing each and every approach with your interviewer so that he can have a good understanding of what you are writing and to help you as well where you stuck.

- To find the middle of a singly linked list.
- A program to check if a binary tree is BST or not or \xc2\xa0A program to check if a binary tree is BST or not.

He has more focus on the time complexity of the programs not on space and told me to optimize my

code as much as I could, At the last, he was happy with my optimized approach.

Then he asked whether I had any questions from him or not and I asked a few questions and my interview ended, I was happy as it went so well.

I started waiting for 2nd interview call and within 2 hours I got the mail to join the meeting for my 2nd technical interview.

2nd Technical Interview(45 min): This round started with a good pace, he asked me to first code some problems and given me 3 questions to code, though they were easy he wanted to see my approach to solve these problems,\xc2\xa0

- To find the column name from a given column number in Excel sheet\xc2\xa0
- To reverse every word of a string without reversing the order of words.
- Question-based on Kadane Algorithm.

After going through these questions he said so let\xe2\x80\x99s start talking about your projects and resume and started discussion about my projects again in detail, then he asked many questions on Node.js as I have written it as my first priority language for web development.\xc2\xa0
Questions on DBMS, indexing in DBMS, NoSQL, and SQL database, how they both operate on data, and explanations for a large system also.

After getting answers to all these questions he asked some additional questions based on OOPS principles and Operating System basics, I answered them all, he was satisfied with the response.

Then finally he asked his last question that Do you have any questions and I asked a few about the technologies that interns will be going to work on an internship, about the work culture of Microsoft.

This round too went well.

At around 6 p.m. I got a call for HR interview (the final round**)**

HR Managerial Interview(30 min): This was the most mind relaxing and chill interview, HR used to ask about myself, my hobbies, my family background, and all those stuff. Then one more person joined the meeting I thought one of the head managers of the company he asked me some technical questions like to find the least common ancestor in a binary tree and some technical questions based on my projects I answered them all.

Then HR wanted me to explain one of my good projects to him, I explained my SIH project to him, and he was happy with that.

The interview ended with some questions from my side about the culture at Microsoft.

Note: At last 22 out of 40 students has been selected for SDE Internship at Microsoft

Some tips

- Be confident throughout the process and if somehow you got stuck ask for some hints from your interviewer. He will love to help you.
- Practice as much as you can of coding questions from any of the trusted sites, I suggest go for GeeksforGeeks, they have the perfect set of questions for every company
- Go through all the past experiences of the company that you are going to give an interview to (All these stuff are available on GeeksforGeeks)
- At last prepare with some questions to be asked from the interviewers at the end.

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Microsoft Interview Experience for Associate Consultant (On-Campus)

- Last Updated :\n29 Oct, 2020

Due to covid-19, this year\xe2\x80\x99s hiring procedure was purely online. The eligibility criteria this year was as follows:

1. **Undergraduate CGPA- 7.5**
2. **Class XII- 80%**
3. **Class X- 80%.**

There were 90 students from my college who were eligible for the online test. There were four rounds in total:

- Online Test
- Technical Interview I
- Technical Interview II
- HR interview

Online test: This comprised of four sections namely **aptitude, computer fundamentals, coding, essay writing.** The aptitude was a pretty average level. If you\xe2\x80\x99ve been preparing aptitude for campus placement, it should suffice for it. Computer fundamentals included MCQ questions on concepts of OS, DBMS, DSA, CN, OOP, SE. The coding round had 2 coding questions of easy to medium level.

All the sections were timed and had sectional cutoff.\xc2\xa0
The results came in like 10 days.

Of the 90 students that appeared for the online test, 22 qualified for the first technical interview.

Technical Interview I: The interviewer mostly asked questions related to your resume and some standard core subjects you did in your second or third year. You were judged not just amongst your college students but with students of other colleges as well because the panel was taking interviews of students of many colleges on the same day.

It started with a brief introduction of yourself, an explanation of your internships and projects, and then questions were asked from OS, DBMS, OOPS, and some easy level code using any language of your choice.
\xc2\xa0

You can also expect a few questions on the concept of SDLC. Some students were even asked a few concepts of Automata and Computer Graphics and some standard puzzles like 3 switches and a bulb.\xc2\xa0

The interview lasted for an hour or an hour and a half.

Of the 22 students qualified for Technical Interview I, 13 qualified for Technical Interview II.

Technical Interview II: For most of my batch mates, it was more of a managerial round that lasted for 15-20 minutes where you were given certain situations and you had to answer what would you do in that case.

But my second technical interview lasted for around 50 minutes and was purely technical wherein the interviewer asked me in detail about my project and internships, and then asked me about the concepts of cloud (basically why we use it and various services like IAAS, PAAS, SAAS) and things related to Microsoft Azure (this was not a part of my resume).\xc2\xa0
Since my project was done using Deep Learning and Computer Vision, the interviewer also asked me how I could use it to help in the present scenario of Covid-19 and that how can people in rural areas benefit from it.

Of the 13 people qualified for Technical Interview II, 10 qualified for HR interview.

Final Round(HR): This was a typical HR interview where you were asked to tell about yourself and where do you see yourself in 5 years and similar other standard HR questions.
I was asked about cloud computing and some OOP concepts in this round as well, but almost everyone else had just 10-15 mins general HR interview.

Everyone who qualified for an HR interview got the offer and no one was eliminated.

Few keys to remember:

- Don\xe2\x80\x99t lie on your resume. If you have very little knowledge of something, do not mention it.
- Too many projects are not a very good idea as a fresher on your resume if you have not done them on your own or if you are not familiar much with the whole working of your project(even your teammate\xe2\x80\x99s part).
- Expect questions from OS, DBMS, OOP, DSA (even if you have not mentioned them in your resume).
- Do not interrupt the interviewer. In online interviews, the audio and video sometimes lag, so there might be a chance that you might sound interrupting the interviewer. General advice would be to wait for at least 3-4 seconds after the interviewer stops speaking.
- Ask questions if you have not understood what the interviewer actually wants to ask.
- Be confident and honest in what you say and never exaggerate anything.

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Microsoft Interview Experience (3+ Years Experienced)

- Last Updated :\n25 Oct, 2020

Round 1:

- Delete Nth node from the end of the given linked list.

I gave the straight forward solution and tested it in codility. Traverse first to get the length of the Linked list, and then traverse again to reach the n-k th element that needs to be removed. He asked for a better solution. Even though I could not come up with it, he only explained the approach (2 pointers).\xc2\xa0

Then we had some discussion about \xc2\xa0https://leetcode.com/problems/fizz-buzz-multithreaded/. I did not give a complete explanation, I talked about how the semaphore and locks concept can be used to solve it.

Round 2: The interviewer was friendly, and he clearly told the expectation is not the syntactically correct code, but structure and logic. He asked me to write very small methods initially, then eventually I wrote the below code.

```
MyClass maxValue(List<MyClass> arr){\r\nMyClass max = arr[0];\r\nfor(int i=1;i<arr.size();i++){\r\n if(!MyClass.greater
```

Then we had a discussion about how to improve \xe2\x80\x9cbothValues\xe2\x80\x9d method. The approach is to get min and max for each pair and then call the maxValue , minValue methods respectively on all maxs and mins. That way we can decrease no of calls made to the greaterThan method.

Round 3:

- Print a given matrix in spiral form
- Sum of two large numbers

After the code, he asked if it works for numbers that are not integers. Then can this be used for doing multiplication?

Type-ahead suggestion discussion for words then for sentences.\xc2\xa0

How to design Google Docs which multiple people are editing at the same time, he was looking for answers in terms of multi-threading. \xc2\xa0Few more random questions related to system design concepts

Round 4: This was the hiring manager round. The first 3 rounds happened on a Saturday. This round was scheduled for the following Tuesday. \xc2\xa0There were a few behavioral questions.

1. What will you do if some else takes credit for your work?\xc2\xa0
2. How will you convey to the team that you want to work on one particular project?

Then he asked me to decide on a simple API rate limiter. After a lot of discussion about the scope of the problem, I gave a queue-based approach and wrote a small block of code.

I was asked about my current pay and location and if I will be interested if they give an offer. Got to know that I got the offer the same day. There was a lot of delay in the further process.\xc2\xa0

But it was a good experience, Interviewers were very reasonable.

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Microsoft Interview Experience for SE Internship

- Last Updated :\n16 Oct, 2020

Microsoft visited our campus to hire pre-final year students for the Software Engineering Intern role.

- Around 270 students appeared for the online test.

Online Test: 90 mins

Conducted on https://tests.mettl.com/ and contains 3 coding questions with different difficulty levels \xe2\x80\x93 Basic, Easy, and Medium and carrying marks accordingly. \xc2\xa0

- Given 2 decimal numbers, x and y compute the division x/y \xc2\xa0and round it off up to 3 decimal places. Similar question- https://www.geeksforgeeks.org/program-compute-division-upto-n-decimal-places/\xc2\xa0
- Given a string, print the length of the longest palindromic substring. https://www.geeksforgeeks.org/longest-palindrome-substring-set-1/ \xc2\xa0
- There are n people standing in a queue to buy something. Two arrays were given \xe2\x80\x93 Waiting time i.e. how much time anyone would wait for his/her turn to come and time spent to get their stuff from the shopkeeper. You have to help the shopkeeper to cover as many people as possible and output the same.

Those who had solved at least 2 questions were selected for the next round. I was able to solve all of them and around 90 students were selected for the next round. \xc2\xa0

Group fly round: 45 mins

It was a pen and paper-based round. 2 questions were given, and we have to solve them efficiently and specify our approach clearly.

- Given a binary tree write a function to connect all the adjacent nodes at the same level. \xc2\xa0https://www.geeksforgeeks.org/connect-nodes-at-same-level/
- Given the arrival and departure times of all trains that reach a railway station, the task is to find the minimum number of platforms required for the railway station so that no train waits. We are given two arrays that represent arrival and departure times of trains that stop. \xc2\xa0 https://www.geeksforgeeks.org/minimum-number-platforms-required-railwaybus-station/ \xc2\xa0

Those who had solved both the problems efficiently and able to explain their ideas clearly were shortlisted for further rounds. 24 students selected for the interviews. \xc2\xa0

Technical Interview 1: 40-45 mins

The interview started with a brief introduction about myself, the interviewer told me to continue for straight 5 mins \xc2\xa0(I only prepared for 2-3 mins so I started telling about what I have done in the college\xe2\x80\xa6 So be prepared for it \xf0\x9f\x99\x82)

Then he moved on to the previous round question (2nd que of the group fly around). He had my solution and told me to validate my code for different test cases. The interviewer was trying to prove that my approach is incorrect by adding new edge cases every time but in the end, he was satisfied with the approach. He also asked about the implementation of Min-Heap since I have used it in my code.\xc2\xa0

This discussion went around 30- 35 mins then he asked me about the different technologies that I have worked upon and a little discussion about them. In the end, I asked him a few questions about Microsoft life and the culture of Microsoft.

Technical Interview 2: 50-60 mins

The interviewer was very cool, he was looking at my resume and I have written web series and cricket in the hobbies section, so he asked a few ques-

- Can you name all the web series that you\xe2\x80\x99ve watched? (He asked a few character\xe2\x80\x99s names from GOT maybe he was just checking that I\xe2\x80\x99ve watched it or not)
- Fav player in cricket and why?
- What do I do bowling or batting?

He told me since I have to manage lectures, labs, assignments, web series, cricket, and many other things so let\xe2\x80\x99s do the job scheduling problem. (https://www.geeksforgeeks.org/weighted-job-scheduling/). I took some time and came up with a recursive approach. He pointed out some edge cases that I was missing and asked me to correct them and I did so. Now he asked if I can use DP to further optimize this solution. I tried but not getting the correct approach then I asked him for help and finally, after 2 tries I was able to write it, and he seems satisfied as well. \xc2\xa0

What is a Binary tree?

What is a binary search tree?

Can you write a function to check whether a given tree is a BST or not? https://www.geeksforgeeks.org/a-program-to-check-if-a-binary-tree-is-bst-or-not/\xc2\xa0\xc2\xa0

I\xe2\x80\x99ve seen this question before but I took some time to think as if this is the first time this question came to me \xf0\x9f\x98\x89 then told him 2 approaches first the less efficient one then the more efficient one and he told me to code the more efficient one. \xc2\xa0

He asked many questions, I asked a few-

- Areas of improvement.
- Technologies that I/everybody should know.
- About work-life balance at Microsoft.

\xc2\xa0 \xc2\xa0

HR cum Technical Interview 3: 40-45 mins

The interviewer asked, What is the name of your previous interviewers? I only remember the 2nd interviewer\xe2\x80\x99s name since the 1st one didn\xe2\x80\x99t tell me his name and I didn\xe2\x80\x99t ask. She said You should have asked his name. (I made sure that I\xe2\x80\x99ll ask her name in the end) then some quick questions-

- Fav Data structure and why do you think this is your fav?
- What is an abstraction in java?
- Draw the class structure of an ATM.
- Write the methods that you have used in the class structure of the ATM machine.
- Write some strings. (Yeah you read it correctly!!!) I don\xe2\x80\x99t know what kind of ques is this but I wrote some uppercase string, lowercase string, and a string with the value \xe2\x80\x9cString\xe2\x80\x9d.

2 easy coding questions- \xc2\xa0

- Given an array of integers, find the first repeating element in it. https://www.geeksforgeeks.org/find-first-repeating-element-array-integers/ \xc2\xa0I solved this with 2 approaches first sorting then she asked to minimize the time complexity then used Hashing.
- Reverse the words in a given string. https://www.geeksforgeeks.org/reverse-words-in-a-given-string/ \xc2\xa0Again an easy one, First reverse each word one by one then reverse the whole string.

The result \xe2\x80\x93 Including me 9 were selected \xf0\x9f\x99\x82

P.S. \xe2\x80\x93 Be confident during the interview and never hesitate to ask if you are stuck. They will definitely help you out.

\xc2\xa0 \xc2\xa0 \xc2\xa0

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Microsoft Interview Experience for SDE Internship (On-Campus 2020)

- Last Updated :\n15 Oct, 2020

Recently Microsoft arrived at our campus for an internship. It was open for CSE with CGPA 7 or above and for EEE, ECE with CGPA 8 or above.

Online Test:\xc2\xa0 It was an online round hosted on https://tests.mettl.com/. There were 3 questions with a duration of 90 minutes and to qualify for interviews, one had to solve at least 2 complete and 1 partial. Every student had a different set. The questions in my set were :

1. Convert given infix expression to postfix expression. The main problem was that we are given character array instead of string in C++, so that\xe2\x80\x99s why most students found that difficult. Though I used C++17 in which there was a string.
2. Given n dice each with m faces, numbered from 1 to m, find the number of ways to get some X. X is the summation of values on each face when all the dice are thrown. This took some time but I used recursion and memoisation and it passed all test cases.
3. We are given the 2nd and 3rd term of GP. We need to find the nth term of GP accurate to 6 decimals. Except for this 6 decimal thing, this question was a cakewalk.

I completely solved 3 questions and out of 104 students, 48 were selected for interviews.

Round 1: Firstly, the interviewer asked me for an introduction, and to make me feel comfortable, he asked some questions related to my hobbies. Then we moved to the code part. He asked me to Print all possible words from phone digits

Though I earlier solved this question once, I took my time to build the solution. I explained my backtracking approach to him. He was satisfied. Then he asked to do this iteratively, after some thinking, I told him iterative one also.\xc2\xa0

Out of 48 candidates, 22 were selected for Round 2.

Round 2:\xc2\xa0 The interview commenced with a brief discussion on my DBMS project, and she asked some questions from the project. Then, she gave me a coding question based on anagrams. Precisely, the question was : we are given a set of strings, say \xe2\x80\x9cbad\xe2\x80\x9d,\xe2\x80\x9d,\xe2\x80\x9dtct\xe2\x80\x9d,\xe2\x80\x9dabd\xe2\x80\x9d,\xe2\x80\x9dadb\xe2\x80\x9d,\xe2\x80\x9dcat\xe2\x80\x9d,\xe2\x80\x9dtac' Then I need to print those strings who are the 1st occurrence of their anagram pattern, in this example, the output should be \xe2\x80\x9cbad\xe2\x80\x9d, \xe2\x80\x9ccat\xe2\x80\x9d. Initially, I came up with a brute force solution and was told to write the code for the same. Later she told to optimise it. After some brainstorming, I wrote the code of optimised version of it. Then she kept on changing the question slightly in order of increasing difficulty. I gave solutions to all questions. But in order to solve questions with optimised solutions, I took really complicated data structures which she told to simplify. Unfortunately, I was not able to do these questions using simple data structures.

Both rounds\xe2\x80\x99 duration was 1 hour and only 1 coding question was asked per round.

After Round 2, 18 were selected for the HR round from 22 candidates.

HR Round: HR round was 10 minutes long. He asked some basic HR questions. Basically, he was checking communication skills. Afterward, he asked 1 question of DBMS which I was unable to answer.

Finally, 8 students got an internship offer. Unfortunately, I wasn\xe2\x80\x99t one of them.

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Microsoft Interview Experience for Machine Learning Internship \xe2\x80\x93 2020 (On Campus)

- Last Updated :\n30 Jun, 2021

Round 1 (Written) :

62 mcq questions in 1 hour. The level of paper was tough. Only 7 were shortlisted. The questions was based on Machine learning Algorithms, probability and counting, statistics. It was conducted on Mettl. If you are able to solve 50% part, then you can expect a call.

Round 2 (Technical Interview) :\xc2\xa0

Focus : Problem solving skills

1st question was based on the trees. I was given an input and a binary tree. My task is to delete all leave nodes whose data is equal to the given input (wait it\xe2\x80\x99s not that simple, you to need to implement cascade delete in this question). I tell him the approach and it was correct. Then he told me to write the code for it. I tried and reached very close to the result but missed one condition. Then he asked few questions on neural networks, sentimental analysis. He gave me a problem that how to classify flight booking emails from other mails. I gave several ideas and approach. It was an open ended question so totally depends on the interviewer whether he likes ur idea or not. After this round 1 was over. It lasts for 50 minutes.

Tip : Practice some questions on Trees and Graphs from gfg. Also read puzzle section.\xc2\xa0

Round 3 (Face to face interview) :

Focus : Projects and Domain knowledge\xc2\xa0

he told me to introduce myself. Then he quickly jumped to my projects section and ask every project one by one in depth. He asked several thing on Neural Network, CNN, Bagging Boosting, decision trees, activation layers. How to prevent overfitting, Regularization etc. How to mix more then one ML Algorithms. How to think, which algo should we apply in any particular scenario. That\xe2\x80\x99s all about second round. It lasts for 45 min.

Verdict : None of us got selected for this profile.

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Microsoft Interview Experience (On-Campus Internship)

- Last Updated :\n17 Aug, 2021

We had Microsoft internship drive on campus for SDE and ML profiles. All rounds were online because of COVID.

Students who had 8 CGPA and above, were asked to apply on Microsoft careers website. We had a coding round for SDE and MCQ type questions for ML Profile. \xc2\xa0

Coding Round :\xc2\xa0

We had 3 questions on Mettl Platform. We had access to C++, but no access to STL. So I coded all questions in Python

1. \xc2\xa0Length of LIS \xe2\x80\x93 https://www.geeksforgeeks.org/longest-increasing-subsequence-dp-3

2. Given a set of n points, find the minimum distance of all pairs of points.\xc2\xa0

\xe2\x80\x93 Greedy solution expected

3. Given an array of n elements, find the mean, median and mode of the array.

\xc2\xa0I was able to pass all test cases in all questions. Based on the coding and ML round and resumes, we were selected for SDE/ML/Both roles. I got selected for SDE interview.

Round 1:

I was asked resume based questions (my experience working as a Research Assistant in 2019) \xc2\xa0and one coding question.

It was a variation of https://www.geeksforgeeks.org/boundary-traversal-of-binary-tree/, to print only alternate nodes.

Round 2:

I was asked about the current Research Assistant-ship I was doing, my past internship with a startup. I was asked some Search Engine related questions. I had one coding question, with an in-depth discussion

https://www.geeksforgeeks.org/minimum-number-of-squares-whose-sum-equals-to-given-number-n/

Round 3:

I was asked about the projects I was proud of, where I see myself in 5 years.\xc2\xa0

I had one coding question, we discussed https://www.geeksforgeeks.org/search-in-a-row-wise-and-column-wise-sorted-2d-array-using-divide-and-conquer-algorithm/

All the interviewers were very friendly and were patient in listening to what I wanted to say.

By the end of the day, I was offered the internship, along with others.

Thank you GFG, I was able to go through the internship experiences of others, which helped me a

lot ! Not to mention all the times, I looked up GFG for Data Structure and Algo related queries

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Microsoft Interview Experience (On- Campus)

- Last Updated :\n15 Sep, 2020

Round 1: It was an online test with 3 coding problems. All the problems that Microsoft asks are available as far as I know.\xc2\xa0

1. It was an easy matrix problem.
2. Dice Throw Problem (DP)
3. \xc2\xa0The Longest contiguous sum subarray problem(DP)

Those who did all three problems were selected for the next round.

I was one of them. But unfortunately, the company canceled its further process as there were few policies of college which company didn\xe2\x80\x99t like.

So, this was my experience.

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Microsoft Interview Experience for Internship

- Difficulty Level :\nEasy
- Last Updated :\n14 Sep, 2020

Recently Microsoft visited our campus for internships. They had a coding round which was followed by 3 interviews (2 technical and 1 HR).

Online Test: It was conducted on mettl and we had 90 minutes to solve 3 questions. Questions were shuffled for everyone but were fairly easy.

1. Given a string we need to return a string in which each character should be increased by 3 units.\xc2\xa0

   Eg.

   ```
   adz -> dgc\r\n
   ```

   The a becomes d, d becomes g and z becomes c. The only trick here was that we just had to complete the given function and they passed the string as a character pointer and so you need to see how to traverse a string represented as a character pointer.

2. Convert an infix expression to postfix expression.

3. Given a string in form of num1+num2=num3 in which one of them is X we need to find the value of X.

   Eg.\xc2\xa0

   ```
   Input : 5+X=7 \r\nOutput: X= 2\r\nInput : 7+2=X\r\nOutput: X=9\r\n
   ```

   So this was basically an implementation based question and we just needed to find out of which one of them was X and accordingly find the answer.

48 students were selected for the interviews.

Round 1: I was asked 3 questions in this round. The questions were pretty easy.

1. Find the max and min element at any point in a stack. I was asked to code it. I tried to keep the interview interactive by telling him my approach as I wrote the code. I was asked to do a few dry runs, and he seemed satisfied with my approach.
2. Reverse a string. We discussed the stack question for about 20 minutes and I told him I will use a stack to reverse it, and he didn\xe2\x80\x99t ask me to optimize it.
3. Mirror a given Binary Tree. I first told him my approach that we will use post-order traversal and then he asked me to code it.

I answered all the questions, so I was pretty confident that I will be selected for the next round.

Round 2: I was asked just 2 questions in this round.\xc2\xa0

1. Find the diameter of a tree (No. of nodes on the longest path in a tree). I had seen this question before and knew the solution so I just told him my approach and we did a few dry runs on sample inputs before proceeding to the next question.
2. Given a number N we need to convert N to 1 by performing a minimum no of operations. The

allowed operations are:

- Subtract 1 from a number.
- Divide the number by 2.
- Divide the number by 3.

Eg.

```
Input: 10 \r\nOutput: 3\r\n10->9->3->1\r\n
```

So at first, I was trying to generalize the solution by taking different cases. The interviewer asked me to change my approach and I thought of a Dynamic Programming approach.\xc2\xa0

C++

```
#include <iostream>
using namespace std;
\xc2\xa0\xc2\xa0
int main()
{
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0int n = 10;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0int dp[n + 1];
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0dp[1] = 0;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0dp[2] = 1;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0dp[3] = 1;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0for(int i = 4; i <= n; i++)
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0{
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0dp[i] = dp[i - 1] + 1;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0if(i % 2 == 0) dp[i] =
min(dp[i], 1 + dp[i / 2]);
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0if(i % 3 == 0) dp[i] =
min(dp[i], 1 + dp[i / 3]);
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0}
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0cout<<dp[n]<<endl;
}
```

Output:

```
3
```

Round 3(HR): So it started with questions like tell me about yourself. I was prepared for this question and I kept the focus on my coding skills. For me, it was a mix of HR and technical round.\xc2\xa0

So, he asked me questions on Doubly Linked List. Given a pointer to a random node of a doubly linked list. Delete the node.

We discussed all the edge cases involved, and he just asked me to code it mentally and tell him each line. He seemed satisfied. Then he asked me why I wanted to work at Microsoft. \xc2\xa0It was followed by questions on OOPS and Hashing.

He asked me what was the implementation of hashing in real life and how hashing is implemented internally. I was able to answer this but I didn\xe2\x80\x99t know the technical terms. Finally, he asked me if I had any questions for him. Never give a no as an answer to this question as it shows that you are not interested in knowing about the company.

Verdict \xe2\x80\x93 Selected

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Microsoft Codess Interview Experience

- Last Updated :\n07 Sep, 2020

In the month of March, I gave an online competition called Codess. \xc2\xa0It had some basic questions on DSA(linked list, queues, stacks, heaps). These were MCQs so you should be clear with basic concepts in DSA.

Engage-2020: When I cleared the Codess, I got into Engage 2020 which is a mentoring program organized by Microsoft. It had two projects from which we had to complete one project.

I had Tic-Tac-Toe with AI agents. In this, we used JavaScript to use the recursive functions. You can refer to the code from the link given below.

https://github.com/nitya2602/tic-tac-toe.\xc2\xa0

We had a great experience doing the project under our mentor allotted by Microsoft.

Interview: Then, we got our interview scheduled.

It was a half an hour interview. He first asked me to introduce myself, so I told him about my few projects so we discussed one of them for 10 min. Then rest of 20 min he asked a coding question:

1. Write to Rearrange characters in a string such that no two adjacents are the same.

Tips: Try to solve as many questions as possible for the interview and be interactive with the interviewer.

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Microsoft Interview Experience

- Difficulty Level :\nHard
- Last Updated :\n01 Sep, 2020

I would like to share my Microsoft interview experience in this post so that it can be helpful for the students preparing for the upcoming interviews. First of all, I would like to mention that the selection process was enjoyable and the interviewers at Microsoft were really nice and kind throughout the process.

Microsoft visited our campus IIT (ISM), Dhanbad in August 2020. The entire hiring process was virtual and, in a nutshell, consisted of 4 rounds.

Round 1(Coding Round): In this round, 3 coding questions were to be solved within a period of 90 minutes. It was held on Mettl platform. This round was quite easy and I had completed it within 20 minutes.

1. Given an integer, find the total number of set bits, first and the last set bit. \xc2\xa0
2. Given a string, find out the longest palindromic sub-sequence.
3. Given an array of integers, find the number of inversions in the array. The expected time complexity is $O(n^2)$.

After the coding round, there were 3 rounds of interview.

Round 2 (Technical Interview): This round went about for nearly 50 minutes and it was quite smooth. The first question asked by the interviewer was based on my projects, experiences, and my current work in the ongoing internships. After this, one coding question based on a binary search was asked.

- Given, a sorted array pivoted (rotated by some number) at some point, find the position of a given element. \xc2\xa0

I gave a brute force O(n) approach straight away and made it clear that I was thinking for an optimized solution. Later, I explained the O(log n) solution using binary search and was asked to write the code for the same. He found something peculiar in my code and I had to prove myself through a test case. Cross questioning on the written code was followed by a question to dry run the code on test cases where my code might fail. I suggested a test case and it failed on that. Finally, I made the corrections and the interviewer was quite satisfied. This round went pretty well.

Round 3(Technical Interview): This round went for nearly 1 hour and 20 minutes. It wasn\xe2\x80\x99t as smooth as the previous 2 rounds and I guess most of the filtering of candidates took place in this round. I was tested on my analytical, coding, and problem-solving skills in this round.

1. Why was I interested in machine learning and deep learning (which is my area of interest) and not my core branch subjects? \xc2\xa0
2. Then, 3 output questions were asked, one of them was based on pointers, another was based on recursion and storage classes. I don\xe2\x80\x99t remember the 3rd one.
3. The next set of questions were based on LRU cache. Define the LRU cache and what data structure would you use to implement it? My first approach was using queue but later on, I felt vectorized implementation along with hashing would work. I was questioned about its space and time complexity and was also asked to further optimize the space complexity. I gave a solution with optimized space complexity at the cost of time complexity. He seemed satisfied with the

solutions. Then, I was asked about a real-life example of LRU cache, I couldn\xe2\x80\x99t think of an example at that time.

4. Questions based on locked transactions in the banking sector. What will happen if 2 transactions are being made from the same account exactly at the same time? What are the different checks made by the bank to keep a check on frauds? I suggested some methods based on analytical thinking and observations from my daily life. \xc2\xa0
5. How is a URL shortened? \xc2\xa0
6. Given, an array of integers what will be the maximum OR value? Find the smallest subset that gives the maximum OR value? I solved this using dynamic programming.
7. Given a BST, find the distance between 2 nodes whose values are given. I explained the DFS approach for this by taking one element as the root. \xc2\xa0

Round 4(Technical + HR Interview): This round lasted for about 45 minutes. Questions in this round were based on the following topics:

- Operating Systems
- Data Structures and Algorithms
- Machine Learning and Deep Learning (my area of interest)
- Project-based questions
- Networking
- System Design
- HR questions

1. What were the questions which you found difficult in the previous rounds? He started cross-questioning on them. How will you develop a machine learning model that detects fraud in the bank sector? (as I had mentioned that real-life example of LRU cache and banking sector questions were challenging) After a brief period of time, I was able to answer what he exactly wanted.
2. What projects have you done? Explain them. \xc2\xa0
3. What were the challenges you faced in the college in the past 2 years?
4. How did you manage to pursue coding and machine learning being from an electrical engineering branch?
5. What have you done outside your college curriculum? (Extra-curricular + Courses pursued + Technical Experience)
6. The next set of questions were based on networking. How does a bank links an account of an account holder when an account number is entered? What protocols are used when this is done? What is client-server scripting? Some more networking questions were asked. I was not aware of the networking concepts but I kept interacting and tried to answer something based upon my knowledge of networking basics that I had learned in CBSE class 12th.\xc2\xa0
7. How will you design an elevator system? What scheduling algorithm will you use for it? I was aware of scheduling algorithms, as it is an important topic in the OS. I suggested 2 methods for it, one being priority-based (non-preemptive) and the other being SJF (shortest job first). But he asked for a solution that does not use these 2 algorithms. I suggested a 3rd one which was based on selecting a lift call that is in the path of the current destination. He asked me to suggest yet another approach. I was pretty much out of ideas, as I had given all the possible options I could think of. I suggested to him an emergency-based approach in case of emergency but I knew it wasn\xe2\x80\x99t practical and I mentioned that too. \xc2\xa0
8. How will you delete a node in a doubly-linked list? I could explain and code it with the help of my knowledge about the linked list. He was quite satisfied with my approach.

Finally, he cooled down the conversation and asked me to chill after a tiring day.

My advice to all the candidates who are going to appear for an interview in the coming weeks or months is to stay calm and confident during the entire process. You can deliver your best only when you are calm and composed. According to me, the companies not only test you on your technical

knowledge but also on, how you interact during the interview and handle a difficult situation. Students generally focus on OOPs, DS/Algo, but I think preparing on topics like Operating Systems, Networking, and System Design will be really helpful in the interview process. \xc2\xa0

The master tip to each and every aspirant is to keep interacting with the interviewer, think aloud so that the interviewer gets to know your approach. \xc2\xa0

Thank you for reading the post. Hope you might have gained some knowledge by reading it. Cheers!

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Microsoft Internship Interview Experience for SWE

- Last Updated :\n25 Aug, 2020

Online Round: My set contained the following three questions:-

1. The Largest Sum of Contiguous Subarray.
2. Evaluate Postfix expression.
3. Dice Throw DP-30

I was able to solve all three luckily. Around 20 students were shortlisted through this online test.

Personal Interview: The interview Process (organized through teams app) consisted of three rounds.

Round 1(Technical): First, the interviewer told me to introduce myself. Then a coding question was given to me related to event scheduling and I was asked to code it. He was convinced by my solution. Then he changed some constraints on the same question and asked me to approach the same.No questions were asked on my resume in this round.

Round 2(Technical): This round started with some basic discussion on my resume, followed by some networking related questions. After that, I was asked a question, which stated. Suppose you have a text file of 500mb and you only have 100mb of space to load it and a pattern is given to you. You have to search this pattern in this large file without accessing the whole file in one go. I was asked to code the algorithm. I used KMP algorithm for the same.

Round 3(Technical): First the interview asked me how I developed an interest in coding as I am from ECE branch. After that, he asked some rapid-fire questions related to machine learning as two of my projects were related to it. After that, he gave me one question related to backtracking and asked me to code it.

Question Link: \xc2\xa0Not this question exactly but it was similar to this

https://www.geeksforgeeks.org/rat-in-a-maze-backtracking-2/\xc2\xa0

This round ended with my internship related doubts.

Each round was of about 45 minutes. Interviewers were friendly enough and ready to help(except third) if we were stuck at some point.

Tips: Always try to discuss your approach first, before you write your code and if the interviewer is satisfied with your approach then code it. Be confident and loud enough while writing your code.

Verdict: Selected

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Microsoft Interview Experience | Off Campus Internship 2020 Summer

- Difficulty Level :\nMedium
- Last Updated :\n24 Aug, 2020

1. ONLINE ROUND [ONE TEST 2019] [90 mins]

- This round was open to students from all the Institutes across India.
- This round had 3 coding questions.
- Coding questions were very straightforward and were mostly implemented based on little logic required.
- One of the questions was
  - Given a JSON string find the max depth of the string.
  - Example \xe2\x80\x9ca:{b:{a:\xe2\x80\x98z\xe2\x80\x99, b:\xe2\x80\x98y\xe2\x80\x99}, c:{z:[2,3]}}\xe2\x80\x9d.
    - Here the max depth is 3.
- I was able to solve and submit all 3 questions within 15 or 20 mins.
- After a month or, so I got a call for Online Interview.

2. ONLINE INTERVIEW [45 mins]

- This round focused on Data Structures, Algorithms, and Implementation.
- Only one question was asked in this round.
- **Problem**: Implement a DS that supports 3 operations.
  - Insert
  - Delete
  - Get Random Element (Return a uniformly random element from the set of elements)
  - It is guaranteed that the elements are unique.
  - I was asked to implement DS that supports all these operations in O(1) time.
- After 15 mins or so I was able to come up with an optimal solution and was able to implement the same within 20 mins.
- After a week I received a mail for Onsite Interview.
- My Solution.

ONSITE INTERVIEW

- The interview was at Hyderabad.
- Onsite Interview consisted of 2 Rounds.
- In my batch, there were 25 students out of which 9 got selected for the Internship.

3. ONSITE ROUND 1 [TECHNICAL] [75 mins]

- This round was majorly focused on System Design but 2 DSA questions were also asked.
- **Question 1** Given a matrix find a submatrix with the maximum sum.
  - The naive solution takes O(n ^ 4) time.
  - This is a standard DP question and can be solved in O(n ^ 3) time using \xc2\xa02D Kadane Algorithm.
  - I gave both solutions.
- **Question 2** Given a row-wise and column-wise sorted matrix find a given element.
  - The naive solution takes O(n ^ 2) time.
  - Can be solved in O(n * log n) time by applying binary search in every row or column.

    - Can also be solved in O(n) time by starting the search from the top right element.
    - I gave all 3 solutions.
- Both questions were asked in the first 15 minutes of the interview and the rest of the Interview was focused on System Design.
- **Question 3** Design a Restaurant Management System.

4. ROUND 2 [TECHNICAL + HR] [40 mins]

- During this round, Interviewer asked related to resume and my projects.
- **Question 1** Tell me about yourself.
- **Question 2** Given two very big numbers (each more than 500 digits), multiply them.
- **Question 3** In one of my Internships I had created a website (along with one friend), So he asked me to explain my entire process of website development from requirement gathering till deployment.
- Similar questions were asked regarding my other projects.
- I have done an Internship in my summer vacation of the second year at Samsung R&D Bangalore, So Interviewer asked me whether Samsung offered me an Internship this year and also asked me about my experience there.
- **The Last Question** Three Qualities why we should hire you?
- It is a standard question and I gave the answer that I read online.

I was selected for the Summer 2020 Internship, also received a PPO at the end of my Internship.

All the best for your interviews.

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Microsoft Interview Experience | On-Campus Internship

- Difficulty Level :\nExpert
- Last Updated :\n02 Sep, 2020

All the rounds were completely virtual and interviews were held at Microsoft Teams except for round 1 which took place at mettl.com. I was also asked to share my screen to write code for the questions in rounds 2,3 and 4.

Round 1: This round had 3 simple questions. The questions were modifications of the below problems \xe2\x80\x93

- Check for URL in a String.
- Given the second and third terms of a GP, Calculate the sum of first n terms of the GP and round answer up to 3 decimal places.
- Balanced Parenthesis.

This round was very easy so most of the students were able to solve all the 3 questions completely, but they also considered time is taken to solve and CGPA for shortlisting.

Round 2: I got 2 questions

- Left rotate and Right rotate an array by given no positions.
- Group all anagrams together. I told him that the question can be solved by inserting every string in a hash map such that the key-value used for anagrams is the same. so I told him that key for any string should be the string after sorting because anagrams after sorting correspond to the same string.

The interviewer was very friendly and was constantly discussing.

Round 3: Firstly the interviewer asked me to introduce myself and asked me to describe briefly about my projects. Then he gave me a question related to OS. The statement was \xe2\x80\x93 \xe2\x80\x9cGiven 2 different Processes which can\xe2\x80\x99t interact with each other describe how can these 2 processes share data from one another\xe2\x80\x9d. I tried to explain to him using a shared memory concept, but he was not satisfied, and he asked me a different question.

Next, he asked me:

- How would you sort 1 GB integers stored in a text file when memory has the capacity to store only 200MB data.

I explained to him the external merge sort approach to solve it and also wrote code for it. Since I was not comfortable in dealing with memory, so I asked him If I can transform the problem statement to \xe2\x80\x93 sorting n (large no of integers) when you can load only k integers in memory (where k is much lesser than n). He also co-operated and let me transform the problem statement.

Then, he asked me to explain the Time complexity of the solution step-wise. After that, he asked me whether I had some questions for him or not. so I asked him to brief me about the type of projects that interns work on in Microsoft.

Round 4: This round began with my introduction and shortly after that the interviewer asked me a coding question. The question was:

- You have flight details of n flights and each flight detail contains source, destination, start time, and end time. He asked to find no airplane required by the airlines so that every flight can be covered.

He didn\xe2\x80\x99t want me to code it but I had to explain to him the approach and which Data structure should be used. The purpose of the question was to test if I was able to visualize the solution using a graph network. I gave him a DFS based solution. Then he asked me basic questions like what is operator overloading, run-time polymorphism, and internal fragmentation.

Final Verdict: I was selected for the internship.

Tips: Just stay calm and confident. If you are unable to think of an optimized solution start with brute force and ask for hints. In most of the interviews, the interviewer is always ready to help, and he also tries to build a solution with you. Don\xe2\x80\x99t Panic and believe in yourself!!

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Microsoft Interview Experience (4+ years Experienced)

- Difficulty Level :\nBasic
- Last Updated :\n17 Aug, 2020

There were 3 rounds of interview in total 2 technical (DS/ALGO) and 1 hiring manager round\xc2\xa0

Round 1 (Technical round):

1) \xc2\xa0Level order traversal of Binary Tree\xc2\xa0

2) Modified question on Knapsack problem\xc2\xa0

Round 2 (Technical round):

1) External Sorting\xc2\xa0

2) Design API rate Limiter\xc2\xa0

Round 3 (Hiring manager round)\xc2\xa0

First, there was in-depth discussion on your current project followed by Basic JS questions\xc2\xa0

I got an offer, Thank you GeeksforGeeks \xf0\x9f\x99\x82

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Microsoft IDC Internship Interview Experience (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n14 Aug, 2020

Microsoft IDC came to our campus for hiring summer intern in area of software development. My experience was really awesome as I had given my first interview. These were virtual interviews due to this CORONA PANDEMIC. I think that in virtual interviews, one of the great benefit is- Stress Level and nervousness-level is too much reduced. In my case, this thing really help me a lot. \xc2\xa0

Coming to my experience:

Round 1: It was online coding round. In this round, we were given three coding questions. First two questions were very easy of my set as compared to my other friend\xe2\x80\x99s set. \xc2\xa0

First Question was: We have given two strings. We have to check that the both strings are anagram of each other. I solved it using mapping.

Second Question was: We have given an array. We have to make every element of that array equal by subtracting and adding the numbers (only from the numbers given in the array), so finally we have to count the number of subtractions or additions (as both are equal) . I donot remember the exact problem. But it is quite easy. \xc2\xa0

Third Question was: It was a famous dynamic programming question:

\xc2\xa0https://www.geeksforgeeks.org/dice-throw-dp-30/

\xc2\xa0I was not able to solve this question completely.

If you solved 2 out of 3, your chances of being shortlist are really high.

Out of around 100 students, they shortlist 40 students.

Round 2: This was virtual interview round. Interviewer was really awesome man and very helpful, nice person. He asked me to introduce myself. Then he asked me only one coding question. \xc2\xa0

https://www.geeksforgeeks.org/find-subarray-with-given-sum/

I have solved this question using brute-force O(n^2). But interviewer wanted O(n) solution from me. I was unable to find O(n) approach. But he gave me hints, at last due to time he said to write code of whichever solution I know. So, It was very bad round for me. But luckily I shortlisted for 3rd round. \xc2\xa0 \xc2\xa0 \xc2\xa0

Round 3: This round was based on CS Fundamentals. Interviewer asked \xc2\xa0me about my introduction. He asked me about my coding language. I said to him C++. Then he asked me about OOPs concept. Following questions he had asked:

1) What is OOPs?

2) Main parts of OOPs

3) Polymorphism Concept

4) Run-time Polymorphism

5) DBMS vs R-DBMS

6) Primary key vs Foreign Key

7) Quick Sort

8) Merge Sort

9) Postfix and prefix expression

10) Also asked me some questions regarding my project.

I answered most of the questions. Successfully reached to HR round.

Round 4: This was HR round. The HR was really nice person. He asked me about everything what I have written on resume. \xc2\xa0

In our campus, Microsoft hired 20 interns. (It was really a big number)

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Microsoft Internship Interview Experience

- Difficulty Level :\nEasy
- Last Updated :\n10 Aug, 2020

I got a chance to appear for the Microsoft internship program. It was an amazing experience. I think it may help to others so I\xe2\x80\x99m going to share it with you. \xc2\xa0

First round: Online\xc2\xa0

First-round was online round on mettle. There were three coding questions. If you have completed all three questions then the possibility of getting an email for the next round is more than 80%. Luckily, I was one of them who get the next round mail. I also solved all three questions.\xc2\xa0

First question: Convert uppercase letter to lowercase letter. This question was a cakewalk for you even if you are a beginner in programming. So one line of code can get you 100 points. You can refer below link which is a similar kind of problem on Leetcode.

https://leetcode.com/problems/to-lower-case/

Second question: I don\xe2\x80\x99t remember the exact question but it was something like find continuous element whose some is max. It can be solved by the sliding window.\xc2\xa0

Third question: This question was interesting as I also at the intermediate level at that time I find it too interesting. But anyway I solved that question. \xc2\xa0Question is that you are given a graph G .and all node of the graph are representing a person an edge representing a friendship between that two-person, \xc2\xa0Now your task is to find minimin disjoint group such that no any person has its friend in another group, means we need to make one group of all the friends and friends of that friend(mutual friend). \xc2\xa0

Here is a link which is not exact but similar kind of question on Leetcode
https://leetcode.com/problems/friend-circles/

Second round: Online interview on Microsoft team

If you are in top performer in the first round then you will get mail after 15 days of the first round, with details of Microsoft team link and date and time to join it. I also get a link and all the other details. My interview was started at 10:00 am. The first interviewer ask me the question \xe2\x80\x9cTell me about your self\xe2\x80\x9d.\xc2\xa0

I replied with my current educational status and hobby and academics details with coding as a priority. Then next he asked me about my project. I replied with some details as he wanted to know only the technology in which I developed my project. Next, he told me that let\xe2\x80\x99s jump to the coding question.\xc2\xa0

Question is the same as in below link: https://leetcode.com/problems/number-of-islands/

The same question was given to me on whiteboard means he gave me a link to write code on that website. \xc2\xa0I gave my first approach with simple if-else but then I found some mistake in it so I told it to the recruiter and then give a solution with bfs. My interview long last for 45 minutes.

And then, at last, he asked me that do you have any questions? at that time I asked some common questions.\xc2\xa0

After second-round I got eliminated but some of able to clear it and the next round is an onsite interview with 2 face to face and one HR round. In all the round, they just ask a coding related stuff only.

So keep coding. Thank you!\xc2\xa0

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Difference between Google and Microsoft

- Difficulty Level :\nBasic
- Last Updated :\n22 Oct, 2020

In 2020, **Google** and **Microsoft** are very well established and are known worldwide. Google and Microsoft, both are American multinational technology companies. They are known by all but what they actually do and are, may not be clear. Both companies have their own different products and services which may be developed by them or are acquired from other companies.

1. Microsoft :
Microsoft was developed before Google. It was founded in 1975. The founders of Microsoft are Bill Gates and Paul Allen. Initially they had developed an interpreter and simulator. They came to fame with the MS-DOS operating system that was launched in 1981. They have launched several famous products such as Microsoft Windows, MS-Office, MS-Servers, MS-Visual Studio, Windows live movie maker, Windows Media Center, Microsoft Edge, Skype, MSN, Windows Defender, Windows Mobile etc.

2. Google :
Google was founded in 1988, by Larry Page and Sergey Brin. This was made as part of their project while pursuing Ph. D. in Stanford University. They brought a new system called PageRank that ranked the pages according to the pages and their importance in a website and by analyzing sites that linked back to the site. This system made their Search Engine stand out from the others. Some of Google\xe2\x80\x99s products are Google Search, Google Chrome, Google Alerts, Google Groups, Google Finance, Google News, Google Adwords, Youtube, Android etc.

Both these companies are leading in the Technology sector. The major Difference between them is that Google\xe2\x80\x99s focus is more on Internet services and Microsoft focuses more on developing computer software and personal computers.

Difference between Google and Microsoft :

S.No.	Google	MICROSOFT
1.	It is an American Multinational technology based company that focusses on Internet-based services and products.	It is an American multinational technology company that develops, and sells personal computers and computer based software, products and services.
2.	Founded in 1988.	Founded in 1975.
3.		

Founders: Larry Page, Sergey Brin.Founders: Bill Gates, Paul Allen.4.

Headquartered in California.Headquartered in Washington.5.It is a publicly traded company.It is a publicly traded company.6.Mission: To organize the world\xe2\x80\x99s information and make it universally accessible and useful.Mission: Empower every person and organisation on the planet to achieve more.7.Sectors: Internet, Computer software, telecommunications equipment.Sectors: Computer Hardware and software, Computer electronics.8.Products: Google Search, Google Chrome, Google Alerts, Google Groups, Google Finance, Google News, Google Adwords, Youtube, Android etc.Products: Microsoft Windows, MS-Office, MS-Servers, MS-Visual Studio, Windows live movie maker, Windows Media Center, Microsoft Edge, Skype, MSN, Windows Defender, Windows Mobile etc.

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Microsoft Interview Experience for Internship

- Last Updated :\n12 May, 2020

Microsoft gives an opportunity to all undergraduate and postgraduate students for 2 months summer internship program. The basic criteria to apply for Microsoft internship program were to have CGPA greater than 7.0, no pending backlogs, and candidates should not have participated in the Microsoft internship hiring process for the last one year.

Round 1- Coding Round

There was a coding round conducted by Microsoft on\xc2\xa0**mettl.com.\xc2\xa0**which consisted of 3 coding questions and the time limit was 90 minutes.

1. Find the Majority element in an array. A *majority element* in an array A[] of size n is an element that appears more than n/2 times.

2. Find the Kth largest element in an array.

3. Given inorder and preorder traversal and number of nodes of a binary tree, find the minimum height of the tree.

Round 2- Virtual Interview or Video Interview

Firstly I was asked to introduce myself. Then the following questions were asked :

1. What is Polymorphism?

2. Difference between overloading and overriding?

3. What are Runtime and compile-time polymorphism? Explain with an example. And what are the conditions under which they occur?

4. Clone a binary tree. Write a pseudo code for it.

5. Clone a binary tree with random pointers and write pseudo code for it.

Round 3-Onsite Technical Interview

I was asked to introduce myself.

1.\xc2\xa0 Print first n elements of a Fibonacci series using the iterative method and then with recursion.

2. Find the minimum and maximum element in a binary tree.

3. Given a matrix if any element of the matrix is zero initialize that row with the value zero.

4. Difference between the linked list and Array.

5. Which searching algorithm I use in the linked list. Find the kth element in a linked list.

I was told to write code for each of the above questions and make test cases and in case of recursion, I was asked to draw the recursion tree as well. Additionally, I was asked to dry run each code.

6. What is Interface(OOPS)?
7. What is Multiple inheritances and what are its applications?
8. Design an E-Commerce website.

Round 4-Techno-HR\xc2\xa0
It was the final round and firstly I was asked to introduce myself. And the following questions were asked thereafter.\xc2\xa0
What are the subjects you have studied till now in your college and which subject interests you the most? (I said Data Structure)

1. Given two very large numbers(number of digits more than 100) write a code to multiply both the numbers.
2. What do you know about Microsoft?
3. Why should we select you as an intern?
4. What are your strengths and weakness?
5. Where are you from? Tell something about the city you belong to?
6. Tell something about your previous interviewer?
7. I was asked to tell my experience of being interviewed at Microsoft.

Be prepared for Operating System Concepts as well. They were asked to other candidates. Mainly focus on DSA, OOPS, OS, and project-based questions.

Every round was an elimination round, even the Techno-HR.
Note:- The interview experience was quite good and they focused on all the core concepts of computer science subjects. Keep calm and stay polite. Be honest and try to keep your approach clean. Don\xe2\x80\x99t think about the results, just enjoy the interview process with a free mind. **GeeksforGeeks was a lot helpful to me** for building concepts and for my interview preparation.

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Microsoft Internship Interview Experience

- Difficulty Level :\nExpert
- Last Updated :\n11 May, 2020

ROUND 1:
It was an online coding round. There were 3 coding questions to be solved in 90 minutes. The questions were:
1. There are exactly N bus stops from Tracy\xe2\x80\x99s coaching center to her home. The number of buses that can be boarded from each bus stop is also given. A bus will only stop at a bus stop whose number is a multiple of the bus stop number from which the bus originates. Find the number of buses originating from each bus stop between her coaching center and her home.
2. You are distributing N candies to K children. You give 1 candy to first child, 2 to the second and so on till K children have received K candies. You then restart from the first child and give him/her K+1 candies, K+2 candies to the second one, and so on till all the candies are distributed. Find the number of candies that each child gets.
3. Given \xe2\x80\x98n\xe2\x80\x99 integers (1<=n<=1000), find the majority element i.e an integer that occurs more than half a number of times. If not, return -1.

ROUND 2:
This round was over skype. Firstly, the interviewer asked me to introduce myself, then he shared a link to collab edit. I was asked to rotate the elements of an array one by one from a given element and print the resultant array.(I told him the brute force so he asked me to optimize it) I was asked to perform dry run of the entire code. He then asked me what is try, catch, and final in OOPs. Then I was asked about my project on image processing. Later on, he asked me to write a code to find the maximum profit that you can make by buying and selling stocks, given per day cost of a stock in an array. (This round lasted for 1 hour 15 minutes)

ROUND 3:
This was the first on-campus interview at Microsoft Office in Hyderabad. Nearly, 25 students were shortlisted for this round..

TECHNICAL ROUND:
Firstly I was asked to introduce myself. Then he asked me to find the minimum element in a stack. Next question was to determine whether a tree is a Binary Search Tree or not.
Then he asked me to search an element in a sorted array whose rows as well as columns are sorted. Then I was asked to fill the elements in a 2\xc3\x972 matrix sudoku in which some elements were already inserted.
Later on, he gave me a proper 9\xc3\x979 sudoku and asked me to give an approach to insert elements in O(N) time complexity. (I kind of blanked out so I asked him for a hint so he suggested that I should try backtracking.
Then I could think of an approach) Then I was asked what is system design followed by differentiating between paging and segmentation, internal and external fragmentation. Is paging disadvantageous, if so kindly explain?
Then I was asked two puzzles. You are given 8 balls out of which one is heaviest and the rest are equi-weighted. You have two weighing machines. Find the minimum number of attempts required to determine the heaviest ball.
The next question was, there is a king having 1000 glass bottles. One day, a person poisons one of the bottles. The king has an unlimited number of prisoners. Find the minimum number of prisoners required to determine the poisoned bottle within the time period of a month. (This round lasted for one and a half hour).

HR ROUND:
The interviewer was pretty cool. After the introduction, I was asked questions like where are you from?
What is special about you? Why should we select you?
Which was your favorite subject in last semester?
Why do you want to join Microsoft?
What Microsoft technologies have you used to date? Then he asked me to elaborate on any of my projects and what I learned from it followed by questions like what do I expect from this internship? What do you want to do in future?

I was asked to wait outside for the result. (This round was pretty short as compared to the first one) (Out of 25 students, 10 were shortlisted for the internship and I consider myself very lucky to be one of them)
[Tips: Just stay calm and confident. Answer all the questions confidently and clear any doubts before solving the question. The interviewer is always ready to help, you just need to analyze what approach is he expecting.]

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Microsoft Interview Experience | On-Campus for Internship

- Last Updated :\n05 May, 2020

Round 1: Online Coding Test

I was in my T.Y. B.Tech. (Sem 5), when Microsoft visited our campus for offering 2 months summer internship.

First Round was online coding test on CoCubes Platform. Difficulty level of questions were easy to medium. 3 Coding questions were to be solved. Questions Were

1. A Number plate problem where only odd and even number plate vehicles can go out on a weekday. Given numbers of vehicle and schedule of odd/even on weekday, find maximum number of vehicles that can go out on a day.
2. A problem based on BFS of Graph. Similar to Rotten Oranges Problem.
3. Given a Singly Linked List, Reverse the linked list in place using O(1) space.

Some Other Questions were

1. Reverse a Linked List in groups of size K
2. Some traversal problem based on BST and graph.

Nearly 25 students passed this round.

Round 2: On Paper Coding Round

Groups were formed and each group was assigned a mentor. We were supposed to explain the approach of problems given to our mentor and code on paper. Questions Were :

1. Check if a given Binary tree is a BST without using extra space.
2. Finding second maximum element of the array.
3. Find Depth of BST.

I found inorder traversal of the tree for first problem but no extra space was to be used. I reduced the space complexity to O(1) but time complexity was O(n). I found depth of BST using Recursion.

Nearly 15 students were selected for Face to Face interviews. I was one of them.

Round 3: Face to Face Interview \xe2\x80\x93 1

Questions asked during my interview were :

1. Write on paper code for Binary Search
2. Implement a Queue data structure using Stack data structure.
3. Write a code to heapify a array. It was basically a Heap Data Structure problem but I messed up here.
4. Asked about Dynamic Programming and a question to find longest palindromic subsequence.
5. ACID property of DBMS.

Only 5 people cleared this round and I was rejected after this.

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Microsoft Interview Experience | IDC Bangalore | 3 years exp | January 2020

- Difficulty Level :\nHard
- Last Updated :\n26 Apr, 2020

I got referred by a college senior. The process took 2 weeks in total.
1 telephonic round, asking about my experience as some basic DS questions.

After 4/5 days, got invited to interview with them in their Bangalore office.(I was already in Bangalore)
4 Back to Back rounds with 1 hour lunch break in the middle. All the rounds went on for 45 mins to 1 hour roughly. Hiring manager round went on for 2 hours.

Round 1:

He asked me to introduce myself, then went on asking about my previous projects etc. Then he asked to find\xc2\xa0\xc2\xa0LCA in Binary Tree.
This was a fairly easy question . I was asked for approach first. Once i told him my approach, he then asked to use the white board to code it up. After coding, he asked me if I could further optimize it. He hinted me on the number of extra recursion calls that happened even after finding the lca. I figured out and edited the code to meet the requirements. After that, he asked me to test my code and what all cases i should consider. (Use as many edge cases/negative cases as possible. Microsoft is obsessed with recursion and edge cases).He seemed satisfied with it. He then asked me if this was a BST, how would I have approached the question. I had to edit the code to run for BST after discussing the approach. (Time complexity and Edge Cases) Then he went on asking why I wanted to switch so early (as I had joined another firm 3 months before) and if I had any questions.

Round 2:

A quick round of introduction. Design a Video recommendation engine and gave me Song genre and artist as a use case. Discussed the approach first. I used simple tree like structure for metadata storage and my approach was based on song rating and watch time. She asked me a lot of questions from it. Asked me to write class diagrams on white board. After writing the class diagrams, she asked me what design pattern i followed, how I would scale it up, what storage I would prefer and why. Next she asked me this : \xe2\x80\x9cSuppose a kid draws a regular geometric shape in an MS Paint blank page, write an algorithm to identify the shape.\xe2\x80\x9d. She was waiting for me to counter question her about the various scenarios, and the question eventually boiled down to identifying a shape in a 2d matrix, where 0 means not filled with colour, 1 means filled with colour.I was expected to write modular code with proper naming of variables and functions. She seemed satisfied with my answer. Then she asked if I have any questions for her etc.

Round 3:

The interviewer was another senior person. He introduced himself and told about his role in Microsoft. He then asked me to introduce myself and we had a discussion about my previous projects. He then asked this : \xe2\x80\x9cThere is a source number and a destination number. You can keep on doing any of the following operations: *2, /2, +2 on the source. You have to come up with a Yes or No if the destination is achievable\xe2\x80\x9d . He asked me to write the code on white board. After that, he asked me if this was an application that i had developed and wanted to ship it, what all things I should be considering before shipping it. What all tests I would be doing before it was deployed into different environments, how will I make sure that there is no stack

overflow due to a recursive function in my application (I came up with counter approach) . What all things to consider while load testing my application etc. He asked some more questions on rate limiting, thread synchronization and locks. After a long discussion, he asked me the same question as why I wanted to join MS (Duh!), why switch so early, and some more behavioral questions.

Lunch break

Round 4:

The interviewer was a very senior person (Director Level) .He first asked me some behavioural questions. why MS ?, why leave so early ? etc . Then we had an in depth discussion on my previous projects and my role in those projects. Then he asked me for\xc2\xa0Minimum number of platformss\xc2\xa0question. After giving the approach, he asked me to code it on white board (also asked time complexity) He then modified it to this : \xe2\x80\x9d Suppose, every platform Pi has a tea seller and every train Ti has Xi people boarding the train. Now, if every passenger drinks tea before boarding the train, how will you assign the trains to stations so as to minimize the maximum difference of profits of tea-sellers (assume tea price to be constant). This modification took me some time to understand. He showed a little agitation at first (may be just to see how interviewees tackle unfavorable situations) but then we ended with a good laugh. I asked some counter questions and finally came up with a heap based approach. He asked me the time complexity and then asked me to code it on whiteboard. (All the codes were on whiteboard for all the rounds) . He seemed satisfied with my answer . He went on asking some more behavioral questions.

Important points: Ask questions if you have any confusion. Practise white-board coding a lot ! Have good knowledge of Time complexity (They will ask you after every code u write). Consider all edge cases while testing your code. Prefer recursive solutions if it doesnt increase time complexity.

Finally after a week, I got a call from the HR and got the Offer !!\xc2\xa0 \xc2\xa0Thanks to GeeksForGeeks for helping me out with the preparation.

\xc2\xa0

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Microsoft interview experience (For SDE-1)

- Difficulty Level :\nMedium
- Last Updated :\n26 Apr, 2020

Total there are four rounds in the interview process. 3 rounds data structures & algorithms and one round is about system design. I was asked to write code on white paper for all these questions.

Round 1:

1. You are given a entry & exit times of all people into office. The task is find out what is the time instant at which there are maximum number of people, if there are more than one time, return the first time.

Input format:

[entry times array]

[exit times array]

Input:

9 1 2 5 6 8

10 4 3 6 7 9

output:\xc2\xa0\xc2\xa0 2

explanation: at time 2 there are two people. Person who came at time[1] and person who came at time[2] are still inside the office.

2. This is the second question.

Round 2:

1. This is the first question.
2. This question is same as first round second question but the data structure asked to reverse here is queue and without using any extra space and O(n) time complexity.
    - Input format: [queue], [group size]
    - input : 4 5 3 2 5 6 7 1, 3
    - output: 3 5 4 6 5 2 1 7

Round 3:

This is a design round. Question asked was this.

Round 4:

This is the question that is asked in this round.

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All questions are expected to be solved in O(n) time complexity and O(1) time complexity. Last round question desired time complexity is O(logn) with O(1) space.

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Microsoft Internship Interview Experience (Off-Campus)

- Difficulty Level :\nExpert
- Last Updated :\n26 Apr, 2020

Hello guys, I\xe2\x80\x99m currently a final year undergrad from Tier 2 engineering college and this is my internship interview experience with Microsoft. Firstly, there was an online coding round on Mettl platform . It had 3 problems.

Problem 1: Array related.(Too easy)

Problem 2:Tree based question.(Easy-Medium)

Problem 3:DP (Medium).

I had to solve all the 3 problems to qualify(but one of my friends got selected by solving 2 problems only) for the group-fly and interview round.

Round 1:Group-Fly round\xc2\xa0\xc2\xa0

This round was a pen and paper coding round where all of us were given 2 problems and we had to write the code in our preferred language. We had to write the full working code(including i/o), we had to derive space and time complexity of our code and also state any different approaches we could have taken for the problem. The time allotted was 30 min only.

Problem 1: Bit-Manipulation problem(Medium)

Problem 2: Given a list of words find whether a given word is a combination of 1 or more words in the list. (PS DP problem. Difficulty-Medium-Hard)

https://www.geeksforgeeks.org/word-break-problem-dp-32/

Around 60 students took the group-fly onsite coding and only 16-20 students moved to the next round.

Of course, I was one of those 20 students else I wouldn\xe2\x80\x99t be writing this article. \xf0\x9f\x98\x80

Round 2:Technical Interview

This was a face-to-face interview. The interviewer asked some basic questions related to my college and educational background. This was just the ice-breaking part. Then he looked at my Resume and gave me class design problem of a telephone billing company. It was an interactive problem, which means I had to design a class given the constraints laid out by him. As the interview went on, he would modify or change the constraints or ask me to add a new functionality. After this he asked me some basic questions related to Java. I was able to answer most of it except a few. After this we started discussing my interest in the field of Machine learning. Again he asked me questions related to ML, like given a dataset with such features, which algorithm would scale well for classification problem. After that he gave me a standard ML based problem and I had to give him a walkthrough of my approach.Then, he gave me simple Ad-hoc problem and asked to write the working code for it, which I was able to solve in 5 min. Finally, he asked me some behavioural\xc2\xa0 questions, like what would you do if you cannot meet the expectations of your manager, etc. This lasted for around 1 hr. After my interview was over, I asked few candidates there about their experience. Some of them got direct System Design questions while some of them

got algorithmic questions. After Round 2, the results were announced and around 8 candidates were selected for Round\xc2\xa0 3, and I was one of those 8.

\xc2\xa0

Round 3: Technical-cum-Project Related Interview

This was particularly straightforward interview . The interviewer asked me some questions related to my non-technical interests which was solving Rubik\xe2\x80\x99s cube. Later on I had done a couple of projects, one was a web-dev project and another one was an ML Project.\xc2\xa0 I had maintained all source code on my Github Repo and given a link to it in my Resume. The interviewer was eager and asked my permission to see my Github repo to which I agreed. He was particularly interested in my ML project and asked me to explain the whole code. While I was explaining, he kept on asking me questions related to ML and the approach I had taken for solving it. Eg. What is feature scaling, label encoding, curse of dimensionality, clustering techniques, and few questions on bayesian classifier. I was comfortable enough to answer all the questions and midway he stopped me and asked few questions related to my ambitions and what do I aspire to become in future. This lasted for about 40 min after which they said that the final results would be mailed to us later. After around 1 month, I received a mail that I had been selected for Internship with Microsoft. \xf0\x9f\x99\x82

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Microsoft Telephonic Interviews for Software Engineer (2 year experienced)

- Last Updated :\n08 Apr, 2020

First Round \xe2\x80\x93
1. Explain current project.
2. Mongo DB vs MySQL.
3. Singleton class and its application.
4. Print all pairs with given sum
[Pseudo code]

Second round \xe2\x80\x93
1. Given an integer \xe2\x80\x98n\xe2\x80\x99. Return a list of all the possible combinations of balanced paranthesis.
For ex \xe2\x80\x93
Input =3
Output=[\xe2\x80\x98()()()\xe2\x80\x99, \xe2\x80\x98(())()\xe2\x80\x99, \xe2\x80\x98((()))\xe2\x80\x99, \xe2\x80\x98()(())\xe2\x80\x99, \xe2\x80\x98(()())\xe2\x80\x99]

2. Group Anagrams
After I solved both of them he asked questions related to Microservice architecture, Spring Boot, REST API. REST vs SOAP.

Third round \xe2\x80\x93
Design a Parking Lot system.
Requirements \xe2\x80\x93
1. There should multiple levels in the parking space.
2. Different types of spaces available for different types of vehicles.
Ex \xe2\x80\x93 Bike, Car, Truck are 3 types of vehicles then there should be a small, medium and large sized parking space to accommodate these.
3. There should be multiple entries and multiple exits. Assume one-one for each level.
4. There should be a way to find out the nearest space available for any vehicle on any floor.
Tasks \xe2\x80\x93
Figure out the entities.
Draw class diagram.
Identify best suitable design patterns and data structures.
Write code for some particular scenarios.
In the end, he asked me a puzzle \xe2\x80\x93 \xe2\x80\x98ABCD * 4 = DCBA\xe2\x80\x99 find out the 4 digit number.

Fourth round \xe2\x80\x93
1. Why do you want to switch?
2. Explain Agile methodologies.
3. Types of caching.
4. Microservice vs Monolithic architecture.
5. Discussed current project, scalability and security issues.
6. Ownership and role in current project.

Thank you GeeksForGeeks.

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Microsoft Internship Experience | On-Campus

- Difficulty Level :\nExpert
- Last Updated :\n31 Mar, 2020

Round 1: It was an online round, having 3 programming questions to be solved in 1 hour and 30 mins, the questions were of average difficulty. All those who solved 2 questions out of 3 were selected for the next round.

Round 2: We had personal Interview in the second round, it started with my introduction and a brief discussion about my projects. Then the interviewer asked me two programming questions that I had to solve on paper. In the first question, I had to tell if a given linked list is a palindrome using O(1) space. I had to write the whole code, and they were checking for corner cases as well. In the second question, they gave me a matrix of 0s and 1s, and if a cell had zero then I was supposed to make the entire row and column as zero. I solved it in O(mn) time and O(1) space. Although I first told my brute force approach, after that I arrived at O(mn) but using O(n+m) space, and then I tried to reduce the space complexity to O(1). The interviewer was impressed by my approach.

Round 3: It was another personal interview, here I was again asked a technical question. The interviewer gave me a use case, which came down to finding k smallest element in an array, it could be done by using a heap in O(nlogn). But I wasn\xe2\x80\x99t able to answer this question, I gave him my brute force approach only. So I was rejected after this round.

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Microsoft Interview Experience | Senior Software Engineer (4 Years Experienced)

- Last Updated :\n18 Mar, 2020

I recently interviewed with MS Hyderabad for Core Services Engineering team.
Please find the questions asked\xc2\xa0below \xe2\x80\x93

Round 1 \xe2\x80\x93

1. Two tables employee (contains name and Id) and employee details having work experience history (contains Id, fromYear, toYear) \xe2\x80\x93 find out all the employees who worked w/o career break.
2. Java implementation for the same.
3. From the same table list the name, fromYear, toYear for all employee.
4. Dependency Injection.
5. Design patterns.

Round 2 \xe2\x80\x93\xc2\xa0

1. PostOrder\xc2\xa0traversal of BST \xe2\x80\x93 iteratively.
2. Given two very large files \xe2\x80\x93 first contains Id and name, another one contains Id and address \xe2\x80\x93 you need to create 3rd file which will contain id, name, and address. - First, \xc2\xa0ask the clarifying questions and then tell the approach.

Round 3 \xe2\x80\x93
1.What is microservice? And a lot of discussion around microservice vs monolithic. Advantages and disadvantages of both the architectures.
2.\xc2\xa0Cloud design patterns.
3. A lot of discussion around performance and Performance Metrics of your service.
4. If you multiply a 4 digit number \xe2\x80\x93 abcd \xe2\x80\x93 by 4, it produces another number \xe2\x80\x93 dbca. Solve for a, b, c, d. These belong to [0-9]
And all are distinct.

Round 4 (Hiring Manager) \xe2\x80\x93 In this round, the whole discussion was around my current project, its scalability and security issues. Also some design principles like \xe2\x80\x93 types of caching\xc2\xa0and when to use which one, the difference between sql and nosql \xe2\x80\x93 were asked.

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Microsoft Summer Internship Off Campus 2020

- Difficulty Level :\nHard
- Last Updated :\n16 Mar, 2020

Whenever We want to get a chance for an interview. First, **we have to arrange a referral**. Personally, I contacted one of the Microsoft SDE. He posted one LinkedIn post on his profile. I saw that and asked him for referral through the mail. As he said, He got around **1000 emails** for a referral from different colleges\xe2\x80\x99 students. After his screening, He gave his referral to **only 5 students**. Luckily, I was in one of them. After getting a referral, I have to sit for an online coding interview round.

Criteria of selection for referral:

- 7.0+ OGPA (Overall Grade Point Average) & No Pending Backlogs
- Strong DSA & Problem Solving Skills
- Projects & Achievements
- CodeChef & CodeForces Ratings \xf0\x9f\x99\x82

Note: Around **11, 000** students were selected for that online round by referrals.

Round 1:\xc2\xa0 This round was held on **mettl.com.** There was a pool of questions out of which everyone got **3 questions in 1 hr 30 min**. The questions were of easy, medium and medium level. I was asked the following:

1. K\xe2\x80\x99th Smallest/Largest Element in Unsorted Array

2. Longest Palindromic Substring

3. Construct Full Binary Tree from given preorder and postorder traversals

In this round, I solved 2.5 problems (1= 100%, 2=%100, and 3 = 50% test score). I couldn\xe2\x80\x99t make it to the next round. I was not good at trees and graphs. That cost me in this interview. After this, there were two onsite interviews. One of them was group fly and the last one was HR round.

Hope you like it!

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Microsoft Interview Experience for full time position of Software Engineer at Bangalore

- Difficulty Level :\nMedium
- Last Updated :\n04 Mar, 2020

My interview was scheduled by some consultancy.\xc2\xa0 I reached Microsoft Bangalore office 15 minute prior than scheduled time.

I couldn\xe2\x80\x99t clear interview but the question they asked i am mentioning here.

Round 1:\xc2\xa0

-> Design SmartPointer Class.

-> Implement queue using two stacks.

-> Sort a given array

-> Depth of the Tree.

Round 2:

-> Given a binary 2D matrix; sort the martix row wise without converting binary value to decimal

-> Given an unsorted array, find a element in the array which is binary searchable. (if binary search algorithm applied on unsorted array then that element should found.)

Round 3:

-> Design MSPaint application.

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Microsoft Interview Experience (3 yrs experienced)

- Last Updated :\n25 Feb, 2020

Round 1:
Coding round
Question 1 : Largest BST in binary tree
Question 2 : Bottom view of a binary tree

Round 2:
Project discussions and scale discussion w.r.t processing a huge file and handling fault tolerance.

Round 3:
Project discussion and 2 coding questions
Question 1 : Boundary traversal of a binary tree
Question 2 : Total time for complete tree to be burned starting from a particular node

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Microsoft Interview Experience (2-3 years Experienced)

- Last Updated :\n24 Feb, 2020

Round 1:\xc2\xa0\xc2\xa0I received a call from one of the recruitment firms 1 week before the interviews which were held in\xc2\xa0 Microsoft Noida Office. The first round was a written round where we were given 2 coding questions and time given was 45 mins.We had to write code on paper.

1.) Given start and end times of people visiting a park find the maximum number of people at any point of time.

Start time\xc2\xa0 \xc2\xa0End time

8:30\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 9:00

8:45\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 10:00

9:00\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 11:00

9:15\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa011:00

https://www.geeksforgeeks.org/find-the-point-where-maximum-intervals-overlap/

2.) Given a stream of 3 kinds of objects say ObjectType ob1, ob2, ob3, arrange them in such a way that equal objects are next to each other or come together.Given a compare() function as shown below:

int compare(ObjectType ob1, ObjectType ob2);

= 0 if (ob1==ob2),

=1 if(ob1>ob2),

=-1 if(ob1<ob2).

Round 2:

After 15-20 mins of evaluation I was called for my F2F interview.

1.)Discussion on current project, he asked me several questions on how the web services are hosted, how do we take care of large number of incoming requests, why don\xe2\x80\x99t we host it on cloud etc.

Then he asked me to design a stack which returns minimum element at any point of time.I explained to him the below solution wrote the complete code for it.He mainly checked for corner cases and error handling mechanisms I used.

https://www.geeksforgeeks.org/design-a-stack-that-supports-getmin-in-o1-time-and-o1-extra-space/

Further he asked me to write all test cases and how will I test my design, how I will unit test my function. Next he asked me to make the class Generic.

He asked one more coding question:

Reverse a linked list in groups of k.

https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/

It is very important to write clean code which covers all the test cases in short production level code.

Round 3:

1.) Discussion on\xc2\xa0 current project in detail.

2.)Write a code to find whether a string is a palindrome or not.

3.)Write a code to find whether any permutation of a given string can form a palindrome. I first calculated the frequency of each letter and depending on even and odd length palindrome returned the output.The latter should contain one letter with odd frequency.

4.)Write a code to find which permutation of a string can result in a palindrome.

First create all permutations of a given string and then check which one is palindrome.

5. Design a wall clock which will be displayed on an app. As and when time changes the needles should align their position accordingly.

I created a class diagram for classes Clock, Needle and how they will be related.He asked me what functions I will use, design patterns, whether to use it inheritance or composition and why?

Round 4:

This was the Hiring Manager round he first asked me how did my previous rounds go, I told him where I did really well and where I could have done better.He asked me to optimize the coding question I solved in written round

where expected complexity was O(N).

Then he asked me a coding question where I had to find the second largest element in a BST where I should not traverse the entire tree.

https://www.geeksforgeeks.org/second-largest-element-in-binary-search-tree-bst/

I had to write complete code with proper syntax and covering all test cases without using global variables.

He asked me several questions on skills mentioned in my resume. Why JavaScript is better and can we run two functions simultaneously in JavaScript. What are pos and cons of inheritance and composition I had to give examples. A lot of discussion on this topic, he gave me real life scenario on this.

Further he asked me why do I want to change my job, why Microsoft?

After this round the HR told me that I am selected!! \xf0\x9f\x99\x82

Thanks to GeeksForGeeks which helped me throughout my preparation.

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How to Prepare for Microsoft Software Development Engineering Interview?

- Difficulty Level :\nExpert
- Last Updated :\n23 Feb, 2020

Bill Gates\xe2\x80\xa6 It doesn\xe2\x80\x99t matter if you are 8 years old or 80 years old, people know this name very well and his contribution to this world. A person who is well known for his extreme kind behavior and for introducing **Microsoft**. When Bill Gates created Microsoft he had a vision that every home should have a computer (preferably with Windows) and he achieved it. Today Microsoft is a well-known tech company in the world. If you are a person who is preparing yourself to get into this company, you might be definitely aware of the importance of **Data Structures and Algorithms** for interview preparation.

There is no doubt that this one is a must-have skill to apply for the job of SDE or software engineer role in Microsoft or any other big tech company. Hiring procedures in these companies are kind of similar but we are going to share some specific detail, tips, preparation strategy and evaluation process of Microsoft to crack the interview. Keep in mind that the difficulty level of these rounds depends on the level of SDE position you are applying and you can prefer any programming language you are comfortable with.

Important Points to Keep in Mind

- In Microsoft, there is no fixed interview process or format. It changes with product groups or teams. The most commonly followed interview process consists of four to five rounds, each focusing on **analytical, problem-solving, designing, coding and testing** the skills of the candidate.
- When you are just out of college (Undergrad), at that time it\xe2\x80\x99s very rare that you are selected for any particular team. Sometimes even the role is not specified while you are being interviewed. When you have some year work or you are passing out of masters then you are generally recruited for a particular team/role in the organization. In these interviews, there is a mix of algorithmic and your expertise specific questions. when you have worked in the industry for the last 8-9 years. There your experience and your resume speak more than any technical interview that you give.
- Do some background research on the company. What\xe2\x80\x99s the company doing right now or what\xe2\x80\x99s the market scenario or technology they are working on currently. That shows your interest in the company and this is a good way to judge a person how much a candidate is interested

in the company.
- Interviewers are trained to not react to your answers so don\xe2\x80\x99t expect yes or no answer from them that if you are heading in the right direction or not. This sucks but is a very effective way of assessing a candidate so prepare yourself to see stone-cold faces.
- Microsoft interview questions/difficulty levels are little bit less consistent vs. Google or Facebook.

Now it\xe2\x80\x99s time to discuss the strategy and rounds that Microsoft conducts for the hiring procedure before that keep in mind a quick tip that works in every company\xe2\x80\xa6 ***Your goal is to write just the right amount of good code and communicate well. You\xe2\x80\x99re not paid to code, you\xe2\x80\x99re paid to think, figure out problems and give the solution.*** To crack any technical interview all you just need is a laptop, a working internet connection, will solve problems regularly and within a few months, you can learn the essentials. The interview procedure in Microsoft kind of similar to other big tech companies so let\xe2\x80\x99s discuss that\xe2\x80\xa6

Sending Application

You can apply for the SDE role visiting at Microsoft Career page but thousands of candidates apply for this role so it\xe2\x80\x99s not easy to get noticed by recruiters for interview calls. Your chances to get the interview call is more if you have any referral or a connection with an employee in Microsoft. If you don\xe2\x80\x99t have we highly recommend making a connection with hiring managers or recruiters via LinkedIn. Also, focus on your CV when you are applying for the job. Below are some points that will help you in getting the call for interviews\xe2\x80\xa6

- Try to make a **single-page resume** and include only relevant things. Make it short, precise because none of the recruiters has more than 15 seconds to scan a CV. Write down only those things you are comfortable with, do not fake anything because the interviewer can spot that easily during the interview. If you are mentioning your project then mention the complexity of your project as well. Check the link Resume Building \xe2\x80\x93 Resources and Tips to prepare your CV.
- Microsoft has a specific website dedicated to student recruitment if you will be graduating from a university.
- Microsoft sometimes recruits at job fairs, hackathons, etc., although waiting for any of those opportunities to arise organically may be a long waiting game, especially depending on where you are located around the globe. You can visit the link hackathon.com to see if there are any hackathons in your area.
- Keep your Linkedin, Github and other profiles updated, hiring managers uses these tools like LinkedIn, alumni databases, and professional associations to find out suitable candidate.

Once you are in touch with a recruiter, they will want to coordinate your first phone interview.

Screening Interview

Shall we invite this candidate for the full loop? To filter out a lot of candidates Microsoft conduct this round and this round saves a lot of time and resources of the company. The screening round could be telephonic or you will be asked to complete a coding challenge where you need to write clean, good and bug-free code and that should be also optimized. This round consists of basic to medium level data structures and algorithms questions, you will have some online document to write down your code and that will be visible to your interviewer. It will be for around 30-45 minutes and it can have a 2-3 coding question. Below is the point to keep in mind for an online coding challenge or telephonic interview.

- Telephonic round is not designed to be very difficult, the meet of the challenge is to be delivered at the on-site interview.
- You need to write the code for the coding question which interviewer will ask, throw out a brute force solution in the beginning, but you should try to improve your solution as well. Think about the time and space complexity and see if you can improve those.
- **Think out loud** and speak clearly (people face trouble here) in phone interviews and tell your strategy to the interviewer to solve the problem.
- Practice writing code on some online document. It will help you to handle the telephonic round very well in interviews.

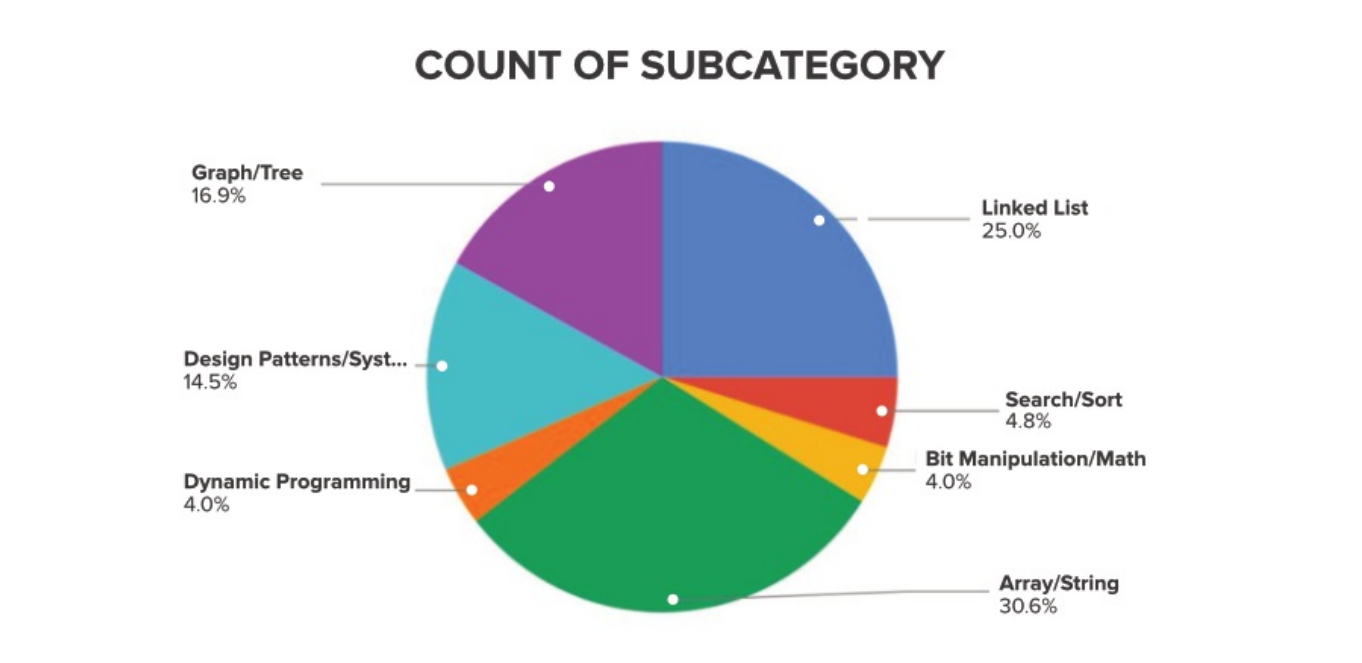
- Solve the problems on GeeksforGeeks, CareerCup and, HackerRank.

Onsite Interview

Once you get selected in the previous round, you will be invited for a loop that will take one full day, consisting of about **four to five** separate interviews. Each of these interviews takes roughly an hour and this will be a whiteboard round. The exact number of rounds depends upon how you perform in each round and the role you are applying for. Now here comes the major role of DSA and Core CS subjects to check your coding, problem-solving skill and command over computer science fundamentals. You need to prepare yourself with all your projects, internship, previous experiences and definitely your coding and problem-solving skill. The difficulty level of the question is based on the role (SDE1, SDE2 and so on\xe2\x80\xa6) you are applying for in Microsoft.

1. Technical Face to Face Round

- The candidate is tested on whether he/she can solve real-world problems using the knowledge of data structures and algorithms. The expectation is to be able to arrive at the most optimized solution to the given problem. Your ability to convey your algorithmic knowledge along with code is must.
- Below is the distribution of the types of problems that were generally encountered in Microsoft interview. This data is based on the interview experiences from Glassdoor for Microsoft.



- Check the link How to Get a Job in Product Based Companies? to deal with in-depth technical coding question, what approach and tips you should follow during the interview.
- Check the interview tips given by recruiters working at Microsoft.
- Ask all the clarifying questions, think about the Brute Force approach, optimize the solution and then write down the code. This is the simple step we recommend you to follow to solve the coding question.
- You need to be comfortable with projects you have done in your past experience or during your internship. The interviewer will throw questions from there so make sure you have complete knowledge and detail about your project to explain it to the interviewer.
- We highly recommend you to go through CTCI (Cracking the Coding Interview) book, practice questions especially on GeeksforGeeks, HackerRank and CareerCup for interview.
- The majority of problems you will encounter in a Microsoft interview will involve some understanding of **arrays and strings**. Apart from that practice the questions of Linked List and Graph/Tree data structure.
- Do not forget to test your code with all the cases. After writing the solution you have to test your code, even if minimally because if you don\xe2\x80\x99t do that, points will be deducted.

2. System Design Round

- System design questions are an open-ended conversation and this round is mostly conducted with an experienced candidate where they test your overall ability to design and scale technically based systems like design *Gmail, youtube, uber*, etc.
- Check the link System Design Interview Questions, System Design Interview Preparation and also check GeeksforGeeks
- The interviewer usually is interested in the choice of resources like Databases, Storage, Logging; efficient algorithms of the functionalities; identifying all the data and classes that would be important to store if anything goes wrong in the system; what functionalities are exposed to the end-user and what not so that they might not screw up the whole system?; Scaling of Systems and servers involved; Use of Multithreading, messaging queues, Cache, etc.
- Have a solid grasp on various database technologies, how they scale, and how they compare, knowledge of frameworks and different technologies helps a lot in system design round.

Interview Evaluation Criteria

After the interview, a meeting is held between all the interviewers to discuss, debate, and justify their individual ratings with the Hiring Manager and HR Representative. After giving the interview you will be compared with the other candidates and interviewers will find the best one considering some factors which are given below\xe2\x80\xa6

- Interviewer have generally a mindset while taking the interview that if he/she can work along with the candidate in his/her daily to a job or not so do not show signs of arrogance or ego while giving the interviews.
- Interviewers will check whether you\xe2\x80\x99ve used the suitable data structures and algorithms while implementing the code or not.
- Interviewers will notice the approach that how you optimized the solution, your knowledge about the choice of programming language, your coding speed, any corner cases that you missed and how you analyzed time and space complexity.
- They will check how you communicated your thought process to solve a specific problem in a logical way. They will also check if you were able to catch the hint and was able to proceed with the solution or not.

Tips

- Learn to **\xe2\x80\x9cthink out loud\xe2\x80\x9d** during your whole interview otherwise interviewer will have no clue what you are thinking. Show your interviewer your thought process about the problem and what approach you are going to follow to solve the problem.
- Never say that you cannot do it. Even if there is a problem that you have not solved before or seemed that you can\xe2\x80\x99t solve it, keep attacking the problem from different angles, the interviewer will give you hints. It is important to catch the hint as fast as possible and proceed with the solution. If you are not able to catch the hint it is a big red flag.
- Always ask relevant questions before jumping to the solution to make it more clear. Always check your assumption with the interviewer and clear all your doubts before heading to the solution.
- Your interviewer wants to see 3 key things in your code. It should run fast, not take up more memory than it needs to and is stable and easy to maintain. Accomplish that and you\xe2\x80\x99re already ahead of most people.

Important Links:

- Microsoft Interview Questions
- Microsoft Interview Experience
- Must Do Coding Question Company Wise
- Glassdoor Microsoft Software Development Engineer Interview Questions
- Microsoft Most Asked Interview Question

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Microsoft Internship Interview Experience

- Difficulty Level :\nExpert
- Last Updated :\n27 Jan, 2020

Microsoft visited our campus for internship hiring.

Online Coding Round:
The round was conducted on CoCubes platform. There were 3 questions (2, 3, and 5 marks respectively), to be solved in 75 minutes. Each person had a different set of questions. My set included:
1. You are given two arrays. Find the sum of all elements which are not common in both the arrays. (2-marks)
2. https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/ (3-marks)
3. Find minimum number that you can get by removing exactly \xe2\x80\x98n\xe2\x80\x99 digits from a string containing digits from 0-9 (leading zeros allowed). (5-marks)

I would recommend trying the CoCubes platform before-hand, because it was difficult to debug (you can\xe2\x80\x99t just simply print anything and check).
About 90 people were shortlisted for the online round. The ranks were based on the score and the time taken.

Fly Round:
This is an on-paper round. You\xe2\x80\x99ll have to write possible approaches, code for the best approach, and the corner cases (sample inputs and expected outputs) for which you would check your code. The questions were:
1. https://www.geeksforgeeks.org/find-duplicate-rows-binary-matrix/
2. https://www.geeksforgeeks.org/find-number-of-islands/

Interview Round 1:
1.Given a matrix of characters.You have to check if there is a path in matrix which can form a given word.
2.Find running median for a stream of numbers.

Interview Round 2:
1.Find the longest common substring of two strings.
2.Given a string, find the number of tokens in a string where a token is either a string enclosed within quotes or a word if it is not enclosed by quotes.

HR Round:
Some general HR questions like tell me about yourself, why Microsoft were asked.

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Microsoft Interview Experience for Hyderabad Office Team(2 years Experienced)

- Last Updated :\n27 Jan, 2020

Round 1:\xc2\xa0

1. Find all the missing numbers from an array of size N whose elements belong to the range [0, N].

https://www.geeksforgeeks.org/find-the-smallest-positive-number-missing-from-an-unsorted-array-set-2/

2. Check whether the given linked list forms a palindrome.

https://www.geeksforgeeks.org/function-to-check-if-a-singly-linked-list-is-palindrome/

Round 2:\xc2\xa0

1. In a hypothetical scenerio, where each character is represented by a variable length ASCII value(1 Byte or 2 Byte). In this system, 1 Byte representation of character starts with 0 as the Most significant bit and 2 Byte representation of a character starts with 1 as the Most Significant Bit. A string of such unknown characters is converted into their respective Byte representation to form a resultant Byte array. This Byte array is the input we have, we need to remove the last character from the Byte array.

Round 3:

1. Questions on my previous experience and project.
2. Design a URL shortener. Asked many questions related to the design I made.https://www.geeksforgeeks.org/how-to-design-a-tiny-url-or-url-shortener/
3. \xc2\xa0A question related to Greedy Approach.
4. An example of a situation I faced in professional experience where I was involved in the resolution of a problem or challenge being faced by the project.
5. An example of a situation where I faced an obstacle in the development scenerio and how did I overcome that obstacle.

Round 4:

1. Again questions on the previous project.
2. Give an example of feedback from seniors or manager of the team. Both positive and negative.
3. Strengths in Soft skills and technical skills.
4. A question related to the MS Paint. Given a grid of N*N, some of the cells are colored to create a bounded figure. Similar to MS paint\xe2\x80\x99s\xc2\xa0fill colour functionality, when I click a cell (x, y) outside the bounded figure all the cells outside it should be coloured with the new colour, similarly inside. Similar to this link, but since it was a bounded figure I recursed it for all 8 directions.\xc2\xa0\xc2\xa0https://www.geeksforgeeks.org/flood-fill-algorithm-implement-fill-paint/

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Microsoft Interview Experience for SDE Internship 2020

- Last Updated :\n23 Jan, 2020

Round 1:

In the first round, the participant was given to conduct online coding test on mettl.com.\xc2\xa0 There were three coding problems.\xc2\xa0 Two of them were easy, based on Strings as far as I recollect.\xc2\xa0 The last question was based on sequences on array.\xc2\xa0 I used Python to solve them.

Test cases were pretty tight.\xc2\xa0 One of them was a critical test case, which analyzed the complexity of your solution.\xc2\xa0 The critical test case needed effective solution to pass.\xc2\xa0 Problems were easy, not much difficult stuff (Simple strings and array).

Round 2:

The second round was online interview conducted on Skype.\xc2\xa0 The interviewer was IIT Delhi alumni (so, you can predict the interview level).\xc2\xa0 It was a technical interview. The scope of syllabus was unknown so they can ask you stuff not yet covered in your semesters.\xc2\xa0 In my case the first question was, differentiate threads and processes based on OS theory.\xc2\xa0 I failed to answer, as OS was to be covered in sixth semester.\xc2\xa0 Next question was, sort two arrays by comparing array elements (compare element of one array with the other array).\xc2\xa0 This was out of my thinking, so I failed to answer.\xc2\xa0 Next question was, print the skeleton of binary tree (one perfect algorithm, no patch work).\xc2\xa0 We needed to come up with a algorithm on-site.\xc2\xa0 This was unique as all sites feature code which are broken into two parts.\xc2\xa0 The last question was on building queue from any no. of stacks. (The hint is no. of stacks required is 2). For dequeue simply pop elements of stack, insert element and again push to stack.\xc2\xa0 For enqueue, simply push element onto stack.

Round 3:

I was rejected in Round 2.\xc2\xa0 So couldn\xe2\x80\x99t appear in Round 3.\xc2\xa0 Round 3 was on-site interview with HR and technical.

Conclusion:

Be thoroughly prepared as questions asked in Round 2 and Round 3 will be out of your league.\xc2\xa0 Be prepared to face them.\xc2\xa0 Only one well versed in International courses and having depth of topics can crack it.

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Microsoft Interview Experience for Software Engineer-2 | 3+ years experienced

- Last Updated :\n20 Jan, 2020

Round 1:

1. https://www.geeksforgeeks.org/find-the-largest-subtree-in-a-tree-that-is-also-a-bst/
2. https://www.geeksforgeeks.org/how-to-print-maximum-number-of-a-using-given-four-keys/

Round 2:

1. https://www.geeksforgeeks.org/external-sorting/

Round 3:

1. https://www.geeksforgeeks.org/select-a-random-node-from-a-singly-linked-list/

Round 4:

1. https://leetcode.com/problems/inorder-successor-in-bst-ii/

Round 5 \xe2\x80\x93 HM round:

1. In depth questions on my redis project
2. Design discussion on the same.

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Microsoft Interview Experience | Off-Campus for SDE Internship

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2020

I applied to Microsoft through one test 2019 about which I was informed by our college TPO for Internship as a software development engineer. All of the candidates who applied were invited for an online coding test on mettle platform.
Online Coding Round:-

Three questions were given in 90 minutes of time to solve. All questions were of equal weight .

- Question 1: Check for balanced parentheses in expression and display the count of parenthesis. https://www.geeksforgeeks.org/check-for-balanced-parentheses-in-an-expression/
- Question 2: Print the maximum sum of the contiguous sub-array in a separate line for each test case.
  I did it using Kadane\xe2\x80\x99s Algorithm
  https://www.geeksforgeeks.org/largest-sum-contiguous-subarray/
- Question 3: Write a function that reverses a string without inbuilt function.
  https://www.geeksforgeeks.org/program-reverse-string-iterative-recursive/

I was able to do all the 3 questions completely.
Key to cracking this round is to try to write as an optimal solution as possible.

After around 2 weeks the next round was scheduled which was on skype. All students who were able to complete at least 2 questions in the coding round were invited.
It went for about 50-55 min. Interviewer initially introduced himself and told me the procedure for that round.
There were 3 questions.

- Question 1: Maximum number of 2\xc3\x972 squares that can be fit inside a right isosceles triangle.
  https://www.geeksforgeeks.org/maximum-number-2\xc3\x972-squares-can-fit-inside-right-isosceles-triangle/
- Question 2: Recursively Reversing a linked list
  https://www.geeksforgeeks.org/recursively-reversing-a-linked-list-a-simple-implementation/
- Question 3: Print all possible words from phone digits
  https://www.geeksforgeeks.org/find-possible-words-phone-digits/he asked me recursive approach for this.

This round was completely based on recursion for me. I was able to answer 2 questions. Then, in the end, he asked me if I have any queries related to it. He also cleared my doubts at the end.

All students who qualified this round were invited to Microsoft Office for the further interview process.

Group Fly Round:\xe2\x80\x93

Around 30-35 students appeared for the group \xe2\x80\x93 fly round. It was a pen-paper test. We were provided with many questions based on mathematics, and one question on arrays to be solved in 60 minutes.

We have to write the whole program from input to output. They were also expecting an optimized solution. You are allowed to use any language.

Note: \xe2\x80\x93 Try to write clean code as possible and use meaningful variable and function names.

Nearly 20 students were selected for the next round.

This was the final round.

My interview was taken by a senior person. He asked to me introduce myself. The interviewer first went through my resume. He then asked me to explain one of my projects. He asked me to make the ER diagram for it and about the normalization in its database.
He asked me about my favorite subject. I said OS and then he asked me some questions related to it. After that, he asked if I had any questions for him. I asked a few questions and it was over.

The interview went for around 25 minutes.

Final Result was declared within 2 hours and I was not selected. 19 students were selected.

The total interview process was conducted from around 9 am to 4 pm.

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On-Campus Interview Experience of companies like UBER, Directi, DE-Shaw, Microsoft.

- Difficulty Level :\nHard
- Last Updated :\n06 Jan, 2020

I decided to write this article to help my fellow juniors with there interviews. I am not saying everything which I write in this article is necessarily true. This is just based on my experience from what I have seen in my college (BITS Pilani).

1) **DE-Shaw** -> This company asks you a lot of questions on OOP, DBMS, Operating systems, etc. This company strongly believes that the core concepts of the students must be strong. This company will also ask you way tougher question on DSA compared to companies like Microsoft, amazon, etc. I was asked questions on sharding, a concept of DBMS. The questions they asked me on OOP, etc, was nothing like you can answer just by reading articles online. DE-Shaw is a hard company to crack. I was among top-5, but then get rejected after final round.

2) **UBER** -> This company loves Graphs. Past two years, this company has been asking questions on graphs. Last year it was:
a) Shortest path in snake and ladder. Well it might seem like standard problem at GFG at once. But it was not. There were snakes below snakes. Ladders above ladders. And the set up was complicated. There might be other ways to solve this problem. But, according to me 0-1 BFS will crack this problem.
b) This, year they asked question on Bridges(a topic from graphs) .

Uber will also ask you a question on OOP design. So, be prepared for that.

3) **DirectI(Media.Net)** -> A very hard coding round. A medium difficulty level dynamic programming problem which was not standard. You won\xe2\x80\x99t find this problem in a standard DP set. Moderate level questions on OOp and DBMS.

4) **Microsoft, Amazon, Adobe, etc** -> These companies hired in mass and the selection was random. Some people got very easy question in the interview. They got in easily. Some got moderate level problems. But yes, almost all the questions were standard. You will find all the problems on GeeksforGeeks. So, if you have practices all the standard interview question at GFG, you will probably get in one of these companies.

A piece of advice: Please do-not memorise questions from GFG or other websites. Practice hard. Learn the concepts. You should become this good that every question seems standard. Focus on paradigm. Learn to identify, what paradigm you would use. DP, greedy, etc. You should be able to solve an unseen problem too. Its important to get into good companies. Solve, as many problems as you can from GFG, but your intent should never be of memorising this type of problem. It only dulls your mind.

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Microsoft Interview Experience | On-Campus

- Difficulty Level :\nHard
- Last Updated :\n30 Dec, 2019

Campus: IIT Dhanbad 2019

Round 1: Online coding challenge

There were two sections in this round. Section 1 consisted of two questions and Section 2 consisted of one question.

Section 1: Question 1: Students come in queue to choose a lunch box. every student has their own preference of lunchbox. either rectangle or triangle. and the boxes are arranged in a stack manner. the student can choose lunchbox if it is his/her preference. else, the student moves to the end of the queue. If the same procedure is repeated, estimate how many students will not get their preferred type of lunchbox ?

I do not remember the second question from this section. But it was easy.

Section 2: A student applies to a college for a particular course. A university offers particular courses and limited number of seats. Our goal is to allow students to register for the college for a particular course. Check weather the registrations of the students will be successful or not.

Round 2: Group Fly Round

In this round, we were supposed to write code on a white paper.

The questions were:

1. Write a program to find all possible longest palindromes in a given string.

https://www.geeksforgeeks.org/longest-palindromic-substring-set-2/

2. The second question was a puzzle with a twist. (should not use division here)

https://www.geeksforgeeks.org/a-product-array-puzzle/

I wrote an O(n2) logic here, so one the Microsoft guy(present to take Technical interview the next day) asked me if I can improve the logic. I Tried for a while and came up with a different logic. But, it was too taking O(n2). I explained him since division was not allowed, I had to\xc2\xa0 come up with this kind of solutions.

Round 3: Technical Interview

The Interviews started on the next day at 5:30am. 43 students were shortlisted for the interview process.

The interviewer started out with questions about my work experience[I had 2.5 years of prior work experience]. Then moved onto the projects I\xe2\x80\x99ve worked on. Be careful about what you have mentioned in your resume. Leaving the Extra currical part of the resume, I was asked questions on each of the topic I have mentioned in my resume. Even the skill set mentioned like strong, intermediate and beginner. everything was covered in the first 30 minutes.

Now, the actual Technical interview has begun. He asked me what I know about system design. I told him about Instagram system design (learnt it from Gaurav sen video from youtube).

He then asked me how do I come up with a system design if I had to design MS paint. He gave me 5 minutes of time to think and come up with the answer. Since I mentioned C++ and OOPS to be my strong skills, he asked me to incorporate at least 8-12 OOPS concepts and come up with a Skeleton code on how each component works and co ordinates.

I came up with solution using concepts like Late Binding, Early binding, Polymorphism, Virtual, Static functions etc., OOPS concepts and I wrote sample codes in C++. Then he questioned how would you handle if power went off while drawing something ? how would your design handle such cases ? \xc2\xa0 I answered them too.

Later questions were asked on DBMS. practical questions were asked and i was able to answer them except a few. then some questions on JDBC, ODBC, Cloud, OS and questions like why cloud, remote systems are required etc., Some discussion on my previous work experience on topics like ERP, WDF, CRM, Middleware.

\xc2\xa0

Round 4: HR round

This was round was not that serious. The HR was really cool. He asked me about my native and how academics are going on in the college, the project I was working on. He tried to make a conversation with me for a while on random topics. I guess the HR was trying to test the communication skills here.

Later he asked the question I\xe2\x80\x99ve never expected to be asked. Why should we hire you ? Why do you think you are suitable for this job ? Would you be able to adapt to newly trending Technologies etc.,

Since I had work experience and I\xe2\x80\x99ve taken a few interviews myself while I was working, I defended well for these questions. Later he explained me about Microsoft Work culture and the Office environment. This round lasted for about 30 minutes.

\xc2\xa0

Later after one hour, there were few people from Microsoft who came up to me and my Friend and told us we were selected. I was on cloud9.

My suggestions would be : 1. Complete Must Do Coding questions on GeeksForGeeks\xc2\xa0\xc2\xa0 2. Be good with OOPS, DBMS and OS. (There is no restriction on programming language being used)

I would like to thank the GeeksForGeeks community with out which, I could not have achieved this. The Must Do coding questions part helped me a lot. I would like to thank the Almighty, my family and Friends. A special acknowledgment to my friend Smriti who pushed me hard towards my success.

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Microsoft Interview Experience | Pool-Campus

- Difficulty Level :\nHard
- Last Updated :\n23 Dec, 2019

Interview was conducted in Bangalore for MS hyd \xc2\xa0team. (Experienced, Pool Recruitment)
Round 1

1. Explain about yourself
2. Explain hash map in java
3. Explain the working of different types of locking mechanism
4. Explain the working of different kinds of locks in database
5. Explain concurrent hash map in java
    1. Explain how locking is done in concurrent hashmap
6. Explain the working of garbage collector in java
7. Merge Sort\xc2\xa0https://www.geeksforgeeks.org/merge-sort/
    1. Variation of merge sort, there are two sorted arrays a and b. b contains some elements \xc2\xa0and some free cells which is equal to length of a. Sort a and b without using extra space
8. Lowest Common ancestor in a binary tree

https://www.geeksforgeeks.org/lowest-common-ancestor-binary-tree-set-1/

7. Search in a sorted and rotated array

https://www.geeksforgeeks.org/search-an-element-in-a-sorted-and-pivoted-array/
Round 2

1. Connect nodes at same level

https://www.geeksforgeeks.org/connect-nodes-at-same-level/

2. A general puzzle problem

Round 3

1. Introduce yourself
2. What happens when you type www.bing.com and hit enter
3. Design a messaging app similar to WhatsApp
4. What is the most difficult part in implementing a caching algorithm, why?
5. Explain different types of caching
    1. Which is the best caching method
6. Most challenging problem faced in your current company, how did you solve it
7. Implement a hybrid dictionary

Round 4
Solve using parallel programming

1. Implement garbage collector
2. Implement grep for a file contains 10000 lines
    1. Variation :: Implement grep for 10000 files containing 10000 lines
3. What is the difference between process and thread

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Microsoft Interview Experience For Data Platform Team (4+ Year Exp.)

- Difficulty Level :\nMedium
- Last Updated :\n17 Dec, 2019

Round 1:\xc2\xa0

Question-1 : Reverse Linklist (Using both method recursive as well iterative in O(n) time.)

Question-2 : Resolve an compile dependency.

Round 2:

Question-1 : Given a list of rectangle coordinates, Find how many rectangles are overlapping.

Question-2 : Given a linklist with different size which represent long integer number. Generate 3rd linklist with the result of sum.

(Conditions/Restriction : Linklist has thousands of node, so recursion will not help here and also using other datastructure to store list won\xe2\x80\x99t help)

Round 3:

Question-1 : Explain In-memory file system, Which i had mentioned as a project in my resume.

Question-2 : Rain Trap Water

Question-3 : Wildcard character match. (\xe2\x80\x98?\xe2\x80\x99 can be match with 0 or 1 char, \xe2\x80\x98*\xe2\x80\x99 can be match with 0 or more char.)

Question-4 : Design a simple cache. Which can store limited number of pages and which support below functionality.

Fun1 : When you update entry in cache at cache miss, Start a timer after time T that entry should be marked as stale entry. For each page you have to maintain timer.

Fun2 : More than one one user at a time can use cache.

Fun3 : Query should be in o(1) time.

Round 4:

Question-1 : Given a buffer, Which is treated as single entity. Where multiple users can read and write. Have to implement synchronization method which satisfy below scenarios.

You are given with two function as well read(), write() inside these functions main read_buffer() and write_buffer() function are there which does the read and write operation. Now write synchronization method in read and write wrapper.

S1 :\xc2\xa0 Multiple reader can read at a time.

S2 : When reader reads any writer should not write.

S3 : At a time any single writer can write to the buffer. If any one writer is writing no should read and no one else should write to the buffer.

While implementing the logic also consider context-switching in the OS.

Question-2 : find if given number is Lucky Number or not.

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Microsoft Interview Experience for SDE

- Last Updated :\n16 Dec, 2019

It was a bulk-hiring process, where they had flown in interviewers from Hyderabad. Around 40+ candidates of more than 3 years of experience had been called. Everyone was made to wait, and it was too stressful on the candidates \xe2\x80\x93 due to the long wait time, and the panel \xe2\x80\x93 due to the high number of candidates to be interviewed. I had two rounds. Each round was less than 30 minutes and very short. Not sure if it is because I gave the answer right away or because the interviewers were not interested (seemed like it).

First round:

- Tell me about yourself.
- About my current work and job.
- Then asked one coding question. That was Reversal algorithm for array rotation.
  He asked to propose any solution first and then optimize it. I said I have encountered this question and know the optimal solution with O(n) time and O(1) space. He asked to explain the solution and then code it. Once I completed, he asked to do unit test and say a few test cases, I did it, that was it.

Second round:

- Few questions about my current work and job
- One coding question. That was Clone LL with random pointer.
  I had not known this question before and I came up with hashing based implementation. The interviewer asked me to write it down, and once done he asked me for alternative implementations. I suggested two other methods all with O(n) extra space, but he wanted with O(1) extra space. I could not come up with it and be asked to leave.

Other people who interviewed with me got the following questions:

- Implement singleton design pattern.
- Clone Circular Linked List.

The overall interview experience was very bad. I had to wait for more than 7 hours just to give 30 minutes of the interview. The interviewers did not discuss or participate in problem-solving, once I solved the given problem, the interview was over. Also, they seemed very disinterested in the entire interview process. HR co-ordination was also very bad. Both interviewers did not have my resume and had someone else\xe2\x80\x99s resume \xe2\x80\x93 so it was irritating. The major focus was on the array, Linked List and design.

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Microsoft Interview Experience for SDE-2

- Difficulty Level :\nExpert
- Last Updated :\n09 Dec, 2019

Location: Hyderabad

Round 1:

1. **https://www.geeksforgeeks.org/connect-nodes-at-same-level/**

Round 2:

1. https://www.geeksforgeeks.org/decode-string-recursively-encoded-count-followed-substring/
2. https://www.geeksforgeeks.org/find-possible-words-phone-digits/
3. https://www.geeksforgeeks.org/merge-k-sorted-linked-lists/

Round 3:

1. https://www.geeksforgeeks.org/second-largest-element-in-binary-search-tree-bst/
2. Design Change game (LLD)
3. Egg drop from ladder problem.
4. Show big image size say 10 MB file in small screen size.

Round 4:

1.\xc2\xa0https://www.geeksforgeeks.org/optimal-strategy-for-a-game-dp-31/

2. Some general question about current project and strength and weakness.

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Microsoft Interview Experience for Software Engineer | On-Campus 2019

- Difficulty Level :\nMedium
- Last Updated :\n05 Dec, 2019

It was an on-campus recruitment.
There were five rounds

Round 1: Online Assesment on 5/11/19
There were three coding questions.

1. Its was a question where ships are sailing in layers.
   - Each ships has a value n.
   - Each ship is followed by (n * n + 1) % M distinct ships whose value is 0 to (n * n + 1) % M \xe2\x80\x93 1
   - Inputs given was L no. of layer and M

Find the total number of ships in all the layers modulo M.

2. Need to return the maximum distance between any two coordinates from given n coordinates. use Euclidean\xe2\x80\x99s method to calculate distances
3. Minimum swaps to make a string palindrome

I could solve all three questions.

Round 2: Group Fly on 30/11/19
In this round, 6-8 students were assigned to a panel member, and we were given two questions. We need to discuss our approach and then write the code on paper.

1. Find the leftmost right cousin of a given binary tree
   Eg:

```
\xc2\xa0A\r\n        /    \\\r\n       B      C\r\n      / \\    /   \\\r\n     D    E F     G\r\n
```

So the left most right cousin of D is F, E is F, F is NULL, G is NULL

2. Given a list of words return those words which contain other words as its prefix.
   Eg: [\xe2\x80\x9ca\xe2\x80\x9d, \xe2\x80\x9cafter\xe2\x80\x9d, \xe2\x80\x9cafterwords\xe2\x80\x9d, \xe2\x80\x9cb\xe2\x80\x9d, \xe2\x80\x9cbe\xe2\x80\x9d, \xe2\x80\x9cbefore\xe2\x80\x9d]
   Output: [\xe2\x80\x9cafterwords\xe2\x80\x9d, \xe2\x80\x9cbefore\xe2\x80\x9d]

I could solve both the code and wrote it on paper cleanly with proper comments.

Next three rounds of F2F interview happened on 1/12/19
Total 3 round took 2.5 hrs

Round 3: F2F interview
The interviewer was excellent, helped me to calm down. Then asked me the\xc2\xa0intersection of two link list question. I explained two approaches and then wrote the code on paper.

Round 4: F2F interview
The interviewer asked me two questions:

1. Snake and ladder
2. Given a list of edges E and list of vertex pairs V. Check if we can create a graph using edges in E such that no pair of vertices in V are connected. Consider both direct and indirect connection.

I gave two-three approaches for both questions. The interviewer asked me to write code of 2nd question, when I wrote half of the code, he said time is up.

Round 3: F2F interview
Asked me one question:\xc2\xa0merge two sorted lists
There can be a duplicate, but the final list should be distinct. i.e. each duplicate should be taken once.
The interviewer asked me to provide at least three approaches. Asked me to write code for the two approaches out of three I could answer. I gave a recursive approach, an approach where we take e extra head pointer and another approach where I was inserting the node of the 1st link list in 2nd one \xe2\x80\x94 coded 1st two approach.

After waiting for 5 min, the HR informed me that they are giving me the offer.

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Microsoft Interview Experience for Summer Internship 2020

- Difficulty Level :\nHard
- Last Updated :\n21 May, 2021

Round-1) Written test conducted on mettl.com\xc2\xa0

There was a pool of questions out of which everyone got 3 questions in 1.5hr. The questions were of easy, easy and medium level. I was asked the following:\xc2\xa0
\xc2\xa0

1. Find roots of given quadratic equation. The tricky part was they asked to return (not print) them having only 3 decimal places.
2. Check for balanced paranthesis in a given piece of code.
3. Given n students, m colleges and n*m Boolean matrix which represents whether student has applied in a college or not. Also, given number of seats in college, what are the maximum possible admissions that could be given in total.

I did all the three to be on safer side. But cutoff surprisingly was low to 1.6 questions solved. They have specific test cases pertaining to corner cases, time complexity cases, etc. 10 test cases per question.\xc2\xa0

54 students were shortlisted for next round.\xc2\xa0

Round-2) Group fly round\xc2\xa0

I wonder why it is called group fly round, when there is neither any group nor anything flying. Here, they gave 2 questions in 1hr where we have to write complete code on paper in any language of your choice. It is recommended to use either C, C++ or Java. The questions are:\xc2\xa0

\xc2\xa0

1. Print all nodes with k distance from target node.
2. Flood fill algorithm i.e. given n*m matrix with different colors in each pixel. Given a co-ordinate (i, j) and a new color k, you need to fill k color at given co-ordinate and all adjacent pixels with same color will be filled with new color. This is done in recursive manner till the boundaries are of different colors.

I did both of them. I would recommend to practice data structures well and basic algorithms. The areas include trees, stack, linked lists, graphs and dynamic programming, in that order. Solving all the questions till this round will give you backup in case you spoil some interview round. Try writing neat and clean code, without cancelling any statement.\xc2\xa0

After this round, they gave a break, followed by presentation by the company officials. After lunch time, results were announced and 21 students moved to next round.\xc2\xa0

Round-3) Technical-1\xc2\xa0

I used to think that to start with, they will ask all flavoured questions like Introduce yourself, etc. Literally speaking, as soon as I entered, the interviewer just said, let\xe2\x80\x99s start with problem solving. He told me that first explain me your approach, if it\xe2\x80\x99s okay, then write the code for it.\xc2\xa0

\xc2\xa0

1. Increasing decreasing array is given, write program to search an element in it.
2. In a stream of characters coming in, keep track of first non-repeating character at each instance.

I explained the approach with an example. After explaining the codes to him, he asked me to write test cases for it. What is of utter importance while writing test cases is all the paths which your program could take should be checked.\xc2\xa0

Round-4) Technical-2\xc2\xa0

It was a kind of rapid fire kind till the point when I was stuck. He started with What is HashTable? Why do we use it? What is the time complexity associated with various operations? What is a good hash function? How to resolve collisions? If all n keys go into same hash value, then O(1) search is violated, how to still achieve this? How is HashMap implemented? Now, the question came at which I was stuck, \xe2\x80\x9cReturn a random number from given HashTable.\xe2\x80\x9d What he wrote was, X = H.random(); How to implement this? Really speaking, I tried to convince the interviewer, but he seemed to be less satisfied. Then he told, let\xe2\x80\x99s move to problem solving.\xc2\xa0

\xc2\xa0

1. Given an array consisting of only 0, 1 and 2. Sort it.\xc2\xa0
   Explained multiple approaches. Now, he started dry run on the code I wrote for Dutch National Flag algorithm. He claimed that my code is not working. I explained him 3times, but everytime he missed something and lead to wrong result. Then he told, we are running out of time, let\xe2\x80\x99s move to next problem.\xc2\xa0
   \xc2\xa0
2. Do you know dynamic programming? I told yes, so he asked me, what all dp problems you have solved. I gave a list of 12-15 different pattern problems. He replied, okay I will not ask you any problem from dp.(probably I had heard of all the problems in his list) He then asked how to check if a given linked list is a palindrome in one pass.

I wrote code for both of them. He seemed dissatisfied at end. He said have a nice day. I thought, it\xe2\x80\x99s over now. But, it was just the beginning. The HR coordinator asked me to go to another room and wait. I was wondering, they should have said goodbye directly, but there was a surprise for me within few minutes. HR called me, please come.\xc2\xa0

Round-5) Technical+HR\xc2\xa0

What you learnt in your previous company? Why MTech then? What is your recent interest of study? It was more of a conversation, because my previous company was next to Microsoft office, so kind of neighbour talks ! You mentioned Sudoku solver, h what is it? How you implemented it? Ok, let\xe2\x80\x99s move to a basic problem. He asked me to write recursive equation for 0-1Knapsack problem and explain. He was happy and asked how was my written and group fly. I told him that I did everything, but I could have done 1 problem in a better way, so he was impressed.\xc2\xa0

I was immediately called in.\xc2\xa0

Round-6) Technical+HR\xc2\xa0

The principal manager with 17yrs exp took this interview. She asked which is your favourite website. I was soo tired, I could barely speak. I didn\xe2\x80\x99t had lunch properly and no snacks. Still, I said something and told her about Quora and why I like Quora. She then asked me Celebrity problem. I was not able to think, but she helped me to think and I was able to answer in third time. Anything you do apart from your regular time? I told her about Marathons and football. Ok, we are done. Any questions? We will let you know the results, you may leave.\xc2\xa0

Results were announced same day night and I was among the 6 people selected, followed by celebrations.\xc2\xa0

Some suggestions:\xc2\xa0

\xc2\xa0

- Prepare from any website like leetcode, geeksforgeeks, careercup, interview bit, etc. But stick to one, don\xe2\x80\x99t get confused by other people are doing this and I am not doing.
- Learn to write code on paper and not just computer.
- Try to attempt before giving up on solutions during interview. The interviewers are very very generous people and they help you a lot. Think that they are here to take only you, so you have solve everything.
- Be sure what you are writing on resume, you must know everything what you write. Write less, speak more. If you write more, what will you have to tell in interview.
- I would recommend writing mini projects which might be small, but you learnt some nice concept from it. I mentioned Sudoku solver and they asked me about it.
- They follow feedback based system after every interview, i.e. they keep on attaching all the sheets you used previously and write their feedback and forward it to next interviewer, so if one interview didn\xe2\x80\x99t go well, don\xe2\x80\x99t feel bad, do your best in next interview and they might still select you.

At last, don\xe2\x80\x99t get disheartened if you are not able to code everything in one go. Learn a concept in a day and solve 3-5 questions on it. One day, when the day is yours, everything will come to you.\xc2\xa0

Till then, cheers !
\xc2\xa0

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Microsoft Interview Experience (On Campus for 2020 Summer Internship)

- Last Updated :\n01 Jul, 2021

Online Round:\xc2\xa0

This round was held in mettl.com There were three questions in a set and different sets for each students.

1. Given coefficient of a quadratic equation find root of quadratic equation and return value with at most three precision. Like if answer is 3.0 then return 3.0 itself but if answer is 3.1249 theen return 3.125. Easy question, find discriminant and apply formula.
2. Given two list of 1\xe2\x80\x99s and 0\xe2\x80\x99s. If first element of both list is same than remove it from both list. If Different than in first list pop first element and append it at last. How many numbers will left in list ? This question can be done using stack and queue.
3. This question is based on sorting two arrays simultaneously.

They shortlisted 27 students for a Group Fly Round.\xc2\xa0

Round 1 (Group Fly):\xc2\xa0

There were two questions and we were told to write complete code on paper.\xc2\xa0

1. Find whether the number is lucky or not.\xc2\xa0https://www.geeksforgeeks.org/lucky-numbers/\xc2\xa0 I gave iterative approach.
2. Find tree is binary or not.\xc2\xa0https://www.geeksforgeeks.org/a-program-to-check-if-a-binary-tree-is-bst-or-not/

Round 2 (Technical Round \xe2\x80\x93 1):\xc2\xa0

First of all, interviewer asked me about my projects related questions for about 10 minutes.\xc2\xa0

1. Given a string find whether it is\xc2\xa0valid parentheses. First I gave approach using stack then interviewer asked me to optimize space complexity.
2. I was given two linked list and multiply them and store it in third linked list. You can only use new space for third list and O(1) extra.

I was asked to write complete code for both questions in paper (C or Cpp).\xc2\xa0

Round 3 (Technical Round \xe2\x80\x93 2):\xc2\xa0

1. First question was connect node at same lavel.
2. Given linked list and and integer m. I need to rotate each m nodes of link list. For example if my linked list is 1\xe2\x80\x93>2\xe2\x80\x93>3\xe2\x80\x93>4\xe2\x80\x93>5\xe2\x80\x93>6\xe2\x80\x93>7\xe2\x80\x93>8\xe2\x80\x93>9\xe2\x80\x93>10\xe2\x80\x93>11\x and m is 4 then return 4\xe2\x80\x93>3\xe2\x80\x93>2\xe2\x80\x93>1\xe2\x80\x93>8\xe2\x80\x93>7\xe2\x80\x93>6\xe2\x80\x93>5\xe2\x80\x93>12\xe2\x80\x93>11\xe2\x80\x93>10\ Time Complexity O(n). Space Complexity O(1). Node value can not be changed.

In this round I was also asked two write complete code.\xc2\xa0

Round 4 (Technical Round \xe2\x80\x93 3):\xc2\xa0

1. There is single core CPU and this code is running \xe2\x80\x9cint main(){while(1);return 0;}\xe2\x80\x9d (infinite loop) and if we try to open notepad will it open ? Give reasons. I explaind Round Robin scheduling.
2. Given a maze, define appropriate data structure to store it. Solve the maze and print the path. I was told to make some\xc2\xa0assumptions if needed. I assumed\xc2\xa0square maze and stored it using two maps. For solving I gave backtracking approach. Then he asked me to write pseudo code.

Thanks to GeeksforGeeks as you can find most of the questions on this platform.
\xc2\xa0

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Microsoft Interview Experience (3 years Experienced)

- Difficulty Level :\nBasic
- Last Updated :\n04 Oct, 2019

Team Name: Azure DevOps

Round 1
Given an array of probability distribution, generate a function to return a char with given probability.
str=[\xe2\x80\x98a\xe2\x80\x99, \xe2\x80\x99b\xe2\x80\x99, \xe2\x80\x99c\xe2\x80\x99]
probabilityDistribution =[50, 25, 25]
https://www.geeksforgeeks.org/random-number-generator-in-arbitrary-probability-distribution-fashion/

4 outputs when called 4 times =a, a, b, c. Create a function
There are coins stored in tree nodes. Each node is supposed to have exactly 1 coin. Total no of coins in a tree is = no of nodes. But the coins are not equally distributed and have to moved to proper nodes (which have >1 or <1 coins). Find the number of moves required.
https://leetcode.com/articles/distribute-coins-in-binary-tree/

Round 2
1 website could link to many other websites. Design a crawler service that could return all websites that are recursively reachable from this website. Design a distributed system where all results cannot be stored in 1 node. [Ans= Decouple storage and compute]

Round 3:
Maximum sum subarray: https://www.geeksforgeeks.org/maximum-subarray-sum-using-divide-and-conquer-algorithm/
Factory pattern question
How do you consume info from an API which produces data faster than you can consume ?

Round 4:
OOPS- Design a Lift.(X cars, each car can have max P passengers, not destination controlled)

Result: **Offered**

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Microsoft FTE Interview Experience 2019 | On Campus

- Difficulty Level :\nMedium
- Last Updated :\n06 May, 2021

Online Round :\xc2\xa0

Online Round was conducted on mettl platform\xc2\xa0

1. Simple Array manipulation question\xc2\xa0

2.\xc2\xa0https://www.codechef.com/problems/ENCD12\xc2\xa0

3. Simple dp question\xc2\xa0

Group Fly Round :\xc2\xa0

Run length Encoding of the string IN-PLACE\xc2\xa0

Tech Round I :\xc2\xa0

1.\xc2\xa0https://www.geeksforgeeks.org/connect-nodes-at-same-level/\xc2\xa0

2. He asked to optimize the above solution i.e., constant space solution\xc2\xa0https://www.geeksforgeeks.org/connect-nodes-at-same-level-with-o1-extra-space/\xc2\xa0

3. If RAM size is 4GB, if 4 processes of size 2GB are launched ! what happens ?(Virtual Memory)\xc2\xa0

4. Continuation of above question. if process size is not limited by size of main memory then what is its limitation (Logical Address Space)\xc2\xa0

5. Above written code has node->val ; Explain end to end how that memory location is accessed\xc2\xa0

6. Paging, Page Table, TLB ;\xc2\xa0Why Paging ?\xc2\xa0

7. Explain Semaphores, Mutex, Spinlocks and differences among them\xc2\xa0

8. what happens if while(1) is running continuously\xc2\xa0

Tech Round II:\xc2\xa0

1. Some simple question on binary trees\xc2\xa0

2. Add two linked lists with head pointer pointing to MSB digit of the number\xc2\xa0

https://www.geeksforgeeks.org/sum-of-two-linked-lists/\xc2\xa0

3. Explain Paging, page replacement Algorithms\xc2\xa0

4. Thread safe and thread unsafe functions\xc2\xa0

5. Continuation of above, how can you transform a thread unsafe function into thread safe

function\xc2\xa0

Hint: Explained above using rand() and rand_r() -> Reentrant Version of rand() ;\xc2\xa0

6. Query Optimisation in DBMS\xc2\xa0

7. Indexing in DBMS\xc2\xa0

Tech Round III\xc2\xa0 + HR :\xc2\xa0

1. Maximum subarray sum problem (Kadane\xe2\x80\x99s Algorithm)\xc2\xa0

2. Given a BST, find the kth largest element\xc2\xa0

3. Given an array containing 0\xe2\x80\x99s and other numbers. Rearrange the array IN_PLACE such that all zeroes come front without changing the ordering of other numbers\xc2\xa0

Ex: i/p arr = { 6, 2, 0, 5, 8, 9, 0, 56, 78};\xc2\xa0

o/p arr = { 0, 0, 6, 2, 5, 8, 9, 56, 78 };\xc2\xa0

Time Complexity O(n)\xc2\xa0

4. Given an array of size n + m where first n elements are sorted and rest m elements are not sorted ; Sort the whole array IN_PLACE !\xc2\xa0

Final Verdict : Selected!\xc2\xa0

Thanks to GeeksforGeeks for all the awesome articles.
\xc2\xa0

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Microsoft Internship Interview Experience (On-Campus)

- Last Updated :\n27 Aug, 2019

Microsoft was the very first company to visit our campus for summer internship 2020. There were total 5 rounds:

a) coding round

b) Group fly

c) Technical interview I

d) Technical interview II

e) HR round

Below is the detailed description of the all the 5 rounds.

Round 1:\xc2\xa0

There were 3 coding questions of easy, easy, medium level. Total 90 minutes were provided for the same.

Question 1:

Check for balanced parentheses in an expression

Question 2:

there are n number of houses, and between each house there are two hills. The height of the two hills is stored in the array as array1 and array2. We need to find the total number of pair of houses, such that while travelling from house-1 to house-2, the highest peak of hill of array1 is equal to the smallest peak of hill of array2.

we have to complete the function and return the number of pairs.

Question 3:

There are n number of post offices present in the city, and distance between the two consecutive post offices in stored in the array. A post man need to deliver post from post office A to B. He can not travel more than K kilometers in one go, he need to stop in between in any post office.

There are m number of queries given as input, Return whether it is possible for the postman to deliver the post or not.

Out of 180 students 38 students were shortlisted, for the next round.

Round 2:

This round was a pen paper round. We were given two questions, we have to write there answers in paper.

1. Design a search engine for global retail application, write\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0

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with latest technologies, which latest technology i have read about and how it works. Why is opted Computer Science and Engineering.

Then he moved on to my project. He asked me what problems did i faced during the project, and what are the features which are still to implement in the project.

This round last around 20-25 minutes

Out of 7 students, 6 students were selected for Internship, and i am one of them \xf0\x9f\x99\x82

<u>How to prepare:</u>

I strongly recommend GeeksforGeeks for practice. I have solved around 600 question on this platform before appearing for the exam. You can go to practice section, and apply tags for various companies and topics.

Have a good command on Data structures and algorithms, Design and analysis of Algorithms and object oriented programming.

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Microsoft Interview Experience (FTE SDE 2020- On Campus)

- Difficulty Level :\nHard
- Last Updated :\n26 Aug, 2019

Microsoft came to our campus on 31st of July 2019 . It was open for students of nearly all the branches having CGPA 7 or above.

Round 1: It was an online coding round hosted over site \xe2\x80\x9c mettl \xe2\x80\x9d . There where 3 coding questions and with a duration of 90 mins. 1st question was finding maximum distant coordinate pair from a given number of coordinates. It was the easiest one. 2nd question was framed like \xe2\x80\x9c find the minimum number of adjacent swaps required to make a string palindrome \xe2\x80\x9c. It was a bit tricky but it was also an ad hoc question. In 3rd questions statement was a bit confusing but it was a simple implementation of queue similar to bfs.
I solved all the three questions but in second question out of 12 test cases for I got TLE for 2 .
Those who solved at least 2 questions got selected for the next round. Nearly 250 students sat for this round out of which 60 got selected for the next round.
Tips : Practice a lot of questions from sites like Geeksforgeeks, Interviewbit, Leetcode etc .

Round 2:\xc2\xa0 It was a pen paper round . We need to solve one question on paper within 30 mins . Question was to Print longest Increasing consecutive sequence which you can make from the elements of an unsorted array. We were strictly told to, not to use library functions. Those who haven\xe2\x80\x99t used any library function and written a clean code with easily understandable logic got selected for the next round . Nearly 10 students got selected for the next round.
Tips : If your approach is correct then writing a clean, commented and properly indented code will take you to the next round.

Round 3: It was a face to face technical interview round. He asked me questions regarding my android project . He seemed pretty impressed with my project . Then he asked me questions regarding system design . Like how to design an app like \xe2\x80\x9c Whats App \xe2\x80\x9d, what should be the structure of the databases/data structures/tables, What functionalities you will mainly focus on, What will be your top 5 test cases on which you will test this application. After this he moved to OOPS . He asked me how will I make some layman to understand Polymorphism . Then he asked questions related to interfaces, abstract class and some other stuffs related to OOPS . Then he asked if I want to ask some questions or say something so I asked one question and this round ended .
Tips : A good project with a bit of innovative idea will be of great help . Good grip over OOPS, OS, DBMS, Data Structure and Algorithms and the programming languages are keys for unlocking this round .

Round 4:\xc2\xa0 It was also a face to face technical round . He was pretty much aware of my previous interview so he asked me about other project apart from the one I described in round 3. Then he started asking situational based questions regarding the project . He was expecting some different answer but he seemed satisfied with my answer too. Then he asked me two coding questions one was to determine the minimum cost to convert a square to a magic square. He asked me to write the code on paper . I wrote the code but it was not very clean so I explained him line by line . 2nd question was to add two char arrays representing two floating point numbers. He told me to write a very clean, understandable and efficient code. So I wrote a clean and understandable code but missed out some optimizations but later on I improvised . That\xe2\x80\x99s all .
Tips : Same as round 3 .

Round 5:\xc2\xa0HR / Managerial/final round. Nearly 6 students made it to this round. He asked me

to introduce my self . Then he asked me my collage experience, about my strengths and what makes me feel proud . He also asked me about my projects a bit . 3 students got selected finally for FTE in Microsoft and I was one of them.

Tips : Be confident and genuine . your answers should not look like typical answers they should contain a bit of your personal touch . You can prepare your answers for common questions of this round beforehand but should have Genuinity and uniqueness .

Final words : According to my experience three most important ingredient for clearing all the rounds are knowledge of what you have written in your resume, confidence and last but not the least luck . So just go for the former two & third one will follow them. Best of luck guys .

ThanQ **GeeksforGeeks** for providing such a wonderful platform where you can get anything and everything one needs to get into some good tech company.

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Microsoft Interview Experience | On-campus for internship

- Last Updated :\n22 Aug, 2019

So, recently, Microsoft had come to our campus for internships and out of around 150 people, 10 were selected. This is my experience of the whole interview process.

Round 1 (online coding round):\xc2\xa0

The coding round was hosted on mettl and there were three questions which we had to solve in 90 mins. The questions are selected from a huge database, so, everyone was allotted a different set. My questions were \xe2\x80\x93

1) Given a directory path in linux, find how far you are from the main directory after the complete path is traversed.

https://www.geeksforgeeks.org/simplify-directory-path-unix-like/amp/

2) Find the longest palindromic substring of given string.

https://www.geeksforgeeks.org/longest-palindrome-substring-set-1/

3) There are n post offices in a row. You are given the distance of each post office from your home. A post office can send a post to another post office if the distance between the two places is less than or equal to x. You are given q queries. Each query contains indices of two post offices. You have to find whether the post offices can deliver post to each other or not. (Expected time complexity \xe2\x80\x93 O(n+q))

For example \xe2\x80\x93

Input : n=3, post[n] = {2, 3, 5}, x=2, q=2

Query 1: {1, 2}. Output: Yes (post office 1 and 2 can deliver post because the distance between them is less than 2).

Query 2: {1, 3}. Output: Yes (Even though 1 can\xe2\x80\x99t deliver directly to 3, 1 can deliver mail to 2 and 2 can deliver to 3. So, 1 can deliver post indirectly to 3).

The questions weren\xe2\x80\x99t tough but the online compiler was a bit different. For example, instead of strings and arrays as input in the function, we were given pointers as input. In the third question, the queries input was given as a double pointer. Some students were unfamiliar with dealing with pointers and so, weren\xe2\x80\x99t able to solve the problems completely.

After this round, 75 people were shortlisted for the group fly round.

Round 2 (Group fly round):\xc2\xa0

There were 2 questions which we had to solve in 60 minutes. We had to write the code on a paper and submit it.

Question 1:

Find the longest continuous subarray having at most k distinct elements.

https://www.geeksforgeeks.org/longest-subarray-not-k-distinct-elements/

Question 2:

Assume an array of n elements. We define a new sort wherein we divide the array into two equal parts and check whether either of the parts is sorted. We continue the process till we get a sorted subarray. Find the maximum length of the sorted subarray.

Example \xe2\x80\x93

Input: n = 6, arr[] = {7, 10, 9, 8, 11, 3}

Output: 2 {7, 10} or {8, 11}

Explanation: As the array is not sorted, we divide the array into {7, 10, 9} and {8, 11, 3}. We again divide the first array into {7, 10} and {9}. Thus, the maximum sorted subarray is {7, 10} whose length is 2.

After this round, 18 people were selected for interviews.

Round 3 (1st interview round):

Each interview round lasted for about 30-40 minutes. The interviewer first asked me about myself, then asked about my projects. Then, he asked me 2 questions. For both the questions, he asked me the time complexity and the space complexity and after he was satisfied with the approach, he asked me to write the code on paper.

1) Given an array, find the length of the longest sine subarray. (sine subarray means the elements should be in an increasing-decreasing-increasing or vice-versa manner).

My approach was to set a flag for increasing/decreasing and then, check whether the sine condition is satisfied or not. If it is, then increase the count and change the flag, else, set the count to 0 after updating maxCount. Time complexity \xe2\x80\x93 O(n), Space complexity \xe2\x80\x93 O(1)

2) Find the number of connected components of a graph. (Standard BFS/DFS approach)

https://www.geeksforgeeks.org/connected-components-in-an-undirected-graph/

Round 4 (2nd interview round):

1) Given an array, select k elements from the array having the maximum sum. We discussed many approaches for this question having different time complexities. Some approaches were sorting (O(nlogn)), max heap (O(nlogn)), dp (O(nk)), recursion (O(2^n)), finding k maximum elements (O(nk)).

2) Given a pyramid of numbers, find the smallest path value to go from the root to the last level.

For example-

1

2\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa03

5\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 4\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 6

Smallest path \xe2\x80\x93 7 (1-2-4)

We discussed a dp approach for this.

dp[i][j] = max (dp[i-1][j], dp[i-1][j-1]) + arr[i][j] where i is the level index and j is the element index of

that level. (Remember to write the base cases and corner cases for all dp questions).

Round 5 (3rd interview round):

1) Given an array of integers, select two numbers having the least difference. I, first, gave him a sorting solution where you sort the array and find the least difference between adjacent elements. Then, he asked me to do it without sorting. I first gave him a brute force solution of O(n^2) but when he asked me to further optimize it, i was unable to do so.

2) A shopkeeper sells items of Rs. 5. There is an infinite line of customers who want to buy the items. The customers have notes of either Rs. 5, Rs. 10 or Rs. 20. We have to find the conditions under which the shopkeeper will be unable to sell more items and find the profit he makes under each condition.

For example- customers[] = {5, 10, 10, \xe2\x80\xa6.}. For this case, after the 2nd customer, the shopkeeper will be unable to return change of Rs. 5 to the 3rd customer as he only has Rs. 10 note with him. So, the business stops and the profit is Rs. 10.

After this question, he asked me to generalize the problem to include Rs. 1, Rs. 2, Rs. 50, Rs. 100 etc notes too. He asked me how this system will be implemented in real life where there are so many types of denominations and so many types of products having various prices.

After this, he also asked me some basic OOP questions, like what are the 4 pillars of OOP and describe each of them.

Round 6 (HR round);

This round was the easiest of all and it lasted only about 10 mins for me. The interviewer asked me the same basic questions and why i wanted to join Microsoft. Then, he asked me two basic questions of DSA:

1) Given a sentence containing many words, reverse the words in the string.

https://www.geeksforgeeks.org/reverse-words-in-a-given-string/

2) Find the LCA of any two nodes in a BST.

https://www.geeksforgeeks.org/lowest-common-ancestor-in-a-binary-search-tree/

\xc2\xa0

After each interview round, the interviewer would ask me whether i had any questions for him. I asked them which skills i needed to develop before coming if i get an internship.

The overall experience was a little tiring because the interviews which started at 9 in the morning went on till 9 in the night. But, it was a great experience as the interviewers were very friendly and gave me enough time to think about the solution. The important thing to remember is that even if you don\xe2\x80\x99t know the complete solution, you have to keep communicating to the interviewer because he generally helps you get on the right path and guides you towards the solution.

The results came in the night and i was one of the 10 selected people. Out of the 10 people, there were also some girls who had given the Codess program organized by Microsoft due to which they got direct entry to the interviews without giving the coding test or the group fly round.

I would suggest to practice from geeksforgeeks and interviewbit (only after covering the basics from geeksforgeeks) because they have a large set of questions which cover almost all the subtopics from all the topics. Also, before any interview, go through the internship experiences that people put

up here so that you get an idea as to what type of questions are asked in the interview by the company.

Also, even though they didn\xe2\x80\x99t ask me much from those topics, I would recommend revising the concepts of OOP and DBMS because a lot of companies ask questions from those topics in the interviews.

Thank you!

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Microsoft IDC Internship Interview Experience

- Last Updated :\n12 Aug, 2019

Microsoft was the very first company to visit our campus. All students of CS, IT, ETC, Electrical having 70% till 4th sem with no current backlogs were eligible for the profile.

Round 1:

The First Round comprised of 3 Programming Problems (90 minutes) mainly based on Competitive Coding. It was on Mettl Platform.

1. A Quadratic Equation was given and we need to return the roots of that equation rounded upto 3 decimal places.
2. There were a story revolving around the problem but the soul problem was a string containing only \xe2\x80\x98J\xe2\x80\x99 and \xe2\x80\x98K\xe2\x80\x99 was given and we need to tell the minimum operations needed to make this string good satisfying few conditions. The operation was to flip \xe2\x80\x98J\xe2\x80\x99 to \xe2\x80\x98K\xe2\x80\x99 or \xe2\x80\x98K\xe2\x80\x99 to \xe2\x80\x98J\xe2\x80\x99. Conditions for a string to be good is the number of \xe2\x80\x98J\xe2\x80\x99 should be equal to number of \xe2\x80\x98K\xe2\x80\x99 and any \xe2\x80\x98J\xe2\x80\x99 can come in string only if there is a matching \xe2\x80\x98K\xe2\x80\x99 before it. For Eg. \xe2\x80\x9cJK\xe2\x80\x9d we will convert it to \xe2\x80\x9cKJ\xe2\x80\x9d and answer will be 0. \xe2\x80\x9cKKKJ\xe2\x80\x9d we will convert it to \xe2\x80\x9cKKJJ\xe2\x80\x9d or \xe2\x80\x9cKJKJ\xe2\x80\x9d and answer will be 1.
3. This problem was also revolved around some story but soul idea was there were several intervals given in form l to r. We need to merge the intersecting intervals and tell the number of intervals left after merging. Eg. (1, 5), (9, 15), (2, 6), (7, 8) answer will be 3 as we will have (1, 6), (7, 8), (9, 15).

I solved all 3\xc2\xa0 problems completely in approx 45 minutes. 130 students were registered for this round and 122 attempted and 70 qualified for next round. The qualified list was quite strange few students who solved 1, 2 problems completely were not qualified and few solving all 3 problems partially qualified for next round.

Round 2:

This was the group fly round\xc2\xa0 and there was problem related to algorithm design to manage a Airport considering all the constraints of the Airport given by them. There were 3 sections of the problem Algorithm, Data Structures Used, Test case scenarios.

I wrote the algorithm revolving around priority queue and different functions determining priority according to different factors.

26 students qualified for next round out of 70.

Round 3:

Next was Technical-I Round.

1. First He asked me tell me about yourself. I told him that I love to do CP and I was having good achievements in my CV related to CP. But he haven\xe2\x80\x99t asked anything related to CP.
2. He told me to pick any one of your project and explain me. I explained him thoroughly and he

asked few doubts and I cleared them and it went good. Then he asked me to pick one more project and explain me. This also went same as earlier. I was having total 5 small projects.
3. Then he asked me that do you know OOPs. I said, I will be having this subject in my current semester but I studied by myself. So he asked me to explain inheritance. I explained with example. He told me to write code in any language. He then asked me that can we inherit a protected or private member of a base class as public member in child class. He asked me the meaning of inheriting with different classifiers like public, protected, private and asked about reason behind that. I was not so sound on OOPs so I gave my answers with declaimer that I am not so sound in OPPs.
4. Then He asked me a DS Problem based on Tree \xe2\x80\x93 https://www.geeksforgeeks.org/diagonal-traversal-of-binary-tree/ I first gave an solution using level order traversal then he tried to find flaw in that solution. He was unable to find any. So he said that OK try to solve this using any other approach. Then I thought about few seconds and given the solution similar to this link.

Round 4:

Next was Technical-II Round.

This time I got a female interviewer and she was more friendly, she was already impressed by my achievements of competitive coding. She said you have so many achievements So, you will have difficult problems. I said I will try my best.

1. She asked to find the number of BST possible from a array of a numbers having all even numbers on left sub-tree of root.
2. She saw my code for earlier problem using Bitwise Operator for checking Odd so she said you know this also, I said yes so she asked me that swap 2 numbers without using extra space. I answered all possible ways. She also asked me to determine which number is greater among 2 numbers using Bitwise Operators. I was thinking on that problem and I was not able to find any way and she interrupted and said it\xe2\x80\x99s okay I also forgot small things.
3. Next she jumped to my very small project of Line Following Bot and we discussed it\xe2\x80\x99s working.
4. Next she asked me a problem on BFS https://www.geeksforgeeks.org/minimum-steps-reach-target-knight/ I explained the solution but she asked me is it possible to do it with DFS? and Why BFS? why not DFS? I explained her the approach from both perspective and proved BFS is better.
5. She said I think it\xe2\x80\x99s already been 40 minutes, So I should leave you and She asked me to ask questions to her. I asked her that we learn these DS and Algo. How we are going to use these in real life projects. She said now you have raised problems for yourself, I will ask you 2 more questions. The whole conversion was very light and friendly. She asked problems related to developing products.
6. She asked me to make a ATM, that was simple implementation taking care of some constraints. Then she asked me to design algorithm for\xc2\xa0 tinyurl conversion from normal URLs and vice-versa . I explained solutions using polynomial hash. PS. she just wanted to hear the solution. I don\xe2\x80\x99t have to code these problems.
7. She directed these solutions and said she this is how you use DS Algo in developing products and That\xe2\x80\x99s All.

Total 9 students left for HR after these 2 technical rounds.

Round 5:

We were having this round over video conferencing with HR over Microsoft Connect over laptops.

1. He first explained that your technical skills will not be assessed in this round.

2. He asked about my summer intern project, its practical applications, extensions possible and difficulties occurred in that project.
3. He asked about my life in college, then my short term goals in college.

I had very short HR round about 10 minutes. And finally 7 students including me are selected. The 2 who got eliminated in this round were having some problems regarding project discussion with HR.

I felt confidence and my resume was a great factor which made this interview easier for me. I want to thank GFG for having this community and its Must Do Problems are really a must do. It helped me a lot in preparing for this Interview,

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Microsoft Interview Experience for Consultancy Job 2019(On-campus)

- Last Updated :\n08 Aug, 2019

Candidate eligibility criteria for KJSCE\xc2\xa0 => CGPA greater than or equal to 7.5 just for being eligible for the aptitude test.

Round 0: Aptitude consisting of quantitative, verbal, coding(2 questions, may need practice), paragraph writing(200 words max). 31 students selected.

Round 1: Technical

- Technical, focused mainly on resume, OOP concepts, JavaScript (as I had previously worked on projects involving it), Databases (ER diagrams, indexing)
- Interview started from a discussion about my projects as well as internships.
- Questions like what DBMS did you use? Why?
- Can Primary key contain two entities?
- Explain foreign key(used an example).
- Do you know C# or any other Microsoft technologies?
- Given a scenario where your manager asks you to work on multiple projects simultaneously, how would you handle the situation?
- Implement the moves for pawns in a chessboard, (consider all cases, the interviewer constantly kept on asking to add more stuff to the existing solution that I was stating)

Round 2: Technical + HR, was a video interview with a guy from Microsoft office, Hyderabad.

Was asked about my journey after joining engineering. A modified version of \xe2\x80\x9cTell me about yourself\xe2\x80\x9d.Unexpectedly, he asked me to explain OOP pillars in between of our conversation. What could be the base class of a ballpoint pen?Told me to approach in a geometrical manner.During our conversation in the earlier phase of the interview, I had mentioned that I liked to read books. He asked me to state the pseudocode for a scenario when I need to choose a new book to read (He actually asked me for a C program initially).
How would you explain a Wi-Fi router (working) to a 5 year old kid?

Round 3:\xc2\xa0 This round was more or less a formality, because whoever cleared the 2nd round got selected eventually (except 2 guys, who wanted to get rejected voluntarily maybe).
The interviewer asked me with whom I talked since morning, as in the guys who interviewed me. He asked me where I stay, about the hostel, the fees (both of the college as well as the hostel). He also asked about the mess food. Actually all of the interviewers asked about the mess food and the hostel life.
Further, he asked me how would I handle a difficult situation?
Given a situation where the solution provided by using Microsoft products is not a good as the solution that is provided by some other company using any other company\xe2\x80\x99s products, what will you ask the customer to do? Will you ask him to continue with Microsoft or would you redirect him to the other company?
Another scenario where the product on which you and your team is almost complete, let\xe2\x80\x99s say about 80%, and then your manager assigns you to a new project that has to be completed within a short span of time, how will you handle the situation?

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At the end of each round, I was asked if I had any questions for them.
Hope this helps! All the best!

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Microsoft IDC Internship Interview Experience

- Difficulty Level :\nMedium
- Last Updated :\n05 Aug, 2019

Microsoft visited our campus \xc2\xa0in the start of August for hiring interns for Microsoft IDC Bengaluru/Hyderabad.All students having cgpa > 7 were shortlisted for the first round.

Round 1:\xc2\xa0

The first round was a coding round conducted on mettl.com\xc2\xa0 for 1.5 hrs.It consisted of 3 questions which were:-

1. You are given n sticks with differing lengths.You can either increase the length of the stick or decrease it.An array of costs was also provided where the ith entry signified the cost for increasing or decreasing the length of the ith stick by 1 unit.You had to make all the sticks of equal length and ensure minimum cost was incurred while doing this.
2. You were given 2 strings A and B.B was a sentence and we had to find all the words in B which had A as their prefix string.For eg: A = \xe2\x80\x9cSan\xe2\x80\x9d \xc2\xa0B=\xe2\x80\x9dSandy Hook has lot of sand\xe2\x80\x9d. \xc2\xa0Output will be \xe2\x80\x9cSandy, Sand\xe2\x80\x9d
3. 2 people A and B are fighting each other.They attack each other equal no.of times .B respects A and never performs and extra attack before A i.e. at all times no.of attacks by A are >= attacks by B.You were given a string where each character denoted the attack by A or B.You had to make minimum modifications to this string to make sure that above mentioned constraints are satisfied .For eg: Given \xe2\x80\x9cBBBB\xe2\x80\x9d we had to make two modifications and convert it to \xe2\x80\x9cABAB\xe2\x80\x9d.

The IDE was unlike the one at gfg and hackerearth and prior practice on this ide would be very helpful .Everyone got different questions and they had different marking schemes so there was no definitive cutoff.60 students were shortlisted for the next round.

Round 2:\xc2\xa0

This was a group flyer round for 1 hr in which we had to write code for 2 question :-

1. Given a time in HH:MM format rearrange digits of the time to get the next closest time possible.You could use any of the digits any no.of times.For eg given \xe2\x80\x9c09:31\xe2\x80\x9d the output would be \xe2\x80\x9c09:33\xe2\x80\x9d .
2. Find diameter of binary tree.This path might or might not pass through the root node.

The code should be written neatly(proper indentation, variable names) with comments in appropriate places . The time complexity should be mentioned and sample test case had to be written and run on the code.I was able to solve 1 question but followed all the rules above and was selected.20 students were shortlisted for the next round.

Round 3:

It was a technical interview where 2 questions were asked :-

1. Given a string identify if its a valid IP address.You can find this question here .
2. Given 2 positions in matrix find whether path exists between them.You can find this question here\xc2\xa0.

Round 4:

It was a technical interview where I was asked to implement a Sudoku-Solver and calculate time complexity of the Backtracking approach.In case of interviews, keep telling the interviewers your approach as you formulate your solution.Write code in a neat way and if you identify a mistake in your code then tell the interviewer and correct it.11 students were shortlisted for the next round including me.

Round 5:

This was a HR round in which questions were asked from the resum\xc3\xa8.I had to explain all the projects that I did and asked him of the projects being done at Microsoft. The interview was very general with no technical questions asked.

Finally, 5 students were shortlisted for the internship on the basis of last 3 rounds.I was also selected.I would like to thank GFG for my success and would request aspirants to regularly do GFG practice in order to get internship at companies like Microsoft.

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Microsoft IDC Internship Interview (On-Campus)

- Last Updated :\n02 Aug, 2019

ONLINE ROUND
The online round was conducted on mettl.com. There were 3 coding questions to be done within 90 minutes. There were various sets of questions. My set consisted of the following:
1- Given a Java program as a string, check if the parentheses are balanced or not.
https://www.geeksforgeeks.org/check-for-balanced-parentheses-in-an-expression/\xc2\xa0

2- You have a stack consisting of 2 types of tiffins, 1s and 0s. There\xe2\x80\x99s also a queue of students waiting in line to collect the tiffin of their preference (either 1 or 0). If the student at the front of the queue gets the tiffin of his choice, he collects it and leaves the queue, otherwise he re-joins the queue at the back. Write a function to calculate the number of students who do not get the tiffin of their choice.

3- Your Pikachu is fighting Mewtwo in a pokemon battle. Your Pikachu has a set of attacks which have been provided to you as an array of strings and another string describing the entire battle. Pikachu can win only if it performs all the attacks one after the other in any sequence. Write a function which returns the index at which its winning move starts, else return -1.
Eg. Input: [thunderbolt, slam, agility, growl]
kickpunchthunderboltgrowlslamagilityheadbutttackle
Output: 9
60 students were shortlisted out of 523 after this round.

II) WRITTEN ROUND
All the shortlisted students were given the same question for which they had to write a code within 45 minutes.
\xe2\x80\x94 Given an interval series having elements of the form [start, end] and another interval. The objective is to incorporate the provided interval in the interval series such that there\xe2\x80\x99s no overlap i.e a number is present only in one unique bucket.

About 30-35 students made it through this round.

III) ROUND 1 (Technical)
1- Write a function that takes 2 parameters, an integer and a Node pointer which points to a node of a sorted circular linked list. The function should insert the element in its correct position in the list and return pointer to the newly inserted node. (NOTE: The linked list does not have a head. And the Node pointer passed as an argument could be pointing to any node in the list)

IV) ROUND 2 (Technical)
1- Given an n x n matrix and a number x, find the position of x in the matrix if it is present in it. Otherwise, print \xe2\x80\x9cNot Found\xe2\x80\x9d. In the given matrix, every row and column is sorted in increasing order.

https://www.geeksforgeeks.org/search-in-row-wise-and-column-wise-sorted-matrix/
2- Write a function to connect all the adjacent nodes at the same level in a binary tree.
https://www.geeksforgeeks.org/connect-nodes-level-level-order-traversal/
3- Write a program that, given an array A[] of n numbers and another number x, determines whether or not there exist two elements in S whose sum is exactly x.
https://www.geeksforgeeks.org/given-an-array-a-and-a-number-x-check-for-pair-in-a-with-sum-as-x/
4- Explain polymorphism.

\xe2\x80\x93 Suppose you\xe2\x80\x99re a businessman who deals in gold. Your technical team predicts the cost of gold in the market on each day over the next week. Find the days on which you should buy and sell gold to maximize profit. (Version 1: You can buy and sell only once. Version 2: You can buy and sell multiple times)
https://www.geeksforgeeks.org/stock-buy-sell/

\xc2\xa0

V) ROUND 3 (HR)

\xe2\x80\x93 I was asked to rewrite the code for the question that was asked in the written round.
\xe2\x80\x93 A few questions about my internships, projects and interests.
\xe2\x80\x93 Why did you choose Computer Science?
\xe2\x80\x93 If you wouldn\xe2\x80\x99t be studying computers, what would you be doing in your life?
\xe2\x80\x93 What are your weaknesses?
\xe2\x80\x93 Why do you want this internship?
\xe2\x80\x93 Put forth your views on any latest technology and cite a few of its applications? (I talked about AI)
\xe2\x80\x93 Apart from the fields where AI is already being used, where else do you think application of AI could be really helpful?

At the end of the entire process, around 16 people were offered summer internship and I was lucky to
be one of them.

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Microsoft Intern Selection Process (On-Campus)

- Difficulty Level :\nBasic
- Last Updated :\n30 Jul, 2019

Round 1:\xc2\xa0 It was an Online Coding Test (OT) which had 3 Problems with a difficulty level ranging from Easy to Medium and we were supposed to solve them in 90 minutes. It was held on mettl IDE and having no prior practice experience on their IDE, it was somewhat difficult for me to get comfortable with it. But eventually, within 90 minutes I was able to solve 2 Questions which cleared my way to take Round 2. The results were declared late night that day and we were supposed to attend Round-2 early in the morning.

I don\xe2\x80\x99t remember the questions exactly, but i can tell you some of them:

1. You are given n number of sticks of different lengths. Length of each stick is given in an array and we had to find the minimum cost required to make all sticks of same length. (Given that Every stick has a cost associated with it in an array to increase or decrease one unit of length.)
2. There are n number of students in a class and there are n number of lunchboxes. Each lunch box is either a circle or a rectangle and each student has a particular priority of lunch box i.e. if the lunch box is of his priority than he will take it and go otherwise he will go back of the queue and wait for his/her turn.(Students are aligned in a queue and lunch boxes are arranged in a stack.). So given n and the two arrays, one for lunch box type and another of student priority, you have to tell how many students won\xe2\x80\x99t be able to eat their lunch.

Round 2:\xc2\xa0 Around 54 people were shortlisted from first round from around 250 people and were allowed to give round 2 which was a Group Fly round. In this round, we were given a problem and we have to solve that problem in 45 minutes by writing the approach and code on paper in a neat manner. Literally, I was thinking of how to write the code without any errors for 35 minutes, then I started writing the code. They told us that they are open to any language, so I decided to write the code in Python 3. The result of Group Fly round was declared within an hour.

The problem was:

You are given a path to a folder and a set of words. There are some files in the folder and you have to search the words in those files that if they exist or not. If there is a match, then output the path of the file and the word.

Round 3:\xc2\xa0 After Group fly round, around 25 people were shortlisted and were told to give the Technical Interview in the next 15 minutes. We were splitted in to groups(In each group number of students were equal to the number of rooms in which recruiters were sitting) in order to conduct this round in an efficient manner. I was in the first group, So they called my name and I was told to go to a particular room. After entering the room, The interviewer asked me my approach to solve the problem which was given in group fly round. I explained him that approach. Then he asked me some questions related to array, one of which was to output the triplet in an array which has sum zero(0) but the triplets would maintain their order as they are in that array. I was able to do that one by reducing the time complexity from O(n^3) to O(n^2). Then he asked me about my projects which were of Machine Learning, I was able to answer most of them. Then he told me to wait for the results.

Round 4:\xc2\xa0I got my Group Fly round and technical Interview-I pretty good so they skipped my Round-4, which was Technical Round-II and I was directed to a new room in which I had Interview with the HR of the Company. Some of the students gave Technical Round-II also.

Round 5:\xc2\xa0 This was the final round and i had the Interview with the HR which was on Skype. He asked me about my previous round experience like how did I solved the problems, What was the most challenging part, My weaknesses, My strengths and many other questions to evaluate me. After sometime, They called me and told me that I got selected for Microsoft Internship. I was really very happy and was not able to express my happiness.

Overall, All the interviewers including the Technical and HR ones were very Chill and told us not to get nervous and give out best.

A big Thanks to GeeksForGeeks.

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Microsoft Non-tech Coding round

- Last Updated :\n30 Jul, 2019

Round 1:\xc2\xa0 There is only one round in the Microsoft screening for full-time as a fresher. The test was conducted by a company hired by Microsoft which conducts tests for the same and the test was taken on the platform tests.mettl.com, the invitation key was provided by the invigilators and the test was covered by 4 sections as follows:

1. Quantitative and analytics
2. Hands on programming
3. Coding
4. WET

In the first section, *20 questions* were given for *20mins*. the second section also contained *20 questions* and time was *20 mins* for this section, the coding section had ***2 codes*** for which we have given *15 mins*, questions were distinct. The last section was about writing *an essay* on the topic \xe2\x80\x9c**ROLE OF MEDIA IN THE DEVELOPMENT OF SOCIETY**\xe2\x80\x9d for which 15mins were given to us.

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Microsoft Interview Experience \xe2\x80\x93 Internship

- Difficulty Level :\nMedium
- Last Updated :\n29 Jul, 2019

Microsoft was the very first company which arrived our campus in the 2019-20 season. It was open to CSE and ECE with a CGPA of 6.0 and above.
Round 1: It was an online round hosted on https://tests.mettl.com/ .There were 3 questions with a duration of 90 minutes and to qualify, one have to solve around 1 and half. But some get shortlisted even with only one correct submission. The questions were in the format like easy-easy-medium.Around 160 appeared for this round out of which around 40 were selected for next round.
Tips- If you are regular at solving problems then this round is going to be a cakewalk for you. But try to have some hands on experience on above platform using the link given because questions are easy but the IDE/Platform makes them tough i.e in my case #include<bits/stdc++.h> wasn\xe2\x80\x99t working :((and the IDE only supported C++ 5.4 and there was no C++ 11/14.

Round 2: It was a pen paper based round.This time they changed their pattern, There were 2 questions, one was based on sequence
https://www.geeksforgeeks.org/look-and-say-sequence/
And the other was from system design.We have to design a search engine for a global retail application for which we have write 1.)Assumptions 2.)Design Considerations 3.)Design components
14 students get qualified for next round.
Tips- The code must be neat and clean with proper indentations for first question.
For the designing they do not want any algorithm implementation like of Trie or something. They want students to think about the problems, solutions for the question and interact with the mentors around.Major criteria to qualify this round was System design question.

\xc2\xa0

Round 3: It was a face to face technical round. The interviewer first asked me a simple question from Linked List.I have given a node and has to return the address of it .List is not sorted.I shared linear search approach but he was not satisfied.Using binary search will cost more time, so he told me to use Hashmap.But still the time complexity remains the same.I think he want to check in how many ways I can think to solve.Then he asked me to explain my solution for the system design question in Round 2. I have explained my solution.Then he asked me what is Scalability, What is Horizontal scalability as I have mentioned Area of interest as Backend Development. Then he asked me the question https://www.geeksforgeeks.org/print-a-given-matrix-in-spiral-form/ .He asked me to code both the questions and also explain the solution for design question on paper.
Out of 14, only 8 were qualified for the next round.

Round 4: It was another face to face technical round. The interviewer in this round first asked me \xe2\x80\x9cTell me about yourself?\xe2\x80\x9d.He asked me to explain my projects.The round started with questions like What is volatile int, difference in \xe2\x80\x9cmain()\xe2\x80\x9d function in C and C++ and how printf() function is compatible with dynamic arguments. Then he moved to coding questions https://www.geeksforgeeks.org/remove-duplicates-from-an-unsorted-linked-list/ . I told him all the approaches and he asked me to code them all. Later he told me to write edge cases for the above question.

Then he asked me the question https://www.geeksforgeeks.org/swap-two-numbers-without-using-temporary-variable/ . I told him all the approaches and code them on paper.He was quite helping and very satisfied with my answer.

Round 5 (HR) : Around 7 students made it to this final round.It was around 21 min long.He first

asked general questions about me, how I\xc2\xa0 computer industry is heading, what latest technology you have learned and what next you will learn.I told him about my interest in backend development and in future I will be learning NLP(Natural Language Processing).So he asked me real time use cases of NLP.Then he asked my solution for design problem in Round 2.He was digging my approach up to the limit.Then he asked some general HR questions.

VERDICT: A total of 6 applicants made it to the final list and I was one of them !!!!!

Tips for F2F rounds : First of all, try to wear a smile on your face during the interviews.Be confident and think out loud. Believe me, most of the interviewers are way cool and supportive. They want you to crack their interviews and they are ready to help as much as possible.

Mention only the things, which you think, you are confident at.

Considerations prior to D-Day : Try to have some internship/academic projects\xc2\xa0 (atleast one) in your Resume. Besides this practice questions on geeksforgeeks and interviewbit during the summers. Stay calm. Stay Chill. Avoid negative people and surrounding. Read past experiences at Geeksforgeeks, they literally helped a lot. Geeksforgeeks. Thanks A Ton.

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Microsoft Interview Experience (SDE Intern-2020-On Campus)

- Difficulty Level :\nHard
- Last Updated :\n23 Sep, 2021

Microsoft was the very first company which arrived our campus in the 2019-20 season. It was open to all CSE, IT, EE and ECE with a CGPA of 7.0 and above.\xc2\xa0

Round 1:\xc2\xa0 It was an online round hosted on\xc2\xa0https://tests.mettl.com/ .There were 3 questions with a duration of 90 minutes and to qualify, one have to solve around 1 and half. But some get shortlisted even with only one correct submission. The questions were mainly based on implementation and can be associated as Codeforces Div 2- A, B and B. One of the 3 was based on bubble sort, other on modular exponentiation and the last one a cakewalk. Around 125 appeared for this round of which 66 were selected for next round.\xc2\xa0
Tips- If you are regular at competitive programming then this round is going to be a cakewalk for you. But try to have some hands on experience on above platform using the link given because questions are easy but the IDE/Platform makes them tough i.g in my case #include<bits/stdc++.h> wasn\xe2\x80\x99t working :((and it took me 20 minutes to figure out that the IDE only supported C++ 5 and there was no C++ 11/14.\xc2\xa0

Round 2:\xc2\xa0It was a pen paper based round. All the candidates were given the same question i.g\xc2\xa0https://www.geeksforgeeks.org/move-zeroes-end-array/ which we have to code on paper within 45 minutes with all possible approaches i.g starting right from brute force to the most optimised one. Around 50 applicants were shortlisted for next round.\xc2\xa0
Tips- The code should must be neat and clean with proper indentations. If you are left with enough time then you can also add comments to it. Besides this, never forget to mention time and space complexities.\xc2\xa0

Round 3: It was a face to face technical round. The interviewer first asked me about my favourite topic and that I answered as Data Structure and Algorithm. Then he asked me about Trees and its types. After this he moved to tree traversal and asked about Iterative Inorder/Preorder traversal along with codes on paper. As I told him initially that I also know about segment trees and Fenwick trees so he asked some basic stuffs related with these.\xc2\xa0

Then he moved on to a real life problem i.g There is a website in which every link contains sublinks under it. The following sublinks further can have sublinks under them and vice versa. The links can be either dead or alive. All I had to do was to return all the dead links in website. I was supplied with two functions : 1)which returned if given link is dead or alive, 2)which returned all sublinks of a given link. I implemented it as BFS traversal and the interviewer was quite happy with my instant approach to problem. He asked me further to code it on paper. At last he asked me if I have something to ask and following this, the round ended with a handshake.\xc2\xa0

Round 4: It was another face to face technical round. The interviewer in this round was a bit more concerned about all WHYs and HOWs. The round started with pointers and their applications. Then he moved to hashing and asked about collisions and their removal techniques. Later he\xc2\xa0 told me to hash string with integers .I first gave him STL based solutions i.g one using map and other using vector of pairs. He further asked me to implement it using structures in C. After that he shifted to Doubly and Circular LInked Lists and we had a half an hour discussion just over these two topics :p\xc2\xa0
Finally, He asked me about update function in segment trees and told me to wait for the next announcement.\xc2\xa0

Round 5 (HR) : Around 15 students made it to this final round. The round started with usual \xe2\x80\x9cTell me about yourself\xe2\x80\x9d and \xe2\x80\x9cwhy this organisation\xe2\x80\x9d questions. Then he asked me about my academic projects mentioned in CV. After that he asked about my hobbies. Subsequently there was a little discussion over Competitive Programming. Lastly he asked if I have had any question for him following which I was told to wait for the final results.\xc2\xa0

VERDICT: A total of 10 applicants made it to the final list and I was one of them !!!!!\xc2\xa0

Tips for F2F rounds : First of all, try to wear a smile on your face during the interviews. You aren\xe2\x80\x99t going to face a megistrate in court. Believe me, most of the interviewers are way cool and supportive. They want you to crack their interviews and they are ready to help as much as possible. The other thing which I personally felt is that it depends a lot on you, where you are driving the interviews to. Like if you know some out of box data structure or algos i.e segment trees or fenwick trees or convex hull or KMP or something like that than try to make them aware that Hey!! What Arrays and strings and Linked list, Let\xe2\x80\x99s move to some advanced talks :p .But, remember, you are never going to argue and insist him to ask what you are better at. There is something called diplomacy :p\xc2\xa0 \xc2\xa0 \xc2\xa0 \

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Microsoft Internship (On-Campus)

- Difficulty Level :\nExpert
- Last Updated :\n19 Jul, 2019

Interviews

Technical Round 1:
warmup questions:
i) Difference between c and c++ and talk about the features of c++?
ii) virtual functions
iii) abstract class

1)Write a function that crawls the hyperlinks present in a website and prints the dead pages?
assuming i have been provided the following functions:
vector <String> hyperlinks_present_in_Webpage(String)
bool is_page_dead(String)

2)How to write an interface in c++ ?

3)Have you worked with api\xe2\x80\x99s?

4)It seems you have limited yourself to curriculum . Any special reasons?

5)Tell about your 2 most challenging pieces of code you have written

6)In ds and algo have i done graph algorithms.name some

Conclusion:
any questions?

Technical Round 2:

1)what do you feel is your strongest language/favourite language?
2)how much is your experience in c++?

```
class parent
{
public:
void walk()
{
cout<<\xe2\x80\x9d parent walking\xe2\x80\x9d;
}
}
class child:public parent
{
public:
void walk()
{
cout<<\xe2\x80\x9d child walking\xe2\x80\x9d;
}
}
child p;
```

p.walk;

3)What will be the output of the above code snippet? Will there be any error?

4)Will a constructor allocate memory if it throws an exception?
Write a code to check the above situation if someone is not sure?

5)Difference between overriding and overloading

6) What are the components of a function\xe2\x80\x99s signature(choose): function name, return type, no of arguments and their data type, sequence of the parameters?

```
class parent
{

public:
parent(String )
{
cout<<\xe2\x80\x9d parent initialised\xe2\x80\x9d;
}
void walk() // consider its a virtual function
{
cout<<\xe2\x80\x9cparent walking\xe2\x80\x9d;
}
}

class child:public parent
{
public:
child()
{
cout<<\xe2\x80\x9cchild initialised\xe2\x80\x9d;

}
void walk()
{
cout<<\xe2\x80\x9cchild walking\xe2\x80\x9d;
}
}
```

7)Indicate which of the numbered statements will compile, run and give the corresponding output

compile(y/n) run(y/n) output

```
1 parent p=new parent();
2 parent np=new child();
3 child mp=new parent();
4 child cp=new child();

5 p.walk();
6 np.walk();
7 mp.walk();
8 cp.walk();
```

(i)The statements that will give error how can i modify them so that the program runs and what will

be the output.
Assume that I cannot change the parent class.
(ii) difference between writing
parent p;
parent p=new parent();

(iii)
can I write
if(NULL == p)
in place of *if(p == NULL)*

(iv) difference between writing
parent *p=new parent();
and, parent &p=new parent();

puzzle :
The interviewer folded a square sheet and tore it in parts, then folded those parts and tore them again.
gave me 10 pieces(2 pairs of identical triangles, 2 pairs of identical quadrilaterals, two pieces of different triangles)and asked me to form a square

HR round

1)Tell me about your education/schooling

2)Why you want to join microsoft for internship?

3)\xe2\x80\xa6.. array question

Swap adjacent elements of an array in such a way
that for given
Input: 1 2 3 4 5 6 **Output:** 2 1 4 3 6 5

4)What will you do to prevent notepad from opening more than one instance.
Write a small code?

5)What is your favourite subject?(give reason)

6)What is your takeaway from the pre placement talk? What did you like in it and Why?

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Microsoft Interview Experience (For Summer 2019 Internship)

- Last Updated :\n19 Jul, 2019

Microsoft came to IIIT Hyderabad for on campus internships. The company visited for 2 profiles: SWE and Data Scientist.

First Round(Online Coding Round)

For the role of SWE, there was a usual coding round on cocubes. We had 75 minutes to solve 3 coding questions. The questions were as follows:

- Minimum character to be appended to the string to make the string a palindrome.(Appending the characters at end of string only) You need to print the character required to be appended at the end. (Similar to this : Minimum number of Appends needed to make a string palindrome \xe2\x80\x93 GeeksforGeeks)
- You are given a 2D character matrix and you need to find in how many ways a given word in present in the matrix, final count needs to be returned. While finding the words in the matrix, one can form words using adjacent cells only.
- A string/word was given as input and you need to find its rank in the dictionary.(Lexicographic rank of a string with duplicate characters \xe2\x80\x93 GeeksforGeeks)The test cases weren\xe2\x80\x99t good enough that you can guess whether to include the duplicate character strings and not. I have provided the link which takes into account the duplicate characters also.

Second Round(For those who applied for ML/Data Scientist profile too)
It was a MCQ test. 49 questions, marking: +4 for correct and -1 for wrong answer. The time given was 75 minutes. The test included questions on probability, Machine learning algorithms like SVM, gradient descent, Collaborative Filtering/Content Based filtering, neural nets and many more.I got shortlisted for ML/Data Scientist Profile. Total around 65 students out of nearly 200(not sure of exact number can be less or more) were shortlisted for both the profiles. 25 for ML and rest for SWE.
Third Round(Group Fly)
We were divided in groups of 10 for the round. It was 1 hour round. We need to write codes for 2 questions on the paper and submit to the mentors alloted to each group. Questions were:

- Find the largest substring in the given string which is a palindrome(Longest Palindromic Substring | Set 2 \xe2\x80\x93 GeeksforGeeks).
- Traverse a matrix in spiral order(Print a given matrix in spiral form \xe2\x80\x93 GeeksforGeeks).

After this round, 30 got shortlisted for next round.

Fourth Round(Interview 1, at max 45 mins \xe2\x80\x93 1 hour)
The round started with my introduction to the interviewer. She was really nice. Then she asked me about some questions on my honors project, followed by a coding question. I need to write the full code.

- The question was: Given an array of size n, I need to rotate it by m positions.(Program for array rotation \xe2\x80\x93 GeeksforGeeks) I need to give the most optimal approach that is inplace with minimal extra memory.
- In second question, I need to allocate memory for a 3D array of size m*n*o. Need to do it through pointer and malloc.

- Suggest some test cases(edge/corner) for the the first question of array rotation.

After this round, 21 people were shortlisted for 2nd round.

Fifth Round(Interview 2, at max 1\xe2\x80\x931:15 hrs)
This time the interview started with direct coding questions. The questions were:

1. Find median for running stream of numbers. Also, asked if the AVL trees can be used for the purpose instead of heaps.(Median of Stream of Running Integers using STL \xe2\x80\x93 GeeksforGeeks) Again I need to write the code in paper for that.
2. This was a DP question. Given a 2*1 small slab, I need to find out ways to fill a bigger 2*t slab(Similar to : Tiling Problem \xe2\x80\x93 GeeksforGeeks). Some other question got built upon it:
   - Number of ways in which the bigger slab can be filled symmetrically.
   - Number of ways in which the bigger slab can be filled asymmetrically. Can\xe2\x80\x99t just tell that its total-symmetric, need to get a recursive relation \xf0\x9f\x98\x9b .
   - He asked the time complexity in the end, which was O(n) for the solution suggested, he helped me out to get the solution.

After this round 15\xe2\x80\x9316 made it to the final round.

Sixth Round(Interview 3, at max 1hour-1:30hr)
In this round, only one questions was asked. It was that: Given a final tic-tac-toe board, I need to tell that whether its valid or not. You can\xe2\x80\x99t assume anything that x plays first. If for any one of the cases, that is if \xe2\x80\x98x\xe2\x80\x99 plays first or \xe2\x80\x98o\xe2\x80\x99 plays first, if the board is valid, the answer should be valid. I need to write the full code for this on paper.Within next 15\xe2\x80\x9320 minutes we got the results. I got selected for ML/Data scientist role. In all 5(including me) for ML and 10 for SWE role made it to the internship. It was one of the happiest moment of my life.
Some tips for coding round:
Especially for MS, the coding round is on cocubes, so the site doesn\xe2\x80\x99t run your code on all the test cases. Be sure that you write the most efficient code possible. Some of my friends who solved even 2 didn\xe2\x80\x99t get selected, as their code might have failed the final test cases.For the MCQ round, attempt all if you aren\xe2\x80\x99t able to do any or many.

Some tips for interview rounds:

- Be confident in whatever you answer. Even if you know that the answer is not fully correct, don\xe2\x80\x99t be like you can tell the interviewer as it is not completely correct.
- If you get stuck sometime, ask interviewer about whether your approach is correct or not.
- Keep talking with the interviewer during the whole process, don\xe2\x80\x99t be into yourself. For every line of code written by you on paper explain why you are doing that.

Thanks to geeksforgeeks team for putting such good content on website. I would advice to go through problems on website as it improves thinking and approach. It helped me a lot in every thing be it subjects, coding problems or practicing the questions.

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Microsoft Interview Experience | (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n18 Jul, 2019

Microsoft came to our campus a couple of days back (15 July, 2019) for offering Summer Internships to student who just finished their B.Tech second year. The CPI(Cumulative Progressive Index) criteria was 7.

Round 1: Online Coding Round:

So this round took place on mettl.com. There were 3 coding questions and the time allotted was 90 minutes.

1. You are given n passwords. You have to print total number of distinct password. On each password you can perform operation any number of times possibly zero. The operation is defined as you can swap data present on any 2 index of a string if the difference of index number is even i.e. swap(a[i], a[j]) if (j-i)%2==0.\xc2\xa0 Test Case: Input:\xc2\xa0 n=5 and passwords are=[\xe2\x80\x9cabcd\xe2\x80\x9d, \xe2\x80\x9ccdab\xe2\x80\x9d, \xe2\x80\x9cbacd\xe2\x80\x9d, \xe2\x80\x9cbdca\xe2\x80\x9d, \xe2\x80\x9ccdba\xe2\x80\x9d]\xc2\xa0 \xc2\xa0 Output : 2\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 Explanation: as \xe2\x80\x9ccdab\xe2\x80\x9d can be converted to \xe2\x80\x9cabcd \xe2\x80\x9d and \xe2\x80\x9cbdca\xe2\x80\x9d, \xe2\x80\x9ccdba\xe2\x80\x9d can be converted to \xe2\x80\x9cbacd\xe2\x80\x9d so you can get only 2 distinct\xc2\xa0 \xc2\xa0 \xc2\xa0password.
2. Today is Tushar\xe2\x80\x99s birthday so he brought n chocolates and he had k friends. He has to distribute all the chocolates to friends in the following way. The first child gets 1 second gets 2 third gets 3 and so on so if there are enough chocolates then kth child gets k chocolates. Now if chocolates are still remaining then he gives again k+1 chocolate to first child k+2 to second child and so on till he distributes all the chocolate. So you have to print k integers defining which child got how many chocolates.\xc2\xa0 Test Case: Input: n=25 and k=5\xc2\xa0 \xc2\xa0Output: [7\xc2\xa0 6\xc2\xa0 3\xc2\xa0 4\xc2\xa0 5]\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \

round. So in our college around 170 candidates did gave this round and 60 moved to next round.

Round 2: Group Fly Round

So as you know its a basic pen paper round in this round\xc2\xa0 we were given 2 question and we had to write the description of the solution and write the code on paper and give its time and space complexity.

1. It was based on this question\xc2\xa0https://www.geeksforgeeks.org/print-nodes-distance-k-given-node-binary-tree/\xc2\xa0 but there was a slight change that it had weighted edges and you had to find all node at distance in range (a, b) from that given node.
2. You are given a doubly link-list whose values were integers you had to determine weather it is palindromic or not.\xc2\xa0 \xc2\xa0Test Case 1: Input: 123 <-> -12 <-> -21 <-> -321 Output: Palindromic\xc2\xa0 \xc2\xa0Test Case 2: Input: 12 <-> -3 <-> 21\xc2\xa0 Output: Not Palindromic

Total 60 candidates gave this round all the candidates who did both the code correct no matter brute force moved to next round. So 26 candidates moved to next round.

Round 3: Technical\xc2\xa0Interview-I

So basically he went to through my resume and then asked me which topic I liked in coding. So, I told him that I like greedy. Then he asked me a very easy question.

Question is: You have to paint you house you have r rooms in your house now there are n painter and each painter cost ci amount per room and he can paint maximum ni number of rooms and each painter will paint minimum 1 room. You have to tell what is the minimum cost required to paint your house.

Then he asked me which technical subjects I studied and in it what all topics I studies. I think the interviewer was around 35-45 years old and was quite experienced and was very helpful. The interview took around 30-40 minutes.

Round 4: Technical\xc2\xa0Interview-II

So first of all he went through my group fly round paper but it was perfect so he didn\xe2\x80\x99t asked anything from it. He was a young interviewer and was more brilliant. So then he asked me 2 questions.

1. So he gave a input and output pattern of link-list and I had to first of all find how was that pattern formed and then write its code.\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0Input: 1->2->3->4->5->6 Output: 1->3->5->6->4->2.\xc2\xa0 So as you can see first you have to make 2 link-list first with nodes on odd indies that is 1->3->5 and other with nodes on even indices that is 2->4->6 and then reverse list which is formed from nodes at even indices which is 6->4->2 and then concatenate both the list.
2. https://www.geeksforgeeks.org/detect-and-remove-loop-in-a-linked-list/\xc2\xa0and he asked me to find all approaches I can make.

This interview took around 40 minutes as I had to write both codes on paper.

Round 5: Technical + HR Interview

So this was the final interview. And the interviewer was very experienced he had worked for last 18 years with Microsoft and also worked in Microsoft head quarters. So initially he asked me what all

data structures I know and asked me my favorite data structure. So I told him vector. Then he asked me 1 coding question.

Question is: You are given n, m so now you have to reach from (1, 1) to (n, m) and you can only move right side and downwards. You have to print all the paths from (1, 1) to (n, m).

Then he went through my resume and asked about my projects and achievements and about my hobbies. And also asked me about my further plan.

So the result was declared immediately after the interviews of all the candidates were finished. And i got selected along with 12 others for summer internship of 2 months.

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Interview with Microsoft O365 team- Bangalore

- Difficulty Level :\nMedium
- Last Updated :\n30 Jun, 2019

Round 1:

In the first round two interviewers were present and each one asked one programming question:

1)Find the smallest missing positive number in a given array of integers:

https://www.geeksforgeeks.org/find-the-smallest-positive-number-missing-from-an-unsorted-array-set-2/

\xc2\xa0

2)Find the equilibrium point of an array

https://www.geeksforgeeks.org/find-the-smallest-positive-number-missing-from-an-unsorted-array-set-2/

Round 2:

Second round one interviewer was present and asked the below two problems:

1)celebrity problem

https://www.geeksforgeeks.org/the-celebrity-problem/

2)Given a linked list with an extra field in each node which points to the next higher value node.

Fill the extra field in all nodes

https://www.geeksforgeeks.org/point-to-next-higher-value-node-in-a-linked-list-with-an-arbitrary-pointer/

\xc2\xa0

I was not able to give an optimal solution for problems in second round and hence got rejected there.

All the best, Guys!!!

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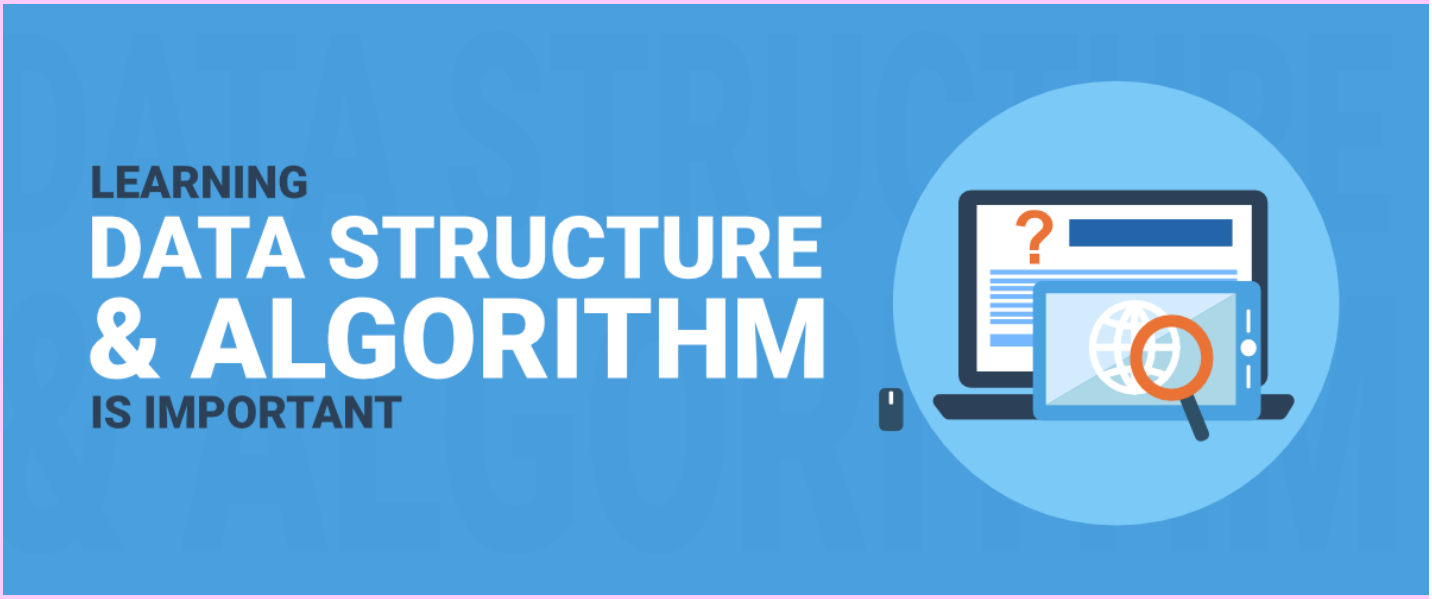
Why companies like Amazon, Microsoft, Google focuses on Data Structures and Algorithms : Answered

- Difficulty Level :\nMedium
- Last Updated :\n25 Jun, 2021

If you\xe2\x80\x99re preparing for a tech interview of any big tech company like Adobe, Amazon, Microsoft, Google, etc. \xe2\x80\x93 most probably, you would have known about the importance of Data Structures and Algorithms to crack these interviews. Yes, most of the interviews for technical roles in these companies are focused on measuring the **Data Structures and Algorithms** knowledge of the candidates. \xc2\xa0
\xc2\xa0

> So the question arises: **Why do Product Based Companies place so much emphasis on Data Structures and Algorithms?**



Software Product Based Companies normally create products that are related to software. So it stands to reason that they require quality **Software Developers** to handle the development process for the software. The pay-scale of Software Developers has increased a lot in recent times globally. According to the report by Glassdoor, the average base pay of Software Developers in India is found to be around **12 Lakhs *per annum***. The average base of software developers ranges from **Rs. 4,00,000** to **Rs 20,00,000** per year (With Product Based Companies occupying the higher end of the spectrum).
\xc2\xa0

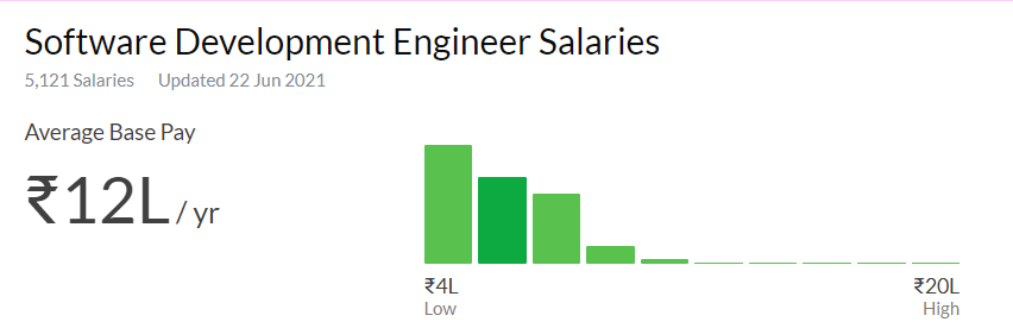


Image Courtesy: Glassdoor

However, there is an acute shortage of well-qualified Software developers in India. As per various standard reports, less than 10% of engineers are actually employable in software-related jobs. **That is where Data Structures and Algorithms come in.** They are so important in Product Based Companies\xe2\x80\x99 interviews as they are the hallmark of any good Software Developer.\xc2\xa0

In addition to that, there are multiple reasons why **Product Based Companies** place so much emphasis on Data Structures and Algorithms as stated below:\xc2\xa0

1. Data Structures and Algorithms demonstrate the **problem-solving ability** of a candidate. There is no room to craft elaborate stories and this means that either the candidate can solve the problem or they can\xe2\x80\x99t.
2. Questions based on Data Structures and Algorithms can be **scaled up or down** according to the knowledge level of the candidate. This means that a variety of candidates can be tested using roughly the same problems.
3. Data Structures and Algorithms are used to test the **analytical skills** of the candidates as they are a useful tool to pick out the underlying algorithms in real-world problems and solve them efficiently.

4. Data Structures and Algorithms are the **fundamentals** of Software Development. They remain the same no matter what new technology is used and that puts the focus on the problem rather than the technology in the interview process.

Learning Data Structures and Algorithms

Now as we have established that Data Structures and Algorithms are important for interviews in **Product Based Companies**, let\xe2\x80\x99s focus on learning them.\xc2\xa0

> Bad programmers worry about the code. Good programmers worry about data structures and their relationships.\xc2\xa0
> \xc2\xa0

While learning Data Structures and Algorithms, it is best to start small with simple topics and then move on to more and more advanced topics. Some of the basic data structures are **Arrays, Linked Lists, Stacks, Queues,** etc. while some of the basic algorithms are **Sorting, Searching,** etc.\xc2\xa0

Some of the major problems that can appear while learning Data Structures and Algorithms are:\xc2\xa0

- **Lack of guidance:** There is no clear guidance while learning Data Structures and Algorithms. There are numerous topics within these umbrella terms with no specific guidelines about which topics would be more useful for different Product Based Companies. This situation can be quite confusing, especially for a beginner.
- **No idea from where to start learning:** Even if the necessary topics in Data Structures and Algorithms are known, the sheer amount of them leads to a lot of confusion. Most beginners have no idea from where to start learning or even what chronological order to follow while learning.

To solve the above problems, we at GeeksforGeeks have designed a number of online courses to learn Data Structures and Algorithms at affordable prices. One of the latest courses created by us is\xc2\xa0the **Complete Interview Preparation** course. This course covers **Data Structures and Algorithms** along with other subjects in order to completely prepare you for placements in your dream company.\xc2\xa0
\xc2\xa0
To learn more about it, read on . . .

Complete Interview Preparation Course

The **Complete Interview Preparation** Course is specifically designed for the **students and working professional**s to help them out in landing their dream job by providing them all the required stuff like premium lectures, theory notes, practice tests, assessment tests, etc. in a single place. In this course, along with **Data Structures & Algorithms**, you\xe2\x80\x99ll get prepared for other required subjects also like Computer Science Core Subjects, Programming Language, Reasoning & Aptitude, etc.\xc2\xa0Also, we know that the placement preparation requires some extensive research process and smart learning as not every subject holds the same weightage in the interview \xe2\x80\x93 hence, this Complete Interview Preparation Course is extensively curated keeping this factor in mind. \xc2\xa0

Some of the prominent features of the Complete Interview Preparation course are listed below:\xc2\xa0

- Around 200+ algorithmic coding problems will be provided
- Track-based learning & Weekly assessment tests
- Premium ***Video Lectures recorded by Sandeep Jain (CEO & Founder, GeeksforGeeks)*** and other industry experts.
- Subject-wise Theoretical content & Objective Questions compiled by subject experts
- Lifetime access to the Course will be provided
- Course Completion Certificate & Internship Opportunities at GeeksforGeeks
- College Students will get the **year-wise weekly plan** for the course
- Free Access to \xe2\x80\x98Get Hired Premium\xe2\x80\x99 at GeeksforGeeks Job Portal
- Dedicated TAs for the Doubt Assistance (Optional)

This course is originally priced at INR 9,999, but it is available at an **offer price of INR 6,999**. Also, if you want to add on the **doubt assistance** facility in this course, you\xe2\x80\x99ll be required to pay an additional amount of **INR 2,999** only. The Doubt Assistance facility will be valid for the complete 1 year from the registration.

DSA Self Paced Course

In case you wish to focus exclusively on Data Structures and Algorithms, you can opt for our latest online course to learn Data Structures and Algorithms named \xe2\x80\x93 **DSA Self Paced Course**, which covers everything about Data Structures and Algorithms from the Basic level to the Advanced level. It offers a wealth of programming challenges that you may face at your next job interview. The course focuses mainly on Data Structure & Algorithms as it the key to selection in top product-based companies.\xc2\xa0

Some of the Key Features of the Course are:\xc2\xa0

- Well-organized tutorials on Data-Structures and Algorithms prepared by the experts
- Premium video lectures by **Mr. Sandeep Jain**, Founder, and C.E.O of GeeksforGeeks.
- Weekly Assessment Tests with Video Solutions.
- Course Completion Certificate & Internship Opportunities at GeeksforGeeks
- Lifetime access to the Course

The price of the self-paced online DSA course is **INR 2,799**. Also, if you want to add on the doubt assistance facility in this course, you\xe2\x80\x99ll be required to pay an additional amount of **INR 1,499** only. The Doubt Assistance facility will be valid for the complete 6 months from the registration.

Geeks Classes \xe2\x80\x93 Live Session

Do you want to get live online classes on Data Structures & Algorithm to learn and master it\xe2\x80\xa6?? If yes, then we\xe2\x80\x99ve **Geeks Classes \xe2\x80\x93 Live Session** course for you. It will be an interview centric extensive online (live) program to build and enhance your DSA skills. The course is designed in such a manner that it will help you to improve your problem-solving and coding skills by enhancing your understanding of Data Structures & Algorithms. The primary goal of this course is to help you in the preparation for the Coding interviews of companies like Amazon, Microsoft, Uber, etc. As it will be an online live class \xe2\x80\x93 you can attend this class from any geographical location and can ask your doubts or queries as well to the instructor similar to an offline classroom program.

Some of the prominent features of this course are provided below:

- Doubt Solving Assistance (TA\xe2\x80\x99s)
- Limited Batch strength
- Course Completion Certificate
- 6 months access to recorded Live lectures of this course
- Other than that, you will also get complimentary access to the course content of the DSA Course.

This **Geeks Classes \xe2\x80\x93 Live Session Course** is being provided to you at a discounted price of **INR 10,999/-.**

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Microsoft Interview Experience 2019 (Internship)

- Difficulty Level :\nMedium
- Last Updated :\n16 Jun, 2019

Round 1:

The first round was an online Coding/Programming test conducted on\xc2\xa0\xc2\xa0mettl.com/. Many students across the country participated in this round. There were 3 questions of varying difficulty levels. Candidates who solved\xc2\xa0 3 problems or 2 problems with 3rd one partially solved were directly called for the onsite Interview. Few Questions were based on simple array manipulation and String manipulation and other on Dynamic Programming.

Round 2:

My interview was scheduled on 23rd February at Chandigarh University. People from different parts of the Country were called for the interview. The Second round was completely based on Data Structures and Algorithms. It was a pen paper-based coding test. We were given 2 questions on linked lists and Arrays, Questions were

1. Find the Maximum Sum of a linked list of length k

Eg.\xc2\xa0 i/p:\xc2\xa0 \xc2\xa01->2->3->4->5->6\xc2\xa0 \xc2\xa0 \xc2\xa0k=5

o/p: 20

2.Rotate an array by k positions inplace

Eg. i/p\xc2\xa0 \xc2\xa0 \xc2\xa0[1, 2, 3, 4, 5]\xc2\xa0 \xc2\xa0k=2

o/p\xc2\xa0 \xc2\xa0 [4, 5, 1, 2, 3]

Candidates were asked to give an efficient solution to these problems. For both the problems, The Expected time complexity was O(n) and constant space complexity. I solved the 1st problem efficiently with linear time complexity and the 2nd problem with time complexity of O(n^2). Out of the 45 candidates who sat for this round 6 were selected for the next round. Fortunately, I was one of them

Round 3:

This was an interview round which was totally based on Data Structure and Algorithms. The interviewer gave me 3 questions and I was asked to provide an efficient solution to these problems. Some of the questions were:

1.Level Order traversal of a Binary Tree

2.Rotate a matrix by 90 degree

3. Merge k sorted linked lists of length k

The interviewer was very friendly, he was trying to give me hints for the problem where I was stuck. I was stuck in the matrix question, he gave me a few hints and I was able to solve the problem successfully and efficiently. I was able to provide efficient solutions for all the 3 questions as per the expectation of Interviewer. Out of the 6 candidates who were selected for this interview only 2 were

selected for the next round. Luckily, I was one of them

Round 4:

This also was an interview round which was totally based on Data Structures and Algorithms and your problem-solving skills. This was quite an advanced round as compared to the 3rd round. The interviewer gave me 2 questions and I was asked to provide an efficient solution for the problems. Some of the questions were:

1. Find the majority element in an array

2. Given a linked list of digits, you need to add a digit to the linked list

Eg. i/p\xc2\xa0 \xc2\xa09->9->9\xc2\xa0 \xc2\xa0digit=1

o/p\xc2\xa0 1->0->0->0

Expected Time and Space Complexity for the 1st problem was O(n) and O(1) respectively.

The 2nd problem looks trivial and easy, but the constraints to be satisfied while solving the problem were quit interesting. Constraints were:

1. You need to solve the problem without reversing the LinkedList

2. You need to solve the problem without using stack and without using recursion.

3. You need to solve the problem with constant space complexity and time complexity of O(n).

I was able to solve the 1st question but was unable to come up with a solution for a 2nd problem that should satisfy the given Constraints. So, I was not selected for the internship.

As it was an internship Interview I was not asked questions on System Design. But be prepared for System Design questions When applying for a SDE role in Microsoft.

Tips:- Know yourself before any interview.
Be calm & answer politely.

All thanks to GeeksForGeeks

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Microsoft Interview Experience for Software Developer

- Last Updated :\n21 May, 2019

Hi,

I am here to share my interview experience at Microsoft. I was working as a software developer at a Financial Domain-based Company for the past 8+ years. I haven\xe2\x80\x99t seen any interview panel for the past decade. so I was scared to face Microsoft (was my primary reason for the failure) as my first interview after a long break. First of all, I am late for the interview. But I did a big mistake which is **I have not prepared for the interview** due to the short notice of the interview day. funny isn\xe2\x80\x99t it?

Round 1: (Inside a Glass Office)

when I entered the room on the gentleman said hello. I smiled (with fear in my face) and said hello. with that, gentleman understood that I was scared and he asked about me I said blabbered everything \xe2\x80\x9cabout me\xe2\x80\x9d once I finished he asked is this your first interview after 8+ years (he got me) I was shocked and said yes. And he started asking me about algorithms if I knew about them? I said NO. and he asked about Data Structures I said NO. He smiled and asked what you know (he asked me about the technologies and knowledge about any \xe2\x80\x9cuseful languages\xe2\x80\x9d that he is looking for.) I said that I know C# and C++ (intermediate level \xe2\x80\x94 \xe2\x80\x9coperator overloaded\xe2\x80\x9d none of which he is looking for.) so he asked me to explain the work that I was been.

I explained everything which comes into my mind and he started asking questions from that. I was shocked, Why was I not asking these questions when I was working back in my office. And he asked me to write down all the application layers which we are using in our application. \xe2\x80\x9cpseudocode by the way\xe2\x80\x9d\xc2\xa0pseudocode? what the hell was that? I wrote down 3 paragraphs about it in detail. he smiles at me again. and asked me \xe2\x80\x9cI think I was asking for some pseudocode kind of think I believe\xe2\x80\x9d and said that was ok. that was all! my interview (First Round was over \xf0\x9f\x99\x81) he asked me to wait outside will call you later after our discussion. (I knew that I was not going to go clear and I am going out)

And I came out and waiting for 1 hour and the coordinator called me and at the first work he said was \xe2\x80\x9cSorry you were not selected\xe2\x80\x9d and I said nothing and he started that do you know what was the placed you have to improve. I said yes, everywhere I have to improve he started describing one by one about it.

Point 1: Never ever come to a company like this without preparing

Point 2: Get to know from the basics

Point 3: Get to know the CORE concepts of what you are working.

Point 4: No need for technology. Learn the core Logics first (Algorithms and Data Structures).

Point 5: Never underestimate the person in front of you.

Point 6: Don\xe2\x80\x99t show your weakness first.

Point 7: Be sure about what you deliver.

Point 8: before you think, Write it down in a sheet read it often until you get it correct.

Point 9: Prepare as much as you can But learn better.

Mistakes I Made:

Include not following the points above. I am too lethargic in preparing for the interview. Underestimated my knowledge and confidence due to the size of the company I am going to go with Interview.

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Interview with Microsoft (office 365 Hyderabad team) at their Bengaluru office.

- Difficulty Level :\nBasic
- Last Updated :\n21 May, 2019

Hi, I am a backend developer with 8 years of hands-on experience. One of the HR person from Microsoft approached me to check if I am interested in an opportunity with them, I was told that there will be total four rounds on the same day, 3 rounds followed by hiring manager round.

Round 1:

2 interviewers in the panel, one was asking questions other was making notes on his laptop

Asked about my past projects, as soon as I mentioned \xe2\x80\x9cNoSQL/Cassandra\xe2\x80\x9d he asked:

- What\xe2\x80\x99s NoSQL?
- Why you chose it over RDBMS?
- What can NoSQL achieve that RDBMS can not?
- Write code to find max sum subarray in a given array.
- Given a sorted array of integers with size n, find if there exists a number that is repeated at least n/4 times, n is length of array. Time complexity should be less than O(n). Explain approach and write code.

Initially I was asked to code in any language but later they kept me from writing scala code and ask me to write in other language, I wrote in Java.

Round 2:

A senior guy from PowerPoint mobile app team interviewed me.

- Given a circular LinkedList which is sorted, Given a node of this LL and an integer, WAP to insert the item in the LL so that the LL remains sorted after insertion, handle all edge cases.
- One more question that I forgot.

Round 3:
A lady (very senior) from Excel online team interviewed me.

- Same questions about NoSQL as in round 1.
- Given a list of train schedules (arrival and departure time), find the minimum number of platforms required to run the trains. Write a program.
- Design a phone book. Follow up: how do you store and retrieve data in Trie data structure?

Lunch Break!

Round 4 (HM round):

Very senior guy working on a instant messenger product.

- How have your other rounds been?
- Asked about my past projects, as I mentioned \xe2\x80\x9cNoSQL/Cassandra\xe2\x80\x9d he asked the same questions as in round 1.

- OO design of an elevator. Write interfaces and implementation and logic.
- Why you want to leave your current job?
- Why Microsoft?
- He told me about how they decide which team to deploy a new joiner in?

All the interviewers gave me enough time to ask questions, except the HM. They have been polite and calm all the time. Overall it was a great experience.

I have been to all the rounds and within two days I got a standard rejection mail.

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Microsoft Interview SDE intern 2019

- Difficulty Level :\nMedium
- Last Updated :\n01 Jul, 2021

Round 1:\xc2\xa0

There were 3 questions in the online round .2 questions related to simple array manipulation and one bst.\xc2\xa0

Those who did atleast 2 questions were selected for\xc2\xa0 other rounds.\xc2\xa0

Round 2:\xc2\xa0

It was group fly round where in we were given 2 questions.\xc2\xa0

1st : There is an array which is sorted but rotated at one end. you have to find the given element in that array.\xc2\xa0

Expected time complexity : logn.\xc2\xa0

I gave the solution using binary search.\xc2\xa0

reference : https://www.geeksforgeeks.org/search-an-element-in-a-sorted-and-pivoted-array/\xc2\xa0

2nd question :\xc2\xa0

Check given tree is BST .\xc2\xa0

Round 3:\xc2\xa0

Technical round :\xc2\xa0

He asked me about my project which i have done till now.I just explained him about my python web scrapping project.Then he went for questions.\xc2\xa0

1st : you are given a bst, you have to print the sum of all nodes whose value is greater than or equal to the present node.(this has to be done for every node present in the bst)\xc2\xa0

He asked me to write the code on paper.\xc2\xa0

my approach : First calculate the total sum of nodes in the bst using inorder recursive function.\xc2\xa0

initialize prev_sum=0;\xc2\xa0

Again traverse the tree in inorder, maintain a sum_prev which is adding node values.Print sum-prev_sum.\xc2\xa0\xc2\xa0 prev_sum+=node_value\xc2\xa0

int SUM=0;\xc2\xa0

void sum(Node* root)\xc2\xa0

{\xc2\xa0

if(root==NULL)\xc2\xa0

return;\xc2\xa0

sum(root-left)\xc2\xa0

SUM+=root->data;\xc2\xa0

sum(root->right)\xc2\xa0

}\xc2\xa0

int prev_sum=0;\xc2\xa0

void solution(Node*)\xc2\xa0

{\xc2\xa0

if(root==NULL)\xc2\xa0

return;\xc2\xa0

solution(root->left)\xc2\xa0

print(sum-prev_sum)\xc2\xa0

prev_sum+=root->data;\xc2\xa0

solution(root->right);\xc2\xa0

}\xc2\xa0

he asked me to try it in one loop.I gave it in one loop using : https://www.geeksforgeeks.org/add-greater-values-every-node-given-bst/\xc2\xa0

2nd question based on kadane\xe2\x80\x99s algorithm.https://www.geeksforgeeks.org/largest-sum-contiguous-subarray/\xc2\xa0

Round 4:\xc2\xa0

1st question minimum length of maximum sum array.\xc2\xa0

I gave this solution using kadane\xe2\x80\x99s algorithm with maintaining prev_minimum_length as a variable\xc2\xa0

2nd question : right view of binary tree\xc2\xa0

i gave my solution using level order (queue)\xc2\xa0

https://www.geeksforgeeks.org/print-right-view-binary-tree-2/\xc2\xa0

She asked me to write the code on paper.\xc2\xa0

She asked me about my projects.\xc2\xa0

Round5:\xc2\xa0

Senior SDE Engineer took my interview.\xc2\xa0

He first asked about me and some random stuffs, hobbies and all.\xc2\xa0

then he asked me one question :\xc2\xa0

Given n points in a globe/2 dimensional infinite matrix . Find the closest point to a given point.\xc2\xa0

o(n2) solution not expected.\xc2\xa0

I approached it by making some tiles for every point . Then i told him that we can first search it in near 8 sqaures /tiles near that given point.Then he took out some mistake and asked me to think more as i m going in the right direction.\xc2\xa0

Then I told him that i ll sort the points according to x variable and then y and then restrict my search for the closest point in the region bounded by that points .\xc2\xa0

he told me not to code as i have coded in all the rounds.\xc2\xa0

My all interviews went quite well and results came after 15 days and I was selected.\xc2\xa0

Just focus on interview specific questions, Operating systems, DBMS, and data structures .\xc2\xa0

Before going for interviews Read some interview experiences .\xc2\xa0

Thanks you\xc2\xa0 geeksforgeeks for such a good platform to prepare for interviews.\xc2\xa0

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Microsoft Interview Experience SDE 1 off campus (8 months exp)

- Difficulty Level :\nExpert
- Last Updated :\n04 May, 2019

1st round was skype interview:
Question 1 : Given a bst find 4 numbers which sum upto a given number .
without using extra space

Answer: Convert bst to dll and use 2 pointers approach O(n^3)

Question 2 : It was based on BST also, don\xe2\x80\x99t remeber the question.

From 2nd round onwards it was on Microsoft Hyderabad campus:
Round 2:
Question 1: Given a rowwise and column wise sorted matrix find number of negative elements in it.
Expected time complexcity O(n).

Answer: Start from bottom left element and if element is negative move right and if positive move up counting the number of negattive elements in a row and keeping boundary condition in mind.

Question 2: Given a Array of String encode that array into a String such that decode function can decode using the encoded String only.

Answer : For each String add Length of string a delimiter and String to encoded String.
If String is \xe2\x80\x9cabcd\xe2\x80\x9d
add 4#abcd to encoded String

Round 3:
Question 1 : Given a binary tree and a list of nodes to be deleted, find the root node of each tree after deletion

For ex if tree is

```
\r\n              1\r\n            /    \\\r\n          2      3\r\n         /   \\\r\n        4     5
```

and node to be deleted is 2, then answer will contain 1, 4, 5
O(n) single traversal.
Answer using postorder traversal.

Question 2: Given Dictionary of words and mobile Keypad, given number find all dictionary String starting from it.
https://www.geeksforgeeks.org/find-possible-words-phone-digits/ similar to this

Question 4:
Based on transforming 1 String to another, using graphs.

Round 3 : Manegerial Round:
General HR questions:
Why should we hire you?
Why do you want to change?
What do you do apart from projects?
One Technical Question:
Sort 50 GB large file of words.
Sorted chunks and then used heap.
Then told about the team i will be joining in details.

In every question they wanted Production ready code on paper.

Verdict: Selected.

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Microsoft Interview experience for full time position of software engineer at Microsoft Ireland Research

- Difficulty Level :\nMedium
- Last Updated :\n29 Apr, 2019

Position: Senior software engineer \xe2\x80\x93 Office 365 team

I initially applied for senior software engineer position in Office 365 Team in Dublin, Ireland in Aug 2018. After a month I received a phone call from the recruiter for a quick chat about my current situation. He asked me the following questions:
1) Why have you applied for this position?
2) What you do in your current role?
3) Where do you see yourself in the next 5-8 years time?

The recruiter was satisfied and he scheduled a technical interview with a software engineer over Skype.

Skype Interview: Technical
It was divided in 2 parts, first he asked me some competency based questions and some projects from my CV. He also asked why I want to work for Microsoft? What is the most challenging project I have worked on and why? \xe2\x80\x93 this was only 15 mints then he gave me a coding interview question give below:
Given an array: [5, 10, 4, 0, 2, 4, 6, 31, 6, 6, 8, 5, 1, 2, 3] find the number that is sum of its left and right subarrays. In this example its 31 because numbers on its left adds up to 31 so are those on its right.
Write a function that will return that number if exists. Return -1 if doesn\xe2\x80\x99t.
Tips: He was looking for time and space complexity and the approach towards the solution. You have to ask questions like is the input array can be null or empty? Should we throw exception in this case? How big is the input array? Does it contain negative numbers? Or decimal numbers? Things like that. This shows that before cracking on writing the code, you think and plan how you gonna approach it. Then think about how you gonna solve it and what time and space complexity will be. Once this discussion is completed ask if its okay now to start writing the code.
So I stated writing code and I also kept explaining what I was doing just to let him know about my thoughts. Once completed writing the function, I walked through the example input array which seemed to be working. Then he changed an input array with zeros and ones and negative numbers to which my code wasn\xe2\x80\x99t able to find the right number.
I thought I failed at this stage. Next, he asked if I have any questions so I asked him about their software development process, build and release process and some other technical / project life cycle type questions. Its very imported to ask question when you are given an opportunity.

After a few weeks I received call from the recruiter that they would like me to come for face to face interview at Microsoft Dublin campus.

On site interview with Office 365 team: Technical
The interview was booked for whole day. It was divided into 4 stages. Each stage lasts for aprox 1 hour and there was a lunch break with the hiring manager as well (which is the part of interview so be careful and don\xe2\x80\x99t get too comfortable).

Stage 1
Given array values = [1, 3, 4, 8] and indices [0, 2]. Write a function that will return an array containing the product of all the values except those in indices. So in this example, the result of that

function would contain the products of 3, 4, 8 and 1, 3, 8.
Of course, ask questions to clarify any confusions and talk through the solution. Explain how you gonna approach it and time and space complexity.

Stage 2:
Find the first non-recurring character in a string. Input \xe2\x80\x9cTeeter\xe2\x80\x9d output \xe2\x80\x9cr\xe2\x80\x9d. Again, ask questions and talk through your idea of how you gonna implement it before writing the code.

Stage 3:
Reverse the words in a string while keeping the special characters in their place. Input = \xe2\x80\x9cHay! Stop writing code in Java, use C#.\xe2\x80\x9d output = \xe2\x80\x9cC#! use Java in code writing, Stop Hay\xe2\x80\x9d. Notice that ! and, are unchanged.

Stage 4 \xe2\x80\x93 This one was with the hiring manager:
Find the missing number from a sorted array. Input = [0, 1, 2, 3, 4, 6, 7, 8, 9] output = 5. I used binary search.

They all seemed to be satisfied and I thought I could receive offer from this team. After 4 weeks the recruiter called and broke the news that unfortunately, the offer has gone to another candidate who was a better fit for the role. However, my feedback was positive and I was recommended to apply for another position in Microsoft.

Position: Senior software engineer \xe2\x80\x93 SharePoint team

After couple of months, I applied for the senior software engineer role for SharePoint team in Microsoft Dublin campus. Received a phone call from another recruiter, she had my feedback form previous interview which she said was positive. She scheduled a technical interview over skype with a software development manager in Redmond Seattle.

Skype Interview.
He asked me a few technical questions regarding C# and CLR. Some ASP.net and .net core questions. He then moved towards a few competency based questions. After that he gave me coding question. He asked me to design a Queue class by using array data structure only. Class should have the following behaviour:
Enqueue(int), Dequeue(), Peek() and Count().
I asked him a few questions to clarify few assumptions and asked his permission if its okay to start writing code. I kept talking while writing the code, we discussed a few things. He liked my solution and asked me if I have any questions to ask. As I said earlier its very important for us to ask questions which I did. At the end, I requested for any negative feedback as it will help me to prepare myself better for next interview.

After couple of days retrieved a phone call from the recruiter, she said since they already have my positive feedback from the office 365 interview so they have decided to skip another technical interview over Skye and invited for face to face full day interview at Microsoft
Dublin campus.

On site interview with SharePoint service team:
First Interview with 3 software engineers:
1. What you do in your current role? / Tell me about yourself.
2. What things do you look for when doing a code review?
3. How do you measure performance of an application?
4. How do you go about implementing new technology in projects?
5. How do you mentor your teammates?
6. What are new features in C# 8.0?
7. What if your teammate finds a new tech that perfectly suits the need, what do you do?

8. Apart from technical mentoring, do you mentor on soft skills?
9. How have you influenced your teammate?
10. White board question:
a. A lift that goes to each floor once (0-7 floors only), given input [0, 7, 5, 3, 4, 1] [[5, 7], [6, 3], [4, 1], [7, 2]]
b. Discuss test cases
c. Note: I don\xe2\x80\x99t understand the point of this whiteboard question. I was an easy one and the interviewer looks unsure what he wanted to find out about my problem solving skills. The 2 dimensional array was flawed so I fixed that and then discussed how I would solve it (algorithm). Eventually I was asked to write code for that algorithm which I did.
d. How would you design an app that calls 3 micro services to complete an online order?

Second Interview with the hiring manager (team manager)
1. Define SOLID
2. What is diff between monitoring and telemetry?
a. Drilled more in telemetry \xe2\x80\x93 how can it help etc..
3. There was a 3rd tech question that I have forgotten.
4. Tell me about the most challenging project you have worked on or led?
a. What ambiguities were there and how did you solve them etc.
5. What do you think a team leader should be?
6. How have you taken a negative feedback from your colleague or a teammate?

Third Interview with the hiring manager\xe2\x80\x99s boss (in Redmond)
1. Have you been told about our team structure?
2. Most challenging project
3. How do you keep on top of new tech and how do you go about learning them?
4. How do you measure success of a project?

After couple of days revived phone call from the recruiter talking me through the offer process. This was the happiest day of my life!

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Microsoft Summer Internship \xe2\x80\x93 2019 | Campus Recruitment

- Difficulty Level :\nHard
- Last Updated :\n20 Apr, 2019

This article is regarding the Microsoft Summer Internship 2019 recruitment process that took place at my college campus \xe2\x80\x93 VIT University, Vellore.

Round 1: Group Fly Round

The first round was group fly round where we were asked to write codes (pen & paper) in any preferable language for the given 2 questions:

1. **Immediately largest and immediately smallest numbers with same number of 1s in binary representation**:\xc2\xa0https://www.geeksforgeeks.org/closest-next-smaller-greater-numbers-number-set-bits/
2. **Intersection of 3 arrays:**\xc2\xa0https://www.geeksforgeeks.org/find-common-elements-three-sorted-arrays/

The given link for second question refers to use of sorted arrays but we could always sort the input arrays as we only had to print the repeating elements among all 3 arrays.

Apart from codes they also expected us to mention the time and space complexities of each program as well as we had to write 3-4 sample test cases alongside the code which could help them evaluate it in better way. In all, we were given around 45-50 minutes for the group fly round.

Round 2: Technical Round \xe2\x80\x93 1

The round went on for about 1 hr to 1.25 hrs for me. I was asked to code for the logic of a car-wash management software based on a number of constraints like:

- Using a priority queue for keeping the booking sorted with respect to special preference to certain customers and time of booking.
- Customers coming for every 11th service to be given a free wash.
- Customers who become regular are to be given higher priority. The regularity can be based on \xe2\x80\x93 3 visits in the last month.

The choice of language was again left onto me. I chose Python to complete the task. The main aim was to keep discussing with the interviewer regarding what is going on in my mind and get suggestions regarding any improvement that could be done.

Apart from this, I was asked questions about:

1. Database Management Systems:
    - What is the use of \xe2\x80\x9cnormalization\xe2\x80\x9d in the database management?
        - The basic idea is to reduce the redundancy in the database and improve its scalability. To which I was questioned regarding: \xe2\x80\x9cWhy do we prefer normalization while storage media is available at cheap cost?\xe2\x80\x9d. One could argue that normalization also keeps data consistent without producing any anomalies and gives an easy understanding of the entire database.
2. Core C Programming:
    - What are placeholders in C?

- Can a C program run without including \xe2\x80\x9cstdlib\xe2\x80\x9d library?

Round 3: Technical Round \xe2\x80\x93 2

In this round the complete focus was on Data Structures and Algorithms. I was asked to write:

1. Various types of binary tree data structure.\xc2\xa0https://www.geeksforgeeks.org/binary-tree-set-3-types-of-binary-tree/
2. Code for pre-order traversal of a given tree.\xc2\xa0https://www.geeksforgeeks.org/tree-traversals-inorder-preorder-and-postorder/
3. What are hash tables and how to handle the collisions? \xc2\xa0https://www.geeksforgeeks.org/hashing-set-1-introduction/

Apart from DSA, I was asked questions regarding Networks and Communications like:

1. What is DNS?
2. On entering a URL in a browser, explain the detailed procedure in which the request is handled by the browser and the result is obtained for the given search query.

The interview was probably 35-40 minutes long.

Round 4: Technical \xe2\x80\x93 HR Round

The last round was conducted by the HR wherein he focused mainly on the projects that I had done. I explained the basic idea behind every project that I did in first 2 years of college. He liked one or more projects because of the kind of innovation that I brought in to solve the problem in hand.

Apart from projects, I was asked about my interests and other open-ended questions to allow them to know more about me. The round was about 25-30 minutes in stretch.

I was very happy to be one of the 5 students who got selected for the upcoming summer internships (2019) at Microsoft.

My tips:\xc2\xa0 Answer what you know. I would advice to accept it if you do not know the answer rather than bluffing a random one. Mainly they focus on skills mentioned in your Resume so keep it simple and direct.

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Microsoft Interview Experience | SDE-II

- Difficulty Level :\nHard
- Last Updated :\n20 Apr, 2019

Round 1(DSA, Design, Java)
1. Write a code to find kth largest element in an array.
Interviewer was interested in the most optimal solution straight away along with writing code for all the heap operations from scratch.https://www.geeksforgeeks.org/k-largestor-smallest-elements-in-an-array/

2. Write a code to merge k sorted arrays of size n.
Used the heap approach again and coded.
https://www.geeksforgeeks.org/merge-k-sorted-arrays/

3. Design a parking lot. He had given a ParkingLot class. He asked me to design the object oriented architecture supporting the park() and unpark() apis.
Then, he discussed the working of all other support apis of different classes along with the minimum argument list for calling. The internal algorithms also were optimised at the end.
For your reference, you can take help from the below link:
https://www.educative.io/collection/page/5668639101419520/5692201761767424/5770234338213888
4. Under which conditions you will use abstract class and when you will use interfaces.

5. Any design challenge you faced in your project.

Round 2 (Design)

1. Design Distributed cache system.
For data coming from the client side, I used the concept of aggregator in between so as to periodically dump that data to the cache side. But data should be sorted while dumping.
So some challenge got introduced that he asked to sort large GB files with 200 mb main memory.
Used n way external merge sort. After agreeing to some extent on my approach, he then asked me to write the full code covering all edge cases for the same.
Also, I used the concept of load balancers just before the cache layer. So, the interviewer asked how you actually implement load balancing. I used the concept of consistent hashing to explain the load balancing part which minimises the redistribution of load when a server gets added/removed and also helps in reducing skewed load on any of the cache by using a concept of virtual servers.
Reference video: https://www.youtube.com/watch?v=zaRkONvyGr8

Round 3(Design)
1. Design Autocomplete feature of Bing search.
All the discussion on how efficiently trie data structure usage will you do and how will you rank the suggestions and how many suggestions will be output to the user.
How will you shard the trie database and design other supporting system components.
My implementation at the end was something like the link given below:
https://www.youtube.com/watch?v=us0qySiUsGU

2. Implement a concurrent mark and sweep garbage collector. I used concept of concurrent hashmap on garbage collector and devised Mark and sweep algorithm accordingly. Then there was discussion on all the concurrency challenges. As I was from Java Background, he asked me this question.

Round 4: (With Director \xe2\x80\x93 Office 365 Web apps Team)
The head was part of Microsoft from last 25 years.
1. Discussion on projects and the project architecture. He asked about what part of my framework I am handling.
Since he was very senior, I started to introduce my current and previous projects from the business perspective first and then moved into the architecture part in detail.
He then stressed on the features I developed in my current project to understand the exact business use cases of the same.
2. My challenges faced on a regular basis and how you resolve them to ensure timely delivery of your product.
3. Then he explained all the challenges and the model of the Web apps they are targeting for their Office 365 product. There is a huge delta from the current scenario of Office 365 as far as deploying on the web as SaaS is concerned.

Rounds were done. The director said HR will contact me. Finally, got the offer in some days \xf0\x9f\x99\x82

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Microsoft Interview experience for SDE-2 (5+ years)

- Difficulty Level :\nExpert
- Last Updated :\n16 Apr, 2019

I had attended a Microsoft hiring event for Hyderabad location and Azure team. My experience is as follows:

F2F First round :
1. https://www.geeksforgeeks.org/zigzag-tree-traversal/
2. https://www.geeksforgeeks.org/find-maximum-path-sum-two-leaves-binary-tree/

F2F Second round :
1. We have given a matrix with positive numbers and few -1 in it. we need to replace each -1 with nearest positive number in the matrix.
2. Modified celebrity problem.https://www.geeksforgeeks.org/the-celebrity-problem/

F2F Third round:
Sudoku solver more optimized than backtracking algorithm.

F2F Fourth round:
we have given 5 million records (points with latitude and longitude and whether information at that point). We will get a query for any position with lat and longitude to get whether information.
We need to return the whether information of nearest point on the globe (already given information)

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Microsoft Internship Interview Experience

- Difficulty Level :\nMedium
- Last Updated :\n06 Apr, 2019

Tech-Set-Go 2018\xc2\xa0

Eligibility:

Microsoft gives an opportunity to all undergraduate and postgraduate students for 2 months summer internship program. Basic criteria to apply for Microsoft internship program was to have CGPA greater than 7.0, no pending backlogs and candidates should not have participated in Microsoft internship hiring process within the last one year.

Round 1(Online Round):

It was Online coding Round conducted in mettl.com on January 6th, 2019.\xc2\xa0 Everyone got 3 different question which needs to be solved in 90 minutes. Level\xc2\xa0of questions was easy-easy-medium. Each question contains corner test cases and also test cases with small and large inputs.

Those who solved all three questions completely (passing all test cases)were called for Onsite Interview at VIT-Chennai.

Round 2(Group Fly):

It was a pen-paper Round and from here each round is an elimination\xc2\xa0round. Do write clean and correct codes, with appropriate names for variables and proper indentation. The paper contains two sections 2 subjective questions and 2 objective questions. For\xc2\xa0subjective questions, we were asked to write test cases also.

subjective questions:

1.\xc2\xa0 \xc2\xa0\xc2\xa0https://www.geeksforgeeks.org/merge-two-sorted-linked-lists-such-that-merged-list-is-in-reverse-order/

2.https://www.geeksforgeeks.org/run-length-encoding/(without any extra memory)

\xc2\xa0Objective\xc2\xa0 questions:\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0

1. Given a code we have to identify the output of the given code. The\xc2\xa0question I got was Minimum-edit-distance.

2. Find\xc2\xa0the error in the code. The code was adding two LinkedList.

Around 20 were shortlisted to next round out of 120 students.

Round 3(1 hr 15 min):

From now it is a technical round where each person is assigned, one mentor. After\xc2\xa0Introduction, I was asked to write code in a paper for a given question. The way we approach a problem and communication of our thought process makes a difference. Finally, they need is a proper algorithm for a given problem. I was given two questions,

1.https://www.geeksforgeeks.org/search-in-row-wise-and-column-wise-sorted-matrix/

2. Nested conditional statement and I wrote a recursive solution and interviewer traced my\xc2\xa0code.

Round 4(1 hr):

The first interviewer asked me to find a cycle in a graph and I\xc2\xa0gave dfs approach for the problem and he\xc2\xa0told to solve a problem without using extra space(visited array) and after seeing my resume he asked gave me\xc2\xa0problem\xc2\xa0based\xc2\xa0on my project (i.e) to find the word from a paragraph. I\xc2\xa0gave a trie-based approach and he\xc2\xa0told to write a function for insertion of a word and searching a word on paper. Both\xc2\xa0logical and syntactical errors were identified and he told to correct it.

Round 5 (30 min):

This was very easy round for me and solved the problem very quickly. The problem was given a wall which contains two kinds of bricks porous (water passes through given brick) and opaque(water passes doesnot passes through given brick). Given a matrix filled with p and o, find water passes to the ground if poured from the top. I\xc2\xa0discussed a dfs approach and he told to write code on paper. After that he told my Interview is over and the result will be announced through mail after a week.

Finally the way we approach and solve a problem is important. GeeksforGeeks is the best place to practice for interviews.

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Microsoft Internship Interview off-campus

- Last Updated :\n04 Apr, 2019

There was one online competitive programming round which shortlisted around 100 students to the recruitment process that happened at VIT Chennai campus.

The first round was a written test. (1 hour)
Questions :
1. Given two singly linked lists sorted in the ascending order, return a linked list sorted in descending order combining elements from both the given linked lists. (10 marks)

2. Write test cases for the above question. (5 marks)

3. Given a string, return the Run length encoding of the string. For eg : aaabbc -> a3b2c, abbbbc -> ab4c
(10 marks)

4. Write test cases for the above question. (5 marks)

5. Some C++ program is given and the output should be determined. (I did not get time to attempt this) (2 marks)

6. Find the error in the given program. A java program that takes two linked lists representing two numbers and return a linked list which is the sum of the two numbers. (3 marks)

Second round : Interview

Question: Check whether a singly linked list is a palindrome or not.
I started with the solution of finding the middle element and reversing the second half of the linked list, then doing a linear comparison of corresponding elements. This works but we are changing the state of the original list.

Then I told about the approach where we traverse from the middle element to the end putting each element inside a stack. Then popping out one by one and comparing with the elements from the head of the list.
This requires O(n) space complexity.

Final approach was a recursion based one. I took time to think this from scratch. One way to solve this is given here. My approach was little different. First finding the mid node. Then passing that mid node to the recursive function. When the recursion bottoms up, we check if the head pointer and the current node in recursion is same or not, also head pointer is updated to next node in each recursive call backwards.

Discussed about how to find the middle node using fast and slow pointers.

Then he asked me to write the end to end code in any language. I used python to code it. He complimented when I used nested functions in python to keep the code clean.

Third round : Interview

Question : Given a chessboard and Knight is placed at point x, y. Given the destination coordinates, find the least number of moves Knight should take to reach the destination.

I used a BFS based approach to explore all paths. There were lot of corner cases to check. We are expected to discuss all these cases.

PS : If you have efficient approaches to solve any of the problems above, put them across the comments section. I will update in the article.

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Microsoft Interview Experience 2019 (TECH \xe2\x80\x93 SET GO) | Off-Campus Internship

- Difficulty Level :\nBasic
- Last Updated :\n08 Aug, 2021

Round 1 : Online Test
Test was conducted on Mettl. Test consist 3 Questions. All three questions were easy level.Those who solved at-least 2 or 1 and half questions were called for interview.

Round 2 : Pen Paper Coding Round
Microsoft conducted its interview process at around 8 centers across the country. I was called at Bhubaneshwar (ITER College). Around 50 Candidates from nearby region appeared for process. We were given 1 question (Removing duplicates from singly linked list) and 30 mIn to solve it. We supposed to write the code(in any language) . Judging criteria was how clean your code is, commenting, test cases etc.

20 students were shortlisted for interview round including me \xf0\x9f\x99\x82

Round 3 : Personal\xc2\xa0Interview
Interview started with some questions from my resume, about my projects, some real life applications of ML algorithms i have used. Then he asked me a simple question related to arrays(that i dont remember). After that he asked about basic OOPS related questions. Then he asked me to design microsoft search engine Bing. I was supposed to give appropriate classes and functions required to implement a Search Engine followed by some test cases. At last he gave me a situation that if i was given some work which i am unable to complete and deadline is approaching, what will i do .Also the only person who can help me is out of reach.

I was eliminated after this round.

Total 3 personal interview rounds each being an elimination round were conducted. Those who cleared all three PI\xe2\x80\x99s were selected. Girls were given special preference. In general, questions asked were from basics(OS, DS, OOPS, CN etc). **NO difficult questions were asked from data structures.** They were mainly interested in your Projects. Those who got selected were having really good projects. Interviews were not at all hard. Good Understanding of CS Fundamentals and some good projects is all you need to get the internship.

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Microsoft Interview Experience 2019 | Off-Campus Internship For IDC

- Difficulty Level :\nHard
- Last Updated :\n04 Apr, 2019

I applied for Microsoft Off Campus Internship through mettl.com. Minimum CGPA was 7 and no backlogs were allowed.

Coding Round(ONLINE)

It was an online coding test which had three questions and 90 mins were allotted for it. Different people got different sets of questions.

1) https://www.geeksforgeeks.org/find-total-number-of-distinct-years-from-a-string/

2) https://www.geeksforgeeks.org/rearrange-odd-and-even-values-in-alternate-fashion-in-ascending-order/

3) https://stackoverflow.com/questions/52775518/number-of-buses-originating-from-a-bus-stop-a-computer-program

I solved all the 3 problems. The result was announced after 20 days and I was qualified. After some days I got my interview details.

Round 0(FLY ROUND):\xc2\xa0

This was a pen-paper based round and in this round almost 160 students participated from different institutes of India. 2 questions were asked and they gave us 60 minutes to solve. The problems were :-

1)https://www.geeksforgeeks.org/a-linked-list-with-next-and-arbit-pointer/

2)https://www.geeksforgeeks.org/reverse-alternate-levels-binary-tree/

Only 20 students were selected for the next round. I was one among them.

Note:- If you have enough time left then write comments and explain your approach . Also variable names should be self explanatory for better understanding.

Round 1(Technical):\xc2\xa0

It was a f2f interview and the interviewer was very nice and friendly.\xc2\xa0 First he brought my fly round paper and asked how can I improve my solutions. Then he asked me these problems:-

https://www.geeksforgeeks.org/expression-evaluation/

https://www.geeksforgeeks.org/program-print-substrings-given-string/

As a modification to the second problem he asked me how will I find the longest repeated sub-string within the same string in which the characters can overlap.

After that he asked me:- Given two tables A and B (in SQL) how can I print only those rows which are present in A and not in B without using multiple select statement (Note that due to this restriction

we cannot use the MINUS operator). I gave him a solution which uses JOIN function in SQL but it was incomplete. After his help I was able to solve it completely. Then he asked me a question in Computer Networks and i told him that I am not good in this topic and he moved on . He then asked me whether I have any questions for him. I asked 2-3 questions and then the interview came to an end.

I was waiting outside when I was informed about the whereabouts of my 2nd interview.

Round 2(Technical):

The interviewer first asked me about my college which was followed by 1-2 minute of general talks. After that he gave me a question and asked me to write the code.The question was:-

Given n locations/directories of a file print the directory in the order such that the parent directory comes before the child directory. For example a directory is \xe2\x80\x9ca/\xe2\x80\x9d and the second directory is \xe2\x80\x9ca/b/c/\xe2\x80\x9d so \xe2\x80\x9ca/\xe2\x80\x9d is the parent directory of \xe2\x80\x9ca/b/c\xe2\x80\x9d because to reach \xe2\x80\x9ca/b/c\xe2\x80\x9d we first need to reach \xe2\x80\x9ca/\xe2\x80\x9d.

Example:-

Input :- 1) a/

2) a/b/c

3) d/

4) d/e

Output :-

The input is already given in the sorted format and can be printed as it is. One more solution can be :-

1) a/

2) d/

3) a/b/c

4)d/e

I told him 3-4 approaches each time with a complexity less than the previous one. But he wanted a better solution. I finally arrived at a solution that we can just sort the strings according to their lengths and he was satisfied. He then told me to write radix sort for the same.

Although I was not confident in implementing radix sort but I tried and after taking some time I finally wrote the code. I explained my approach to him and then he told me to wait outside.

I was very nervous after this interview as I was not sure about my implementation of radix sort. But after some time I was called for the next round.

Round 3(HR) :

First he asked me to introduce myself and how were my previous interviews.The interviewer was polite. He asked me what i generally do to pass my time. Then he asked me my favorite topic in programming. I told him data structure. He asked what in data structure. I told him trees and graphs.

He then asked me how will I explain to someone what is a tree who knows nothing about coding. Following that he asked me some applications of graphs. I told him maps, but he wanted another solution. He asked me how do you think Facebook works. I told him the connections between the friends is a generalization of graph data structure. Then more questions about implementation of mutual friends in Facebook followed. The interview came to an end and he asked me whether i have any questions for him. I asked him a\xc2\xa0 few questions.

After some time the HR came and asked for my resume and told me that they will get in touch with me within a few days to tell me whether I was selected or not.

After almost 30 days I got a mail from them stating that I was selected. Hurrah!!!!

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Microsoft Interview Questions (3.5 years)

- Last Updated :\n02 Apr, 2019

Round 1
1)\xc2\xa0 Second largest element of bst
2) Next smallest permutation of string
3) Split words into meaningful words(ex \xe2\x80\x93 iworkformicrosoft- i work for microsoft)
4) Arrange elements in array so that they will become ap

Round 2
1) Dequeue Implementation
2) Design calculator app

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Microsoft Interview Experience 2019 | Off-Campus Software Engineering Internship

- Difficulty Level :\nMedium
- Last Updated :\n31 Mar, 2019

Microsoft conducted an all India drive for hiring SDE Interns(Minimum CGPA was 7 and no backlogs were allowed). They conducted a coding round in which people who solved 3 got a call or people who solved 2 and had a higher CGPA(+9) also received a call. Girls solving one problems were called for on site interview.

Round 1: Online Test

Test was conducted on Mettl.com.

Questions:

1. https://www.geeksforgeeks.org/remove-duplicates-from-a-given-string/
2. Return sum of top k elements of Array.
3. https://www.geeksforgeeks.org/find-maximum-depth-nested-parenthesis-string/

Round 2:\xc2\xa0

\xc2\xa0 It was a group fly round where there were around 54 candidates. They gave us 40 minutes and four problems to solve.The four problems are as follows:

1. Predict the output of a given program.
2. Write operations of Stack.
3. \xc2\xa0Implement substring function.
4. https://www.geeksforgeeks.org/merge-two-sorted-linked-lists-such-that-merged-list-is-in-reverse-order/

I was rejected after this round.

After this there were 4 rounds.

Thanks to geeksforgeeks team for putting such good content on website. I would advice to go through problems on website as it improves thinking and approach. It helped me a lot in every thing be it subjects, coding problems or practicing the questions.

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Microsoft Interview Experience 2019 | Off-Campus Software Engineering Internship (Hyderabad)

- Difficulty Level :\nEasy
- Last Updated :\n27 Mar, 2019

Microsoft conducted an all India drive for hiring SDE Interns(Minimum CGPA was 7 and no backlogs were allowed). They conducted a coding round in which people who solved 3 got a call or people who solved 2 and had a higher CGPA(+9) also received a call. Girls solving one problems were called for on site interview.

Coding Round Questions:

1.\xc2\xa0https://www.geeksforgeeks.org/remove-duplicates-from-a-given-string/

2.\xc2\xa0 It consisted of 2 parts :

a)\xc2\xa0https://www.geeksforgeeks.org/construct-tree-inorder-level-order-traversals/

b)\xc2\xa0https://www.geeksforgeeks.org/find-minimum-depth-of-a-binary-tree/

3. I don\xe2\x80\x99t remember the question but it was based on disjoint set concept.

I solved two and third was partial.

Round 1:\xc2\xa0 It was a group fly round where there were around 54 candidates. They gave us 40 minutes and four problems to solve.The four problems are as follows:

1)\xc2\xa0 Predict the output of a given program.

2)\xc2\xa0https://www.geeksforgeeks.org/sum-array-elements-using-recursion/

3)\xc2\xa0https://www.geeksforgeeks.org/pairwise-swap-adjacent-nodes-of-a-linked-list-by-changing-pointers-set-2/

4) Given a matrix of size n*m . fill in the matrix in the form of level order traversal of tree.For example:

for a 4*4 matrix u should fill it as:

1\xc2\xa0 \xc2\xa0 \xc2\xa0 2\xc2\xa0 \xc2\xa0 \xc2\xa0 6\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa07

3\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa05\xc2\xa0 \xc2\xa0 \xc2\xa0 8\xc2\xa0 \xc2\xa0 \xc2\xa0 13

4\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa09\xc2\xa0 \xc2\xa0 \xc2\xa012\xc2\xa0 \xc2\xa0 \xc2\xa014

10\xc2\xa0 \xc2\xa0 \xc2\xa011\xc2\xa0 \xc2\xa0 15\xc2\xa0 \xc2\xa0 \xc2\xa016

There were 15 people who were selected for the next round.

I solved three questions and was among 15.

(Tip: write clearly without cuts and first explain your approach and then write your code with proper variable names. Make sure to add comments in between your code for better explanation and at last

write the time complexity for that code).

Round 2:\xc2\xa0

It was a personal interview which was taken by two interviewers. They were really nice and gave a lot of time to discuss on. We had a long discussion on the my projects that I did. They asked me the algorithms used and the libraries and the functions in deep. They also asked me how could I do the same without functions and other stuffs. It went for around 20 minutes. The next 15 minutes had a problem discussion in which I was asked\xc2\xa0 coding problems\xc2\xa0 such as

https://www.geeksforgeeks.org/remove-duplicates-from-a-given-string/

https://www.geeksforgeeks.org/lru-cache-implementation/

I gave a solution using map. They later asked me to implement set or map, which I was able to do. I was asked operating system questions on deadlock, starvation, multiprocessing and multithreading and many more.

At last he asked me a simple question on strings.

https://www.geeksforgeeks.org/delete-a-linked-list-node-at-a-given-position/

After lunch, they informed that I made it to the third round. Around 10 made it to next round.

(Tip: Be confident on what you say and stick to it. They just see your confidence and approach)

Round 3:

The interviewer was of young age and seemed to be nice from the beginning. He asked me about my brief introduction and then started asking coding problems which were

1) Write a code to find minimum distance between two nodes in a tree.

2)\xc2\xa0https://www.geeksforgeeks.org/stock-buy-sell/

3)\xc2\xa0https://www.geeksforgeeks.org/given-an-array-of-numbers-arrange-the-numbers-to-form-the-biggest-number/

this was given with a condition : not to use comparator function.

Be prepared to cover all the conditions and write all the test cases for your solution. After this I was asked to debug some problems and then I was asked about my projects.

About 10 minutes later I was informed that I was selected for HR .

Round 4(HR):

First he asked to introduce myself in brief. Then he gave me a string coding questions. I solved it with all conditions mentioned and gave me various approaches. He was satisfied. After that he asked me about my projects, what I learnt from it and many other .

After that he asked me if I have any questions for him. Guys don\xe2\x80\x99t say no. Just ask anything that is worth asking . He just sees how curious you are to know about the company.

With this I cleared all rounds and they selected 4 and took our resume.After 15 days, I received a mail stating that I am selected.

\xc2\xa0

Thanks to geeksforgeeks team for putting such good content on website. I would advice to go through problems on website as it improves thinking and approach. It helped me a lot in every thing be it subjects, coding problems or practicing the questions.

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Microsoft TechSetGo Summer Internship Interview Experience

- Last Updated :\n14 Mar, 2019

Round 1- Group Fly
Approx 100 students gave this round and 20 made to the next round. Selection was made on the basis of time and space complexity

Question 1: Given a double linked list you have given a function Ispalindrome(head, tail) you have to print whether the linked list is palindrome or not . The data of linked list is in integer.

Input 1: 12 -> 11 -> 21
Output 1:- Yes
Explanation: 121121 it\xe2\x80\x99s palindrome

Input 2: 12 -> -5 -> 21
Output 2: No
Explanation: 12-521 consider -(minus) as hyphen

Input 3: 12 -> -5 -> -21
Output 3: Yes
Explanation: 12-5-21 consider -(minus) as hyphen

Question 2: Given an array of integer values you have to output an array consisting of indexes in which the sum of left values is equal to the sum of right values. Function based problem function_name(inputarray [ ]) you have to print the output array.

Input 1: inputarray = [-5, 5, -5]

Output 1:[0, 1, 2]

Explanation at 0th index i.e. inputarray[0] = -5
The sum of left elements are 5+(-5)=0
And there is no element in right therefore sum of right elements is 0 similarly for 1 and 2 index

Input 2: inputarray =[1, 2, 3]

Output:[ ]

Explanation No such index

Round 2 Technical Interview
20 students gave this round and approx. 10 students cleared it

Question 1
Given a string you have to exclude all the vowels and determine whether the string is palindrome or not. Solve it by using no extra space and minimum time complexity.
Function (inputstring)

Input 1: inputstring= Vishavjeet
Output 1: No
Explanation removing all vowels from inputstring it becomes Vshvjt and it is not palindrome

Input 2: inputstring= NamaN
Output 2: Yes
Explanation removing all vowels from inputstring it becomes NmN and it is palindrome

Question 2
Function (inputarray [ ], k)
Given an inputarray of integer values and an integer values k you have to output an array containing minimum value in k values.
Minimum time complexity (O(n))
Input 1: inputarray =[2, 1, -3, 2, -4]
Output :[-3, -3, -4]
Explanation in first kth elements i.e. 2, 1, -3\xc2\xa0 -3 is minimum in next kth elements i.e. 1, -3, 2 -3 is minimum and in next kth elements i.e. -3, 2, -4
-4 is minimum

Question 3
I forgot it was based on Kadane\xe2\x80\x99s Algorithm

Round 3 Techical Interview
4-5 students were called for the final round

Question 1:
Function (root)
Given a tree you have to print the tree in preorder without recursion.

Round 4 Last Round
I was not called for this round but the experience was worth to be shared.

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Microsoft Internship Experience | Off-Campus Internship (Hyderabad)

- Difficulty Level :\nHard
- Last Updated :\n25 Jul, 2019

Microsoft conducted an all India drive for hiring SDE Interns(Minimum CGPA was 7 and no backlogs were allowed). They conducted a coding round in which people who solved 3 got a call or people who solved 2 and had a higher CGPA(+9) also received a call. Girls solving one problems were called for on site interview.

Coding round questions:

1. Distribute N candies among K people
2. Minimum steps required to convert X to Y where a binary matrix represents the possible conversions
3. Minimum number of sets with numbers less than Y

Round1:
It was a groupfly round where there were around 150 candidates. They gave us an hour and two problems to solve. The two problems are as follows:

1. Find the Lowest Common Ancestor in a Binary Tree
2. Given a matrix, find and print the maximum path sum from 0, 0 to n-1, m-1.

People solving both the problems and girls solving the first one completely and printing the maximum path sum for the second were taken to the next round. There would be 25 people who made it.

Round2:
It was a personal interview which was taken by two interviewers. They were really nice and gave a lot of time to discuss on. We had a long discussion on the ML projects that I did. They asked me the algorithms used and the libraries and the functions in deep. They also asked me how could I do the same without functions and other stuffs. It went for around 30 minutes. The next 15 minutes had a problem discussion in which I was asked a problem find the K-th largest element in the array. I gave a solution using set since they initially said that it contained unique elements, as soon as they said it has duplicate elements, I switched to priority queue. They later asked me to implement set or priority queue, which I was unable to do. After lunch, they informed that I made it to the third round. Around 10 made it to next round.

Round3:
The interviewer was of young age and seemed to be nice from the beginning. He asked me initially on my low semester marks, and they gave me an option to choose from DSA or Software Engineering or Architecture, on which I choose DSA. He gave me 3 questions during this course which I solved successfully.

1. Find the minimum element in rotated sorted array. I solved and coded the same using Binary search, he just asked me to add a case for n==0 which I missed.
2. Sort an array of 0\xe2\x80\x99s and 1\xe2\x80\x99s without sorting and minimum number of lines of code.
3. Detect a loop in linked list. He just asked the approach and asked me to not write the code.

After that he asked me whether I would be able to answer real life problems using DSA. Then he asked me to implement a dictionary, on which I gave a trie solution, he was impressed with the

answer, and asked me about search engine optimizations and DSA application on the search engines while predicting texts in search box. We has a light chat after this for 2 to 3 minutes, in which he seemed to be impressed.

After an hour, they took our CV and selected 4 out of the 10 who were there. I went personally to the recruiter over there to know the reason for the rejection. He asked my name and after cross checking, mentioned that, since everyone was good, they were left with nothing but to choose on CGPA. I sadly had a low CGPA of 7.33 which turned out to be curse.

I will love to thanks the GFG team for their incredible website and the placement questions that they have. Without them, I would have not made it into the last round.

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Microsoft Interview Experience for Azure Team Hyderabad

- Difficulty Level :\nMedium
- Last Updated :\n31 Mar, 2020

Interview was for Azure team IDC Hyderabad. Total 9 candidates came.

Round 1:\xc2\xa0

2->7->8->11

|

13->16->17->21

|

22->23->27->29

|

30->32

Sorted Linked List given like above where each node has 2 pointers left and down. For each row starting nodes down points to next row start. Each row has 4 elements, except last one which can have <= 4 elements. Next rows start element is greater than previous rows end element. We need to design and code for it insert of new value at correct place\xc2\xa0and delete operation. 8 went for next round.

Round 2:

1. What is memory hierarchy?
2. Difference in virtual ans physical memory?
3. How cache works?
4. What are different algorithms to insert value in cache if value is not found?
5. Threads accessing same variable at same time. How on processor level they are assigned value?
6. Implement LRU algorithm for cache. I did in O(cache_size). Was expecting more optimal approach.
7. Write from scratch hash function. Even if key is integer, string, etc. Handle in O(1) time. And mapping to value also with as less memory as possible.

Round 3:

1. Implement Billing design in cloud. Any 3rd party can use it and implement there billing system.
2. Write Singleton class implementation.
3. \xc2\xa0Stock-Time problem. Given stocks according to time. We need to tell when we can buy stock. So we never get loss and write all test case for it.
4. Implement Post Order Traversal.
5. Why Microsoft? 4 were selected for Managerial round.

Managerial:

1. When we click + button in chrome and new tab opens what all happens.

2. Implement memcopy from scratch in c when source, destination pointer given. Where as size from source also given. I used for loop and de-reference copy. Forgot to implement corner case if destination pointer within source block which we are copying. Got Rejected.

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Microsoft interview experience (Internship)

- Difficulty Level :\nMedium
- Last Updated :\n19 Jun, 2019

Microsoft gives an opportunity to all undergraduate and postgraduate students for 2 months summer internship program. Basic criteria to apply for Microsoft internship program was to have CGPA greater than 7.0, no pending backlogs and candidates should not have participated in Microsoft internship hiring process for last one year.
The process have 2 rounds. They are:-
1)Online coding round
2)Interview

- **Online coding round:**

  It was an online coding round with 3 questions, hosted at tests.mettl.com. The duration of the test is 1 hour 30 minutes and everyone gets a different set of three questions. Better the time and space complexity greater marks.

  The set of questions for me were \xe2\x80\x93

- Rotate array
- Remove all duplicates from a given string
- Program for K Most Recently Used (MRU) Apps

Around 120 students were shortlisted by the time I attempted. I was one of them. In my view, questions weren\xe2\x80\x99t that tough. All you need for solving is practice.

  - Interview:

In this round there will be 4 technical interviews and every round is an elimination one.
First round is an offline writing coding round. Do write clean and correct codes, with appropriate names for variables and proper indentation.
These were the questions that I was asked to solve-

    - Find least common ancestor of a binary tree
    - Maximum sum path in a matrix

Of 120 students , 15 members were short-listed for next round.
In the second round of technical interview, one mentor will be assigned to every person and questions regarding linked list, binary trees, dynamic programming\xe2\x80\xa6etc., will be asked.
In the third round, we had a discussion with the project that we are mentioned in the resume.
The last round was HR interview and in this, they asked questions about the introduction, puzzles and some tricky ones.
Apart from all these they shortlist based on CGPA.
I would like to suggest to solve all problems in GeeksforGeeks and it also very helpful in understanding the gist of the subject.It also arranged all the topics like data structures and algorithms in proper structure. I sincerely thanks to GeeksforGeeks.

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Microsoft Hiring Drive: Delhi: 3.5 Years Experienced

- Difficulty Level :\nMedium
- Last Updated :\n24 Feb, 2019

Microsoft interview for 3.5 years experienced held at Delhi on 23rd Feb 2019.

Round 1 (Written):
1) https://www.geeksforgeeks.org/function-to-check-if-a-singly-linked-list-is-palindrome/
2) https://www.geeksforgeeks.org/zig-zag-traversal-of-a-binary-tree-using-recursion/
3) https://www.geeksforgeeks.org/minimum-distance-between-two-occurrences-of-maximum/

Round 2 F2F:
1) https://www.geeksforgeeks.org/find-maximum-possible-stolen-value-houses/
2) https://www.geeksforgeeks.org/minimum-time-required-so-that-all-oranges-become-rotten/

Round 3 F2F:
1) https://www.geeksforgeeks.org/count-possible-decodings-given-digit-sequence/
2) https://www.geeksforgeeks.org/print-palindromic-permutations-given-string-alphabetic-order/

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Microsoft Internship Interview Experience

- Difficulty Level :\nMedium
- Last Updated :\n17 Feb, 2019

I applied for Microsoft internship(TECH SET GO 2018) through mettl.com. There were few basic criteria to apply like min 7\xc2\xa0 cgpa, no backlogs..it was a 6 round process.

Round 1: It was an online coding test which had three easy to moderate level questions and 90 mins were allotted for it.\xc2\xa0 for this round, you should be pretty good with string manipulations, arrays. they were not language specific. take care of the space and time complexity.

q1. https://www.geeksforgeeks.org/program-for-k-most-recently-used-mru-apps/

q2.https://www.geeksforgeeks.org/count-possible-decodings-given-digit-sequence/

q3. https://www.geeksforgeeks.org/count-number-ways-reach-destination-maze/

people who solved at least 2 were through this round. out of 350 from my college, 20 were selected and were called for interview after 35 days.

Round 2: it was a group event (56 people from different colleges were there). we were given the same question\xc2\xa0**find the common element in all the rows of a row-wise sorted 2d array**. people who were having the most optimized code were selected.(don\xe2\x80\x99t use predefined functions). 22 out of 56 went to the next round.

Round 3: (45mins) My interviewer\xc2\xa0she asked for my intro and from that, we went to the **project** I made during my internship. She was interested in knowing how I implemented authentication and authorization in my application. she was very humble and responsive towards all my doubts. then she asked me to design a **file system**. there were basic **DBMS** questions like **ACID, \xc2\xa0 inner, outer, left, right join**. questions on dynamic and static polymorphism were also asked. she went through all the subjects I had studied in my previous sem like **COMP ORGANISATION, DIGITAL LOGICS, GRAPH THEORY**.\xc2\xa0 I was asked to design a database for the library management system and perform testing on it. Again basic oops concepts were asked. explanation of abstraction was one.

Data Structure ques-(coding)

1. **remove duplicates from a linked list in O(n).**
2. **circular array from the double linked list (**always discuss your approach before coding**.)**

I wasn\xe2\x80\x99t selected for the next interview(there were 3 more). Around 10-11 made to the next rounds. Have at least 2-3 good projects on your cv, and practice well from geeksforgeeks. a lot of questions were from this site!!

thanks!!

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Microsoft IDC Internship On-Campus Interview Experience 2018

- Difficulty Level :\nHard
- Last Updated :\n08 May, 2019

\xc2\xa0

Microsoft IDC Hyderabad visited our campus in July for internships. Engineering Physics and all Computer and Electrical/Electronic branches were allowed. They set CGPA cut off as 7 for applying.

Round 1: Online test

The first online round was online having a duration of 75 minutes. It was hosted on Co-Cubes which had 3 coding questions but everyone had random ones. Their was a choice of language between C, C++, Java and C#. Also not all test cases were visible and majority of them were backend/hidden cases which were evaluated later. Mine were :-

1. https://www.geeksforgeeks.org/round-the-given-number-to-nearest-multiple-of-10/ (2 marks)
2. https://www.geeksforgeeks.org/linked-list-sum-nodes-0s/ (3 marks)
3. https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/ (5 marks)

I did these 3 questions in around 25-30 minutes as they were fairly easy. After this round shortlist of 110 students from around 1000 students was released 5 days later. Although the criteria was not revealed mostly those who completed all questions with required time and space complexity were selected.

Tip : Speed can matter in this round if everybody manages to do 3 questions. Think about optimization later when you have attempted all 3.

Round 2: Group Fly (Pen and Paper test)

This was a pen and paper round and happened 5 days after the online test. It was 45 minutes long and included 7 short answer question based on Data Structures and also a Coding question. The Coding question had 2 parts and the second part was a bonus part but all short questions were mandatory.

The Coding question required us to write working code for Boundary Traversal on paper in a language of our choice. Even though I was not aware of this solution beforehand I did it using a modified BFS and it was accepted.

The bonus part was based on Spiral traversal of the tree. So we had to output all the inner layers in an anti-clockwise order as well. I didn\xe2\x80\x99t attempt this part as only 5-10 minutes were left and decided to revise my other answers. Fortunately I found a mistake as well. I also made sure to include comments in my written code during this time.

The short questions were easy but prone to mistakes. Also they varied from person to person mostly in terms of values given. They were based on :-

1. Array address calculation
2. Infix postfix conversion
3. Macro expansion
4. Speed Difference b/w Row and Column major traversal

5. Output of string after manipulation by loops
6. Recommending a Data Structure for the given situation
7. Suggestion correction for given code (if incorrect)

Tip : Make sure to do questions correctly rather than doing all questions.

Round 3: Technical Interview 1

Only 31 students were selected after the previous round for the interviews.

My interview started a couple of hours after the test. The interviewer did not bother to ask me for my resume. She immediately gave me a question.

It was LCA problem and I wrote the code based on method 2 in under 5 minutes.

Then she asked me Anagram Substring Search. For this question we discussed quite extensively on optimization and even went on to discuss trade-offs b/w unordered and ordered map like memory usage and also the underlying data structure i.e. Red Black Tree and Hash Table. Initially she was not convinced with my algorithm and kept asking me to make test cases and perform a dry run (My handwriting and untidy code may have contributed to that :p). Due to this we spent almost half an hour on the interview.

Tip : Practice writing code using pen and paper as all interviews were taken in this manner.

Round 4: Technical Interview 2

This interview started half an hour after the previous one. The interviewer initially inquired regarding how my written test went and then asked me for my resume. She asked a couple of questions on some mentioned points. Afterwards she also gave me questions to code for.

Firstly she asked me Root to leaf path sum problem and I wrote the code in a recursive manner. I was accumulating the sum instead of subtracting it and she asked if I could improve it more. I told her I could remove the extra variable and she agreed.

Then she asked me what my favorite Data Structure is (FYI it is DSU) and that she would ask a question on it. I told her that I did not mind it and she could ask me related to whichever one she wished. She looked a bit surprised at first but then told me that I had the right spirit and for this question she gave me an array related one. The question was:

> Find the position i in an array of length n such that absolute difference b/w maximum element to left of i (a[j] where j<i) and maximum to right of i (a[k] where k>i) is maximum.
>
> In other words, |max(a[0..j])-max(a[k..n-1])| should be maximum where j<i and k>i.

The solution immediately struck me and when I told it to her she asked me to code it. It was done using two arrays using one-dimensional Dynamic Programming (prefix max and suffix max). Due to this it was the shortest interview out of all even though she kept insisting on making a variety of test cases.

Tip : If you are confident in your skills take a chance. You can impress interviewers very well this way.

Round 5: HR + Technical Interview

After waiting about an hour for other interviews to finish the results were announced and few people were told to wait. I was the first person to be called from the group by the HR manager. This one

lasted about half an hour. Initially he asked me to give a basic introduction and after this he asked about the projects and skills from my resume (Android+Web+Data Science). Although he didn\xe2\x80\x99t ask about Android we discussed why I took certain decisions in my project and the rationale behind. There was a lot of stress on the reusable aspect of code in the projects. He even went as far as asking about details of implementation in packages like numpy, pandas and Django and why they were effective as opposed to the conventional implementations.

He seemed more like a Manager as he was visibly older than the rest of the interviewers. But to my surprise even he asked me Coding questions as I thought it would be strictly HR round. QWERTY Words was the question. I did this one easily. Then he asked me to do it in an iterative way instead of recursive and I took some time to get to the solution. I explained to him that the difference in question was similar to the difference b/w DFS and BFS and so it could be done be using a queue. When I finished writing the code he hold me that the interview was done and asked if I wanted to ask him anything. (All interviews ended like this)

Tip : HR rounds are a potential banana skin so be communicative and don\xe2\x80\x99t give up as you may get a subtle yet important hint.

Round 6: Final Interview

This was an impromptu interview seconds after the previous one, taken by another Manager who was taking HR Round of other candidates. I felt that it was just to test me after a long day as he went back to other candidates after giving me just one question. Later I found that other selected candidates weren\xe2\x80\x99t required to give this so I guess he was just trying to test me himself and/or unsettle me with a casual interview. The question was to build a custom ATOF function (Ascii to Float) with character array as input. After about 10 minutes of writing the basic function I wanted to ask him a doubt and when I called him he came back and read the code straightaway. After reading it he told me I was done for the day.

Naturally I was cranky as it had been almost 14 hours on campus and so I got a little agitated in my response to his cryptic answer of what the result is :p . He then said with a smile in Hindi \xe2\x80\x93 \xe2\x80\x9cGo home and party\xe2\x80\x9d. I didn\xe2\x80\x99t expect the official confirmation that day but just when I got home the Internship Coordinator sent the list.

8 people were selected and my name was among them. Immediately congratulations started pouring in and it was a great moment.

Tip : Majority of Tech companies prefer to concentrate on competitive coding and problem solving ability of the applicants in interviews. Practice. Understand. And don\xe2\x80\x99t cram because when you will be dealt with an unknown question only your understanding of topics can help you. So believe in yourself as you can cover up for other flaws by concentrating on this.

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Microsoft Interview Experience 2018 @ IIT

- Difficulty Level :\nHard
- Last Updated :\n30 Dec, 2018

Round 1: Online coding test on cocubes platform.

The questions from my set were-

1. We are given a number, we have to find the next greater number from the same set of digits. https://www.geeksforgeeks.org/find-next-greater-number-set-digits/

2. Given two nodes in a binary tree, find the distance between the two nodes. https://www.geeksforgeeks.org/find-distance-between-two-nodes-of-a-binary-tree/

3.\xc2\xa0 Find day of week given a date. https://www.geeksforgeeks.org/find-day-of-the-week-for-a-given-date/

Around 70 students were selected for group fly round

Round 2: Group Fly

It consisted of objective choice questions from various topics like OS, CN, DBMS, Computer Architecture, (basically gate CS syllabus) and some Linked List coding questions, where we had show all operations of a linked list like all possible cases of addition, deletion of nodes. Try to cover all corner cases as possible and explain it with diagrams to make your answers stand out than others. Also, ask the invigilators present there for any doubts if you have (They are very friendly).

\xc2\xa0

Around 40 students were selected for interview.

Round 3: Technical Interview 1

Please be confident for the interview, even if you dont know the answer, try to find the solution and donot give up. They are basically testing your thinking ability so try as hard as possible and give your 100%.

In the first round, the question he asked was a bit tricky. The question was- given any word, find how many words we can make from the letters of that word. I tried to give some approach as I didnt know the optimised one directly, I said to use all possible combinations possible and check in dictionary if that word exists, the interviewer seemed convinced but he asked if I can do better, he gave some hints and then I was able to come up with the solution- we had to sort the word based on letters and in dictionary also we\xe2\x80\x99ll sort the words and then count.

Note : All the sorted versions of same letters will give the same result.

He was convinced, then he asked some questions related to CN, DBMS, OS. Though he didnt ask about my project, but I explained him \xf0\x9f\x98\x9b because that was my forte and I wanted him to ask questions on that (he did not ask anything :P)

Round 4: Technical Interview 2

In the second round, he asked given birth dates and death dates of people, find the maximum

population year.

Here we will use an array and make +1 for birth year and -1 for\xc2\xa0 death year and at the end traverse the array and find the maximum value (return the corresponding year).

It took me around 5 mins to come up with this solution so, he asked me another question-

Given a mobile keypad, find all possible combinations of letters, given digits.
https://www.geeksforgeeks.org/find-possible-words-phone-digits/

I was able to answer that and he was very convinced as I answered this one in one shot (By luck, I had read this question just 5 mins before the interview and he asked me the same question :D)

\xc2\xa0

Round 5: HR Round

She did not ask anything and I was given a hint that I am selected (they cannot reveal the results before the end of session). It was the happiest moment for me \xf0\x9f\x99\x82

\xc2\xa0

Overall the process went well . All I can suggest is be very confident and give your 100%. If you know your project well\xc2\xa0 try to explain it to them even if they dont ask for it so that they can know what all you have worked upon (The interviewer\xc2\xa0 doesnot know you, its only in those 15 mins he will come to know about you so try to give him more reasons to select you).

\xc2\xa0

At the end, I would like to thanks Geeks for helping me in the process.

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Microsoft Interview Experience | SDE \xe2\x80\x93 2018

- Difficulty Level :\nHard
- Last Updated :\n06 Nov, 2019

A big thanks to\xc2\xa0GeeksForGeeks ! Here is a small contribution from my side.

This is regarding On campus placements, from an Indian Institute of Technology.

Round 1: 3 Coding Question

- https://www.geeksforgeeks.org/segregate-even-and-odd-elements-in-a-linked-list/\xc2\xa0 (5 Marks)
- https://www.geeksforgeeks.org/maximum-sum-such-that-no-two-elements-are-adjacent/\xc2\xa0(5 Marks)
- Character decoding. For Example : for AA# we have to print 550 something like that. The pattern was given and we were supposed to convert. (3 Marks)

These were the questions from my set. Everyone had\xc2\xa0 a different set and the platform was Cocubes. Everyone who did around 10 Marks was selected. Around 90 people were selected. The platform is pathetic for first timers. Time management is important.

Round 2: Group Fly

- https://www.geeksforgeeks.org/print-binary-tree-vertical-order-set-2/
- https://www.geeksforgeeks.org/minimum-time-required-so-that-all-oranges-become-rotten/

Everyone who did both the questions, with the most optimal solution, was selected. Here people were divided in groups of 6 and each group had a mentor. We were supposed to convince the mentor with the solution and jot it down on paper. Around 30 people were selected. They were judging problem solving ability as well as communication skills.

Round 3: System Design + Technical

- https://www.interviewbit.com/problems/design-url-shortener/
- https://www.geeksforgeeks.org/boundary-traversal-of-binary-tree/
- https://www.geeksforgeeks.org/diameter-of-a-binary-tree-in-on-a-new-method/
- https://www.geeksforgeeks.org/reverse-a-linked-list/

They were searching for the most optimal solution. Every code has to be written on a paper. Some of the solutions provided in GFG are not as optimal as they were expecting. And the worst time complexity for them was linear(if possible) with constant space. Moreover they wanted more than one solution for a given problem. Regarding system design, be confident about whatever you say, since the topic is gigantic.

Round 4: Technical

- https://www.geeksforgeeks.org/median-of-stream-of-integers-running-integers/
- https://www.geeksforgeeks.org/perfect-sum-problem-print-subsets-given-sum/
- https://www.geeksforgeeks.org/median-two-sorted-arrays-different-sizes-ologminn-m/

Here too they were looking for most optimal solutions with almost constant space(if possible). They were asking to write the code on paper. Usually interviewers are very friendly and they readily help. But they appreciate if you don\xe2\x80\x99t need the help.

Round 5: Technical + HR

Here I was facing the head of the team. The person was very polite and well spoken. He asked me my favourite project and asked me to explain it. He asked my interests. He asked me about my other projects. My open source contributions. Why I switched from ECE to CSE(I am from MTech CSE). Then he asked a few basic CS fundamental questions. At the end I asked him about my review, he told he was very pleased with my performance and eventually I was selected.

Practice writing code on paper and debug it. Practice trees, graphs and linked-lists very well. Be familiar with system design concepts. Know everything you put on your resume. And be confident. Best of luck !

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Microsoft IDC FTE Interview Experience

- Last Updated :\n09 Nov, 2018

The entire process consisted of a total of 5 rounds (including online coding and group-fly round) all of which have been described below.

Round1: Online Coding Test

There were 2 sets of questions. 60 students appeared for this round. The three questions I got were:

1. The first question was very simple. Something like comparing the characters in two strings. I would just like to point out that the co cubes platform is not very user friendly and its better you know how to deal with character arrays, pointers, etc. (Most people code in c++ and are habituated to using strings. So just brush up your c concepts a day before the test and you should be good to go.) (2 marks)

2. https://www.geeksforgeeks.org/minimum-number-appends-needed-make-string-palindrome/ (3 marks)

3. Separate the vowels and consonants in a linked list, putting all the vowels first followed by the consonants. Something similar to\xc2\xa0https://www.geeksforgeeks.org/arrange-consonants-vowels-nodes-linked-list/ (5 marks)

Stay calm during the round and check your codes even after the sample test pass (they are very weak). Also, I would like to point out that there were memory constraints in some of the questions but a couple of students who had used extra memory were also selected. So in case you are not able to write a code without memory use it rather than leaving the question.

Round 2: Group-Fly

26 students were shortlisted for this round.
There were two questions given in this round. The code was to be written on paper in 45 mins.

1. Check if string 1 is a rotated version of string 2,

2. A variation of the word break problem. Given a dictionary of words we had to find out the longest word in the dictionary that could be formed from the rest of the words.

Note that you have only 45 mins. They expect you to write the code for both the problems. I had written a dynamic programming solution for the second question but wrote a brute force for the first (O(n^2)). Note that the first question could also be solved in O(n) using kmp but I would not have had the time to complete both questions if I tried the kmp approach. A fellow student who tried the kmp could not write complete code and was not shortlisted for further rounds.

A very important point in the group fly is to interact with the interviewers. They are very nice and helpful. Explaining your solution makes it easier for them to evaluate your solution later.

About 10 students were shortlisted for further rounds.

Round 3 (Technical round 1) :

The interviewer was very friendly. First I was asked to introduce myself. I was then asked to design

a recommendation system for Amazon. Here we discussed about data privacy issues. The next design problem was to design a tiny URL. I used the analogy that the decimal numbers are smaller than the corresponding binary numbers. Hence the URL could be made shorter by using a larger number of characters to represent the URL.

I was then asked about my interests, which I mentioned were software development, ml, deep learning, etc. I was then asked to apply deep learning to contribute to the growth and progress of India. I applied deep learning to predict and analyze the increasing pollution in rivers in India.
I was then given 2 simple problems. One was on graphs and the other was to find the number of ways from the top right corner to the bottom right corner in a grid (permutations and combinations).

Some behavioral questions followed:
1. Tell one weakness of yours.
2. Tell me two of your strengths

I was then asked if I had any questions for the interviewer. I knew a lot about the interesting things that Microsoft worked at but I asked him what he thought about the company and if he could share some of his projects.
The interviewer as I mentioned was really friendly. It\xe2\x80\x99s important to make sure you are clear about the problem before you start solving it. Asks questions to the interviewers who will be more than happy to answer your queries.

Round 4 (Technical round 2):\xc2\xa0

The round 3 was about 1.5 hours long for me. However, this round was about 45 mins.
I was first asked about my projects during my internship.
The questions asked were based on row major and column major ordering (how is the cache affected). What is a cache?
What is polymorphism and what are the two types of polymorphisms and explain them?
There was a question of converting a doubly linked list to a singly linked list. We were allowed to modify the data in the nodes (use xor of addresses).
The next question was regarding databases in which we discussed triggers, indexing, hashing, etc.
I was then finally asked if I had any questions for the interviewer.

Round 5 (HR):

This round was a telephonic interview with a senior technical individual at Microsoft. He too was very friendly and first asked me to introduce myself. He was impressed by the projects and internships that I had done. We had a discussion on the work I did there and the technologies that I used. He then asked me about my interests and the difference between AI and machine learning. He told me a lot about the work at Microsoft which all sounded very interesting.

4 students were finally selected for full-time employment at Microsoft.
What\xe2\x80\x99s important to realize for you guys is that working hard is in your hands. So do that and forget about the result. What you learn will never go in vain. All the best!

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Microsoft Interview Interview Experience for Full Time

- Difficulty Level :\nMedium
- Last Updated :\n04 Nov, 2018

Microsoft Visited our campus for full time and internships.

Round 1 (online Test) : it was a 90 min coding round hosted on cocubes. Three questions were asked

(2 Marks): https://www.geeksforgeeks.org/round-the-given-number-to-nearest-multiple-of-10/

(3 Marks): construct a binary search tree with the help of given post order traversal.

(5 Marks): https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/

Tips :- Solve the questions with calm mind. Don\xe2\x80\x99t stress yourself during test because you have to do 3 coding questions in 90 minutes. Don\xe2\x80\x99t spend too much time on any question if you are not able to do it in the first attempt.

I would suggest you to write code again if you have time rather then finding bugs for more then 10 min.

Microsoft give preference to girls and pointers. Cut off for boys was 7/10 while some of the girls with 5/10 marks and good pointer was also shortlisted.

Round 2 (Group Test) : 77 candidates were shortlisted for group test. In contrast to their traditional second round i.e. group fly. Second round was a group test. All students were asked to write the code for two question on paper in one hour. The questions were given in 30 min gap.\xc2\xa0 Unlike group fly round you just have to write the code.

Question 1: https://www.geeksforgeeks.org/connect-nodes-at-same-level/

(instead of nextRight we have to link nextLeft)

Question 2: https://www.geeksforgeeks.org/cutting-a-rod-dp-13/

(even the test case was same \xf0\x9f\x98\x89)

Tips:

1. Your code must be neat and clean.
2. Use proper indentation.
3. Use as many comments as possible.
4. Dry run your code
5. Write time and space complexity of your approach.
6. your approach must be easily understood.

Trust me, they evaluate the candidates on above points only. 16 Candidates were selected in this round.

\xc2\xa0

Round 3 (Technical Round 1) :

Interviewers took a short introduction of me. After that, he asked me to explain one of my Machine learning project. After 15 min. of discussion he asked me a coding question:

Given a binary search tree, a value M and another integer K. We have to find K such node data from the binary search tree whose difference from M is minimum.

I told him a approach using max heap. He asked me to code the approach. I asked him to give me some time so that i could find a better efficient approach taking in account that the tree is BST for the same. But i was unable to rectify the better approach, i just told him my intuition . later he asked me to code the solution using heap only. he took a look on my code and asked me to go.

All other interviewer were asking two or three coding question to the candidates, so i was unsure about my performance in the interview.

Tips:

1. In interview, reaching to the final solution is not important. They just want to see how you approach to the problem.
2. Take care of boundary condition,
3. Try to make use of every single detail given in problem.
4. Try to understand the problem.
5. you must think loudly

Round 4 (Technical Round 2) :

12 candidates make it to TR 2 .

Second TR was my best interview of all three. The interviewer was very interactive. He asked whether i m satisfied with my first interview. Which question was asked in that round? and if i am satisfied with my approach i gave in first round. I replied i can give a better approach now. But after checking my feedback from first interviewers he ask me to stop and start working on a new problem.

Question: https://www.geeksforgeeks.org/longest-subarray-sum-divisible-k/

Although, i have done this question many times, but due to nervousness i was unable to recall the solution. I tried solving the question using basic programming logics. Interviewers also guide me on the way. With the help of interviewer, i was able to write an efficient approach.

He was impressed and was extremely satisfied with me and my CV. he said i m on perfectly right track when i asked if there is anything i can improve.

Interview last 40 min and he asked me to wait for third round.

Round 5 (Technical Round 3) :

Third round was taken by a senior technical member of Microsoft. She was focusing on the attitudes of candidates along with their technical aspects. only 10 candidates reached to third round. Some had an additional review round after TR 2 to get into TR 3.

The interview starts with the basic introduction. She asked me my favorite subject. I answered DS and ADA. She asked me the reason for it. Later, She asked me some questions from OS i.e..

What is memory management?

What is cache? what are the used of cache.

Demand Paging. Their use.

Although my answers was not to the point. But i was somehow able to explain the concept. she didn\xe2\x80\x99t look much satisfied. Then she asked one coding question ie. https://www.geeksforgeeks.org/the-celebrity-problem/

I gave her the efficient approach and explained it well to her. She asked me to write the code and then to explain it.

and my interview as over. it last for 30 mins. i was the second person reached to third round.

Tips:

1. While writing code take care of boundary condition and clean code
2. It would be better if you explain each and everything you are writing on paper
3. You must be hard working or present yourself as one.
4. They need technical enthusiast. so make sure you present yourself like that only.

6 Candidates were selected after 3rd round. I am one of them. and hence MANIT has bagged 9 (6 + 3(PPO)) selection in microsoft in academic year 2018-19.\xc2\xa0 \xf0\x9f\x99\x82

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Microsoft IDC Interview Experience

- Difficulty Level :\nHard
- Last Updated :\n25 Oct, 2018

Test:

- Find first non-repeating character in the string.
  Input: \xe2\x80\x9caabcbd\xe2\x80\x9d
  Output: c
- K-reverse linked list
  Input: 1 2 3 4 5 -1\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 k = 3
  Output: 3 2 1 5 4
- Cut short binary search tree in the range of given integers.
  Input: 7 5 10 4 6 8 -1 2 -1 -1 -1 -1 9 1 3 -1 -1 -1 -1 -1 -1 (level order input)
  Lower range = 4 upper range = 8
  Output:
  7: 5, 8
  5: 4, 6
  8: -1, 9
  4: -1, -1
  6: -1, -1
  9: -1, -1

Around 200-300 people gave this round and 80 were able to clear it.

Group fly round:

- Remove and replace the character \xe2\x80\x98c\xe2\x80\x99 from a given input string by double characters \xe2\x80\x9c**\xe2\x80\x9d
  Input: \xe2\x80\x9ccalcic\xe2\x80\x9d
  Output: **al**i**
- Given a binary tree whose structure is as below

  ```
  Class BSTspecial{\r\npublic:\r\n  BSTspecial* parent = NULL;\r\n  BSTspecial* left = NULL;\r\n  BSTspecial* right =
  ```

  Given a node (note it can be either of nodes of the tree whether it is root or not) you need to find its immediate right sibling/cousin if any or return NULL if not present.

  Input:
  1 2 3 4 5 -1 6 -1 -1 -1 -1 -1 -1(level order input)
  For node \xe2\x80\x985\xe2\x80\x99 answer is \xe2\x80\x986\xe2\x80\x99
  For node \xe2\x80\x984\xe2\x80\x99 answer is \xe2\x80\x985\xe2\x80\x99
  For node \xe2\x80\x986\xe2\x80\x99 answer is -1
  For node \xe2\x80\x981\xe2\x80\x99 answer is -1

Out of 80 people, 14 were shortlisted for interviews.

Interview:

Round #1:

- What do you understand by time complexity? And what was your time complexity for the question which were asked in group fly?
- You are given n strings and a string joining function which takes two arguments (both strings) its time complexity is such than it is the sum of lengths of both the strings.
  If s1 is k units long and s2 is l units long T.C = O(k + l)

  Now, you are required to generate an algorithm such that minimal time is taken to join n strings.

  Strings: s1, s2, s3, s4,
  \xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6, sn.

  Lengths: l1, l2, l3, l4,
  \xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6., ln.

  Hint: O(log(n)*(l1 + l2 + l3 + \xe2\x80\xa6\xe2\x80\xa6.. + ln)) might not be the best way, this only works for\xc2\xa0 strings with almost equal length.

- Find whether a given linked list is palindrome or not.
  Without extra space in O(n) and not breaking any links.

  Note: recursion\xe2\x80\x99s stack space will be ignored.

Round #2:

- Return a data structure from a given tree such that all the children of each\xc2\xa0node point towards their respective parent and root node towards NULL.

  Discuss the time complexity of the approach.

  And then I was asked to improve it.

Due to late night Round #3 and HR were clubbed we were only 4 people, but I was asked to leave.

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Technical Test Patterns of Samsung, Microsoft, Deloitte, etc

- Last Updated :\n29 Jul, 2021

DE Shaw\xc2\xa0
One coding question (Graph BFS \xe2\x80\x93 Number of islands)\xc2\xa0
10MCQS(Technical)\xc2\xa0

Samsung Semiconductor(Bangalore)\xc2\xa0
3 Hour 1 coding question\xc2\xa0

Samsung research(Bangalore)\xc2\xa0
1.5 hours\xc2\xa0
3 coding question\xc2\xa0

Microsoft\xc2\xa0
1.5 hours\xc2\xa0
3 coding question\xc2\xa0
(Random for everyone)\xc2\xa0
(Mine \xe2\x80\x93 one simple array baswd and 2 trees \xe2\x80\x93 LCA and sum of nodes)\xc2\xa0

Citibank\xc2\xa0
Mcqs(Apti + technical)\xc2\xa0
Cannot go back to previous question\xc2\xa0
2 coding question\xc2\xa0

Qualcomm\xc2\xa0
Mcqs (Technical + apti)\xc2\xa0

SAP labs\xc2\xa0
2 coding question (one was class based)\xc2\xa0
Mcqs (apti+technical)\xc2\xa0

Goldman sachs\xc2\xa0
1 coding question\xc2\xa0
Mcqs (tech + apti)\xc2\xa0

Visa\xc2\xa0
4 coding questions\xc2\xa0

Codenation\xc2\xa0
3 coding questions\xc2\xa0

PWC\xc2\xa0
Apti mcqs\xc2\xa0

Deloitte\xc2\xa0
Apti mcqs\xc2\xa0
Jam\xc2\xa0
Resume based, DBMS questions in Interview\xc2\xa0

Sandisk\xc2\xa0

Technical and apti MCQS\xc2\xa0

AIRTEL Xlabs\xc2\xa0
2 coding questions\xc2\xa0
mcqs(technical mainly java based)\xc2\xa0

Deutsche bank\xc2\xa0
2 coding questions\xc2\xa0
Technical mcqs(c++, java, predict the output etc)\xc2\xa0

Amazon\xc2\xa0
2 coding questions\xc2\xa0
(Bfs shortest path to reach from x to y)\xc2\xa0
Technical + apti MCQS\xc2\xa0

Tsystems\xc2\xa0
2 Coding question\xc2\xa0
(Bfs shortest path to reach from x to y)\xc2\xa0
Technical + Apti Mcqs
\xc2\xa0

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Microsoft IDC Interview Experience (On Campus Internship)

- Difficulty Level :\nHard
- Last Updated :\n14 Dec, 2018

Round 1(Online Test): There were three questions on cocubes:

1. First(2 marks): https://www.geeksforgeeks.org/calculate-the-total-fine-to-be-collected/
2. Second(3 marks): Find the smallest number which when appended to given number will make the resultant number a palindrome.
3. Third(5 marks): https://www.geeksforgeeks.org/remove-bst-keys-outside-the-given-range/

   98 people were selected for the next round. All those who had done all 3 questions or (2 questions and a good cg) made it to the next round

Round 2(Group Fly):

They conducted this round in 3 sets . I was in the first set which included 42 students. A common question was written on the board and around 6-7 students were alloted a common mentor.

- The question was \xe2\x80\x9d given a circular linked list and an integer k, you need to traverse the list till index k (first index is 1) and delete the node at the kth index. Do this repeatedly until only a single node is left and return this node.\xe2\x80\x9d We were asked to write\xc2\xa0 the solution on paper in 45 minutes.What they focussed on was writing **clean code** and considering all the **corner cases** .
Solution : (GeeksforGeeks Link)

Total 23 students made it to the next round out of 98.

Round 3(Technical Interview):

1. He asked about my branch and courses I had done.
2. He gave me a Binary Search Tree and a number k and asked me to find the two nodes to get the sum k. He wanted proper written code for this considering all the test cases.Then he asked me to write the code for a Binary Tree instead. He helped me throughout the conversation and was satisfied by my answer.
3. Then he gave me an array and a number k and asked me to find all combinations of numbers in array to get the required sum k. I gave a backtracking approach for this and again he asked me to write proper code for this . After that he asked me to get all combinations of two numbers from the array to get the required sum. I gave a hashing approach and wrote the code for this. Then he asked me to do this without hashing . I gave a two pointers approach for this.
   Solution: GeeksforGeeks Link

Round 4(Technical Interview):\xc2\xa0

1. He saw my resume and asked me about my projects, related to big data. I explained him everything I had done . The he asked me to design a big data system to see all the log files generated and figure out the error immediately by seeing the log file generation system. I struggled a lot. I told him my main work was Setting up big data system and i did not know much of system design.
2. Then he moved on to DSA and asked me to move array data from one location to another given only the source and destination pointer. Then he gave me a question \xe2\x80\x9d given stock

prices, find the maximum profit that can be made by repeated buying and selling of stocks\xe2\x80\x9d . I explained him and he wanted proper code for the same. He gave me enough time to write the code properly. He advised me at the end to focus on all the test cases before i write my code.
Solution : GeeksforGeeks Link

Finally, 12 students were selected.

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Microsoft IDC Interview Experiences (On Campus Internship)

- Last Updated :\n27 Sep, 2018

Round 1(Online Test): There were three questions on cocubes:

First2 marks): https://www.geeksforgeeks.org/calculate-the-total-fine-to-be-collected/

Second(3 marks): Find the smallest number which when appended to given number will make the resultant number a palindrome.

Third(5 marks): https://www.geeksforgeeks.org/remove-bst-keys-outside-the-given-range/

98 people were selected for the next round. All those who had done all 3 questions or (2 questions and a good cg) made it to the next round

Round 2:(Group Fly) Since 98 was too large a number to accomodate in the room. They conducted this round in 3 sets . I was in the first set which included 42 students. A common question was written on the board and around 6-7 students were alloted a common mentor. The question was \xe2\x80\x9d given a circular linked list and an integer k, you need to traverse the list till index k (first index is 1) and delete the node at the kth index. Do this repeatedly until only a single node is left and return this node.\xe2\x80\x9d We were asked to write\xc2\xa0 the solution on paper.What they focussed more on was writing clean code and considering all the **corner cases** . Total 23 students made it to the next round out of 98.

Round 3:(Technical Interview) He asked about my branch and courses I had done. Then he said he would ask me questions on trees as I had said DSA as one of the courses. He gave me a Binary Search Tree and a number k and asked me to find the two nodes to get the sum k. He wanted proper written code for this considering all the test cases.Then he asked me to write the code if it was a Binary Tree instead. He helped me throughout the conversation and was satisfied by my answer although wanted a written code which i struggled a lot with.

Then he gave me an array and a number k and asked me to find all combinations of numbers in array to get the sum, k. I gave a backtracking approach for this and again he asked me to write proper code for this too. After that he asked me to get all combinations of two numbers from the array to get the required sum. I gave a hashing approach and wrote the code for this. Then he asked me to do this without hashing . I gave a two pointers approach for this. He was repeatedly focussed on whether i considered the corner cases or not.

Round 4(Technical Interview): He said he had not prepared anything as such . He saw my resume and asked me about my projects, related to big data. I explained him everything I had done . The he asked me to design a big data system to see all the log files generated and figure out the error immediately by seeing the log file generation system. I struggled a lot. I told him my main work was Setting up big data system and i did not know so much of system design. Then he moved on to DSA and asked me to copy array data from one location to another given only the source and destination pointer. Then he gave me a question \xe2\x80\x9d given stock prices, find the maximum profit that can be made by repeated buying and selling of stocks\xe2\x80\x9d . I explained him and he wanted proper code for the same. He gave me some time to write the code properly.

Finally, 12 students were selected

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Microsoft Interview Experience (On-Campus Internships 2018)

- Difficulty Level :\nMedium
- Last Updated :\n14 Dec, 2018

Microsoft IDC visited our campus for internships. They set CGPA cut off as 7 for applying.

Round-1(Online test)

The first online round was on Co-Cubes (a very bad platform with no option of custom input as well.) which comprised of 3 coding questions (Test Duration: 75 mins). Not all the questions were same, Different students had different questions. We just had to complete the functions for all the problems. You can choose your language between C, C++, Java and C#, :-

1. 2 marks \xe2\x80\x93 https://www.geeksforgeeks.org/round-the-given-number-to-nearest-multiple-of-10/\xc2\xa0
2. 3 marks \xe2\x80\x93 Given a date in the format (DD/MM/YYYY), find the day of the week. Given \xe2\x80\x93 01/01/1990 was Monday.
   Solution : GeeksforGeeks Link
3. 5 marks \xe2\x80\x93\xc2\xa0https://geeksforgeeks.org/rearrange-a-given-linked-list-in-place/

Some other questions got by others were \xe2\x80\x93

1. https://www.geeksforgeeks.org/average-of-ascii-values-of-characters-of-a-given-string/\xc2\xa0(2 marks)
2. https://www.geeksforgeeks.org/given-a-number-find-next-smallest-palindrome-larger-than-this-number/\xc2\xa0(3 marks)
3. https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list\xc2\xa0(5 marks)

   After this round 37 students from 75 students were shortlisted. Though no official cutoff was released, unofficially boys getting at least 7 marks and girls getting at least 2 marks qualified.

Round 2: Group Fly (Pen and Paper test)

This round was pen and paper coding round. 2 questions were given and we had to write our own code in pen and paper without using any library. From the scratch you have to write everything. 6-7 students were assigned a single mentor discuss question and approach.

- Question 1: Alphabet is defined as A, B, K, C, D, E, F, G, H, L, N, NG, R, P, Q, T, S, W, U . Note \xe2\x80\x93 \xe2\x80\x98NG\xe2\x80\x99 is a single letter. You need to write a function that given two words as a parameter, compare the words and reuturn their lexicographical order as per alphabet system written above.
- Question 2:\xc2\xa0https://www.geeksforgeeks.org/diagonal-sum-binary-tree/

In this round it was very important to communicate with the mentor assigned with regards to the solution approach as only he was responsible to selected you. You should also first understand the question carefully and clarify it with the mentor. Writing clearly and neatly is also important. After this round 14 students were selected for next rounds.

Round 3: Technical Interview

I was asked 3 questions in this round \xe2\x80\x93

- https://www.geeksforgeeks.org/urlify-given-string-replace-spaces/
- https://www.careercup.com/question?id=5756760659853312
- Fastest way to loop through a 2d array \xe2\x80\x93 that is horizontally or vertically if the order doesn\xe2\x80\x99t matter to user. https://stackoverflow.com/questions/997212/fastest-way-to-loop-through-a-2d-array

I was able to solve all 3 questions with some guidance from the interviewer at times and fix my mistakes. Overall he seemed satisfied and asked if I have any questions for him.

Round 4: Technical Interview

> The interviewer took my resume and asked me questions on the skillset I had mentioned like databases, javascript, tensorflow, difference between Machine Learning and Deep Learning, use of NLP etc.

- He then asked me difference between SQL and NoSQL (I had mentioned MongoDB in resume) and things related to them.
- Then he asked me to design the database of a Flipkart like website using SQL and NoSQL.
- Then he asked me this question \xe2\x80\x93\xc2\xa0https://www.geeksforgeeks.org/print-reverse-of-a-linked-list-without-actually-reversing/ Since I wasn\xe2\x80\x99t able to do this without extra variable he gave me hints to do that.
- Then he asked me about JOIN in database, DDL, DML and gave a question on MySQL Merge and Joins. Then he asked me about OOPS \xe2\x80\x93 things like Abstraction, Encapsulation, Protected, Static variable etc. He also gave me another question, I do not remember that one! Sorry.

This was a long interview of more than an hour, as the interviewer was discussed a lot of things with me including Azure.

Round 5: Non-Technical Interview

> This was like an HR round. The interview asked me my expectations of internship, my projects and interests in computer science. He asked me a lot of things about why computer science, on my favorite technology and other stuff. He didn\xe2\x80\x99t give me any specific question to solve but kept on asking questions like this. It was about 30 minutes of interview.

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Microsoft Interview Experience (Full Time 2018 Washington DC \xe2\x80\x93 with 2.5 years of experience)

- Difficulty Level :\nEasy
- Last Updated :\n14 Dec, 2018

The complete process involved an online phone screen, and an onsite interview (no travel)

I was recommended to a recruiter in the Washington DC metro area, and the office was down the street from where I lived. I talked to the recruiter over the phone, and scheduled a phone screen with a Principle Software Engineer.

Phone screen:

> Since it was over the phone, it was a little hard hearing and understanding what the other person was saying. But they asked some basic questions at first like what do I do, and they were looking for how well I can explain technical stuff.

- I explained over the phone a cool project I was working on at work. I\xe2\x80\x99ve worked on a lot of projects, but I picked the most interesting one. The interviewer didn\xe2\x80\x99t care if it wasn\xe2\x80\x99t my latest project because the one I was talking about was actually a lot more interesting.
- Then the interviewer asked me a technical question: Given requests at random times, return the requests from the last 1 minute. It was a little more detailed than that, and I wasn\xe2\x80\x99t able to finish the question, but somehow I was still able to be called onto the on-site interview.

On-site interview:
I walked in and there were about 12 other people being interviewed as well. They put us in a separate conference room and then we had 4 rounds of interviews after that. Each 45 minutes, and then one 15 minute break. Total 4 hours.

First round:

> Asked basic questions.

- Then asked a question where given brackets, parenthesis, and/or curly braces, see if it is valid. Like {]}{})(, {}()[()]. The first one would be false, the second one would be true. The interviewer really looked for when I would get stuck, and tried to see how I would react when I didn\xe2\x80\x99t know something. He liked the part when I got stuck, and when I was able to find my way back to the solution.
GeeksforGeeks Link

Second round:

> This round the guy was a bit unconventional. I don\xe2\x80\x99t think he asked me a single basic question to start the conversation. He walked in, asked me to code some problems, and then left. Barely any words at all besides technical question clarifications.

- But the questions he asked was if A=1, B=2, C=3, \xe2\x80\xa6, then write a function to return the number corresponding to the string. Z would be 26, then it would be AA, which would be 27. What would BB be, or ABC, or ABB, etc.

Third round:

1. This was the design question. The question was design tinyURL.
2. Also was asked remove duplicates from a linked list.

Fourth round:

This was the toughest. I think he was the main engineer to impress.

- He asked given a sentence \xe2\x80\x9chow are you\xe2\x80\x9d, reverse the words and return \xe2\x80\x9cyou are how\xe2\x80\x9d. I could not use splitBy(), and I had to also not use any data structures. I was able to solve it in optimal time, but I ended up needing a data structure. But there was a way to not use data structures actually.

Solution :GeeksforGeeks Link

After that I just went home. I felt really good about the interview, but I didn\xe2\x80\x99t hear anything for a while. Then they called me late next week and told me I had multiple teams interested in hiring me for multiple positions. Then I had to pick which one I wanted. I ended up picking Azure AD as a Software Engineer. This was probably the happiest day of my life \xf0\x9f\x99\x82

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Microsoft Interview Experience (Internship 2018)

- Difficulty Level :\nHard
- Last Updated :\n15 Sep, 2018

The complete process involved one online round, one group fly, few technical interviews, f2f interview with senior manager.

Online Coding Round:\xc2\xa0

This round had 3 questions and was conducted on the cocubes\xe2\x80\x99 platform. The questions that I got were:

1. Given a list of car numbers and date, return the total fine collected from the cars. If the date is odd, each even-numbered car is fined 250 rupees and vice versa. (2 marks)
2. Evaluation of infix expression.\xc2\xa0(3 marks)
3. Removing k digits from an n digit number such that the number formed is the smallest. Similar to this.\xc2\xa0(5 marks)

People who had a good CGPA (9+) or had done at least 2 questions went to the next round.

Group Fly:

There were around 22 people who gave the group fly round, 15 of which got selected for the interview. We were given two questions in this round, we had to discuss the approach with our mentors and write a compilable code on a page. The questions were:

1. Check if the two given binary trees are mirrors of each other. The solution can be found here.
2. Given a text and a dictionary, check if the text can be broken into words that belong in the dictionary. Bonus marks if you can also tell in how many ways this can be done. This can be done by a recursive approach (without DP), but that would take exponential\xc2\xa0time. We were expected to optimize the approach both in space and time. The solution can be found here.

Try to write clean found with a lot of comments and proper variable names. They also considered if you have given an iterative approach or a recursive (iterative was more preferred since it\xe2\x80\x99s faster, but it did not make much difference in the end).

Technical Interviews:

I had 3 technical interviews, try to interact with the interviewer as much as you can. If you are giving them a brute force approach, make sure you tell them what is the problem with it before jumping into an optimized solution.

Round 1: All the questions in this round were based on arrays.

The first question I got was to count the number of distinct numbers in a window of size k. The solution can be found here.\xc2\xa0I gave 2-3 approaches with their time and space complexity before coming to the O(n) solution.

In continuation to this, he asked me to print the largest number in the window of size k. The solution can be found here. I had to write a compilable code for this problem, I solved it using dequeue. He also asked me to create test cases and dry run my code, I was judged on whether I can think of the corner cases in my approach.

Round 2: This round had a mixed bag of questions.

The first question was based on binary search, just to warm things up. He asked me a few questions on strings (like largest substring with unique characters and LCS), but I told him I had already seen them before so we moved on to dynamic programming questions.

In the next question, I was given a boolean array with A[i]=1 denoting that the ith place is safe and A[i]=0 meant that the ith place contained a bomb. Given an initial speed k, after reaching a safe point, you could either increase or decrease my speed by 1, or keep it the same. You can move exactly k number of steps in the array where k is your current speed. If you reach the end of the array or your speed becomes 0 at any safe point, you win. If you step on a bomb or go beyond the array size, you die. In how many ways could you win the game? I first gave him a recursive solution then tried a dynamic programming approach to solve the problem. Except for a few corner cases, I could do this problem.

The last problem in this round was tree based, I was given a binary tree with nodes containing a number in the range 0-9, hence each path from the root to leaf can be thought as an n digit number where n is the path length. I had to find the sum of all paths. Since the sum can overflow, I had to use modular arithmetic. Later he asked me to write a compilable code for the same.

While I was solving these questions, I was asked a few questions about my projects. The questions were related to authentication (session and token) and database in general.

Round 3: This round was fairly easy, I was asked basic questions.

First I was asked to write a code that prints a pyramid pattern using asterisks (*). Later the\xc2\xa0asterisks\xc2\xa0were replaced by Pascal\xe2\x80\x99s triangle.

Finally, I was asked to write a code that returns the height of a generic tree.

Final Interview:

This was more of an interaction than an interview, the senior manager and I discussed the various projects that are going on in Microsoft, he showed me the project he was working on. He was friendly.

Finally, after spending 15+ hours on interviews, I got selected, alongside 5 other people from my college!

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Microsoft interview experience 2018

- Difficulty Level :\nBasic
- Last Updated :\n14 Dec, 2018

Round 1:online test

There were 3 questions :OT

1. Delete m nodes after n nodes in a linkedlist
2. Find day of a date if 1 jan 1990 was monday
3. Write a program in which if it is 75 make it 80 and if it is 74 make it 70

Round 2: Group fly

there were 2\xc2\xa0 questions :

1. Infix to postfix
2. connect nodes at same level in a binary tree

Interview Rounds:

Round 3:

1. coin change (Denomination\xc2\xa0 problem of dp)

   \xc2\xa0

2. Reverse k nodes in a linkedlist

   ```
   Input : list = 1 2 3 4 5 6 7 8 ,k = 3\r\n output = 3 2 1 6 5 4 8 7
   ```

Round 4:

1. You are given a sorted array in which all elements are occurring twice except one element find that element in logn complexity
2. You are given a array suppose 1 2 4 6 Now output should be 48 24 12 8
   This you have to do without using division operation

Round 5:

In this round\xc2\xa0 a simple problem was given suppose\xc2\xa0 \xc2\xa0you are given some files which may be dependent on each other so you have to tell all possible routes and also tell you which processes can run concurrently.He was asking me what you will do and how you will make its prgm.

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Microsoft Interview for SDE-2

- Last Updated :\n14 Dec, 2018

Round 1:

1. Write a method to search pattern in a given string; (naive solution) but working code with all edge cases.
2. Write a method that accepts 9\xc3\x979 array of Sudo and returns if it is a valid state of sudoku. (Empty cells denoted by 0\xe2\x80\x99s).
3. some networking concepts ie. TCP and about my experiences with DB.

Round 2:

1. LLD and HLD about a functionality in my project.
2. https://www.geeksforgeeks.org/converting-roman-numerals-decimal-lying-1-3999/

Round 3:

1. Design a battleship game; wanted all classes and interfaces and method signatures.
2. Difference bwn Virtual and physical memory (asked in a twisted way)

Round 4:

1. Discussions about current project and the work I had done earlier
2. Design a class whos job is to provide an id to other parts of application, one id can be used by one person at a time.Also the callers will come with an id; our job is to say YES or\xc2\xa0 No to whether he can use it. If some other person came with the same id we have to return false until the first caller is done with it.
3. I gave him HashSet and array of booleans approach, he wanted something else (kind of bitvectors)
4. https://www.geeksforgeeks.org/check-if-a-string-has-all-characters-with-same-frequency-with-one-variation-allowed/

I misinterpreted this questions but still coded it out completely, lol

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Microsoft Interview Experience (For Internship)

- Difficulty Level :\nHard
- Last Updated :\n01 Oct, 2018

The complete process consisted of an online coding round, a group fly round and three technical interviews.

Online Coding Round: There were 3 \xe2\x80\x9cfunction problems\xe2\x80\x9d i.e. we only had to complete a function, carrying 2, 3, and 5 marks respectively and the total time allotted was 75 minutes. It was conducted on the Cocubes platform and though I did not face any problem with libraries in Java, some of my batch mates using C++ did. On submission, the results of some trivial test cases were shown.

2 marks: Odd numbered cars can travel on an odd date and even numbered cars on even dates. Other cars would be fined 250 each. Given the numbers of the cars(an array of integer) traveling on a date(an integer), calculate the total fine collected.

Examples:

```
\r\nInput : cars = [1, 2, 3], date = 15\r\nOutput : 250(for car 2)\r\nInput: cars = [3, 4, 5], date = 16\r\nOutput : 50
```

3 marks: Next smallest palindrome

5 marks: Sum of cousins in a binary tree

Group fly round: There were 7 short answer type question on C and DSA and a coding problem Detect and remove loop in a linked list

Interviews: These were 3 personal technical rounds.

First round: It was a linked list question. I had to code the solution on a paper and dry run it while explaining it to the interviewer.

Second round: I had done a course on Machine Learning so I was asked some questions on gradient descent and classification problems.
I was asked two problems. The first one was to find the square root of a number accurate to 10 decimal places. I gave a binary search solution which I had to code.

The second question was to sort a list of numbers if the k least significant digits are not important.
Examples:

```
\r\nInput : list = [674, 689, 349, 327, 989], k = 2\r\nOutput : [349, 327, 674, 689, 989] is valid and so is [327, 349,
```

My first approach was radix sort but eventually came up with a solution based on bucket sort. The idea is to map every element to \xe2\x80\x98buckets\xe2\x80\x99 by dividing it by 10^k e.g. both 674 and 689 will get mapped to the bucket 6, 349 and 327 to \xe2\x80\x983\xe2\x80\x99 and so on and then sort the buckets. I did not have to write the code.

Third round: We had a discussion on my project on key frame extraction. He asked me questions on the algorithms and how I could improve it.

The question asked was open ended and the solution was reached through discussion.
There is a numeric keypad. The key 1 maps to \xe2\x80\x98a\xe2\x80\x99, \xe2\x80\x98b\xe2\x80\x99 and \xe2\x80\x98c\xe2\x80\x99, 2 to \xe2\x80\x98d\xe2\x80\x99, \xe2\x80\x98e\xe2\x80\x99, \xe2\x80\x98f\xe2\x80\x99 and so on. So the sequence of key press 12 maps to all possible combinations i.e. \xe2\x80\x9cad\xe2\x80\x9d, \xe2\x80\x9cae\xe2\x80\x9d, \xe2\x80\x9caf\xe2\x80\x9d, \xe2\x80\x9cbd\xe2\x80\x9d, \xe2\x80\x9cbe\xe2\x80\x9d and so on.
There is also a list of strings and given a sequence of key press display the strings having a mapping as prefix.
This is similar to how a search works in the dialer of a phone.

```
\r\nlist = [abc, adg]\r\n\r\nsequence = 1\r\noutput = [abc, adg]\r\n\r\nsequence = 12\r\noutput = [adg]\r\n\r\nsequence
```

Memory is not a constraint but time is critical.

My initial approach was to store the list of strings in a prefix tree followed by BFS according to the sequence of key press. But the complexity is exponential to the number of key presses in the sequence so I had to find a different solution which was based on hashing.

This was not so much of a question as it was a discussion of various approaches and the most important aspect was to convey the thought and the rationale behind it.

I had to code up a part of the solution.

Overall, the interviewers were helpful and it was encouraged to asked questions.

Keep hustlin\xe2\x80\x99,
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Microsoft Interview Experience

- Difficulty Level :\nMedium
- Last Updated :\n12 Sep, 2018

In this article I will describe my recent Microsoft Interview Experience. Microsoft has opened a new center in Belandur Bangalore. I directly got a call from them to come for an interview with them. I had to reschedule my interview twice as I was sick on the day of my first interview and got stuck with some personal work the second time.

So, I showed up on their office after rescheduling my interview twice. The office was pretty and all the floors are occupied by Microsoft. Upon reaching there I called up my recruiter and she asked me to take a visitor pass from the reception and asked me to go to the respective floor where the interviews will be conducted.

I took my pass and took the lift to that floor. Upon reaching I called up the recruiter again and she showed up with a smile and escorted me to the pantry. She asked me if I had my breakfast and told me to grab some food from the pantry. I told her that I already had my breakfast and not feeling hungry.

She then asked me to sit on the sofa and told that the interviewer will come shortly. After about 5 mins, the interviewer came and I went with him to the interview room.

We then introduced each other and he asked me to write a program. I will not be disclosing the questions as similar questions are available on lot of websites.

As I did not solve that question before, I discussed various approaches to solve it and finally settled down with a recursive solution. He then asked me to write the code for the same. I wrote the code neat and clean and tested the same with some inputs.

He said that it looked good. As we had still some time left, he asked me another question and simply asked me the approach. It was a simple trick question. I almost got it correct in the remaining time and he said that it\xe2\x80\x99s OK and the first interview ended.

He asked me to sit in the pantry again. I went to the rest room and after that sat in the pantry again. There was a big fridge full of juice and soft drinks. Varieties of fruits were also kept on the slabs. I went to the coffee machine and took some milk. Did not have much appetite for fruits and juices.

Meanwhile, the second interviewer came and greeted me with a friendly smile. We went inside the interview room. He asked me to sit and went to take some paper and pen. We then introduced each other. He has been in Microsoft for quite some time.

He then asked me a question which is related to the work he is currently doing at Microsoft. He told me that he will keep the question very simple at first and would build upon that as we dive deep.

I quickly came up with a good design of the classes we needed and then discussed my approach regarding the algorithm we needed to implement.

He then added some more constraints and asked me to code it. I coded it up fairly quickly and then discussed the complexity. As the solution was Optimal, he moved to the next question which was basically a follow up to the first question and I was supposed to design a data structure.

It took me some time to come up with an efficient data structure on the spot and after some discussions, I came up with a relatively complex data structure which solved the purpose. But after

some observations found out that we could manipulate the Trie data structure to achieve the same.

He then asked me if I had any question. I asked him regarding his day to day work. The technologies that he has been using in his current project etc.

He then asked me to sit in the pantry again. The recruiter came to me and handed over a lunch coupon and told me that remaining rounds will be after lunch. She also informed that the second interviewer would come and take me to lunch with him.

After some 10 minutes, the interviewer that I talked to in the second round came and we headed off for lunch. The cafeteria was in the ground floor and the ambiance was awesome. There were different counters for Chinese, North Indian, South Indian etc.

We headed to the North Indian counter. I gave my lunch coupon and he swiped his card as 100 Rs/- is added to the card of each employee for food. We took the food and sat on a nearby table.

The food was pretty good. But he insisted that it was even better in the earlier office. We discussed about the Cab facility that Microsoft provides and he told me that it was pretty good. He takes the cab at 8 am in the morning as he commutes from Indra Nagar and it takes him half an hour to reach office as there is less traffic at that hour.

He then takes the 4:30 pm cab in the evening and reach home by 5 pm. This routine saves him a lot of time. He can spend the time with family which would have been spent in traffic otherwise.

We also talked about the projects that are going on in the Bangalore IDC. After we finished our lunch, we again went back to the same floor and he asked me to wait in the pantry.

After around 20 mins, the third interviewer came looking for me and we went to the interview room. He told me that it\xe2\x80\x99s going to be a design round with some focus on data structure.

He asked me to design and implement a standard design pattern. After I wrote the code, he asked me a question which is a clever manipulation of the design that I just implemented. There was a lot of discussion regarding the approach and complexity.

After that we moved to the next question which was a bit complicated and I came up with a cache based design using a Trie and and a Heap.

We were done with the interview and I asked him regarding the cloud technologies that they are using for the projects. He answered them in great detail and we were done with the interview. He then asked me to sit in the pantry again.

After 10 mins, the fourth interviewer came and fourth round started. He told me that it will be a design round and asked me to draw the architecture of my current project on the white board. There was a lot of discussion on the pros and cons of the design and what can be done to improve the same.

He then asked me to design an API which would be accessed by millions of users taking security, scalability, availability etc. into account. There was a lot of discussion on the approach, sharding, CAP theorem etc. I also gave him the example of the Diego architecture used by Cloud Foundry which was somewhat related to the approach we were discussing.

After that there was lot of discussion regarding Fault tolerance, Bulk heads, Time outs etc. It was a long round and I felt exhausted. After this, there was some behavioral questions as well and once the round was over he asked me to sit in the pantry again.

I headed straight to the Fridge, took out an Amul cool, and emptied it in no time. I went to the wash room and when I came back, I saw the recruiter waiting for me. She told me that the next round will

be the Hiring Manager round and briefed me about the round a bit.

After some 10 mins, the Hiring Manager came looking for me. We headed to the interview room. He introduced himself and asked me regarding my current project. He also asked me to draw the architecture of my current project.

We then had a long discussion regarding thread pool. He then asked me to code up a multi threaded program and I did. We then had a discussion regarding the approach I chose. We then talked about good code practices, importance of Testing and things that I have been doing in my current project to move the components to cloud.

The interview was basically over and he asked me the technologies that I enjoy working with. We had a short discussion on it and he asked me to wait in the pantry.

After some 5 mins, the recruiter came and informed that they would hire me and some person from the HR department would reach out to me.

I thanked her and came out of the building. I was having a headache and took a bus for home. So, it was quite a nice experience. The process was very professional and all the people were very friendly and welcoming.

You can also check my Xerox Interview Experience here

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Microsoft Interview Experience (On-campus Internship 2018)

- Difficulty Level :\nEasy
- Last Updated :\n05 Sep, 2018

Microsoft IDC visited our campus on 25th August, 2018 for on campus internships. They set CGPA cut off as 7 for applying.

Round-1(Online test)

The first online round was on Co-Cubes (a very bad platform with no option of custom input as well.) which comprised of 3 coding questions (Test Duration: 75 mins). Not all the questions were same, Different students had different questions. We just had to complete the functions for all the problems. You can choose your language between C, C++, Java and C#, :-
1) 2 marks \xe2\x80\x93 https://www.geeksforgeeks.org/round-the-given-number-to-nearest-multiple-of-10/\xc2\xa0
2) 3 marks \xe2\x80\x93 Given a date in the format (DD/MM/YYYY), find the day of the week. Given \xe2\x80\x93 01/01/1990 was Monday.
3) 5 marks \xe2\x80\x93\xc2\xa0https://geeksforgeeks.org/rearrange-a-given-linked-list-in-place/

Some other questions got by others were \xe2\x80\x93
https://www.geeksforgeeks.org/average-of-ascii-values-of-characters-of-a-given-string/\xc2\xa0(2 marks)
https://www.geeksforgeeks.org/given-a-number-find-next-smallest-palindrome-larger-than-this-number/\xc2\xa0(3 marks)
https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list\xc2\xa0(5 marks)

After this round 37 students from 75 students were shortlisted. Though no official cutoff was released, unofficially boys getting at least 7 marks and girls getting at least 2 marks qualified.

Round 2: Group Fly (Pen and Paper test)
This round was pen and paper coding round. 2 questions were given and we had to write our own code in pen and paper without using any library. From the scratch you have to write everything. 6-7 students were assigned a single mentor discuss question and approach.
Question 1: Alphabet is defined as A, B, K, C, D, E, F, G, H, L, N, NG, R, P, Q, T, S, W, U . Note \xe2\x80\x93 \xe2\x80\x98NG\xe2\x80\x99 is a single letter. You need to write a function that given two words as a parameter, compare the words and reuturn their lexicographical order as per alphabet system written above.
Question 2:\xc2\xa0https://www.geeksforgeeks.org/diagonal-sum-binary-tree/

In this round it was very important to communicate with the mentor assigned with regards to the solution approach as only he was responsible to selected you. You should also first understand the question carefully and clarify it with the mentor. Writing clearly and neatly is also important. After this round 14 students were selected for next rounds.

Round 3: Technical Interview
I was asked 3 questions in this round \xe2\x80\x93
1)https://www.geeksforgeeks.org/urlify-given-string-replace-spaces/
2)https://www.careercup.com/question?id=5756760659853312
3) Fastest way to loop through a 2d array \xe2\x80\x93 that is horizontally or vertically if the order doesn\xe2\x80\x99t matter to user. https://stackoverflow.com/questions/997212/fastest-way-to-loop-through-a-2d-array

I was able to solve all 3 questions with some guidance from the interviewer at times and fix my mistakes. Overall he seemed satisfied and asked if I have any questions for him.

Round 4: Technical Interview
The interviewer took my resume and asked me questions on the skillset I had mentioned like databases, javascript, tensorflow, difference between Machine Learning and Deep Learning, use of NLP etc. He then asked me difference between SQL and NoSQL (I had mentioned MongoDB in resume) and things related to them. Then he asked me to design the database of a Flipkart like website using SQL and NoSQL.
Then he asked me this question \xe2\x80\x93\xc2\xa0https://www.geeksforgeeks.org/print-reverse-of-a-linked-list-without-actually-reversing/ Since I wasn\xe2\x80\x99t able to do this without extra variable he gave me hints to do that.
Then he asked me about JOIN in database, DDL, DML and gave a question on MySQL Merge and Joins. Then he asked me about OOPS \xe2\x80\x93 things like Abstraction, Encapsulation, Protected, Static variable etc. He also gave me another question, I do not remember that one! Sorry.
This was a long interview of more than an hour, as the interviewer was discussed a lot of things with me including Azure.

Round 5: Non-Technical Interview
This was like an HR round. The interview asked me my expectations of internship, my projects and interests in computer science. He asked me a lot of things about why computer science, on my favorite technology and other stuff. He didn\xe2\x80\x99t give me any specific question to solve but kept on asking questions like this. It was about 30 minutes of interview.

Finally we were done and we got the good news. They selected 11 students from our campus. It was a good experience!

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Microsoft Full Time Interview (On Campus)

- Last Updated :\n14 Dec, 2018

1st Round (75 mins)

Online coding round hosted on CoCubes:

1. Round of to nearest 10s multiple. If units digit of the given number 10 26==>30
2. Print the next smallest palindrome number for a given number.
   E.g 51==>55 66==>77 99==>101
3. Delete n nodes after traveling m nodes in a linked list until the end of the list

2nd Round (Group Fly) 30 mins

1. Question \xe2\x80\x93 Given a BST print out all root to leaf paths whose sum equal to a given number.
   Also, write a full program which includes the construction of the tree and then find the paths.

   This was a written round and there was one question for which we had to write the full program. It is very important that you ask questions from the instructor about the problem, to have the full understanding of the problem and what they actually need. Don\xe2\x80\x99t be in a hurry as mere solving is not important, your solution must be correct and optimized so it is highly advisable to tell out your approach to your mentor. I would say the deciding factors in this round generally boils down to the clarity you have about the problem and the things demanded in the solution, sometimes they even ask to write down the algorithm, measure the time complexity, give out proper test cases and then write a !! CLEAN CODE!!!. (Yes handwriting and clarity matters or else they might even not read your paper, they are humans too)

3rd Round (F2F)

1. Detect cycle in a linked list
2. Find the rotation count in a rotated sorted array
3. Write a single function which can check palindrome for both string and number. (Done using function overloading)
4. Give practical example of polymorphism, from either agriculture, business, gaming, health, shipping industry. I gave him an example from the gaming industry where in a game there are different functions executed when a player hits any surface. This question test your thinking capability so be creative to answer such questions.
5. Pay an employee using a 7 units gold rod? (Puzzle) https://www.geeksforgeeks.org/puzzle-4-pay-an-employee-using-a-gold-rod-of-7-units/
6. Explain the algorithm for heapsort and implement it
7. Implement YouTube So he told me to mainly focus on how I can handle scalability, Performance, Availability. To solve design questions you need to know the concepts involved which u can develop through making projects or practicing design questions. So I told him that to handle Performance I would use things like Multi-threading, Caching, Distributed Computing etc. For handling Availability, there are things like Replica Servers, Loosely Coupled Systems For Scalability, there are things like Multiple DBs, Horizontal Shradding, Vertical Shradding, Lazy Loading He asked me more question related to the design of the client-side application(web or native application)

   After this round, I was directly sent to the final round\xe2\x80\xa6. Lucky Me

4th Round (Technical+HR)

1. He asked me to tell him something about myself and was parallel looking into my CV. Asked me a lot of questions from my internships and projects. So only write things which u know very well. Like 90% of this round was focused around my CV
2. Then he asked me to design a Chatbot as a similar project was there in my CV. He said to give a vhigh-levelevel design of the different components of the system.
3. Rotate a matrix by 90 degrees clockwise
4. How is Memory management done in python, or How memory management is different in python and C
5. What are the new technologies you have learned in the last 3 months

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Microsoft Internship Interview On-campus

- Difficulty Level :\nEasy
- Last Updated :\n18 Dec, 2018

The first round was the basic elimination round- online coding test. There were sets of questions and everybody got 3 random questions from it. The marking scheme of the questions was 2, 3, 5 marks. The test was conducted on cocubes platform. The test duration was 75 minutes. Here are some of the set questions I remember:

1. Delete m nodes after n nodes of a linked list
2. Calculate the sum of two numbers and return the sum if the sum and first no have same no of digits else return the first no.
3. Evaluate infix expression.
4. Trim BST.
5. Find the day from the given date.
6. Based on Rounding off a number.

Around 54 people were shortlisted for the next round.

Then we had a group fly round. There were 2 questions:

- Resolve the unix path. (I did this using a stack)
- No of encodings possible(based on DP)

After this, only 16 people were shortlisted.

Then, we had the first technical interview. I was asked about my favourite data structure, complexity of BST, AVL, etc. Then, I was asked to code a min depth question where merging of nodes had to be done. (horizontal distance approach). Next question was to find the minimum index in a stream of characters which matches all the characters in a given string. (I solved it using a hashmap). Also I had used Neo4j in one of my project so I was asked how graph databases are better than the others.

In the second technical interview,

1. I was asked\xc2\xa0https://www.geeksforgeeks.org/minimum-number-platforms-required-railwaybus-station/ .
2. Second question was to find the largest number smaller than the give number by only using the digits in the given number.
3. Then I was asked to reverse a linked list iteratively.

In the third and final technical interview

1. I was first asked to find the Kth neighbour of a node in a binary tree.
2. Then i was asked to find the column number if the column name in ana excel sheet was given.

Overall, what I learnt during the interview process is that if you\xe2\x80\x99re stuck anywhere, seek help from the unexpected source- the interviewers. Ultimately, they are in your campus to get you on board with them and hence are ready to give hints whenever you\xe2\x80\x99re stuck. The key is to keep communicating everything that\xe2\x80\x99s on your mind to the interviewer so as to know if you\xe2\x80\x99re moving in the right direction and always listen and use their feedback carefully.

Finally, 4 students were selected for the internship.

Thanks to geeksforgeeks for being the best site to practice coding and prepare for interviews.

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Microsoft Full Time Interview Experience (On campus)

- Difficulty Level :\nHard
- Last Updated :\n31 Aug, 2018

Microsoft conducted online round in August 2018 at our institute. Around 270 students applied for the test.

Round 1(Online): It was conducted on CoCubes and consisted 3 questions and time limit was 75 min. The questions were as follows:

1. (**2 marks**) https://www.geeksforgeeks.org/find-the-first-repeated-character-in-a-string/

2. (**3 marks)** https://www.geeksforgeeks.org/find-patterns-101-given-string/

Question was similarSt to this question the difference was that there can be a case in which there can be no 0\xe2\x80\x99s as well.

3.(5 marks) https://www.geeksforgeeks.org/remove-bst-keys-outside-the-given-range/

This round was bit easy for me and I solved all the problems within 20 mins.

Advise: Always read previous interview experiences.

Outcome: 68 out of 270 students made it to the second round i.e. group flyer

Round 2(Group Flyer) : Students were divided into groups of 7/8 students and provided a mentor.

2 questions are given and you have to discuss the approach with the mentor and write the optimised approach on a paper.

Question 1: https://www.geeksforgeeks.org/word-break-problem-using-backtracking/

Variation of the above problem was given, one has to find the minimum number of words which one can use for making a given sentence.

Question 2: Students of different heights are attending an assembly. The problem is that if a student has less or equal height than the student standing above him\xc2\xa0 then he/she cannot see the assembly. Task was to find the minimum number of students randomly such that maximum number of students can see the assembly.

Ex: 9 1 2 3 1 5

output : 2 students i.e. 9 and 1 has to be removed so that 4 students can see the assembly.

I saw a pattern that its an implementation of LIS.

Advise: Always discuss your approach with the mentor as much as possible and write a very neat and clean code on the paper. Always try to give the time and space complexity of the solution you are providing.This round is a group flyer but you have to code individually.

Outcome: 30 out of 68 made it to the next round.

3/4 face to face interviews are lined up and each round is an elimination round.

Round 3(1st Technical F2F) : The interviewer seemed very friendly, he calmed me down by asking about me. He asked about my projects. I had live projects in my basket. He asked me to provide the link(do not lie about your projects it\xe2\x80\x99s normal to have not done a good project). Moving forward he asked me Data Structures based questions.

1. Find the grandparent of a given node in a Binary Tree.

I gave a brute force implementation using O(n) space. He asked me to optimize my solution. I thought a while and gave my approach.

Take two nodes i.e. parent and grandparent initialized as NULL. Call recursively for left and right subtrees when you find the given node return the grandparent. Before calling recursively make grandparent=parent and pass root as parent. return the left or right answer which ever is not NULL.

He then asked me to write down the code on a paper.

O(1) space if recursive stack used is not considered.

2. https://www.geeksforgeeks.org/count-pairs-with-given-sum/

I gave the unordered map based solution by hashing the frequency of numbers.

O(n) time and O(n) space complexity.

Advise: Always have a correct image of the questions in your head before writing a the final solution. Ask as much valid doubts as possible always give the brute force solution as soon it strikes your head. Then discuss the optimised solution with the interviewer and write code for it. Make test cases on your own and test it with your code, if something fails fix the code. Always discuss what you are doing, the interviewer always gives hints if you are going in the wrong direction. Always ask good questions if the interviewer gives you a chance to ask one. Have a smile on your face throughout and just don\xe2\x80\x99t panic.

Outcome: I along with 15-16 students made it to the next round.

Round 4 (2nd Technical F2F) : This was a tough one for me and a decider you can say. He asked whether I am comfortable with data structures or not (obviously answer was yes) .

Question 1: https://www.geeksforgeeks.org/the-celebrity-problem/

Initially when I was given this problem it was not clear to me. I asked a lot of questions about how are the inputs given, can one person know many person\xe2\x80\x99s etc. He asked me to write down the code. I was not really confident about my code and discussed a general approach he helped me by providing a hint that you must eliminate elements in each decision. I after a lot of struggle came up with the optimised solution using 2 pointer approach. He helped me reach the final solution. I was very relaxed after I gave the optimised answer, interviewer was satisfied.

Question 2: https://practice.geeksforgeeks.org/problems/boundary-traversal-of-binary-tree/1

This problem was a cake walk for me.

2 OS based questions: What is deadlock? and What is page fault?

Questions were very basic and needed basic OS knowledge.

Advise: If nothing strikes you ask as many questions as possible because you are anyways out if you don\xe2\x80\x99t ask one and don\xe2\x80\x99t give the solution, luckily you might get a hint which you can use to reach a solution . Reaching a solution is very very important when many

students are in the same league.

Outcome: I made it to the next F2F round along with 9-10 students.

Round 5 (3rd Technical F2F) : This round was to test my fundamental concepts. He gave me a problem which was that given n boxes with x1, x2, x3, \xe2\x80\xa6.xn balls in each of them. You need to reach a final state by transfering balls so that at the end every basket contains same number of balls . Tell whether one can reach the stable state or not. The condition was that if box n2 has x2 balls if box n1 is transfering to n2 then he has to transfer x2 balls or the same number of balls which is already present in any box has to be transfered in the same box.

He discussed the approach with me, and asked me how will I predict whether a transfer is possible or not and whether it will reach a stable state or not. I used hashing to predict a given state then he asked me the implementation of hash table. I told him everything I knew about it. He was convinced. He asked me to ask any questions from him. This marked the end of this round.

Round 6 (4th HR + Technical) :\xc2\xa0Asked about my academics, my projects which I did in Ruby on rails, asked about Semaphores its implementation. At the end he left me with a question i.e. Alien Dictionary. He asked me to ask any questions from him. This marked the end of this round.

The interviews went on till 1 a.m. at night. The result came at 5:00 a.m. in the morning 5 students where offered FTE at MICROSOFT and I was one of them . It was the best day of my life.

I thank GeeksForGeeks, regular practice on geeksforgeeks helped me alot during the interviews. Focus on finding a solution rather than knowing a solution during practice.

Contributed by Yash Kapoor(iamaverage)

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Microsoft Interview Experience (On-Campus for Internship 2018)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

Online Coding Round :

This round was conducted on Cocubes. There were 3 coding questions for which time alloted was 75 minutes. There were various sets of questions .My questions were:

- Given a string, the task is to find the average of ASCII values of characters in the string .
- Intfix evaluation.
- Cousin sum of a binary tree .

Other questions were:

- Next smallest palindrome.
- Given a number in form of string containing n digits .Find the smallest string after m deletions.
- Reverse a Linked List in groups of given size

Round 2:\xc2\xa0

This\xc2\xa0 round was a pen paper round .Questions included 7 short answer question based on C and data structures\xc2\xa0 and a coding question was there .All short questions were mandatory.

1. https://www.geeksforgeeks.org/detect-and-remove-loop-in-a-linked-list/

Short questions were easy just read the question carefully \xf0\x9f\x99\x82 because chances of silly mistake were there .

Interview I :

In this round questions asked with me were:

- Implement three stacks in an array such that space is well utilized.
- I was given a min heap and was asked to code for converting it to max heap .(I had to write a clean a code and dry run it on\xc2\xa0 a given\xc2\xa0 array representation of heap);
- I was given a 2\xe2\x80\x99s complementary binary representation of\xc2\xa0 a number and I had to convert it into decimal.

After that normal questions on data structures were asked like amortized time to built a heap and to proof it .

Interview 2:
This was the round I liked the most so I want to elaborate it .In this round interviewer\xc2\xa0 asked me about what questions were asked in previous interviews, my favourite data structure for which I replied trees and then why I like trees etc.Basic questions on trees.

- Then I was asked to implement\xc2\xa0 a text editor (basically optimally perform a pattern search after any number of string deletion or insertion from a given text file).This round fully revolved around this question .

At first I started with a brute force solution just searching the pattern starting with every index position.I was asked to write the code for this. Further I suggested KMP algorithm search .But the interviewer wanted something out of my mind not an already present algorithm or such and asked me also if I can optimize it further .After sometime I came up with\xc2\xa0 building a suffix tree thus the search time was just reduced to length of the string but the space complexity was huge in worst case and after every insertion or deletion I had to build the whole tree again.The interviewer was impressed with this but asked me to optimize it further . Later I thought to implement it with a structure containing a set for each character and store the index of occurence of each character in this set and suggested to run dfs for searching the pattern (Thus the space complexity was reduced to\xc2\xa0 O(n)).The interviewer was impressed with the approaches I tried .Later he asked me have I any question\xc2\xa0 for him.

TIPS : Always discuss the first solution which come in your mind whatever be the complexity then proceed to think for the optimized one.

Interview 3:

This was the last round . I was asked to introduce myself .Then what are my interests and what do I want to see myself in coming future, my achievements etc.

- Then I was asked\xc2\xa0 questions based on C/C++.Like basic features of OOP(a real life example where inheritance can be used), difference between function and macro(a program was given to me based on macro and I had to find what output will be).Types of polymorphism .
- Coding questions were asked\xc2\xa0 for which I had to give logic (no code was required).Out of these I knew one question from before so I told him that I knew it and he changed the problem . One of the question was finding a number in sorted and rotated array.

Later he asked me have I any question\xc2\xa0 for him.

6 students got internship and I was one of those.

TIPS :Remain honest through out the interview .Inteviewers just want to see how you approach to\xc2\xa0 an unknown problem so dont think that complexity of my solution is too much .Discuss with the Interviewers whatever you are thinking . Some students were asked puzzles also (You can find sample ones at geeksforgeeks puzzles section).

\xc2\xa0

THANKS FOR READING .

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Microsoft-IDC Interview Experience-SDE profile (on-campus for FTE)

- Last Updated :\n30 Jun, 2021

Microsoft visited NIT Jalandhar on 6th August, 2018 for hiring. approximately 250 students were eligible for 1st round.\xc2\xa0

Round 1: (coding round)\xc2\xa0(75 MINUTES)It was conducted on cocubes\xc2\xa0platform. there were different sets of questions and every set had three questions. I got following questions:\xc2\xa0
\xc2\xa0

1. Given a string find the number of occurrences of regex\xe2\x80\x99 10*1\xe2\x80\xb2.
2. given a condition that only odd-numbered\xc2\xa0cars can be used on odd-numbered days and even-numbered cars can be used on even-numbered days. you are given an array of car numbers and a date, find out the number of cars that can be used.
3. https://www.geeksforgeeks.org/minimum-positive-points-to-reach-destination/

I was able to solve two questions and I was selected for next round. 70 students were selected for next round.\xc2\xa0

Round 2:(Group fly)\xc2\xa0 (30 MINUTES)This round was pen and paper round.All students were given a question and we need to write algorithm as well as code on paper. write neat code and properly explain your algorithm. question is given below:\xc2\xa0
https://www.geeksforgeeks.org/perfect-sum-problem-print-subsets-given-sum/\xc2\xa0

25 students were selected for next round.\xc2\xa0

Round 3:(technical interview)\xc2\xa0 Interviewer first asked me to explain my projects. One of my projects was on jdbc so he asked me a query on sql related to it. Explain your projects properly and confidently. Then he asked me below question:\xc2\xa0
https://www.geeksforgeeks.org/print-a-pattern-without-using-any-loop/\xc2\xa0

I answered this question and wrote the code.\xc2\xa0Then he asked me to develop test cases for this questions. I found out the cases where a solution to this question may fail. Then he asked me questions on OOPS concepts (inheritance, difference between class and\xc2\xa0 objects, etc)\xc2\xa0

I was shortlisted for the next round.\xc2\xa0

Round 4:(technical interview)\xc2\xa0 Interviewer asked me for brief description of my projects. Then he asked me to tell the approach which i used in group fly round. I had used Dynamic programming. Then he asked me to find more optimized way as dp was using a lot of space for a large amount of numbers. So I tried recursion and he said it will use lot of time. so I tried sorting and some more approaches like trees etc.\xc2\xa0

Then he asked me a question that there are aeroplanes landing and taking off. we need to construct a system which will ensure collision-free landings and taking offs. I told an approach using semaphores. He discussed this approach in depth and then said that in aviation\xc2\xa0what will be the factors considered for collision then I said that we will check speed, angles, etc. He was checking how much pressure I can handle and in such pressure how much I can think. Then he asked me about normalisation, denormalisation, OOPS concepts like real-life significance of objects,

what is the real life example of linked list.\xc2\xa0

I was shortlisted for the next round.\xc2\xa0

Round 5(HR+technical)\xc2\xa0 Interviewer asked me the following questions:\xc2\xa0
\xc2\xa0

1. tell me about yourself \xe2\x80\x93\xc2\xa0 projects
2. strength
3. weakness
4. how your weakness effects you
5. what do you know about microsoft\xc2\xa0(its products)
6. machine learning
7. cloud computing
8. benefits of cloud
9. where do you see yourself after 5 years?

8 students were selected for Microsoft and I was one of them. Geeksforgeeks helped me a lot to achieve this.
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Microsoft Interview Experience, FTE, (on-campus)

- Difficulty Level :\nHard
- Last Updated :\n18 Aug, 2018

Microsoft visited Thapar Institute of Engineering and Technology for hiring. The **first round** was on cocubes. There were different sets and the questions that I had in my set were:-

1. Given two numbers, \xe2\x80\x98m\xe2\x80\x99 and \xe2\x80\x98n\xe2\x80\x99, after adding m+n if the no of digits in m + n and n are same return n, otherwise, return m + n. (2 marks)
2. Given a number in the form of a string, return the next smallest palindrome bigger than the given number. (3 marks)
3. Given a number in the form of a string, remove k elements from it so that it forms the smallest number possible.\xc2\xa0 (5 marks)

Questions from other sets: Trim BST, Evaluate Infix Expression, average of Ascii characters, some question related to date (sorry, I don\xe2\x80\x99t remember), and reordering the linked list nodes.

I did the first two efficiently and did the last question with brute force (checking all combinations and selecting the smallest one) as I was not able to come up with the efficient approach.

From about 200 students, 68 students were selected for group fly round.

Group Fly Round

2 questions were given to be solved in 2 hours. Both were pretty standard dynamic programming questions.

1. Remove min no of elements such that the resulting sequence is in strictly increasing order.
2. Word Break problem. Our problem was a slight variation of the problem in the link. We had to find if the string forms a meaningful sentence with **fewest** words possible.

28 students were selected for next round.

F2F Interview Round 1

I was interviewed by the senior most engineer from Microsoft. He greeted me and then became serious afterwards. He gave me the problem gas stations. First he asked whether I had solved it before, to which I said no, as I had not solved it before.

I gave him two approaches, the O(n^2) one where I would check every pump for a circular tour. Then he asked me to improve the solution to linear time, and I did it.

Then he gave me another problem, Alien Dictionary. I was discussing my approach but said me to move on as I was taking too much time. He then asked me if I had any questions for him. I asked him what he does on daily basis at Microsoft. He replied to my question happily. And asked me to wait.

I thought I will be rejected as I did not solve the second question completely, but by the grace of God, I was allowed to sit for further rounds.

F2F Interview Round 2

This round was good. The interviewer was very friendly and calm. He first introduced himself and

asked my to give a quick introduction. Then he also asked me about my interests. Then he asked me a few questions.

1. Given a function f1, which returns either 0 or 1, both with probability 50%. Make another function f2 such that the probability of returning 0 becomes 1/3 and returning 1 becomes 2/3.
2. Given an array find all the pairs in the array where their absolute difference equals k.
3. Given the arrival and departure times of guests in a hotel, find out the time interval where there will be max no of guests and the max no of guests. A similar problem.

This round went well, he asked if he had any questions for him, I asked him a few and replied them happily. I asked,

1. How can I improve?
2. What product are you working on?

F2F Interview Round 3

Again a friendly interviewer. He asked me to introduce myself and took a look at my resume. He asked me to describe one of my projects. I described my project. He asked how I implemented a certain feature, and I gave him the answer.

Then he asked me few questions of which few I had done before, so I told him that I had done that questions before.

1. Given two strings A and B. Count the no of anagrams of smaller string in the larger string.
2. Given a rotated sorted array, search for a given element.

He asked me what were the other subjects I liked from computer science. I replied OS, but he did not ask any questions on OS.

This interview went well too. He asked me if I had any questions for him and I again asked the same questions that I asked in the previous round.

I was asked to wait outside. Then the HR told me that there are no further rounds for me and I can leave for the hostel. The result came the next morning and I was selected as a Software Engineer. I got a feeling which I had never experienced before. All the hard work paid off finally. The entire process took more than 12 hours.

Total 5 students were selected for full-time role and 5 students were selected for the internship.

Number 1 tip:\xc2\xa0 Be confident and discuss all approaches before discussing the most optimal approach.

Number 2 tip:\xc2\xa0 Keep talking, interviewers will give hints if you go wrong.

I would like to thank geeksforgeeks as it was a crucial resource during my preparation.

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Microsoft Interview Experience (On Campus for Full Time)

- Difficulty Level :\nHard
- Last Updated :\n18 Aug, 2018

Microsoft visited BITS Pilani, Hyderabad Campus for placements in August, 2018. The detailed process was as follows:

Round 1: Online Coding, 75 Minutes, 3 coding questions from a Question bank (65/~150 shortlisted)

The platform used was **Co-Cubes**. 3 questions were asked of 2, 3 and 5 marks respectively with varying difficulty.

1. Given a number, round it off to the nearest multiple of 10. https://www.geeksforgeeks.org/round-the-given-number-to-nearest-multiple-of-10/
2. Given a date, find the day it will be if 1/1/1990 was a Monday. similar to \xe2\x80\x93\xc2\xa0 https://www.geeksforgeeks.org/find-day-of-the-week-for-a-given-date/
3. Given a linked list, print m nodes, delete n nodes and so on.\xc2\xa0 https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/

some of the other questions which were also asked were

1. Given a grid with each cell consisting of positive, negative or no points i.e, zero points, find minimum initial points to reach cell (m-1, n-1) from (0, 0), with some constraints. https://www.geeksforgeeks.org/minimum-positive-points-to-reach-destination/
2. Given a string \xe2\x80\x98str\xe2\x80\x99 of digits and an integer \xe2\x80\x98n\xe2\x80\x99, build the lowest possible number by removing \xe2\x80\x98n\xe2\x80\x99 digits from the string and not changing the order of input digits. https://www.geeksforgeeks.org/build-lowest-number-by-removing-n-digits-from-a-given-number/

Round 2: Group Fly Round, 45 Minutes, 2 coding questions, Written Round (~20/65 shortlisted)

This was a written round and we were expected to write fully functional code, without any bugs and errors. Library functions used, if any, had to be explained and if possible, code for that too (not that rigorous). Pseudo code and algorithms were also allowed.\xc2\xa0 All the assumptions made had to be explained as well.

1. Print the nth line of the pattern given

- 1
- 11
- 21
- 1211
- 111221
- 312211
- 13112221
- \xe2\x80\xa6

https://www.geeksforgeeks.org/look-and-say-sequence/

1. Given an array of numbers, arrange them in a way that yields the largest value.

https://www.geeksforgeeks.org/given-an-array-of-numbers-arrange-the-numbers-to-form-the-biggest-number/

Round 3: Technical Interview 1, ~1:15 Hrs

The interviewer was very friendly and started by asking some questions related to my resume and summer internship . Then he started with some questions based on Data Structures and Algorithms

1. Given a Unix File Path as a string, normalize it as efficiently as possible

e.g \xe2\x80\x9c/abc/def/../..\xe2\x80\x9d would yield \xe2\x80\x9c/\xe2\x80\x9d on normalisation and \xe2\x80\x9c/ghi/jkl/./..\xe2\x80\x9d would yield \xe2\x80\x9c/ghi\xe2\x80\x9d

https://www.geeksforgeeks.org/simplify-directory-path-unix-like/

I gave him an approach using stack and he was satisfied with it. **Corner cases** were very important.

1. Given a polynomial expression, simplify it as efficiently as possible, and sort it in decreasing powers of the variable.

e.g 5x^12 + 6x^10 + 4x^5 + 6x^5 + 3x^3 + 2x^3 + 9 would result to 5x^12 + 6x^10 + 10x^5 + 5x^3 + 9

I provided him with 3 approaches, one with trees, one with max heap and finally one with Linked lists, considering all the corner cases and continuously optimizing the code with respect to time and space complexity. He seemed happy with my approach.

1. Given a reference to a linked list node(not the head node), delete that node.\xc2\xa0 https://www.geeksforgeeks.org/in-a-linked-list-given-only-a-pointer-to-a-node-to-be-deleted-in-a-singly-linked-list-how-do-you-delete-it/

Next, he moved on to DBMS and OS. Some SQL queries and Synchronization problems were asked and I was asked to explain the Producer-Consumer problem in synchronization. A few ML questions were also asked.

The interviewer then moved on to my projects and I was asked to draw the detailed ER diagram for one of my projects.

Round 4: Technical Interview 2, ~1:15 Hrs

Some more questions related to projects were asked along with a few puzzles. Some basic Coding questions were also asked.

This round was a mix of technical and HR, as there were a lot of resume related questions. I was required to explain the project that I had done in my summer internship in detail, which technologies I had used, team structure, designing the project as well as why we had chosen to go with the said details.

Round 5: HR / Design Round, ~1:30 Hrs

This round was basically a mix of HR and creative design round. The interviewer wanted to check whether the candidate can think out-of-the box with regard to any given problem and come up with unique, optimized solutions.

Questions like design a spectacle, Inventory Management System were asked and a lot of DBMS theory like 3 schema abstraction, data independence, ACID properties, concurrency control, 3 tier, 2 tier architecture were asked. I was required to draw each and every phase of the designing

process.

In the end, **4 candidates** were selected for the the role and I was one of them!!!

Some tips related to coding interviews which helped me a lot\xc2\xa0

1. The interviewers were very friendly and knowledgeable and try to understand your solution, rather impose theirs on you, unlike certain companies.
2. The ***NUMBER ONE*** thing interviewers were looking for was ***CONFIDENCE***. Almost everyone shortlisted had superb knowledge of computer science, but if he/she could not speak confidently, or stayed quiet during the interviews, they were rejected on the spot! Even people who had the highest score after group fly and had completed the HR round first were rejected due to this.
3. It\xe2\x80\x99s okay to make mistakes during the interviews, they\xe2\x80\x99re there to correct and help you, but its more important to keep talking and let the interviewer know what is going on in your head the whole time.
4. Keep talking about your thought process and telling the interviewer what is going on in your head. Don\xe2\x80\x99t sit idle.
5. Always inform them of any assumptions and your language preferences you make before coding and then proceed. ***Always try to include Corner Cases***.They are very important.
6. Yeah and one thing, except the online coding round, ALWAYS write **comments** while coding. I repeat, always write comments for anything you do. It matters a lot, especially for the group fly round.
7. Prepare 2-3 questions for the interviewer for each round. Its better if its related to the company, JD and shows your interest in them.
8. You should know each and everything written on your resume. You can be asked to elaborate on anything in detail. Don\xe2\x80\x99t write anything you can\xe2\x80\x99t speak for ~5 minutes.
9. Important subjects include DSA, DBMS, OOPS, OS, TOC and to some extent Networks. Disciplinary Electives\xc2\xa0 are very important too.
10. *Vital Info \xe2\x80\x93 Co-Cubes displays only 3 test cases and rest are all hidden. So try to make your code as efficient and optimal as you can, including all the corner cases.
11. Try practicing coding on a computer as well as on **paper**. You\xe2\x80\x99ll understand the nuances of the code better.
12. **Internships**! Try getting a summer internship. The work that you\xe2\x80\x99ll do there will be an important talking point in your resume. If you get a PPO, then chill, else experience is still very valuable. Resume is very important and please spend more time on writing it properly.

Thanks!

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Microsoft Interview Experience (SDE II)

- Difficulty Level :\nHard
- Last Updated :\n15 Aug, 2018

Round 1:

First round was machine test that comprised 3 questions.

1. Given an array of numbers in range (0 \xe2\x80\x93 49) and queries having start index and end index, find maximum element for each query. (I used square root decomposition).
2. Given N natural numbers, 1 is missing, find the number. Then, the interviewer expanded the problem to find 2 or more missing numbers.
3. Given a continuous stream of strings, find top 10 largest strings at any instant. Following link will be helpful.

\xc2\xa0

Round 2:

This round was based on HLD (high level design).

1. Design a search engine. Handle the cases of Auto-Correction and Text-Prediction (like modern search engines). Explain\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 (Tries + DFS + String Handling). Then, we discussed about Search Engines and how user experience can be\xc2\xa0 improved.

\xc2\xa0

Round 3:

This round was based on my projects at Delhivery.

1. Discussion on Green Threads and how are they different from kernel level threads. Explain using multithreading and\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 multitasking. Which one performs better. (I used green threads in I/O intensive tasks.)

2. Design an authentication using AWS services like Api gateway and lambda.

3.\xc2\xa0Then, he asked me about my Google Summer of Code project and my contributions to open-source and we had a very\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0healthy discussion.

Round 4:

This round was taken by a senior manager.

1.\xc2\xa0Given an array of integers of size n. An element at index i is called peak element if arr[i \xe2\x80\x93 1] < arr[i] > arr[i + 1] for i in range 1\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 to n \xe2\x80\x93 1 OR arr[i] > arr[i + 1] for i = 0 OR arr[i] > arr[i \xe2\x80\x93 1] for i = n \xe2\x80\x93 1; Find all peak elements in an array in less than O(n)\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0

\xc2\xa0 time complexity.

2.\xc2\xa0You are given many files of 6 GB, each having stream of integers. You have space of 4 GB left in your main memory (mainly to\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 swap out, swap in). You have to store sorted sequence of integers in all file in a other output file. How will you do that?

Then we had discussion on Red black trees, sharding, redis internals, concept of single threaded applications and event loop .etc.

Round 5:

This round was based on Behavioral Skills taken by HR team.

They asked several situational based questions like if there is some tussle between you and your manager regarding some implementation, how did you tackle that. Was your manager convinced.

After 1 month I got a call from HR that I have been selected.

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Microsoft on Campus Placement and Interview Questions

- Difficulty Level :\nHard
- Last Updated :\n13 Aug, 2018

Microsoft recently visited our campus IIT ROORKEE. The selection process was as mentioned below.

First round was an online coding round consisting of three questions conducted on CoCubes website(Test portal) .

Q1) Very basic question -: Given two integers n and m return n+m if the number of digits in n+m is equal to the number of digits in n otherwise return n. n and m can be positive and negative as well. **2 MARKS**

Q2) Basic dp question -: Given a string of length n find out the number of possible strings having no consecutive ones in the string. **3** MARKS

Q3) A linked list normal level question -: Given a linked list L1 \xe2\x80\x93 > L2 -> L3 -> \xe2\x80\xa6.. Ln-1 -> Ln return the string in the following format L1 -> Ln -> L2 -> Ln-1 -> L3 -> Ln-2 -> \xe2\x80\xa6. **5 MARKS**

Though not officially declared but the cutoff was 7/10 marks.

Students were shortlisted for second round .

Second Round was a group fly round . Details are mentioned below

Q1) Given a 8 bit integer swap its two consecutive bits (d0 with d1, d2 with d3 .. and so on) and then return it. For example 00010101 (23) should return 00101010 (42) .

Q2) Merge two sorted linked list . The duplicates in two linked list should be present only once in the final linked list .

Q3) There exists a linear path from 1 -> n cities for example 1->2->3->4-> \xe2\x80\xa6 ->n Each path connecting two cities has a cost associated with it. You need to answer queries regarding the cost of moving from (xi -> xj) city.
The space complexity can be O(n) but queries must be answered in O(1) time complexity according to the question.

Q4) Some output question on C++ based like
char *ptr = \xe2\x80\x9cABCDEF\xe2\x80\x9d
char str[] = \xe2\x80\x9cABCDEF\xe2\x80\x9d
cout<<sizeof(str);
cout<<strlen(str);
cout<<sizeof(ptr);
cout<<strlen(ptr);

Q5) Reverse the words in the given sentence .
"Sky is blue" should return "blue is Sky"

Q6) Given two rectangles and their bottom right, bottom left, top left and top right coordinates (x, y) find the coordinates of the rectangle formed by the intersection of the two rectangles.

The problem with group fly round is that you have to write the code on sheet of paper so you should be very careful while writing the code as a human would be reading it . Proper indentation, comments (if you have time) should be written along with the code. Mention a bit about your approach to give the checker a hint and make it easy for him to evaluate.

Shortlisted students were called for interview.
There were two technical interviews.
First technical interview
The interviewer was really friendly and in the first interview he asked to introduce myself and tell me about your recent project mentioned on the resume. The exact question was
Briefly describe your recent project and what were the difficulties that you faced during the implementation of the same.

Then he asked me the famous count and say problem. Given a string \xe2\x80\x9caabbbccd\xe2\x80\x9d return the string \xe2\x80\x9ca2b3c2d1\xe2\x80\x9d as result.

Second question was to implement the Linux tail command which prints the last n lines of the file as output where n is a integer parameter. File handling question.

The interviewer asked me to write the code on paper so again do practice to write code on paper as sometimes people cut a lot of times and mess up in the interview. Think properly about the implementation during the provided time and don\xe2\x80\x99t rush to write the code instantly.

First interview ends.
Second interview

Question 1) First question was to come up with a code that provides 3 suggestions to you as you type in the phone . In this interview you are not expected to write the entire code but you have to provide the interviewer with the approach for the question.
The question was as I type \xe2\x80\x9cbananaa\xe2\x80\x9d the code should suggest me with banana. The spelling mistake can occur in between the word, in the end, in the beginning. Provide me with three strings from the dictionary having maximum match with the mis-spelt word. In case of word exists in the dictionary don\xe2\x80\x99t suggest anything.

Question 2) Given an array of integers maximize num1 + num2 \xe2\x80\x93 distance.
distance between \xe2\x80\x985\xe2\x80\x99 and \xe2\x80\x9910\xe2\x80\x99 in the array 5 4 89 25 10 is (4).

Second Interview ends and the interview ends.

Prepare 2-3 questions to ask the interview about the company and ask them when he says \xe2\x80\x9cDo you have any question for me\xe2\x80\x9d. Stay positive during the interview. Usually The interviewer asks to write the test case where your code can possibly fail. Even if you know your code won\xe2\x80\x99t fail, try to generate some interesting test cases; don\xe2\x80\x99t stay quite. The interviewer checks your approach and your communication skills and your ability to guide him through your thought process rather than coming up with the correct code in the first attempt. He helps you if you are moving in the wrong direction.

Overall it is a bit luck dependent as well.

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Microsoft \xe2\x80\x93 SDE On Campus Full Time

- Difficulty Level :\nMedium
- Last Updated :\n11 Aug, 2018

Round 1: There was an online coding round held on CoCubes comprising of 3 questions (2+3+5 marks). Around 250 students appeared for the test, the questions were :

1.First Repeating Element in a string.
https://www.geeksforgeeks.org/given-a-string-find-its-first-non-repeating-character/

2.Reverse a Linked List in k sizes.

https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/

3.Print the sum of cousins of a node given the pointer to the node and the sum.

https://www.geeksforgeeks.org/print-cousins-of-a-given-node-in-binary-tree/

Around 64 students were shortlisted after this round.

Round 2: This is the Group Fly Round and everyone was giving one same question and 30 minutes to solve it on paper with pen.

\xe2\x80\x9cGiven an array print all subsets except null which sums up to given sum\xe2\x80\x9d
https://www.geeksforgeeks.org/perfect-sum-problem-print-subsets-given-sum/

The key is to write the code efficiently and neatly and you need to write algorithm also along with comments to explain the code. Interact as much as possible with the mentor.

After this round 25 students were selected for P.I.

Round 3:Technical Round 1

1.The Interviewer was very calm and asked me about myself and had a little discussion about my hobbies.

Later he asked me about my projects and had a great discussion about it.

Then he asked me to improvise the approach of the question given in group fly round, I wasn\xe2\x80\x99t able to do that,

Later he asked me about OOPs Concepts and principles and Asked me to create queue using stacks.
https://www.geeksforgeeks.org/queue-using-stacks/

Round 4 : Technical Round 2

1.The interviewer asked directly about my projects and later give a problem to solve

https://www.geeksforgeeks.org/median-two-sorted-arrays-different-sizes-ologminn-m/.

Later, during discussion about my Web Development project, he asked me to design the system for YOUTUBE like websites. I did struggle at first but he cleared my doubts and I was able to satisfy him with my answer.

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Microsoft Interview Experience (On-campus internship)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Online round:

It was conducted on Cocubes. It consisted of 3 questions:

1. 2 marks:Average of ascii characters of string.
2. 3 marks:Reverse alternate k nodes
3. 5 marks:Cousin sum in a binary tree.

Other questions were:

1. Infix evaluation
2. Given an array of numbers, find the smallest number after n deletions
3. Next palindrome.

   Of 200 students about 60 were selected for next pen and paper round.We had one ds question detect and remove loop from a linked list and 6 short questions based on C.

   At the end of each round I was asked the question \xe2\x80\x9cDo you have any question for me?\xe2\x80\x9d.

Round 1:

First I had to explain my approach, then write the entire code and test cases for each problem.

- Reverse a sentence.

Input:\xe2\x80\x9dThis is a test\xe2\x80\x9d

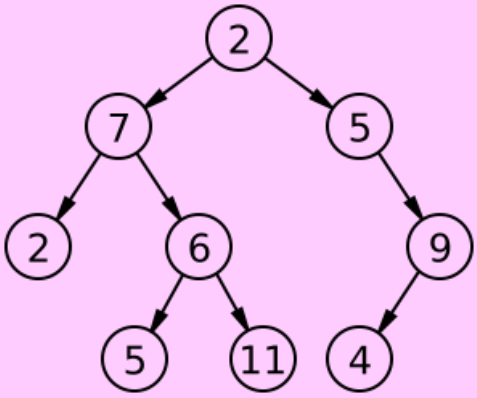
Output:\xe2\x80\x9dtest a is This\xe2\x80\x9d

- Reverse the sentence preserving whitespaces.

Input:\xe2\x80\x9dThis is\xc2\xa0 \xc2\xa0a\xc2\xa0 \xc2\xa0 test\xe2\x80\x9d

Output:\xe2\x80\x9dtest a\xc2\xa0 \xc2\xa0is\xc2\xa0 \xc2\xa0 This\xe2\x80\x9d

- Identify whether given nodes of a binary tree are directly connected or not.



INPUT\xc2\xa0 \xc2\xa0 \xc2\xa0OUTPUT

2\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 true

5, 4\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0false

5, 4, 9\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 true

Round 2:

- There are two types of characters one of 1 byte and another of 2 bytes, I had to delete the last character.
- Design a remote just like\xc2\xa0 keypad of old phones, and display all corresponding channels in TV.

INPUT:

22223377

OUTPUT:

a

b

c

a

ad

ae

aep

aeq

And we have to display channels with output as prefix.

Round 3:

First I was asked \xe2\x80\x9cTell me about yourself.\xe2\x80\x9d

then \xe2\x80\x9cWhat I wanted to do in life?\xe2\x80\x9d

and 2 coding questions, just logic no implementation.

1. Popultate right pointer in a binary tree.
2. Given a file print all the anagrams together.

Finally, I was selected.It was one of the best moments of my life.

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Microsoft Interview Experience (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Online Coding Round:

It was conducted on Cocubes. There were 3 questions to be solved in 75 mins. My questions were:

1. \xc2\xa0Given a character array, find the average of ascii characters in the array.\xc2\xa0Ex:- i/p = ab12, o/p = 73.5\xc2\xa0 \xc2\xa0(2 marks)
2. \xc2\xa0Evaluation of a given infix expression(as character array). Ex:- i/p = 4-5*14/7+2, o/p = -4\xc2\xa0 (3 marks)
3. \xc2\xa0Find the lowest number possible by removing k digit from a given number. Ex:- i/p = 4312389, k=3, o/p = 1238\xc2\xa0 (5 marks)

Out of 200 students, approximately 60-65 where selected for pen & paper round. Gettting more than 5 marks was enough for clearing this round. Regarding cocubes, it is a simple ide where one can only test the code for compilation error and few basic test cases. We where not able to run the code for custom test-cases, but you can certainly modify the input string for checking.

Pen & paper round:

This round consisted of 7 short questions(based on C lang.) of 3 marks each and one coding question of 6 mark. The coding question was Detecting and Removing Loop from a Linked List. All the questions where compulsory. Around 24 students moved forward for face-to-face personal interviews.

Round 1:

Interviewer went through my cv and asked some question from OOPs, like what are virtual functions and destructors, and difference between new and malloc. Then how to deallocate memory and what happens for the combination of :- (new and free) and (malloc and delete). Then he asked me 2 coding questions:

1. Given a Binary Search Tree, convert it into a Doubly Linked List. He asked me to write some test cases.
2. Given a row-wise sorted n*n matrix, Print the elements of matrix in non-decreasing order. Space complexity of O(n) was allowed. I used min-heap to solve it.

For the questions try to 1st tell your approach and use test cases to dry run your approach. Then move to writing code, when asked.

Round 2:

I was asked :

1. There are two parallel lines. One line has n points and other m points. Points are connected to each other in a zig-zag manner. Find the number crosses i.e, points of intersection of connections. Similar to this problem-\xc2\xa0 https://www.geeksforgeeks.org/counting-cross-lines-array/
2. A set on N rectangles, each having sides aligned to x-axis and y-axis, was given. Another rectangle was given and I had to check how many rectangles from the set completely lie inside the new rectangle. We can sort the set along x-axis and y-axis, and find the no of rectangles by

using 4 binary searches.

3. Exception handling in c++ and java.

One more round was there for selected students. Total 6 students was selected.

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Microsoft IDC Interview Experience (For Full Time)

- Difficulty Level :\nExpert
- Last Updated :\n10 Aug, 2018

Round-1(Online test)

The first online round was on Co-Cubes which comprised of 3 coding questions (Test Duration: 75 mins) :-

1. Given a string, find the first non-repeating character in it. (2 marks)

https://www.geeksforgeeks.org/given-a-string-find-its-first-non-repeating-character/

2. Given a date in the format (DD/MM/YYYY), find the day of the week. (3 marks)
3. Delete N nodes after M nodes. (5 marks)

https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/

Around 40 were selected after this round.

Round-2 (Written Test)

This round comprised of 2 coding questions (45 mins)

1. Given a unix path as a string, find the current path of the directory.

Eg: \xe2\x80\x9ca/./b/../c\xe2\x80\x9d \xe2\x80\x93 \xe2\x80\x9ca/c\xe2\x80\x9d

I used the concept of Deque, though it can be solved through stack.

2. Given a number, count no of decodings.

https://www.geeksforgeeks.org/count-possible-decodings-given-digit-sequence/

Some extra cases were given, which had to be handled.

Suggestions :- Mention time and space complexity explicitly after the code completion. Avoid any cuttings and errors.

Time was very less and good time management was required.

Around 15 were selected after this round.

Round-3 (Technical Interview)

1)Question from my project. He asked me about my summer internship and the selection procedure. Then he asked me about my project including workflow, efficiency consideration and various typical questions. I answered all of them.

2)He gave me first question. In a parliament, there are 500 constituencies, each constituency stand for a vote and there are [0, m] votes that can be casted. Tell which constituency will win. In a parliament the constituency which get more that 50% of votes will be a winner. I generated various test cases and confirmed the answer from him. I conveyed my approach handling all corner cases. He was satisfied with my approach.

3)Given an array of integers, find the largest number which can be formed. I again generated various test cases to confirm the question. Later, I discussed my approach and was asked to code. He checked by taking various test cases.

4)Later, he asked me to implement tic tac toe and some discussion on best possible data structure to be implemented.

The interviewer was really helpful and the r**ound ended well.**

\xc2\xa0Round-4(Technical Interview)

1)Given N-ary tree, find the length of the longest path of the consecutive integers. I discussed the approach to which I was asked to code.

2)Given pairs [m, n] such that in a race, position of m>n i.e. m finishes race before n. Find the order in which all the players finish the race. Being a sportsperson, it wasn\xe2\x80\x99t difficult to crack this one!

The interviewer seems to be satisfied. I was waiting for the next round.

Tips:- Always discuss the first approach you have in your mind and then think for the optimised solution.

Around 9 were selected after this round.

Round-5(HR + Technical)

1) Given a string, replace the substring with a value present in the map. I discussed the approach and one of the test cases failed to which I was asked to rethink my solution. I discussed another approach to which he said ok.

2) Question from project. I did a project using ruby on rails. I was asked about some security checks which can be implemented in a website as a developer and various gems implementation. The discussion went till hacking and I tried answering them. The interviewer asked me some basic questions on my other projects.

At the end, I was among one of the four selects!

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Microsoft Interview Experience (On campus internship)

- Difficulty Level :\nMedium
- Last Updated :\n31 Aug, 2018

It was conducted on Cocubes. It consisted of 3 questions:

2 marks:Average of ascii characters of string.

Input:abc

Output:(65+66+67)/3=66

3 marks:Reverse k nodes at a time in a linked list.

5 marks:Cousin sum in a binary tree.

Other questions were:

1.Infix evaluation

2.Given an array of numbers, find the smallest number after n deletions

3.Next palindrome.

Of 200 students about 60 were selected for next pen and paper round.We had one ds question detect and remove loop from a linked list and 6 short questions based on C.

At the end of each round I was asked the question \xe2\x80\x9cDo you have any question for me? \xe2\x80\x9d.

Round 1(F2F):

First I had to explain my approach, then write the entire code and test cases for each problem.

1.Reverse a sentence.

Input:\xe2\x80\x9dThis is a test\xe2\x80\x9d

Output:\xe2\x80\x9dtest a is This\xe2\x80\x9d

2.Reverse the sentence preserving whitespaces.

Input:\xe2\x80\x9dThis is\xc2\xa0 \xc2\xa0a\xc2\xa0 \xc2\xa0 test\xe2\x80\x9d

Output:\xe2\x80\x9dtest a\xc2\xa0 \xc2\xa0is\xc2\xa0 \xc2\xa0 This\xe2\x80\x9d

3.Identify whether given nodes of a binary tree are directly connected or not.

Input Output

2 true
5,4 false
5,4,9 true

Round 2(F2F):

1.There are two types of characters one of 1 byte and another of 2 bytes, I had to delete the last character.

2.Design a remote just like\xc2\xa0 keypad of old phones, and display all corresponding channels on TV screen.

Input:22227723
Output:
a
b
c
a
ap
aq
aqa
aqd

Round 3:

First I was asked \xe2\x80\x9cTell me about yourself.\xe2\x80\x9d

then \xe2\x80\x9cWhat I wanted to do in life?\xe2\x80\x9d and 2 coding questions, just logic no implementation.

1.Popultate right pointer in a binary tree.

2.Given a file print all the anagrams together.

Finally, I was selected.It was one of the best moments of my life.

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Microsoft Interview Experience \xe2\x80\x93 On campus SDE Intern

- Difficulty Level :\nEasy
- Last Updated :\n02 Aug, 2018

Microsoft invited applications for interns from our college. Process consisted of following rounds. each round was an elimination round. we started off with about 200 applicants and in the end 10 were selected.

Round 1:\xc2\xa0

First round was an online test on Co-Cubes that comprised of three coding questions. (75 Minutes)

Question 1:\xc2\xa0https://www.geeksforgeeks.org/evaluate-a-boolean-expression-represented-as-string/

Question 2: dont remember sorry!

Question 3:\xc2\xa0https://www.geeksforgeeks.org/connect-nodes-level-level-order-traversal/

\xc2\xa0

Round 2: Group Fly(Written Test 45 Minutes)

In this round we were divided in groups of about 4-5 and assigned a interviewer . 2 questions were given and we had to write code, give test cases and explai approach. Alithough it was a written round, but i would advise to try and interact with interviewer and discuss approach.

Question 1: Given an equation print its reverse. Ex. I/P=\xc2\xa0 66 + 23 * 45 +77/330 ; O/P=\xc2\xa0 330/77+ 45 * 23 + 66\xc2\xa0.

this is similar to -> https://www.geeksforgeeks.org/reverse-words-in-a-given-string/\xc2\xa0 the only difference is to also reverse words when operators are encountered.

Question 2:\xc2\xa0http://www.zrzahid.com/longest-increasing-path-in-a-matrix/

The key to clear this round is to write code and explain it\xe2\x80\x99s approach very clearly . They need to see your problem solving skills and how you try to approach it. Reaching right answer is not that important.

Round 3, 4, 5 : Personal Interview (60-75 Minutes each)

Group fly was followed by 3 personal interviews. Each was an elimination round . In each round first my resume was discussed. It is important that you know your projects in and out.

Then interviewer gave me a simple question :

1)https://www.geeksforgeeks.org/rearrange-characters-string-no-two-adjacent/

2)https://www.geeksforgeeks.org/longest-common-subsequence/

3)https://www.geeksforgeeks.org/dynamic-programming-set-12-longest-palindromic-subsequence/

4)https://www.geeksforgeeks.org/maximum-difference-between-two-elements/

5)How does square root library work ? Implement it.

I was also asked some questions from OS. Process, threads and paging were asked.

First we discussed approach and then he asked me to code. It is important that you keep discussing your approach while thinking about it. Be confident . Walk interviewer through each line of code. First try to give naive and brute force solution . Do not try to jump and give the most optimized solution right away. They need to see your problem solving skills. The interviewer will try to break your code by test cases. But they will also suggest solutions here and there. They are also very friendly so environment is relaxed.

Round 6 : Personal Interview \xe2\x80\x93 HR (60-75 Minutes)

This was the final round with a senior interviewer he asked me about myself and why I wanted to work with them.

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Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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Microsoft Interview Experience \xe2\x80\x93 Full Time Employee \xe2\x80\x93 2018

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Interview experience from Birla Institute of Technology, Mesra

Round 1: Online Coding Round

This round was on CoCubes platform and consisted of 3 questions (2, 3 and 5 marks).

- Given a string, calculate the ASCII average of the characters (as float). [2 Marks]
- Given a number as a string, find the next greatest palindrome (return as String). [3 Marks]

This is a popular SPOJ question.

- Rearrange a given linked list according to the order. [5 Marks]

https://practice.geeksforgeeks.org/problems/reorder-list/1

Other Questions that were asked :

- https://www.geeksforgeeks.org/remove-bst-keys-outside-the-given-range/
- https://www.geeksforgeeks.org/print-cousins-of-a-given-node-in-binary-tree/
- https://www.geeksforgeeks.org/print-cousins-of-a-given-node-in-binary-tree/

101 students were shortlisted from 250+ applicants.

Round 2: Group-Fly Round

This was an interesting round. We were asked to design an Air Traffic Controller System. We had to write our ideas, data structures and algorithms on a paper. There were some additional constrains

1. 4 AM \xe2\x80\x93 6 AM is the busiest time of the day
2. Air Traffic doubles on weekends and triples on holidays
3. The Airport caters International, Domestic, Commercial and Private flights.
4. Weather, medical emergency, etc are also to be taken care of

Apart from this, we had to create 5 tests for our system. We had to design and execute the test-cases. 45 minutes were given in total.

I used a multi-threading model and used important scheduling concepts like Semaphores.

29 students were selected for PI.

Round 3: Personal Interview

3 rounds of interview total.

In the **first round**, I was given 2 coding questions.

1. Reverse an Integer only using Mathematical Operations.
2. Given N natural numbers, 1 is missing, find the number. Then, the interviewer expanded the

problem to find 2 or more missing numbers.

I had to write the code and run a few test cases as well.

The **second round** was again technical,

The interviewer asked me to implement a dictionary. I used Tries and HashMap. He later asked me to handle the cases of Auto-Correction and Text-Prediction (like modern search engines). I wrote the code as well and he asked me to explain it (Tries + DFS + String Handling). Then, we discussed about Search Engines and how user experience can be improved.

Then, he asked me about OOPS.\xc2\xa0What is Run time and Compile time polymorphism? Explain and give examples.

The **third** and the final round was with a senior manager,

He asked me everything about my projects and we had a discussion in detail. He liked the originality of my projects and was impressed by my work. Then, he asked me about my Google Summer of Code project and my contributions to open-source and we had a very healthy discussion.

About 5 minutes later, the HR called me and said that I was selected. It was one of the best moments of my life.

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Microsoft interview experience | Set 180 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n01 Oct, 2018

Microsoft IDC visited our campus(IIEST Shibpur) on 24th July, 2018 for on campus hiring.

Round 1: Coding Round

1)Find the first non repeating element in the array

https://www.geeksforgeeks.org/given-a-string-find-its-first-non-repeating-character/

2) Find the next highest palindrome

http://www.ardendertat.com/2011/12/01/programming-interview-questions-19-find-next-palindrome-number/

3) Reorder a linked list

https://www.interviewbit.com/problems/reorder-list/

Out of 170, 41 were shortlisted for round 2

Round 2: Written Test

It was a pen and paper round. We were asked to write the brute force as well as optimal solutions in paper.

1. Find if there are two elements in an array that sum upto 6.

https://www.geeksforgeeks.org/write-a-c-program-that-given-a-set-a-of-n-numbers-and-another-number-x-determines-whether-or-not-there-exist-two-elements-in-s-whose-sum-is-exactly-x/

2) \xc2\xa0\xc2\xa0\xc2\xa0 Count all the paths from top left to bottom right of a matrix given that you can move only in two directions, right and down.

https://www.geeksforgeeks.org/count-possible-paths-top-left-bottom-right-nxm-matrix/

12 people were selected for the next rounds

\xc2\xa0

Round 3: Technical Round Phase 1

1)Asked some questions from my resume regarding my projects and internships. \xc2\xa0And what are my favourite topics in data structures and algorithms.

2)Asked me to explain the two questions that I had solved in the previous round.

3) Which data structures would you use to design a parking lot system? He gave me ten minutes to design it\xe2\x80\x99s blueprint and write the code as well.

I came up with a DS involving hashmap to store <car no, slot no> and priority queue which keeps the list of empty slot nos. Each time a car enters, the top of the priority queue is assigned to the car and

the slot no is removed from the PQ. Each time a car leaves the value corresponding to the car no(i.e the slot no) is searched, inserted into the PQ and the map pair is removed.

This followed by a number of questions revolving around that DS like what additional features i would add so that a data structure of this kind \xc2\xa0works in India.

4)Testing: I give you a pen. How will you test it? He gave me 5 minutes to write down whatever i would do to test that pen.

5) What is inheritance? Give an application level example of inheritance.

6) Explain stacks, queues and linked lists with application level examples of each.

7) Any questions for me? I asked many. How has been your experience in Microsoft? How many students have you interviewed? Do you like interviewing ? What are the qualities of a desired candidate?

Round 4: Technical Round Phase 2

1. Given an integer in string format. Convert it to an actual integer, keeping in mind all cases like \xe2\x80\x98-\xe2\x80\x99 sign, \xe2\x80\x98+\xe2\x80\x99 sign and if the string contains any other char apart from numbers. I was asked to write the code involving all the cases.
2. Design an online book reading system.
3. What would be the classes and functions you would use to represent this system?
4. You want to store a dictionary. What is the data structure that you would use?
5. My answer was Trie so his next question was to explain what a Trie is, how it works, it\xe2\x80\x99s time and space complexities.
6. How can you calculate the space used by a Trie?
7. Difference between inner and outer join
8. Application level examples of outer join.
9. Questions on networking regarding the APS model. Routers are in which layer? What does the network layer do? Where are ports? What does transport layer do?
10. Sql query to find the 4th maximum element from a table.

Round 5: Techno- Management Round

This round consisted of one technical question. Apart from that I was asked a lot of questions related to my resume, my interests, my passion, my family, what i want out of a career, my projects and many other things.

1) How will you find out a no is positive or negative without using >0 or <0?

I told him we can do that using bit manipulation. Find the leftmost bit and check if it\xe2\x80\x99s 1, if yes then it will be negative. Was then asked to write the code in paper.

Overall, this was like a casual conversation.

After ten minutes I was informed that I am hired. I couldn\xe2\x80\x99t believe my ears. Words fall short for what I felt at that moment. Total 5 students were selected from our college(Indian Institute of Engineering Science and Technology, Shibpur)

This article is contributed by **Pratima Upadhyay**.If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview experience | Set 179 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n08 Aug, 2018

Round 0: Coding Round

3 coding questions :

Platform cocubes (ui is very bad and be prepared to code in a very small text editor which can\xe2\x80\x99t be enlarged).

1.Find average of ascii values of stream of characters (1 mark).

2.Evaluate a given infix expression consisting of numbers and operators.

3.Linked list question : insert the reversed liked list of nodes at odd position at alternate places.

1->2->3->4->5 to 1->5->2->3->4

(Other Questions were){

2. regular expression matching

find how many substrings match that 10*1, exist in a given string.

3. Trim the BST so that it contains nodes with values within a given range only.

}

Round 1: Pen and Paper Round

2 questions were given and correct code was expected to be written.

1. Trains arrival and departure time was given and u have to calculate the max. platforms required so that no train has to wait.

2. Set the next pointer of all tree nodes.

(next pointer should point to node right to current node at same level).

Round 2: Technical Interview 1

1. Asked me about my project.
2. Construct BST from preorder and optimize it . Write correct code for it . (I also had discussion with interviewer why the complexity can\xe2\x80\x99t be decreased than nLogn).
3. Rotate matrix by 90 degrees (she asked me if i had already done it, to which i replied yes and she gave me an easier one).
4. Check if all leaf nodes of a tree lie on same level . Write code also

.

Round 3:Technical Interview 2

1.Asked me to write a random() for hashmap to return a random key in 0(1) time .

He helped me through it and i talked about all the pros and cons of solution as we were constructing the solution.

2. Asked me to write code to construct Trie.

3. Asked me question about calculating Bandwidth of network as a application level programmer.

BW=data transmitted/time delay(he asked but i didn\xe2\x80\x99t agree and i talked about all the delays and retransmission and stuff involved in time delay than he gave hint about files read/write)

so application point of view ::

time delay=file read/write time+propagation delay

so BW=data transmitted/propagation delay.

4. Gave me 25 horses problem to which i politely replied that i know it already.

5. Then he asked me how many matches will be there if every person is to have a match with every other.

ans : nc2.

6. How many matches if there are knockouts in a tournament.

ans : n/2+n/4+n/8+\xe2\x80\xa6\xe2\x80\xa6+n/2^logn

Round 4: Technical Cum HM Interview

1. Discussion about the projects , what i did and what my teammates did. What did i learn from it.
2. Infix expression evaluation. Why do u need 2 stacks he asked .
3. Design Patterns
    1. What design pattern i used in my project
    2. what do u know about Singleton design pattern
    3. write code to implement Singleton design pattern
        1. I wrote 4 approaches with their pros and cons.
4. Write a function getCallHandler() for a call center consisting of 10 employees 1 lead 1 call center head.
    1. Calls had to be transferred to lead only if no employee available and to call center head only if no employee and lead is available.
    2. Then he asked when will my solution fail and i talked about multi threaded programs and race around condition for shared variable .
    3. he asked me to write code for synchronizing it.
5. Asked about os i use and if i have used any of its api . Asked me about ubuntu.
6. Why do i wanna join microsoft ?
7. what about technology do u like?

SUGGESTIONS :
1. Don\xe2\x80\x99t spend too much time on writing code and being silent throughout . Write half the code, discuss your approach and its cons. They will spare the coding by having a look at even your half written code.

2. If u can\xe2\x80\x99t fake that you have already done a question then straight ahead tell the interviewer.

3. Discuss things with the interviewer about your ideas and approach, they can\xe2\x80\x99t help u if they don\xe2\x80\x99t know where r u stuck . Also it gives them an impression that u can solve a problem with some other person or u can cooperate (team player).

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Microsoft Interview experience | Set 178 (On-Campus Internship for IDC)

- Difficulty Level :\nHard
- Last Updated :\n29 Nov, 2018

There were a total of 3 rounds. 1st was online coding, 2nd was written coding and last round was divided in three parts, basically 3 Technical Interviews.

Round 1:

Online test on CoCubes contains 3 Coding Questions (Only Function to complete). Total time given was 75 minutes.

1. Find the average of sum of ASCII values of all the characters in a string.
   Example:

   ```
   \r\nInput : swati\r\nOutput :110.4\r\n\r\nLOGIC:\xc2\xa0 (115+119+97+116+105)/5= 110.4
   ```

   GeeksforGeeks Link

2. Evaluate the value of an infix string. The string will not have any spaces or brackets and priority of \xe2\x80\x98*\xe2\x80\x99 and \xe2\x80\x98/\xe2\x80\x99 is greater then the priority of \xe2\x80\x98+\xe2\x80\x99 & \xe2\x80\x98-\xe2\x80\x98 .

   Examples:

   ```
   \r\nInput : 5+10/2*6-3\r\nOutput :32\r\n\r\nLOGIC: 5+5*6-3 = 5+30-3 = 35-3 = 32
   ```

   GeeksforGeeks Link

3. Given a BST, a min value and a max value, delete the nodes of the BST having data smaller than min value and greater than max value.
   Example:

   ```
   \r\nInput :\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 10\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0/\xc2\xa0 \xc2\xa0 \xc2\xa0 \\\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 8\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0/\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 /\xc2\xa

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa02\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa011\xc2\xa0 \xc2\xa

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0minValue= 3\xc2\xa0 \xc2\xa0maxValue= 13\r\n\r\nOutput :\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa010\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0  /\xc2\xa0 \xc2\xa0 \\\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0   8\xc2\xa0 \xc2\xa0 \xc2\xa0\xc2\xa013\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0     \xc2\xa0 /\r\n

   \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0     11\r\n
   ```

   GeeksforGeeks Link

The online round was easy as they were looking whether the basic concepts of students are clear or not. A total of 109 students sat for the online rounds out of which 31 qualified for the next round.

Round 2:\xc2\xa0

Written Test had 2 questions and total time given was 45 minutes.

1. Given an array and a key you need to rotate the array elements \xe2\x80\x98key\xe2\x80\x99 times.
   Example:

   ```
   \r\nInput 1:\xc2\xa0 arr[]= [1, 2, 3, 4, 5, 6]\r\n\r\nkey=2\r\n\r\nOutput : [ 3, 4, 5, 6, 1, 2]\r\n\r\nInput 2 : arr
   ```

   GeeksforGeeks Link

2. Given a string you need to print all its sub strings
   in lexicographic order.
   Example:

   ```
   \r\nInput :\xc2\xa0 ABC\r\nOutput : A AB ABC AC ACB B BA BAC BC BCA C CA CB CAB CBA
   ```

   GeeksforGeeks Link

Write a lot of comments to make your program more and more readable. Make sure your work is neat and try to write the code that is most optimized and uses least space. But if optimized code doesn\xe2\x80\x99t strike you write the logic you can think of. After this round 14 students were selected for the 3rd round.

Round 3:

This round is divided\xc2\xa0into 3 Technical Interviews.

Technical Interview 1:\xc2\xa0

- **Subjective Questions:**
  1. \xc2\xa0How can you implement a virtual destructor ?
  2. \xc2\xa0Which is better for traversal array or link list ?
  3. What is difference between recursion and function looping?
  4. What features do you think can be added or modified in MS Word\xc2\xa0 ?

5. Practical uses of Stack.

- **Coding Questions:**
  1. Given a decimal number, convert it to its equivalent roman number.
  2. Given first n natural numbers in an array, it is said that one number is missing. Write a code to find the missing number.
  3. Given first n natural numbers in an array, it is now said that two numbers are missing. Write a code to find the missing numbers.

When I got my first question from OOPs, I told the truth to the interviewer that I have not yet studied OOPs and requested him to ask questions from Data Structures. At the end he asked me if I had any questions for him, so I asked him to review\xc2\xa0 me as a candidate for their company and which concepts I need to learn and improve. Apart from these questions we had a conversation about my college and what advice he would like to give to all the students aspiring for a technical job in any MNC(not necessarily Microsoft only).

Technical Interview 2:

- **General Questions:\xc2\xa0**
  1. Why Microsoft should hire you? What makes you different from other\xc2\xa0candidates shortlisted for the interview?
  2. He asked about my summer internship and the projects I had mentioned in my CV.
  3. Asked the difference between stack, queue and link list and also which is better.
- **Coding Question:**
  1. Given a list of strings find the maximum length string which is made up of the combination of other strings in the list.

```
\r\nInput :[Information, Technology, Batchof2020, \r\nInformationTechnology, Batchof2020InformationInternship]\r
```

Technical Interview 3:

In this\xc2\xa0 round, the interviewer went through my whole CV thoroughly and asked me about my hobbies of which debating was the most\xc2\xa0 highlighted one. So he had a pseudo debate cum discussion with me on the role of a good speaker.

After that we played a word guessing game, I don\xe2\x80\x99t remember the name of the game. He basically explained the game to me and told me about all the rules. After playing the game he told me to write the code for the game and that it will be my last question for the day. I wrote the code in 4-5 minutes. He seemed satisfied with the code and wished me Best of Luck!

This was the end of Selection Process and approximately 10 minutes after I was told that I am selected \xf0\x9f\x98\x80

It was my first interview experience and I got selected! The 10 hour long process ended giving me the best opportunity of my life.

This article is contributed by Swati Bararia.

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Microsoft IDC Interview Experience | Set 177 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n08 Aug, 2018

Round 1:

It was a coding test which was held on CoCubes platform. 3 problems were given of varying marks:

2 marks: Given a string, find the first non-repeating character in it. For example, if the input string is \xe2\x80\x9cGeeksforGeeks\xe2\x80\x9d, then output should be \xe2\x80\x98f\xe2\x80\x99 and if input string is \xe2\x80\x9cGeeksQuiz\xe2\x80\x9d, then output should be \xe2\x80\x98G\xe2\x80\x99.

https://www.geeksforgeeks.org/given-a-string-find-its-first-non-repeating-character/

This question was really easy to solve. Just simple implementation by using HashMap.

3 marks: Given a number, find the next palindrome larger than the number.Number was in String format.

5 marks:\xc2\xa0Given a singly linked list L_0\xc2\xa0-> L_1\xc2\xa0-> \xe2\x80\xa6 -> L_{n-1}\xc2\xa0-> L_n. Rearrange the nodes in the list so that the new formed list is : L_0\xc2\xa0-> L_n\xc2\xa0-> L_1\xc2\xa0-> L_{n-1}\xc2\xa0-> L_2\xc2\xa0-> L_{n-2}\xc2\xa0\xe2\x80\xa6

https://geeksforgeeks.org/rearrange-a-given-linked-list-in-place/

Round 2 (Fly\xc2\xa0Round) :\xc2\xa0 It was a pen and paper round. We need to solve the problem given to us on paper using Brute force as well as optimised approach.

Q1. Given an array A[] of n numbers and another number x, determines whether or not there exist two elements in S whose sum is exactly x.

https://geeksforgeeks.org/write-a-c-program-that-given-a-set-a-of-n-numbers-and-another-number-x-determines-whether-or-not-there-exist-two-elements-in-s-whose-sum-is-exactly-x/

Q2.\xc2\xa0 The problem was to count all the possible paths from top left to bottom right of a m X n matrix with the constraints that\xc2\xa0***from each cell you can either move only to right or down***

https://geeksforgeeks.org/count-possible-paths-top-left-bottom-right-nxm-matrix/

Tips to crack this round:

1. Write well. Good handwriting matters to some extent.
2. Write the approach first and comment your code well.
3. At last write the time complexity and space complexity of the solution you wrote. All these really matters to an extent.

12 students were selected for the next round.

Round 3 (Technical Interview):\xc2\xa0

This was a Face2Face round.

He first asked me to introduce myself and then asked me about my internship.Then he started

asking me questions from Object Oriented Programming. The questions were:

Q. What do you know about virtual destructors? I answered it briefly . He was satisfied with my answer.

Q. What is Run time and Compile time polymorphism? Explain and give examples.

Q. What is method overloading ? What are the different ways to overload a method ?Write a piece of code for method overloading. Whether it supports run time or compile time polymorphism?

Q. Can a object of base call access the methods of child class that is overridden?

Then one coding question

Q. Given a set of 1000 natural nos. Out of which two nos are missing. Find those two nos. He just wanted to know my approach.

Q. Then he asked me do you about linked list?Where you can use linked lists?

Q. Swap two nos without using third variable as well as arithmetic operator. It was a cake walk. It can be done using bitwise xor(^) operator.

First round went really well. They directly told me to go to HR Round.

Round 4 (Technical cum HR) :

He was senior most of all the interviewers. He asked me many questions about my schooling and what are the options i was getting after my 12th exam?

Then he asked about my internship and projects. He was very impressed with summer internship project.

Then he asked me about my projects related to android development. Then i showed him some of the apps made by me.He was very impressed with my apps.

Then he asked me to design a model which will keep track of the objects i.e. which objects are placed where in the home using voice enabled commands.

Then asked me how much time you will take develop an application for us? I answered Sir it will totally depend on what the app demands.

Then he told me let\xe2\x80\x99s build an app now.It was a game where there were two users . First user entered a word of four characters and submit . Then second user have to guess that word . He wanted to automate the process of guessing by the second user.I explained him my approach using **HashMap and Prefix Matching** . He was very much satisfied.

And then asked the common HR questions like Why Microsoft?What\xe2\x80\x99s your career objective? and all.

I was then asked to wait.

Finally 5 students were selected and I was one among them. It really was the most amazing day of my life. <3

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Microsoft Interview Experience | Set 176 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n08 Aug, 2018

Round 1(Coding Test):
It was a coding test which was held on cocubes platform. 3 problems were given of varying marks:

2 marks: Given a number, we need to find the nearest multiple of 10 of it. The rules were as follows:
1. If the unit\xe2\x80\x99s digit is less than 5 return the nearest multiple of 10 smaller than the given number and if it is greater than or equal to 5, return the nearest multiple of 10 greater than the given number.
Example:
Input:
144
156
Output:
140
160
This question was really easy to solve. Just simple implementation by using modulo operation.

3 marks: Given a number n, we need to return the number of possible binary strings of size n where there are no consecutive ones in it.
This is quite a popular dynamic programming questions for interviews. GeeksForGeeks has a solution for it. Link:https://www.geeksforgeeks.org/count-number-binary-strings-without-consecutive-1s/

5 marks: Given a linked list and two integers M and N. Traverse the linked list such that you retain M nodes then delete next N nodes, continue the same till end of the linked list. This was quite easy. GeeksForGeeks has a solution to it. Link:https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/

50 students were selected after this round.

Round 2(GroupFly Round):
It was a pen and paper round. We need to solve the problem given to us on paper and explain our approach to the mentors who were near us. Problem given to solve: Print all the paths in a binary search tree with a given sum. This was easily solvable using stacks or vectors and having the concept of recursion and inorder traversal of a tree. Tips to crack this round: 1. Write well. Good handwriting matters to some extent.
2. Write the approach first and comment your code well.
3. Atlast write the time complexity and space complexity of the solution you wrote. All these really matters to an extent.

24 students were selected for the next round.
Round 3(Technical Interview):
This was held in skype. The first half an hour discussion was entirely based on the projects and internships I worked
upon. She asked me about the detailed explanation of the Research Project I did at IIT Kharagpur and also about the Machine Learning Internship I did at Acadview. After that she asked two coding questions: They were:
1.Given a sorted array of decimal numbers we need to find a decimal number x in it. She asked me to reduce the number of comparisons in it. I was really confused as what to do better than logn

approach of binary search. I told her many cases:
When the elements can be repeated we need to find the first and last index.
She said she need further optimization. I was really confused what to say.
I then said what if the number of elements are large then to reduce overflow we need to calculate mid in other way to avoid overflow issues. Then I told her the answer she was looking for. If the element to be found is greater than the maximum number in the array we just needed to return false. I know this was naive but this was what she was looking for. \xf0\x9f\x98\x9b

2. Given a linked list, you need to detect whether there exists a loop in a linked list or not. She asked me not to approach it with the famous hare and tortoise method, stack method or hashing method but to modify the structure of the linked list in such a way and use as little extra memory in the node\xe2\x80\x99s structure possible to detect the loop in a single traversal. For this I used a boolean variable in the node\xe2\x80\x99s structure and manipulated it during traversal to find the loop.
She was impressed by my approach and seemed satisfied after she looked at my code. She then asked me to wait for the next round.

Round 4(Technical Interview):
This was a F2F round.
He first asked me to introduce myself and then asked me about my internship. He then asked me a question:

Given a set of integers, the task is to divide it into two sets S1 and S2 such that the absolute difference between their sums is minimum. This really took time to explain my approach to the interviewer. I first started from the recursive approach and then went on with the bottom up DP solution to the problem. He was really asking me a lot of questions on my approach and was giving me test cases to validate my approach. He was satisfied with my approach finally.
GeeksForGeeks has a solution to it. Link:
https://www.geeksforgeeks.org/partition-a-set-into-two-subsets-such-that-the-difference-of-subset-sums-is-minimum/

Then he started asking me questions from Object Oriented Programming. The questions were:
1. Explain inline functions. Why do we use it?And what does the compiler do when it sees the word inline? When can an inline function be disadvantageous?
2. Explain abstract classes. What if a pure virtual function is not defined in the derived class?
3. The famous diamond problem using virtual base class. He then went on with Database Management Systems. The questions were:
1. Explain the workflow of databases. From Software Resource Specification to normalization. He just asked me about the steps.
2. Next he asked me about all forms of normalization and we had a detailed discussion on it. He was asking me a lot of questions on BCNF.
Next he shifted to system design:
Given a shopping site like flipkart or amazon, you need to design the payment portal page and how you would validate the information you entered.
He gave me three different categories of payment:
1. Debit Card
2. Credit Card.
3. Net Banking.
Also he asked me to say each and every test methods that I will use to test the page. We had a detailed discussion on it. Net banking part was the most challenging part. He then asked some HR Questions which I aced through easily.

Round 5(Technical cum HR):
The interviewer first asked me about the summer Internship I did at IIT Kharagpur. He was asking

in-depth questions from it. He really knew about the noise models and the networks I used.
He then asked me about my Machine Learning Internship and gave a real world problem to solve it with any algorithm I know.
Given our College Portal, how will I display the top trending news in twitter of all categories. I used K-Means Clustering to solve the problem. He then asked me about how it works and I explained him the centroid shifting method.
He didn\xe2\x80\x99t give any reaction..:P

He then shifted to Operating Systems:
What is a semaphore? Is it a variable or a function? How are its atomic operations defined? How is it used to solve critical section problem? How is it used to maintain the order of execution of processes?
I gave him the required answers. He seemed satisfied. He then asked a question:
Rotate a N*N matrix clockwise.
This was easy for me and I explained him the transpose and reverse rows approach. He was satisfied with my approach.
He again shifted to system design:
He asked me to design a URL Shortenener like tiny URL.
I really struggled a lot with this as I haven\xe2\x80\x99t studied system design well but I gave him the hashing and encoding method and trying to approach it with it. He again gave neutral expressions..:P
Finally he asked me about my family background. About my hobbies and the accolades I won in it. And then asked the common HR questions like What\xe2\x80\x99s your career objective? Why Microsoft? and all.
I was then asked to wait.
Finally 10 students were selected and I was one among them. It really was the most amazing day of my life. \xf0\x9f\x99\x82

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Microsoft Interview Experience | Set 175 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n13 Jul, 2018

So this was campus hiring and Microsoft was visiting our campus(IIIT-Delhi) for the first time and offering quite a handsome salary. They set CGPA cut off as 7, only qualified students were asked to appear for the upcoming rounds. Total 175 students cleared the CGPA cut off.

Round 1 : This round was hosted on the CoCubes platform, I\xe2\x80\x99d say platform wasn\xe2\x80\x99t user friendly at all. We were given 3 problems to solve within 75 mins. Not all the questions were same, Different students had different questions. We just had to complete the functions for all the problems. You can choose your language between C, C++, Java and C#, python wasn\xe2\x80\x99t allowed.

Question 1(2 Marks): You are given 2 integers m and n. If the no of digits in (m+n) is same as no of digits n, then return (m+n) else return n.
Question 2(3 Marks): You are given an arithmetic expression which contains only (+, -, *, /) operators. Precision of (*, /) is greater than precision of(+, -). You have to evaluate the expression, if 2 consecutive same priority operator occur, evaluate them from left to right.

```
E.x. - 2 + 5 * 2 / 10\r\n2 + 10 / 10\r\n2 + 1\r\n3
```

Question 3(5 Marks): You are given head node of a linked list, int n and int m. Traverse the linked list such that you retain M nodes then delete next N nodes, continue the same till end of the linked list without using any extra space. Gfg already has a solution
https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/
After the First round around 55 students were called for the next round.

Round 2: This round was pen and paper coding round. 2 questions were given and we had to write our own code in pen and paper without using any library. From the scratch you have to write everything.
Question 1: In byteland number system works in the following way Z, A, B, C, D, E, F, G, H, I \xe2\x80\x93 they are in increasing order. Individual Z has no value(think it as 0). Now you are given a number, you have to return the minimum no you can create with those digits without leading Zs. Input won\xe2\x80\x99t contain leading Zs. Mention some test cases as well.
Question 2: You have a dictionary with set of words, you have to create a data structure which will give you no of words of length L whose ith character is C. Queries are very frequent, Try to optimize it. So basically complete the following function:
Int countWords(int L, int i, char C)

I made some stupid mistakes in question 2, so I wasn\xe2\x80\x99t sure I will get a call or not. But they probably called all the students who successfully solved the 1st problem(bug free code) and and tried 2nd problem. After round 2 around 23 students were shortlisted and were called for the personal interview rounds. Now in PI anything can happen, there are some students who got offers just after 1st round, some of them got it after 2nd round, some of after 3rd round. So I had total 3 rounds, all of them were technical.

Round 3: This round was quite good. I was asked to solve this problem
https://www.geeksforgeeks.org/count-possible-decodings-given-digit-sequence/
In this case he asked me to print all the sequences as well. He asked me to write down full ode(like proper code including main functions and all). Then he took my solution and tested against an example, did a dry run on pen paper and checked whether all combinations were printed or

not.https://www.geeksforgeeks.org/maximum-size-rectangle-binary-sub-matrix-1s/
I was asked to solve this problem but I had to print maximum size of the square. I was able to solve both the problems and he seemed quite happy, then he asked me what are the projects I had worked on and am working on it now.

Round 4: Within 5 mins I was called for the next round interview and probably it was toughest of all.
I was asked to code the problem: given a string S which contains all the digits, I have to solve this problem without using recursion.
S = solve(S), solve function is basically sum of all digits. Continue this operation will you are left with a single digit.

```
E.x . - 2345\r\n14 (2 + 3 + 4 +5)\r\n5 (1 + 4)
```

I wrote a solution like:

```
While(S.size() != 1)\r\n{\r\n   S = solve(S);\r\n}
```

Solve functions is doing the sum, but he wasn\xe2\x80\x99t satisfied with that. Then I said I\xe2\x80\x99ll maintain a frequency array and sum everything and still wasn\xe2\x80\x99t satisfied with my solution. He said there is much simpler solution.

What is friend function? Give an example of friend function.
What is volatile?
What is operator overloading. Write the code of new operator-overloading-
https://www.geeksforgeeks.org/overloading-new-delete-operator-c/

Write your own function for itoa. Then some basic question about variable initialization and memory allocation regarding that problem. I wasn\xe2\x80\x99t satisfied with this round and I wasn\xe2\x80\x99t quite sure I\xe2\x80\x99d be asked for further rounds.

Round 5: In last round He asked me to do whatsapp chat designing. What kind of data structure you\xe2\x80\x99d use, write pseudo code for that. If you will use DBMS, write all the schemas. We had a very detailed discussion on this. Finally after last round they asked us to wait while they continued with intern interviews, we were expecting maybe we\xe2\x80\x99d have another HR round. But that was it, one of my friends(member of Placement committee) went to them to confirm about the status and when he came back I got the great news. Later HR called us to give us some goodies and finally congratulated. It really was one of greatest moments of my life.

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Microsoft Interview Experience | Set 174 (First Round On Campus)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Round 1:

All the branches were allowed . Eligibility criteria was CGPA above 7 . It was conducted on cocube . Everyone gets different set of questions . 3 coding questions in 90 min .

- Count how many times 1001 is repeated in string . If not then return -1
- Find index of first non repeating element in string
- A linked list and m, n was given . We have to delete the nodes between m and n.

Marks were distributed as 2, 3, 5

The test is conducted on cocube. Cocube is similar to normal wordpad. You cannot get any suggestions. Everything you have to do on your own. You cannot print anything . Even if you write print statement it does not print anything on console. It just check whether your code is working for testcase or not. If there is any error in your program it does not show what it is. Even the brackets also not get closed. It takes lot of time to run program .

Tip \xe2\x80\x93\xc2\xa0 Practice writing programs on notepad and running on console.

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Microsoft Interview Experience | Set 173 (On Campus)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

Round 1:

Round 1 was Aptitude Test . It was held on Cocube Platform . There were 3 Code to complete in 90 Minutes .\xc2\xa0 The eligibility for giving Aptitude was cgpa >7 .The Set of Question was different for everyone .
I got the following 3 codes

1 . Find the first non-repeating character in string . return its index .\xc2\xa0 (2 Marks)

2 . Evaluate string expression and return result .\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 I/P = 2+3*5+8\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 O/P = 25\xc2\xa0\xc2\xa0 (3 Marks)

input was in the form of string

3. I don\xe2\x80\x99t remember exactly but It was Robot want to reach to the rightmost bottom of array\xc2\xa0 so minimum amount of energy he required\xc2\xa0 . A 2\xc3\x972 matrix was given\xc2\xa0 containing the energy reguiurd for next move.

It was a DP problem.\xc2\xa0\xc2\xa0\xc2\xa0 (5 Marks)

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Microsoft Recruitment Process

- Difficulty Level :\nMedium
- Last Updated :\n07 Jul, 2021

- About the Company
- Recruitment Process
- Questions asked in Microsoft
- Interview Experiences
- Where To Apply

About the Company:

Microsoft Corporation is an American multinational technology company with headquarters in Redmond, Washington. It develops, manufactures, licenses supports and sells computer software, consumer electronics, personal computers, and services. Its best-known software products are the Microsoft Windows line of operating systems, the Microsoft Office suite, and the Internet Explorer and Edge web browsers. Microsoft was founded by Paul Allen and Bill Gates on April 4, 1975, and rose to dominate the personal computer operating system market with MS-DOS in the mid-1980s, followed by Microsoft Windows. Since 1990, the company made a number of corporate acquisitions, their largest being the acquisition of LinkedIn for $26.2 billion in December 2016, followed by their acquisition of Skype Technologies for $8.5 billion in May 2011.
Satya Nadella took over as CEO in 2014 and henceforth the company has scaled back on hardware after losing market in the domain of mobiles and has instead focused on cloud computing, a move that helped the company\xe2\x80\x99s shares reach its highest value since December 1999. As of 2016, it is the world\xe2\x80\x99s largest software maker by revenue, and one of the world\xe2\x80\x99s most valuable companies.

> \xe2\x80\x9c\xe2\x80\xa6what is going to drive the country forward is the ingenuity of the people of India and how technology can be an enabler. We are fully committed to bringing the best technology to help in that process.\xe2\x80\x9d
> Satya Nadella, CEO, Microsoft

- More Information on Microsoft Corporation India >>
- Latest news on Microsoft India >>
- Life and Work Culture at Microsoft India >>

Recruitment Process:
Microsoft conducts 4 to 5 rounds to select the freshers as SDE in their organisation:

- Online Round
- Onsite Round
- Technical Round 1
- Technical Round 2
- Technical Round 3 (System Design Round)
- Technical-cum-HR round

Online Round:
The CoCube or the online coding round consists of 5 to six competitive coding questions with a time limit running between 1 hour to 1 hour 30 minutes. The questions level varies consisting of questions from domains of Arrays, String, Single Linked List, Double Linked List etc.

Onsite Round:
The group fly round or the onsite round consists of a written coding contest. Questions are provided and time span of 10 to 15 minutes are given to solve it and another 20 minutes are provided to explain the approach to the mentor, under whose supervision one is assigned to do the task. One should be well versed with the domains of competitive coding, data structure and algorithms to clear the round. Few problems asked are:

- Implementation of Deep Copy
- k most frequent words from a file
- k (or most frequent) numbers in a stream

Technical Rounds:
These consist of face to face rounds with the interviewer and to pass through these round one should have good knowledge regarding the facts mentioned in the CV. The questions are generally asked from the projects, internships or training mentioned in the CV. Following this one should be well known with the course related subjects like Data Structure, Algorithms, Operating System, Networking, Database Management etc. So, basically, the interview tests whether everything mentioned in the CV is full proof and the interviewee is having in-depth knowledge regarding the subjects dealt during the course of engineering. Students can also be expected to write codes in the interview. The final technical round consists of System Designing where questions from various domains can be asked like Cloud COmputing, Microsoft Azure, Dropbox and various Microsoft technology driven engines.

Technical-cum HR Round:
This round deals less with the technical questions but more with the HR questions like:

- Where do you see yourself in next 5 years, 15 years and 25 years?
- Questions on family background.
- Strengths and Weaknesses.
- Questions on the facts mentioned in the CV.

Questions asked in Microsoft:

1. Trapping Rainwater Problem
2. Count all possible paths from top left to bottom right of a mXn matrix
3. Print a pattern without using any loop
4. How to design a tiny URL or URL shortener?
5. Write Code to Determine if Two Trees are Identical
6. Given only a pointer/reference to a node to be deleted in a singly linked list, how do you delete it?
7. Thrashing in OS
8. Kadane\xe2\x80\x99s Algorithm
9. Sum of Leaf Nodes at Min Level
10. Minimum number of coins dynamic programming vs iterative
11. More articles on important and asked topics >>
12. More questions asked >>

Few Interview Experiences:

1. Microsoft Interview Experience SDE 1
2. Microsoft Interview Experience SDE 1
3. Microsoft Interview Experience SDE 1
4. Microsoft Interview Experience SDE 1
5. Refer here for all Microsoft related articles and questions

Where To Apply:
Apply at Microsoft

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Microsoft Interview Experience | Set 172 (Off-Campus for SDE 1)

- Difficulty Level :\nHard
- Last Updated :\n22 Feb, 2022

An employee(alumnus of our college) had taken CVs of interested students from CSE and IT department. A few students were shortlisted for the online round.\xc2\xa0

Round 1 (CoCube Online Round)\xc2\xa0

Question 1: Basic question on Strings. Cake walk completely.\xc2\xa0
Question 2: Easy question on Linked List. Adding two numbers.\xc2\xa0
Read https://www.geeksforgeeks.org/sum-of-two-linked-lists/\xc2\xa0
Question 3: Intermediate question on Linked List. Cant remember the exact question but it was primary based on\xc2\xa0
finding the mid point, followed by some other operations.\xc2\xa0
Read https://www.geeksforgeeks.org/write-a-c-function-to-print-the-middle-of-the-linked-list/\xc2\xa0
Read https://www.geeksforgeeks.org/function-to-check-if-a-singly-linked-list-is-palindrome/\xc2\xa0

Round 2 (Group Fly Round (Onsite))\xc2\xa0

There were 40 students in total. They were divided into 10 groups of 4 each. Each group was assigned a mentor and were seated in different rooms. This is a written coding round. Though there are 4 members in each group, don\xe2\x80\x99t mistake this round to be a team round. You compete with the rest, not work with them. Firstly a question is given and 10 minutes are provided to solve that problem. Once 10 minutes are over, you have got to explain your approach to the mentor. It should include your understanding of the problem, your approach, corner cases and your final idea. After the mentor is done with discussing the solution with all the members, second question is given. 20 minutes are provided to solve this problem. After discussing the solution, the round ends. Results are declared after 30 minutes.\xc2\xa0

Question 1: Implement Deep Copy\xc2\xa0
Read https://www.hackerearth.com/practice/notes/deep-copy-and-shallow-copy/\xc2\xa0
Question 2: Let\xe2\x80\x99s say you are given a stream of tweets. At any point of time, top k tweets must be shown on the screen.\xc2\xa0
Now, i must mention that this is all the mentor said. Now it\xe2\x80\x99s your responsibility to talk to the mentor and understand the question completely before jumping to the solution.\xc2\xa0
After clarification, the question meant, each tweet will have a description, likes, retweets. Now you have got to be able to write a module which displays top 5(k=5 lets say) tweets on the screen.\xc2\xa0
Read https://www.geeksforgeeks.org/find-the-k-most-frequent-words-from-a-file/\xc2\xa0
Read https://www.geeksforgeeks.org/find-top-k-or-most-frequent-numbers-in-a-stream/\xc2\xa0

15 people were selected for the next set of rounds.\xc2\xa0

Round 3 (Face to Face Technical Round 1)\xc2\xa0

This was a 75 minutes long round. A member of the recruiting team will take your interview. Initially he asked me a few things written in my CV. He must have spent 15 minutes on that. He took interest in my self projects and asked me a few questions related to Web Development.\xc2\xa0

Question 1: What is MVC and how is it different from FLUX? (Because i had used Redux during my internship and i like rails)\xc2\xa0
Question 2: Explain how the site that you have built works. (Based on my self-project)\xc2\xa0

Following this, he asked me the simplest question of the millennium. Only thing i could understand from this that he wasn\xe2\x80\x99t interested in the solution of the problem, but the kind of test cases my solution tackles.\xc2\xa0

Question 3: A Web page has an input field for a string. Write a function which would return an integer for the given string.\xc2\xa0
Example: \xe2\x80\x98 0567 \xe2\x80\x98\xc2\xa0
Output: 567\xc2\xa0
Question 4: The Trapping Rain Water Problem\xc2\xa0
Read https://www.geeksforgeeks.org/trapping-rain-water/\xc2\xa0

Round 4 (Face to Face Technical Round 2)\xc2\xa0

This was a 75 minutes long round as well. The interviewer was a senior member of the recruiting team. He spent 30 minutes on my CV. I had to justify every line that was written on it. Starting from my CGPA to my internships to my self projects to my skills. Be confident when you talk about your CV.\xc2\xa0

Following this, he asked me about my course subjects. I answered DS, Algo, OS, Networking, OOPs. He asked several questions\xc2\xa0

Question 1: Name layers of the OSI Model with protocols belonging to the layers.\xc2\xa0
Question 2: What is the significance of Data Link Layer?\xc2\xa0
Question 3: Difference between Router and Hub? Which layers do these devices belong to?\xc2\xa0
Question 4: How is scheduling done in Linux and what data structure is used?\xc2\xa0
Question 5: What exactly is TLB?\xc2\xa0
Question 6: What is the diamond problem and how is it solved?\xc2\xa0
Question 7: How does Overriding work?\xc2\xa0

Following this, he gave me two quetions to solve.\xc2\xa0

Question 8: While installing npm packages, there might be a problem while installing those packages. What can be that problem? I replied that one package A can have a dependency package B and package B can have package A as one of its dependency. Problems like these can happen. He nodded and asked how would you solve this? Basically the question reduced to finding cycle in a directed graph.\xc2\xa0
Read https://www.geeksforgeeks.org/detect-cycle-in-a-graph/\xc2\xa0
Question 9: Given a binary tree, revert all the links and return a vector containing all the leaf nodes.\xc2\xa0
This has a very intuitive post order traversal based solution.\xc2\xa0

Round 5 (Face to Face Technical-cum-HR round)\xc2\xa0

This was a 30 minutes round. The interviewer was a senior member as well. He didn\xe2\x80\x99t ask many technical questions. He also focussed on my CV and asked me a few HR questions.\xc2\xa0

Question 1: Where do you see yourself in 5 years, 15 years and 25 years.\xc2\xa0
Question 2: What interests you more? Full-Stack or Back-end?\xc2\xa0

\xc2\xa0\xc2\xa0

5 people were hired and I was one of them. I would like to thank this community and this is a way of giving back. Cheeers. \xf0\x9f\x99\x82\xc2\xa0

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Microsoft Interview Experience | Set 171 (Experienced)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

About Me: 6.5 Years experienced professional.

[Online]
Round 0: Hacker rank 90 min online test.

[Onsite]
Round 1:

1. Given a string, return whether string is valid or invalid. A valid string is one which has each character repeating the same no of times as any other character. Also, if, at most one character appears unmatched no of times than rest of the characters, its also a valid string. All other strings are invalid.
   Solution : GeeksforGeeks Link
2. Given a TV remote: The keypad numbered from 0 \xe2\x80\x93 9 is also mapped to alphabets (a-z) [i.e. 1-a, b, c; 2-d, e, f; so on]. Also given is a long list of channel names. User will provide an input i.e. digit string \xe2\x80\x93 Task is to display all channel names that start with the different string combinations that are produced through user input. [i.e. Input \xe2\x80\x9912\xe2\x80\x99 will correspond to combinations \xe2\x80\x98ad\xe2\x80\x99 \xe2\x80\x98ae\xe2\x80\x99 \xe2\x80\x98af\xe2\x80\x99 \xe2\x80\x98bd\xe2\x80\x99 \xe2\x80\x98be\xe2\x80\x99 \xe2\x80\x98bf\xe2\x80\x99 \xe2\x80\x98cd\xe2\x80\x99 \xe2\x80\x98ce\xe2\x80\x99 \xe2\x80\x98cf\xe2\x80\x99. Hence display all channel names that start with these combinations].

Round 2:

1. Given two strings, find out minimum no of operations required to convert string 1 to string 2. The only operations allowed are Insert, Delete, Replace. *[\xe2\x80\x98Edit Distance\xe2\x80\x99 Problem]*

Round 3:

1. Output of a small piece of code \xe2\x80\x93 Judging the property that when a process is killed, corresponding Threads also get killed.
2. A log file of a server is given. Data is stored in form of [IP, timestamp] tuple for the IP that hit the server at the given timestamp. Give an algorithm to find top 10 hits in last 5 mins.

Round 4:

1. Given a Binary tree with nextsibling pointer. Populate nextsibling, using constant space (i.e no queue etc).

All Practice Problems for Microsoft !!

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Microsoft Office India Interview experience | Set 170 (2 Years Exp)

- Difficulty Level :\nExpert
- Last Updated :\n10 Apr, 2018

Round 1:
Validate an infix arithmetic expression string (braces and brackets are similar to parentheses): (1+2)*{[90*3]-[67+8-9]}

Proposed Ans: Djikstra\xe2\x80\x99s Shunting yard

Interviewer\xe2\x80\x99s Ans: Parser Tree

Round 2:

Given a shelf of books, categorise those books according to any particular property of a book e.g. Alphabetic increasing author\xe2\x80\x99s name, category, date of publish etc. The value of the property of the book has to be fetched from an external service and the call is expensive.

Constraints: O(1) space, the calls to get the priority of a book should be as minimized as possible.

Proposed Ans: Quick sort with a priority map associated with the property of the book, a modified partitioning scheme where every element\xe2\x80\x99s priority is fetched once, total of nlogn calls.

Constraint variation: Minimum swaps.

Proposed Ans:

1. Selection sort with O(n^2) time and O(1) space. \xe2\x80\x93 n swaps

2. Bucket sort with O(n) space and time. \xe2\x80\x93 0 swaps

Round 3:

Given a very long string and a transformation map, replace all the occurrences of any needle strings with their resultant transformations e.g.

```
input_string = \xe2\x80\x9cabcd;lt;qwer;gt;asd;\xe2\x80\x9d
map = {";lt;" : "<", ";gt;" : ">"}
transform(input_string, map) // should equal \xe2\x80\x9cabcd<qwer>asd;\xe2\x80\x9d
```

Proposed Ans: Naive solution by processing character by character and replacing the suffix if it matches with any of the needles.

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 169 (SDE 2 for 3.5 years experience)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

1st round(online coding):

1. Given an array that contains both positive and negative integers, find the product of the maximum product subarray.
2. Sort an almost sorted array where only two elements are swapped.
3. Given an integer value and a pointer to the head of the linked list, delete all the nodes from the list that are greater than the specified value.

2nd Round(DSA) :

1. Find median of BST. BST can have duplicates as well. Had to write production level code using recursion and backtracking both. I told him various approaches. However, he was looking for the median in one scan only using two pointers.

3rd Round(DSA):

1. Introduction and detailed project discussion.
2. Find the majority element in an array. The majority element is the element that occurs more than half of the size of the array. We discussed various approaches and finally had to write working code for one of them.
3. Left View of a Binary Tree. Working code was required and some questions from the code. Like, why you used static variable and how will you do it without using any static and global variables.
4. Some questions from pointer, like,

Structure of linked list is :

```
\r\nstruct node{\r\n     int val;\r\n     node *next;\r\n}\r\n
```

So, what will happen if you remove * from node *next.
And some more deep questions from pointers.

4th Round(Design).

1. Design a real-time URL spam filtering service. We have information about billions of URLs whether they are spam or no. We need to come up with an architecture solution to store all the URLs and retrieve the information in minimum latency. There were some constraints, like, you have been given a very small memory. So, you can load only a few URLs in memory for the query.
2. Implement your own malloc and free for application x, which should control the heap memory usage of the application x. Discussed various approaches for assigning memory for a request.

5th Round(HR)

1. Project discussion and some behavioral questions.
2. Any offer in hand?

6th Round(Hiring manager):

1. Introduction.
2. Detailed discussion of recent project.
3. Some behavioural questions.
4. Given preorder traversal of a binary search tree, construct the BST. Full working code was required.
5. Given events, like, switch on, switch off, pull chair. Design an architecture to count the number of events in given time frame. Time frame can be minutes, hour or day.

All Practice Problems for Microsoft !

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Microsoft IDC Interview Experience | Set 168 (Off-Campus for Internship)

- Difficulty Level :\nHard
- Last Updated :\n03 Apr, 2018

I applied to Microsoft through referral program for Internship as software development engineer. All of the candidates who applied through referral were invited for an online coding test on co-cubes platform after 2-3 weeks.
Online Coding Round (On Co-Cubes) :-

Three questions were given in 75 minutes of time to solve. Solving on co \xe2\x80\x93 cubes platform is a nightmare by the way, no auto \xe2\x80\x93 completion, cannot even copy \xe2\x80\x93 paste or test your code manually.

Question 1 (2 \xe2\x80\x93 Marks) : It was either compare two strings or add two strings (each character of a string was from 0 \xe2\x80\x93 9).

Question 2 (3 \xe2\x80\x93 Marks) : Find largest subarray with distinct elements in it.
https://www.geeksforgeeks.org/subarrays-distinct-elements/ (Here its asked to calculate sum)

Question 3 (5 \xe2\x80\x93 Marks) : Write a function that accepts root of binary tree as its argument and return the sum of all leaf nodes at maximum depth from root.

https://www.geeksforgeeks.org/sum-leaf-nodes-minimum-level/

This question is just the opposite but the core idea remains same.

E.g\xc2\xa0\xc2\xa0\xc2\xa0 1
\xe2\x80\xa6\xe2\x80\xa6../ \\
\xe2\x80\xa6\xe2\x80\xa6.2\xc2\xa0\xc2\xa0 3
\xe2\x80\xa6\xe2\x80\xa6/\xc2\xa0\xc2\xa0 \xc2\xa0\xc2\xa0 \\
\xe2\x80\xa6..2\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 1
Ans :- 2 + 1 = 3

The system testing of solutions was done after your submission of all 3 questions, and result is not shown to you (whether all 3 went correct or not). You were however given a very weak test case on co-cubes to check your solution, which easily showed false positive.
You have to solve **ALL 3** questions to qualify this round and try to write as optimal solution as possible.

All students who qualified coding round were invited to Microsoft Gurgaon for further interview process.

Group Fly Round : \xe2\x80\x93

Around 60-65 students appeared for group \xe2\x80\x93 fly round. It was a pen \xe2\x80\x93 paper test. We were provided with only one question, to be solved in 45 minutes.

Question \xe2\x80\x93 Given a binary tree convert it into n-ary tree with following conditions each node at same level are connected to each other from left to right in a single chain and the whole level is connected to root R.

E.g\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0
1\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 \xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0
R
\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6../\xc2\xa0 \\\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 \xc2\xa0 \xc2\xa0
\xc2\xa0 / | \\
\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa62\xc2\xa0\xc2\xa0\xc2\xa0 3\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 ->\xc2\xa0\xc2\xa0 1\xc2\xa0\xc2\xa0
2\xc2\xa0 4
\xe2\x80\xa6\xe2\x80\xa6./\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 /
\\\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 \xc2\xa0 \xc2\xa0\xc2\xa0\xc2\xa0
|\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 \\
\xe2\x80\xa6..4\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 5\xc2\xa0\xc2\xa0
6\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 \xc2\xa0 3\xc2\xa0\xc2\xa0\xc2\xa0 \xc2\xa0 5
\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa
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One part of this question is something similar to https://www.geeksforgeeks.org/connect-nodes-at-same-level/
and in the next part we had to define a *data \xe2\x80\x93 structure* (this was important) for our output tree and connect accordingly.

We have to write the whole program from input to output, along with some test cases and dry run your solution (They wanted to test your program testing skills for corner cases). They were also expecting optimized solution. You are allowed to use any language.

Note : \xe2\x80\x93 Try to write clean code as possible and use meaningful variable and function names and keep talking about different approaches to your assigned mentor.

I solved it using queue and level order traversal with output structure defined as follows :

```
struct Node{
struct Node* root;
vector<struct Node*> child;
int value;
};
```

Nearly 20 \xe2\x80\x93 25 students were selected for next round.

Round 1 (Technical) : \xe2\x80\x93

Question 1 \xe2\x80\x93 Given a binary tree, return the root of largest BST subtree in it.
https://www.geeksforgeeks.org/find-the-largest-subtree-in-a-tree-that-is-also-a-bst/

I had to completely code it on paper from input to output, and then explain the whole code.
Write few test cases for it (including some edge cases) and dry run my solution.

Interviewer first went through my resume. He then asked me to explain one of my project(Specifically what part I did).

He than began asking me questions from OS (He asked from scheduling, context switch, PCB, Virtual Memory), he was quite impressed from me as I gave almost all the correct answers.

The interview went for around 45 minutes.

Round 2 (Technical) :-

Question 1 \xe2\x80\x93 Given a binary tree, print its left view.
https://www.geeksforgeeks.org/print-left-view-binary-tree/
I had to code its leftViewUtil function.

Question 2 \xe2\x80\x93 WAP to rotate a array by k elements.
https://www.geeksforgeeks.org/array-rotation/

I just had to explain my logic, I gave him two approaches first one was with O(k) extra space (Method 1) and 2nd one was Method 3 of above link. He was satisfied with my logic but he wanted to think of another approach so he gave me a hint of something to do with reversing the array so the code would be of 3 lines.
After this hint I was able to give him the approach he wanted.
https://www.geeksforgeeks.org/program-for-array-rotation-continued-reversal-algorithm/

Round 3 :-

My interview was taken by a senior person. He asked to me introduce myself, and then proceeded to ask about my interests (related to CS). Throughout the interview, he was talking with me discussing different things and asking questions. He asked me my favorite problem. I described him a dynamic programming problem. Then he asked me a lot of questions related to OS(Critical Section Problem, Memory Management).

After that, he asked if I had any questions for him. I asked few questions and it was over.

Final Result was declared within half and hour and I was selected. Along with me 4-5 more students were selected.

The total interview process was conducted from around 9 am to 6 pm.

ADVICE :-
Clear concept of data structure and algorithm is necessary, alongside knowledge of OOPS concepts, OS and DBMS is also important. Project\xe2\x80\x99s are also necessary, and having some interesting projects surely attracts curiosity of the interviewer.

Do not panic if you are stuck, or not able to answer. Try from very basic approach from brute force to actual solution and keep talking to your interviewer discussing various approaches it is the most important part.

GFG is must to be able to perform good in interviews.

\xc2\xa0

This article is contributed by **Shubham Kothari**.

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Microsoft interview experience: | Set 167 (7 Years Experienced)

- Difficulty Level :\nHard
- Last Updated :\n27 Mar, 2018

Round 1: k frequently words in a given file of huge data.
Find index of distortion in a sorted but a little bit distorted array.

Round 2:
First non repeated character in character stream of huge data.
Design of URL shorter service .

Round 3:
Projects

Round 4: with Technical partner manager .
\xe2\x80\x93 island problem in a mxn matrix of integers
\xe2\x80\x93 image compression
\xe2\x80\x93 Design a service which talks to three other google calanedar like serices and merges those calendars in a single view for a user .

All Practice Problems for Microsoft !

My Personal Notes\n*arrow_drop_up*

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Microsoft Interview Experience | Set 166

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

Round 1:

1. Reverse bits of integer and give the resulting number.
2. a/b/../c/d/e/\xe2\x80\xa6/f => a/c/f\xc2\xa0 => count of .\xc2\xa0 == n => go back (n-1) time (directory path given)
3. Nuts and bolts problem

Round 2:

1. Binary search tree with parent pointer find two nodes with given sum.
2. Design phone contact book

Round 3:

1. Design TCP
2. Search an element in sorted infinite array
3. K Painter problem

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 165 (Software Engineer)

- Last Updated :\n14 Mar, 2018

Round 1: Hackerank Test

Round 2: Find majority in an array and flattening of the linked list

Round 3: Write an algorithm to design an application for the timer utility. If some user ask for 30 secs and after its request has been processed another request come for 5 secs. Second request should be processed and first request should be handled similarly.

Round 4: Given a date find whether bank is open on this date or not.

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Microsoft Interview Experience | Set 164 (On-Campus for Internship)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

I had opted for the on campus Internship Interview for Microsoft at almost the beginning of my third year. Here is the interview experience.

To anyone who is reading this. Thanks a lot for being here and I hope this is going to help!

Round 0:

This round was conducted online on the Cocubes platform. We just had to fill a Google form for participating and i think there was a CGPA cutoff of 7 or so.

Anyway, talking about the round, there were 3 programming questions and nearly 1500 participants as far as i can remember. The questions were basic. The three questions that i were asked are as follows:

1. This was a very basic String related problem where we had to find the longest sequence number of consecutive 1\xe2\x80\x99s in a given Binary.
2. This was a tree based question where it was given a tree and a sum and had to find the shortest subtree including the root node of which the sum is equal to the given sum.
3. I don\xe2\x80\x99t exactly remember the third question but it was a simple tree based question too.

The time allotted was 90 minutes.

40 people were selected from this round and i got through as i had solved all the three questions.

Round 1:\xc2\xa0

This round was actually conducted by the guys from Microsoft after about a week.

- We were given a question related to a 2 way Linked list and we had to write the code for insertion and deletion in an optimized manner and such that the linked list remains sorted and of minimum height possible.

It was hard for me write the entire code in 30 minutes of the given time but it didn\xe2\x80\x99t matter. They were just checking your approach.

There were evaluators who you had to explain the code to and they did try to unnerve me a bit but if you\xe2\x80\x99re confident with your approach, you\xe2\x80\x99ll do fine.

Nearly 20 people were selected from that round and I got through.

Round 2:\xc2\xa0

This was the first P2P interview where the interviewer asked me a question related to Binary Tree.

- They had asked me to find the kth largest element in a binary search tree. The common approach

is to find the inorder and then pick the kth element from the last but i had solved it using recursion. The Interviewer was pretty impressed.

- After that he had asked me to find an O(n) solution to the famous RGB problem. Initially i couldn\xe2\x80\x99t solve it but with slight help from the interviewer i was able to do it.

Then he asked me a few basic questions regarding OS and i kind of answered 75% of them.

Most importantly just tell them that you don\xe2\x80\x99t know if you\xe2\x80\x99re not fluent with the answer to the question. It\xe2\x80\x99s better than just pretending to know the answer.

All the people were selected for the second P2P round.

Round 3:

1. In this round I was asked given an IP address and i had to check if it was a valid IPV4.

   I personally code in JAVA. So I had handled all the cases using Exception handling. The interviewer seemed impressed.

   A few people were selected for the third round.

Round 4:

1. This was the last round. The interviewer was really friendly with me. He asked me a few questions about pipelining and then he had asked me to write the code for the following problem:

   If there is a log file of the form : A person \xe2\x80\x98A\xe2\x80\x99 visits a Page \xe2\x80\x98P\xe2\x80\x99 at Time \xe2\x80\x98T\xe2\x80\x99, I had to find the number of times any person has visited a page \xe2\x80\x98P2\xe2\x80\x99 afer visiting Page \xe2\x80\x98P1\xe2\x80\x99

   I had provided an O(n) solution for that namely by hashing the list of all visited logs of a person with the person Id which happens in Linear time. After that in each list we need to find the entries for page \xe2\x80\x98P2\xe2\x80\x99 exactly after page \xe2\x80\x98P1\xe2\x80\x99.

   Key: Person Id

   Value: ArrayList<Logs> for that person

   I really enjoyed writing that code. \xf0\x9f\x98\x89

   The Interviewer liked my approach and had congratulated me.

That was pretty much it. The next day i got a mail from Microsoft that i had been selected for the Internship along with 3 of my other college mates.

My takes and suggestions:

I would firstly like to thank GeeksForGeeks as i owe a lot to them. I used to practice coding questions from GFG a lot pretty much all the time. Seriously, you guys are the best. I used to read some Interview experiences from GFG and that had helped a lot for developing my approach for an Interview.

They want you to think aloud in an interview. Don\xe2\x80\x99t just code but firstly speak to the interviewer about your approach and then go ahead. Talk to the interviewer at all stages about the code.

Lastly, practice a lot of questions and keep your concepts clear.

The most important topics:

One should pretty much study all the topics but I personally feel that Binary Trees, Dynamic Programming and basic Algorithms are the most important thing to study at first. Then you can go for Graphs.

Also you must learn recursion which is pretty evident as you can\xe2\x80\x99t solve tree related questions without recursion.

I am looking forward to the Internship which is due to begin on May 2018. Once I\xe2\x80\x99m done with the internship i\xe2\x80\x99ll write another article on my Internship experience.

\xc2\xa0

Lastly, If you want to practice programming for Interviews, GEEKS FOR GEEKS is the guy you wanna talk to. \xf0\x9f\x98\x89

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All Practice Problems for Microsoft !

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Microsoft Interview Experience | (SDE-2 for 3 Years Experienced)

- Difficulty Level :\nMedium
- Last Updated :\n02 Mar, 2018

I had got a call through Naukri Portal . I got interview invite for a weekend drive.

Round 1
Hacker rank test :
Q1 : Given relationship of child-parent for a tree for all nodes. Find the diameter of that tree.
Q2 : https://www.geeksforgeeks.org/maximum-difference-between-two-elements/

3 more MCQs in test.

Round: 2
Q1: Given a n-ary tree. Find the longest path (top to down) with consecutive integers in increasing order
Q2: Design a RangeSet class where you can Add, Delete and search in a optimized way

E.g. add 10-20
Delete 13-27
Add \xe2\x80\x93 23-28
Search (3)- output false
Search (22) \xe2\x80\x93 output false
Search (24) \xe2\x80\x93 output true

Round: 3
Q1: https://www.geeksforgeeks.org/search-an-element-in-a-sorted-and-pivoted-array/
Q2: Given a tree find the next right element towards any given element in input (Level order traversal)
Q3: Count all possible distinct sums (top-down) in a binary tree.

Round 4:
Q1: https://www.geeksforgeeks.org/nuts-bolts-problem-lock-key-problem/
Q2: https://www.geeksforgeeks.org/dynamic-programming-set-27-max-sum-rectangle-in-a-2d-matrix/
Q3: Given 2 trees, check whether Tree A contains Tree B. (Contains mean all nodes and orientation of their children should match)

Round 5:
Q1: Given a string like below, it has words embedded for zero to nine, You need to calculate the sum as per the string

onehhhtwominusthreehhkkseveneightjnine
should be equivalent to
1+2-3+78+9
output: 87

twothreekkkminuspponeksevenoeightllninenine
should be equivalent to
23-1+7+8+99

Output : 136

onetwothreefour
output: 1234

Q2: Design a tiny URL service like bit.ly

Q3: one puzzle :
Given 1 Box with 2 latches
A and B stay in different states.
A has 2 keys of latch 1
B has 2 keys of latch 2
Now user A has to send a message in a box to User B.
while sending the message A has to make sure that no one on the way reads the message. If A sends the Key along, anyone can open it and check .
How would you make sure that this threat to read the message in between, is removed.

It was a good experience, although i got reject after a few days

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Microsoft Interview experience | Set 162 (For Front End Developer)

- Difficulty Level :\nHard
- Last Updated :\n21 Feb, 2018

I applied through an employee referral. The process took around 2 weeks. I was interviewed at Microsoft (Bangalore) in November 2017.

Mainly they wanted developers for redesigning their product outlook.com in ReactJs.\xc2\xa0News

Initially, I got a mail from HR and I replied back stating my availability. Later I had a talk with HR and scheduled for a telephonic interview.

Round 1(Telephonic):\xc2\xa0

The interview started with my CV. He asked me about my work and responsibility at my current office. Then started with some questions which I was asked to code in plain javascript.

1. Reverse String in-place\xc2\xa0Link
2. Flattening an array. Ex: Input : [[1, 2, 3], 4, [5, [6, 7]] Output: [1, 2, 3, 4, 5, 6, 7]. I gave a recursive solution.
3. Designing an\xc2\xa0image carousel.\xc2\xa0Link

I answered all of them, and then he said that interview is over. And I will be contacted further if selected. (I was surprised since I expected some more questions). Then just after around half an hour, I got a call from the HR, and she said that they\xc2\xa0want to continue with further rounds, and asked for my availability.

Round 2(Onsite at Bangalore):\xc2\xa0

There were around 15 other candidates for this round. They handed us a sheet and asked to\xc2\xa0write two codes in 1hr.

1. Expression Evaluation.\xc2\xa0Link

2. Write a code in HTML, CSS, JS to form two list selection. And the user can perform several operations on these like:

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 >> & <<(Move all from List1 A to List B).

\xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 > & < (Move only selected items)

Up, Down to select the item

Also an Text Area and Add button below List A, to add rows to the list.

Writing these codes on paper was messy and I never expected this from Microsoft. Anyways around 10 people got selected for\xc2\xa0the next round.

Round 3(PI):\xc2\xa0

I was a bit nervous\xc2\xa0and the interviewer asked me to calm relax and asked for my experience with javascript. Then she asked me (rather discussed) on how to make a UI design for the snake-ladder problem. We had a discussion after which she asked me to write a code to insert the numbers(1-100) spirally(as in the snake ladder game). I coded it and eventually round 3 was over.

Round 4(PI):\xc2\xa0

He went through my CV and asked a question related to ECM(which I have been working on at my office). Then he asked me to write a code for reversing a Linked List.\xc2\xa0Link\xc2\xa0. He seemed\xc2\xa0fine with the code and asked me to wait outside.

I was happy till then. Had a sumptuous lunch at the MS office.But then HR called me up after sometime and said they can\xe2\x80\x99t continue any further.I don\xe2\x80\x99t know the exact reason for the rejection but had a great experience to interview with Microsoft.

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Microsoft Interview Experience | Set 161 (On campus)

- Difficulty Level :\nMedium
- Last Updated :\n31 Mar, 2020

Microsoft came to our campus in which around 170 people participated.

First Round:
This was conducted on CoCubes.com where we had to solve 3 questions in 75 minutes. The questions were different for everyone. Questions for me were:

1. https://www.geeksforgeeks.org/length-longest-consecutive-1s-binary-representation/
2. https://www.geeksforgeeks.org/leaders-in-an-array/
3. We had been given a linked list and we had to segregate its even and odd position nodes in such a way that odd position nodes before even positioned nodes and even positioned nodes had to be appended after odd positioned nodes but in a reverse order. We were not allowed to use any extra space.

   ```
   Ex \xe2\x80\x93 linked list: \xe2\x80\x93 1 -> 2 -> 3 -> 4 -> 5 -> 6\r\nOutput: \xe2\x80\x93 1 -> 3-> 5 -> 6 -> 4->
   ```

   Out of that 72 people were selected for further rounds.
   Further rounds were conducted in Microsoft Hyderabad office.

Group Fly:

In this 2 questions were displayed which were common to everyone. There was a mentor assigned to 6 people with whom you can discuss the questions and ask doubts. (PS: Try to talk to them as much as possible. Tell them your solution before submitting. Tell them some good test cases which you could think of) .

Questions were:

1. https://www.geeksforgeeks.org/minimum-number-platforms-required-railwaybus-station/
2. https://www.geeksforgeeks.org/connect-nodes-at-same-level/

Out of that 36 people were selected for further rounds.

Technical Interview Round 1:

I didn\xe2\x80\x99t find the interviewer very helpful. He asked me some out of the blue questions too.

- Count the number of ones in the binary representation of a number.

I gave him the naive approach first. He asked me to reduce the time complexity. I told him we could use memoization. Again he said I want something in between (i.e. neither too much space complexity nor too much time complexity). Then after some unsuccessful attempts, he asked to use threads (weird, yeah!). Then he was not satisfied and asked to move on.

- https://www.geeksforgeeks.org/union-and-intersection-of-two-linked-lists/

This was quite easy and I wrote the full code. However, he asked some test-case specific questions and I was not really able to answer them. Then we moved on.

Luckily I was selected for Round 2.

Technical Interview Round 2:

This time the interviewer
was really helpful and sweet. He asked me a question:

- 1.) Given two strings s1 and s2. Remove all instances of characters in s2 from s1 in place.

```
Ex: s1 = "hello world" : s2 = "eo" ; new s1 = "hll wrld"
```

I gave him two approaches.
a.) O(mn) where we use brute force.
b.) O(n) where we use a hash map to store character of s2

and traverse s1.

He also wanted something in between. After thinking for s

ome time I came up with a mlogn approach where you sort s2 and search for characters of s1 in s2.

He was really impressed and happy.

After this, I

was told that I got the internship! \xf0\x9f\x98\x80 Geeksforgeeks was really helpful for me for preparing for my internship.

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Microsoft Interview Experience | Set 160 (Off Campus)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Skype Round

1. Discussion on projects and the current work.
2. Print all the subsequences of string.

Face to Face Interview

Round 1

1. Check whether two strings are anagram of each other
2. Given millions of words, return all groups of strings that are anagrams.(full implementation of solution using trie)

Round 2

1. Add two linked list of different size.(using recursion)
2. You are given two string str1 and str2 of the same length.You can rotate str2 by 1. You have to find the minimum shift operation required to get common prefix of maximum length from str1 and str2.(full implementation of solution using KMP Algorithm)
   Solution : GeeksforGeeks Link

Round 3

1. How to sync 2 databases after every write operation(system design)
2. Design extensible calculator (object-oriented design/ class diagram).

Round 4

Deep discussion on current work in a team (about challenges faced, tech used, block diagram, etc)

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Microsoft Interview Experience | Set 159 (On campus)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Round 1:

The first round consisted of two coding questions to be solved in 1 hr \xe2\x80\x93

1. Given a binary tree, print the boundary of the tree in the anti-clockwise direction. Reference: https://www.geeksforgeeks.org/boundary-traversal-of-binary-tree/
2. Given a 2-D array, each consisting of value 0 or 1, 0 denoting sea and 1 denoting land. Find the perimeter of the largest island.

The selection criterion was to complete at least one complete running code, with sample cases. It was a pen and paper round, and the mentors were around in case any sort of help was required. This was a fairly easy round. 13 candidates were shortlisted after this round.

Round 2:

> The interview began with a little conversation about college and subjects being taught. Then the interviewer asked me if I can code a question in graphs, I said yes. So he asked me to code the following problem-

- Given a directed graph and a start node, find whether it is possible to reach out to all the other nodes in the graph. After I wrote the code, he asked me to extend it to all nodes, i.e. instead of a single source, the code should output YES if all the nodes are connected to one another, else answer NO.

While I was writing the code on paper, the interviewer was scanning each and every word on my resume and was asking me questions in between. He checked my all online programming handles like codechef, hackerrank\xc2\xa0etc.

Suggestion: Do not lie on your resume, mine was verified thoroughly.

- Then he gave me the next problem related to trees. It was a situation based question, which on decoding was equivalent to this problem-\xc2\xa0Given a BST, delete the smallest element from the tree.
- The next question was an easier one. Given an\xc2\xa0array of pairs (height,coins), I was asked to find the sum of coins for a particular height.

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Microsoft Interview Experience | Set 158 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n21 Dec, 2017

Microsoft visited our campus. Before that, about a month ago they had conducted an online coding test. The interview consisted of 3 f2f rounds.

Online test:

The test comprised of 3 coding questions. The questions were not same for everyone. I was the winner of Microsoft Code.Fun.Do so I was directly qualified for group fly round.

Group Fly

Question 1 \xe2\x80\x93 Connect every node to next right node. If any node is the rightmost node of that level, then connect it to leftmost node of next level.

Extra marks for constant space and test cases.

Similar to this:

https://www.geeksforgeeks.org/connect-nodes-at-same-level-with-o1-extra-space/

Question 2 \xe2\x80\x93 Find pairs for given sum in a sorted singly linked list without extra space.

Extra marks for constant space.

Similar to this:

https://www.geeksforgeeks.org/find-pair-given-sum-sorted-singly-linked-without-extra-space/

Round 1:

About my branch.

Basic OS concepts like PCB. What does it store?

Threads. Multithreading. Is there any entity which is different for every thread? What are those entities?

Two nodes of a BST are swapped, correct the BST

https://www.geeksforgeeks.org/fix-two-swapped-nodes-of-bst/

He asked for test cases. I gave 7-8 test cases. He was impressed by those test cases. Full code was expected.

Round 2:

He saw my branch and gave me a mathematical problem.

https://puzzling.stackexchange.com/questions/11998/1-2-3-4-5-6-7-8-9-100

Delete n nodes after m nodes of a linked list

https://www.geeksforgeeks.org/delete-n-nodes-after-m-nodes-of-a-linked-list/

How is your college life? Will you miss it?

Round 3:

What do you want to do in future?

System Design : Given a Client-Server model, How will you handle a large number of requests coming?

We discussed this for 15 mins. I made few diagrams and told about scalability and concurrency. (involved both DBMS and OS) How we handle concurrency?

I told him about mutex and semaphore.

https://www.geeksforgeeks.org/swap-bits-in-a-given-number/

He seemed happy. Asked me if I had any questions. Explained about his work at Microsoft.

It took close to 2 hours for all three rounds. Straight after the 3rd round, HR took me to her room and with a huge smile said you are a very prominent candidate and you have made it.

\xc2\xa0

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Microsoft Interview Experience | Set 157 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Microsoft visited our campus. Prior to that, about a month ago they had conducted an online coding test. The interview consisted of 3 f2f rounds.

Online test:

The test comprised of 3 coding questions. The questions were not same for everyone.

- Find the missing number in an AP series.
- Find max sum path(sum of values of nodes) in a binary tree. The nodes may have negative values too.
- Given a binary tree, find the number of subtrees that sum up to a particular value.

Round 1:

1. General introduction. Project description.
2. Serialize and deserialize a binary tree.

   Full code was expected.

Round 2:

1. General introduction.
2. How would you make loading of webpages faster?
3. Said something about cache, server-side loadbalancer etc. The interviewer went into details of caching, asked about several situations like, what if power failure occurs while writing to database, leading to a brief discussion on checkpoints, log files etc.
4. Finally he asked me to design LRU cache. Was expecting only code snippets and proper data structure usage.

Round 3:

1. General introduction.
2. Connect all the nodes in the same level of a binary tree.

   I proposed a basic level order traversal using queue.https://www.geeksforgeeks.org/connect-nodes-level-level-order-traversal/

   But he came up with a bunch of constraints, so I gave this solution instead. https://www.geeksforgeeks.org/connect-nodes-at-same-level-with-o1-extra-space/

   He didn\xe2\x80\x99t look very pleased, but moved on.

3. Given a circular array that has been rotated, find a particular element in it.

   Gave the basic O(logn) approach for finding element in sorted rotated array by finding pivot first.

   He asked me to do it in one go without separately finding pivot.

Wasn\xe2\x80\x99t too hard to figure out.

He seemed happy. Asked me if I had any questions. Explained about his work at Microsoft.

\xc2\xa0

\xc2\xa0

\xc2\xa0

About 1.5 hrs later they declared the results. They had selected 4 students for Microsoft Redmond and around 8-9 for MSIDC, myself included \xf0\x9f\x99\x82

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Microsoft IDC Interview Experience | Set 156 (Off-Campus for Full Time)

- Difficulty Level :\nHard
- Last Updated :\n12 Dec, 2017

I applied to Microsoft through referral program for full \xe2\x80\x93 time position of software development engineer. All of the candidates who applied through referral were invited for an online coding test on co-cubes platform after 2-3 weeks.

Online Coding Round (On Co-Cubes) :-

Three questions were given in 75 minutes of time to solve. Solving on co \xe2\x80\x93 cubes platform is a nightmare by the way, no auto \xe2\x80\x93 completion, cannot even copy \xe2\x80\x93 paste or test your code manually.

- **Question 1 (2 \xe2\x80\x93 Marks)** : Given a singly linked list, with some positive numbers (valid numbers) and zeros (invalid numbers).\xc2\xa0Convert the linked list in such a way that if next valid number is same as current number, double its value and replace the next number with 0. After the modification, rearrange the linked \xe2\x80\x93 list such that all 0\xe2\x80\x99s are shifted to the end.
  E.g.\xc2\xa0 \xc2\xa0 2 -> 2 -> 0 -> 4 -> 0 -> 8
  Ans: \xe2\x80\x93\xc2\xa04 -> 4 -> 8 -> 0 -> 0 -> 0
- **Question 2 (3 \xe2\x80\x93 Marks)\xc2\xa0**: I do not remember. It was array \xe2\x80\x93 based.
- **Question 3 (5 \xe2\x80\x93 Marks)\xc2\xa0**:\xc2\xa0Write a function that accepts root of binary tree as its argument and return the sum of all leaf nodes at maximum depth from root.
  E.g\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa61
  \xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6/\xc2\xa0 \xc2\xa0\\ \xc2\xa0
  \xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6.2/\xe2\x80\xa6\xe2\x80\xa63
  \xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6.\xc2\xa0 /\xc2\xa0 \\
  \xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6.2\xe2\x80\xa6\xe2\x80\xa61
  Ans :- 2 + 1 = 3

The system testing of solutions was done after your submission of all 3 questions, and result is not shown to you (whether all 3 went correct or not). You were however given a very weak test case on co-cubes to check your solution, which easily showed false positive.
You have to solve ALL 3 questions to qualify this round.
All students who qualified coding round were invited to Microsoft Hyderabad for further interview process.

Group Fly Round : \xe2\x80\x93

Around 150 students appeared for group \xe2\x80\x93 fly round. It was a pen \xe2\x80\x93 paper test. We were provided with only one question, to be solved in 45 minutes.

- **Question** \xe2\x80\x93 Given a string, partition it in minimum number of substrings such that each partitioned substring is a palindrome. Output the minimum number of partitions required. It is a standard dynamic programming question,\xc2\xa0https://www.geeksforgeeks.org/dynamic-programming-set-17-palindrome-partitioning/.

We have to write the whole program from input to output, along with some test cases (They wanted to test your program testing skills for corner cases). You are allowed to use any language.
Note : \xe2\x80\x93 Judging criteria was correctness of the code than anything else. Try to write clean code as possible and use meaningful variable and function names. People who had correct running code (Even in exponential time complexity for DP) were selected than faster codes with errors.

Nearly 30 \xe2\x80\x93 35 students were selected for next round.

Round 1\xc2\xa0(Technical) : \xe2\x80\x93

Interviewer first thoroughly went through my resume. He was impressed with my competitive coding profile, and then asked me to explain one of my project. He then asked me two algorithmic questions.

- **Question 1** \xe2\x80\x93 Given a tree rooted at a certain node, find the maximum height, also print all the nodes on the path on maximum height.\xc2\xa0https://www.geeksforgeeks.org/write-a-c-program-to-find-the-maximum-depth-or-height-of-a-tree/
  I had to completely code it on paper from input to output, and then thoroughly explain the whole code.
- **Question 2** \xe2\x80\x93 Given a N X N matrix with positive, zero or negative elements, find the sub \xe2\x80\x93 matrix with largest sum.\xc2\xa0https://www.geeksforgeeks.org/dynamic-programming-set-27-max-sum-rectangle-in-a-2d-matrix/
  Even after lot of thinking, I was not able to provide the optimal O(n^3) solution, and offered him brute \xe2\x80\x93 force + preprocessing solution of O(n^4). He was not helping with hints. After sometime, he asked me to the code solution I got, and interrupted me and said it\xe2\x80\x99s ok as I was halfway through writing the code.

The interview went for around one hour.

Round 2 (Technical) :-

This was the hardest interview round. Interviewer literally asked me everything under the sun. Interviewer first asked me to introduce myself, as she went through my resume. She inquired about my competitive programming profile, and my hobbies. I was asked few OS questions on multi \xe2\x80\x93 threading and it\xe2\x80\x99s real \xe2\x80\x93 life implementations.\xc2\xa0Afterwards, I was provided with a design problem,

- \xe2\x80\x9cImagine you are a project manager of Microsoft, design a messenger service app like WhatsApp\xe2\x80\x9d. You have to explain all the points and features diagrammatically, such that even a non \xe2\x80\x93 technical person can understand.

She then noted down four sectors from my resume, namely, data structure and algorithm, programming language (C++), DBMS and Client \xe2\x80\x93 side scripting, and then asked me to rate myself in all four.
Firstly, she started basic questioning like, \xe2\x80\x9cwhat is a tree\xe2\x80\x9d, and progressed to BFS & DFS, their algorithm, uses and where one is preferred over another. This lead to thorough discussion on Dikstra\xe2\x80\x99s shortest \xe2\x80\x93 path algorithm. Underlying reasons was to check your in-depth knowledge.
After DSA, discussion moved to C++, pointers, their uses and difference between struct, class and their pointer handling. Discussion went around OOPS concepts like polymorphism, function overloading and overriding.
She then proceeded with networking questions. This discussion went on like a recursive DFS, as

everything we discussed, lead to some other topic. Few topics and questions I remember were, \xe2\x80\x9cWhat is a IP\xe2\x80\x9d, \xe2\x80\x9cWhy a machine needs a IP\xe2\x80\x9d, \xe2\x80\x9cWhat is a static and dynamic IP, and when one is preferred over another\xe2\x80\x9d, \xe2\x80\x9cFirewalls\xe2\x80\x9d, \xe2\x80\x9cEncryption Methods / Cryptography\xe2\x80\x9d,\xc2\xa0\xc2\xa0\xe2\x80\x9cabout HTTP and HTTPS protocol\xe2\x80\x9d and thorough questions on \xe2\x80\x9cClient \xe2\x80\x93 side & Server \xe2\x80\x93 side scripting\xe2\x80\x9d.\xc2\xa0Discussion also veered to\xc2\xa0off-topic questions like, we have to design a robot / system which recognises emotions by voice, how & what parameters will you use to do the same ?

Finally, we finished discussion on networking, and she asked me two simple DBMS SQL queries, one being \xe2\x80\x9cprint the second largest number in the table\xe2\x80\x9d.

This interview went around for more than one and half hours. Interviewer was very helpful and friendly, and gave hints whenever I was stuck.

Note : \xe2\x80\x93\xc2\xa0 Do not panic if you are stuck, or not able to answer. Be honest to what to do or do not know. If the question is factual, you can admit you don\xe2\x80\x99t know, rather than blabbering non \xe2\x80\x93 sense. However, for thinking / brainstorming questions, it is better to be persistent and go on trying.

Round 3 : \xe2\x80\x93\xc2\xa0

Now, only 10 \xe2\x80\x93 12 students were remaining.\xc2\xa0Few people had a HR round for this, few didn\xe2\x80\x99t even had this round. Mine was technical round.

My interview was taken by a senior person. He asked to me introduce myself, and then proceeded to ask about **all**\xc2\xa0my projects. Throughout the interview, he listened without cross \xe2\x80\x93 questioning me. After that, he asked if I had any questions for him. I asked few questions and it was over.

Final Result was declared within half and hour, and **9 people\xc2\xa0**were selected at last. Fortunately, I was one of them.
The total interview process took nearly 11 hours.

ADVICE :-
Clear concept of data structure and algorithm is necessary, alongside knowledge of OOPS concepts, OS and DBMS. Project\xe2\x80\x99s are also necessary, and having some interesting projects surely attracts\xc2\xa0curiosity\xc2\xa0of the interviewer. It should be kept in mind they look for a balanced candidate with knowledge in different fields.
During interview, keep on communicating with the interviewer, be curious and cross \xe2\x80\x93 question them.

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 155 (For Data Scientist)

- Last Updated :\n11 Dec, 2017

Online Test: This was a cocubes online test. Multiple choice questions regarding basic machine learning and a little bit of neural network was asked. The test also had a section on basic aptitude and logical reasoning.\xc2\xa0 14 people out of about 100 were selected for the GroupFly round.

The **Group Fly** round consisted of two coding questions. We had to write working code for them on paper and also write unit tests.

1> Given a string like \xe2\x80\x9cfun1(fun2(a,b) ,c ,fun2(a),fun3(c,d))\xe2\x80\x9d how many unique function signature are there. Ans:4
You can use 2 stacks and count the number of commas in between the brackets.

2> Given a box of dimension W,H and co ordinates of points inside that box. Find the largest area that is free of any of these points.

Round 1: First Round of interview was with a member of the bing team at microsoft. He asked me about my Project. I had to explain the project fully with most of the maths involved.

Round 2: The second interview was about basic coding skills. The interviewer gave 2 questions and I was supposed to solve them on paper. The first question was more about how you approach the problem rather than code. He thank asked me why neural network work and why is it a booming field.

Given a W,H of a big box and multiple boxes of different w,h . You want to fit the smaller boxes into the big box so that the placement looks aesthetically pleasing.. the smaller boxes could be less than the number required to fill the big box fully. That is there could be only one small box or there could be infinite small boxes of different sizes..

Round 3:\xc2\xa0 This round was a mixed HR and technical round. The interviewer asked me about what I expected out of the job. What I knew about the work. He than gave me a simple coding question for which I was to write the code on paper. He also asked me about why I wanted to work in the field of machine learning.
https://www.geeksforgeeks.org/minimum-number-platforms-required-railwaybus-station/

\xc2\xa0

Overall the interview was fun. The interviewers were friendly and helped if you get stuck at some place in your approach.

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Microsoft Interview Experience | Set 154 (For 1.5 Years Experienced)

- Difficulty Level :\nExpert
- Last Updated :\n10 Dec, 2017

I applied for the position of Software Engineer at Microsoft IDC, Hyderabad, given 1.5 years of my experience. My rounds were of intermediate level I guess.

Round 1: Hackerrank test
There were 1 questions in this round.
1.) First question was based on strings. Given a string of characters, there will be a roll function given to you. The roll function will specify the subarray [s, e] in the string and this subarray shall be rolled how many times. Example: if s =\xe2\x80\x9dabcd\xe2\x80\x9d and roll() specifies that subarray [0, 2] be rolled by 2 (roll 0th position 2 times), it\xe2\x80\x99ll increment 0th position by 2, thus s[0] = c. Roll function can be called as many times, then there will be some queries to output the character at any particular position.
Solution: I did this by keeping the count of the number of times any character is rolled. For maintaining count, I used the cumulative frequency type of method in which we increment the count at position \xe2\x80\x98s\xe2\x80\x99 by n, then we decrement count at position \xe2\x80\x98e+1\xe2\x80\x99 by n. This passed all the test cases.
2.) https://www.geeksforgeeks.org/count-ways-express-number-sum-consecutive-numbers/

After this written round, I was called for onsite interviews.
Round 1:
This round was based on data structures. I was asked two questions in this round. With two technical questions, I was asked about 2 projects of my resume.
1.) First question was reversing a linked list n groups of k.
2.) Second one was the zig-zag traversal of binary tree in a bottom up manner. Ex: if level order traversal of tree is [1], [2, 3], [4, 5, 8], [6, 8, 9, 7]
then required output was: [7, 9, 8, 6], [4, 5, 8], [3, 2], [1].
She wanted me to optimize as much as I can. I firstly talked about the brute force approach, using recursion, then I told her about the 2 stacks approach. She wanted me to use only stack and do that. Also, being an experienced person, they expect you to write a very neat code with proper test case coverage. They may not see at that moment, but they do look at it after the interview.
After every interview, I was being given feedback.

Round 2:
This round was focused towards DP.
1.) First question in this round was Weighted Job Scheduling. I told him the DP approach, then he went on to how you found the states of DP. How do you generally approach the DP problem. I told about optimal substructure and overlapping. Then he asked me to write the recursive code for the given question. We then had a lot of discussion on its complexity.
2.) Second was LIS.
Overall this round was easy. He then moved on to some design problems and general concepts of OS and Networking. He asked me to design cache, taking care of scalability and reliability. I talked about how distributed systems can be helpful, horizontal and vertical splitting, sharding concepts, replicas etc.
3.) This question was what happens when you type a url in the web browser. He went on to various routing policies like weighted routing etc.
I had AWS CSA in my resume, so he went on to concepts like CDN and cloudfront distributions.
I had blogs on which I contribute, the interviewer asked me to open any of them. I recently started

blogging on cloud computing and opened that. He asked some 2-3 questions about that.
This round was the longest, of around 1.5 hour or so. Very interactive I felt. Enjoyed the most in this round.

Round 3:
This round was majorly for the discussion of design problem.
1.) The first question we discussed about how to design the malloc() API. How memory allocation is done. If you are given a big array of free bytes, and requests keep coming for some size, how will you allocate that. After allocation, how will you deallocate. Note that we de-llocate using free which takes only the pointer to delete the memory it is pointing to. We don\xe2\x80\x99t give the size here, so, we need to maintain the size for each allocation request in our implementation.
2.) The second question was designing strtok(). Then he asked me to check if there was anything wrong with strtok() library function. I couldn\xe2\x80\x99t guess it. He then gave me a hint to think about multiple requests coming at same time. Basically, the API is not thread safe. I was in my code creating a vector for its implementation. Then, problem reduced to writing a code that will ensure only one vector gets created even when multiple processes try to call the function at the same time. I told him how we can do that using singleton design pattern. I then wrote its code and we discussed about lazy and early instantiation in that.

Round 4:
This was the last round with the Azure\xe2\x80\x99s head and some behavioural questions were asked.
Majorly in this my resume projects were discussed.
The design problem we discussed was designing autocomplete API of the search engine, I gave the trie solution as per the data and scenario he gave me. I was asked to write its full working code. Then he came on to concepts and things to be taken care of while designing the search engine. Also, I was majorly asked the question, that why I am looking for a change.

After some 10-15 minutes, I was informed that my interviews went well and I\xe2\x80\x99ll be extended the offer. Today I have it \xf0\x9f\x99\x82

My advice: When we are appearing for interviews having some experience, companies expect us to write full working code covering all test cases. There should difference in the way we, being experienced write the code and a fresher writing the same piece. Also, having knowledge of design problems is a must. They test us on scalability, fault tolerance, reliability, user experience, load handling etc. Keep an open mind and try to think in all prospects when a design question is asked.

I\xe2\x80\x99d like to thanks GeeksforGeeks for their incredible website, contributing on and learning from which has provided me immense knowledge and confidence.

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Microsoft IDC Bangalore Interview | Set 153 (O365 Team)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

For experienced profile

Round 1:

General discussion on career so far.

1. Difference between process and thread
2. Given a long string and a small pattern, find whether any permutation of the pattern in present in the string (Working Code\xc2\xa0 and a dry run expected, not pseudocode). Find the space and time complexity.
3. Toughest technical challenge faced in career so far

Round 2:

1. Given an array of integers, write pseudocode to find the smallest non-negative integer not present in the array (can use additional space)
2. Consider a n*n grid. Suppose each cell in the grid has a value assigned.\xc2\xa0 We can go from each cell in row i to a diagonally higher cell in row i+1 only [i.e from cell(i,j) to cell(i+1, j-1) and cell(i+1, j+1) only] . Write a pseudocode to find a path from bottom row to top row such that the maximum value is obtained.
   Similar Question : GeeksforGeeks Link

Round 3:

1. Suppose you have a binary tree. What is the best way to serialize and send this information such that the receiver can construct the tree correctly. Code not asked.
   Solution : GeeksforGeeks Link
2. Given a n*n grid where most cells are cubicles and m cells (m << n^2) are pantries. There can be walls between two cubicles through which we cannot have a path. Given the locations of walls and pantries, for a given cubicle find the nearest pantry. Working code expected.
3. Interviewer interrupted purposefully while coding Q2 and asked 2 rapid questions
   1. time complexity to find 10th largest number in a heap
   2. time complexity to find 10th largest number in an array

Round 4:

Open ended questions:

1. Consider twitter. The requirement is to show the top 10 trending hashtags at a given time. How will you analyze/store the twitter feed to show this data.
2. Design an elevator system for a building where number of elevators can be increased later.

Round 5:

Hiring manager round:

1. Write a C function that takes a string and delimiter as input, splits the string based on the delimiter and returns a list of resulting sub strings.
2. OS question \xe2\x80\x93 Suppose the current program running has an infinite loop, can you run

another program.

Overall experience : Very quick process. The interview took place in their office and was finished in around 5 hours.

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Microsoft Interview Experience | Set 152 (IDC Software Engineer II)

- Last Updated :\n18 Dec, 2018

Round 1

1. Discussion on authentication and authorization..OAuth 2. how it is used in your project
2. Implement stack using queue and reverse of it
3. find loop in a linklist and remove loop
4. Discussion on sharding and distributed concepts.
5. project discussion and role

Round 2 :

1. implement word search using LL and arrays only
2. One design question for car factory.. basically checking DI for car and engine relationship
3. Flipkart use case, what all web services and module you can think of and how load is distributed and then discussion on search service.

Round 3 :

1. Design discussion on dependency injection
2. question related to https and database security
3. Singleton pattern detail discussion
4. project discussion

Round 4 :

1. One coding question, give next closest greater time e.g. 13:45 \xe2\x80\x93>13:51
2. Java concepts and JMM
3. project discussion
4. One challenging situation and how you handled it

Round 5 :

1. Purely based on projects and deep dive in core modules

Round 6 :

1. Project discussion
2. Basic behavioral and scenario based questions

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 151 (SDE-2 3.5 years experience)

- Difficulty Level :\nMedium
- Last Updated :\n24 Nov, 2017

Round 1:

- Place all numeric characters in string before alphabet characters .
- Using min swaps and O(1) space and Maintain the order of characters.

Round 2:

1. Median of stream of integers.
2. Discuss algo.
3. Shortest common supersequence of 2 strings.
4. Discuss recursive Time complexity and write\xc2\xa0code for best approach decided.

Round 3:

1. Merge 2 sorted linked lists
2. Sort large file using small memory.
3. Kadane algorithm

Round 4:

1. Discuss logging framework
2. Discuss event dispatcher
3. 2 stacks in one array
4. 1 stack and 1 queue in one array
5. 2 queue in one array
6. Garbage collector in Java.

Round 4:

- Discuss projects.
- Design a n reader writer class.

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Microsoft IDC Interview Experience | Set 150 (Off-Campus for Full Time)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

I applied Off campus through Microsoft referral program. Initially the shortlisting was done on the basis of CV.

Round 1:

First round was Online coding round on co-cubes platform. There were 3 Questions to be done in 75 minutes. The questions were:

1. Given an array of integers of size n. Assume zero as invalid number and all other as valid number. Convert the array in such a way that if next valid number is same as current number, double its value and replace the next number with 0. After the modification, rearrange the array such that all 0\xe2\x80\x99s are shifted to the end. **[2 marks]**
   Eg: [2, 2, 0, 4, 0, 8]
   => [4, 4, 8, 0, 0, 0]\xc2\xa0 \xc2\xa0
2. Given an array arr[], find the maximum j \xe2\x80\x93 i such that arr[j] > arr[i] \xc2\xa0 \xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0**[3 marks]**
3. Write a function that accepts root of binary tree as its argument and return the sum of all leaf nodes that are at minimum level (i.e closest to leaf node).\xc2\xa0 \xc2\xa0**[5 marks]**

Students shortlisted were called Hyderabad for interviews.

Round 2:\xc2\xa0(Group Fly round)

1. Given a sequence of words and a limit n (max number of characters on a single line), You need to put the break or end that line such that limit n is not exceeded and also the complete word comes in single line i.e a word does not split into two lines.

   Example:\xc2\xa0
   Its flagship hardware product are the\xc2\xa0Xbox\xc2\xa0video game etc. n=16

   Output:

   ```
   Its flagship\r\nhardware product\r\nare the Xbox\r\nvideo game etc.
   ```

15\xc2\xa0Out of 44 were shortlisted for the next rounds.

Round 3:\xc2\xa0(Technical F2F)

1. The interviewer asked me to introduce myself and my areas of interest in Technologies. I said Machine Learning, then we had a discussion on Machine Learning algorithms.
2. Merge Sort for linked list and array.
3. Reverse a linked list. Both iterative and recursive approach. Comparison between them.
4. Questions regarding my internship experience.
5. Aptitude Question: You are blindfolded and 10 coins are place in front of you on table. You are allowed to touch the coins, but can\xe2\x80\x99t tell which way up they are by feel. You are told that there are 5 coins head up, and 5 coins tails up but not which ones are which. How do you make two piles of coins each with the same number of heads up? You can flip the coins any

number of times.
6. Discussion on my Minor Project.

9 Out of 15 were shortlisted for the next rounds.

Round 4:\xc2\xa0(Technical F2F)

1. Stock Buy Sell to Maximize Profit.
2. Sum of given range using segment tree.
3. How to perform the testing of code. Write all the test cases including the boundary ones for the above two codes.
4. OOPS concept:
   i)Encapsulation
   ii)Overriding and Overloading example
   iii)Real life implementation of abstraction and inheritance.
5. Aptitude Question: 100 people in room with a bulb on the ceiling. A person can see the rest 99 people but not himself. Some people have stickers on their face. Person himself can check the rest 99 people but does not know if he has sticker on his face. Light bulb turns on and off after fixed interval of time. If a person gets to know that he has sticker on his face, he has to move out of the room. At some point of time person comes to know if he has sticker on his face or not. How?
   Finally, he was satisfied with my answers and asked me if I had any questions. I asked him some questions about role and the work Microsoft offers.

7 Out of 9 were shortlisted for the next rounds.

Round 5:\xc2\xa0(Technical + HR)

1. Discussion on Minor Project and work done at JP Morgan during my internship.
2. Tower Of Hanoi Problem.
3. System Diagram of my minor Project and its use cases.
4. Why Microsoft? Why should we hire you?
5. One Change Microsoft can do on one of its products.
6. Why did you opt for Computer Science? Other Basic HR questions. Finally the interview was over. All the candidates were selected and were offered Full Time offer.

Suggestion: Don\xe2\x80\x99t be tensed if you didn\xe2\x80\x99t get an answer. Keep thinking and asking questions and try to interact with your interviewer. Don\xe2\x80\x99t walk off immediately, ask some questions in return. They will give you hints if you are struck.

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 149 (On Campus)

- Difficulty Level :\nMedium
- Last Updated :\n28 Jun, 2021

Round 1:

It was on CoCubes Platform.

There are the following rounds for Microsoft \xe2\x80\x93

- **Quantitative Aptitude**\xc2\xa0\xe2\x80\x93 20 Ques, 20 Mins
- **Technical Aptitude**\xc2\xa0\xe2\x80\x93 20 Ques, 20 Mins
- **Written English Essay Test**\xc2\xa0\xe2\x80\x93 1 Essay 150-180 words, 20 mins
- **Coding Round**\xc2\xa0\xe2\x80\x93 2 Questions, 1 Hour

However, on some Campuses, there are only Coding Round which has 3 Questions to be solved in 75 mins.

- **Number of Questions \xe2\x80\x93**\xc2\xa03 Coding Questions
- **Total Time \xe2\x80\x93**\xc2\xa075 mins

or if Aptitude rounds are also there in Campus then

- **Number of Questions \xe2\x80\x93**\xc2\xa02 Coding Questions
- **Total Time \xe2\x80\x93**\xc2\xa060 mins

Round 2:

1.Given 3 sorted arrays we have to find the minimum absolute difference between the min and max among the 3 elements from the arrays\xc2\xa0https://www.geeksforgeeks.org/find-three-closest-elements-from-given-three-sorted-arrays/

2. Add 1 to a linked list this is a quite easy question.

- Print the level order traversal line by line. I used a queue to solve the problem. He was very much satisfied with my code. so, he asked me a simple question next.
- Given an array and the number. Find two elements whose sum is equal to the given number. First I said\xc2\xa0\xc2\xa0$O(N^2)$ solution. He asked me to optimize. Then I said to use the hashmap. He was satisfied and asked me to write the code. He asked how hashmap is implemented and what is the process inside it.
- He asked for my favourite language. Then he asked me questions about polymorphism and how it is implemented.

Round 3:

It was technical cum HR interview.

- He started the interview by asking HR questions like Why Microsoft should select you?
- Why are you better than other people? He was very impressed by my resume (after seeing co-circular activities).
- Then after 20-25 minutes of HR, he started asking me a coding question.
- The first question he asked me was that there is an infinite stream of numbers and you have to

give the median everytime a number is added (question can be found on geeks for geeks).
- First, i gave him O(nlogn) approach but after thinking for some time, I gave him O(logn) time approach using Heap. He was impressed.

Firstly I have to tell all my previous problem then he gave me the problem similar to coin exchange problem.
Then some questions are asked about Where do you grow? In which field do you want yourself to grow? And finally the Microsoft products you are using like visual studio and then he gave a brief introduction to various fields in the organization.

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Microsoft Interview Experience | Set 148 (Internship IDC Pool Campus)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

Round 1: (Online Coding)

Online coding round on co-cubes platform. 3 Questions 75 mins. Questions are very easy.

1. Given two arrays find the min in first array and max in the second array and return the product of the two elements(2 marks)
2. Given a 2d matrix and a column we have to sort the rows of the matrix based on element present at that column in that row(3 marks)
3. Link the nodes at same level in a binary tree(5 marks)

12 Out of 45 were shortlisted for the next rounds. This is a pool campus Interview A total of 50 students from 5 different colleges in Bangalore were shortlisted for the Interview round.

Round 2: (Group Fly round)

1. Given a sorted string. Like aaaabbccc. You have to modify the string to a4b2c3. Constraints such as we should not traverse the string again. It should be in-place like we should not construct a new string.
   Solution : GeeksforGeeks Link

The aim of this round is to eliminate half of the contestants.

Round 3: (Technical F2F)

This is the first face to face Interview and The interviewer was very strict he was not at all helping me and also he was discouraging me.

- He gave me a easy question in a very complex manner. ultimately the question was just finding the minimum spanning tree.

Round 4: (Technical F2F)

1. Check if a linked list is a palindrome. Without Altering the linked list. Traverse once. Constant extra space. O(n) complexity.
2. Given a matrix that is sorted in row wise and column wise, Search for an element x. He is expecting a complexity in log scale.
3. Implement c++ \xe2\x80\x99s atoi function

The Interviewer gave me a hint for the first question but I was not able to do the first question and he was not encouraging me.

Round 5: (Technical F2F)

1. Given two sorted linked list merge them into a single linked list. You are supposed to remove duplicates while merging you are not suppose to create any new node in the process. In single traversal.
2. You are given an array where each element signify number of jumps that you can make from

that position. You need to find out the minimum number of jumps required to reach the end of the array.

3. Each course is having some dependencies on other courses. In a semester you can take any number of courses but for taking a course all its dependent courses should be taken. You need to find out minimum number of semesters needed to complete all the courses.
   Example: C, Basic data structures, c++(Depends on C), Advanced Data structures(depends on Basic ds), Java (depends on c,c++, Advanced Ds). You can complete all the courses in 3 semesters (Sem1: C,BDS; Sem2: c++,ADS; Sem3: Java)

The interviewer was very helpful encouraging.

Round 6: (Technical + HR)

1. Wap to Reverse a linked list using recursion. (He asked me to explain the solution with a recursive call stack)
2. You are having N blocks of memory create two functions get and release.
   Function Get(x) takes x as input and it should assign x blocks of contiguous memory and return the index where the x starts.
   Function release takes the memory index and frees the memory.
3. He about my Internship experience and work done at Paytm
4. Why Microsoft?
5. Why should we hire you?\xc2\xa0

At each and every round they are testing how good you write code. They asked me to write code for each and every question. They are also checking how good your variable names are and your coding style. They want each and every solution to be optimised in both space and time complexity. Remember that O(2N) is not equal to O(N) for them and also for most of the other companies. They need it in one traversal. Total of 9 students out of 50 was selected. With the help of Geeks for Geeks, I also got selected for the Internship.

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Microsoft Interview Experience | (Internship)

- Difficulty Level :\nHard
- Last Updated :\n15 Nov, 2017

Round 1(Online round):
This was basically an online round consisting of three coding questions and 90 minutes were given. One was simple ad-hoc, other was string manipulation and the last one was LCA (lowest common ancestor).

https://www.geeksforgeeks.org/lowest-common-ancestor-binary-tree-set-1/ .

Round 2(Group-Fly Round): We were given two questions to write code in 45 minutes. First question was that we were given an expression and to reverse the expression of the string for
ex:

```
input :- 3 / 45 + 6\r\n\r\noutput:- 6 + 45 / 3
```

https://www.geeksforgeeks.org/reverse-words-in-a-given-string/

Second question : It was a question based on Longest Increasing subsequence rather it had to find LIS in a 2-d matrix and it could start from any position and can move in any four direction.

For ex:- input : \xe2\x80\x93 {{9, 9, 8},{6, 9, 7}, { 2, 1, 7}}

output : 4 1->2->6->9

https://www.geeksforgeeks.org/longest-increasing-subsequence/

Round 3 (Technical Interview): It was vis-a-vis interview. The interviewer asked me about my projects. Then he asked me Page Thrashing in OS, simple questions based on Deadlock. Later on he also asked me to show NAND and NOR are universal gates and to convert an expression using one of the universal gates. Later on he asked me Next Greater number with same set of digits .

https://www.geeksforgeeks.org/find-next-greater-number-set-digits/

Round 4 (Technical Interview): I was called for the second interview where I was askeda tough question on Probablity and then Dynamic Programming i.e. LCS.

https://www.geeksforgeeks.org/longest-common-subsequence/

Round 5 (Technical Interview): It was the last interview where I was asked whether I was comfortable with linked lists. The questions was that the structure of the node is changed i.e.

```
struct Node{\r\nint data;\r\nstruct Node* next\r\nstruct Node* nextGreater ;\r\n}
```

you have to assign next Greater to the correct node .

For example:-

```
 7->3->8->NULL
```

output:- linked list in which node value 7 nextGreater points to node value 8, node value 3 nextGreater points to node value 7 and node value 8 nextGreater points NULL since there is no greater element than 8.

Note :- The interview experience was quite good and they focused on all the core concepts of computer science subjects. Keep calm and stay polite. **GeeksforGeeks was a lot of help to me** as it helped me a lot in my preparation.

All Practice Problems for Microsoft !

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Microsoft IGD Interview Experience | Set 146 (On Campus)

- Difficulty Level :\nMedium
- Last Updated :\n14 Nov, 2017

Round 1: Aptitude Round

It consisted of 4 sections namely General Aptitude (20 minutes, 20 questions), Technical Aptitude (20 minutes, 20 questions), Coding (1 hour, 2 questions), and Written English Test (20 minutes, 1 essay of 150-180 words).\xc2\xa0 Since there was no negative marking, it was advisable to attempt all the questions.\xc2\xa0 In the General and Technical aptitudes taken together, I was able to solve 37 and guessed 3.\xc2\xa0 The questions were easy but lengthy so I had to manage the time accordingly.\xc2\xa0 Before every section, the rubric must be read thoroughly.

General aptitude was a melange of questions from logical reasoning, relations, patterns, and sequences.\xc2\xa0\xc2\xa0Technical Aptitude consisted of questions on\xc2\xa0OS,\xc2\xa0DBMS,\xc2\xa0Data Structures,\xc2\xa0Algorithms, and\xc2\xa0OOP Concepts using C++.\xc2\xa0 The Coding round required the candidate to solve 2 questions, allotted randomly from a set of questions, based on simple algorithmic concepts.\xc2\xa0 Finally, the Written English Test (WET) required the candidate to write an essay on the given topic (again allotted randomly).\xc2\xa0 Care was to be taken that the number of words in the essay strictly lay in the given range.\xc2\xa0 A few topics for WET that I remember were \xe2\x80\x9c*Impact and influence of media on the modern society\xe2\x80\x9d* and *\xe2\x80\x9cIs CGPA the most important criterion in today\xe2\x80\x99s schools?\xe2\x80\x9d*

Round 2: Technical Round (1 hour)

The round started with a brief introduction about myself and then the interviewer started with questions from my CV.\xc2\xa0 I had 2 internships, 2 academic projects, and 2 Web Development Projects.\xc2\xa0 First, he asked me to describe what I had learned in my last internship.\xc2\xa0 Then he randomly picked a WebD project and asked for a brief explanation after which he asked me draw its ER Diagram.\xc2\xa0 After I finished explaining the ER Diagram in detail, he asked me to write a SQL Query based on my ER Diagram.\xc2\xa0 It was a simple join query, which I solved using a nested query and explained how it can also be written using JOIN.

Next was a question on the practical application of OOP Concepts \xe2\x80\x93 *\xe2\x80\x9cSuppose a grocery store has a discount offer on a certain product but the customers are segregated into different groups based on some criteria such that every person gets a different discount.\xc2\xa0 How will you design a system for this scenario?\xc2\xa0 Assume that a customer may revisit the store and he/she will not re-enter all the customer details after the first visit.\xe2\x80\x9d* Simple \xe2\x80\x93 Connect your object oriented system to a database and use method overloading for the different groups.

After these questions came the puzzles.\xc2\xa0 The first one was the \xe2\x80\x9cThree Ants and Triangle Problem\xe2\x80\x9c.\xc2\xa0 I was able to solve it in about 2 minutes, after which the panel started making arbitrary puzzles like *\xe2\x80\x9cA family has 3 sisters.\xc2\xa0 1 is playing a piano, 1 is playing chess, and 1 is cooking food.\xc2\xa0 Assuming that all the 3 sisters can do all the three tasks, what is the probability of 2 winners in each case?\xe2\x80\x9d*\xc2\xa0 After I gave a thought on the question for some time, I asked for some additional information to which they said \xe2\x80\x93 *\xe2\x80\x9cThink of the number of participants in each task and you can assume each task to be a competition\xe2\x80\x9d.*\xc2\xa0 Using this hint, I was able to crack the question.\xc2\xa0 Piano can be played by only 1 person at a time, so probability of 2 winners is

0.\xc2\xa0 Chess is played by 2 players at a time and either 1 player wins or the game is drawn, hence the probability of getting 2 winners is again 0.\xc2\xa0 In the task of cooking, all 3 can participate together.\xc2\xa0 Hence the probability of 2 winners in cooking is 2/3.\xc2\xa0 Finally, they asked me questions on File Indexing and the advantages and disadvantages of the different types of indexing and then I was cleared for the next round.

Round 3: Managerial Round (25 \xe2\x80\x93 30 minutes)

This round started with the interviewer asking me to describe myself apart from the things mentioned in my CV.\xc2\xa0 Then she threw some scenarios and situations and wanted to assess my approach to those problems, and not the solution in particular.\xc2\xa0 Some of the situations were \xe2\x80\x93 *\xe2\x80\x9cYou are given a project that uses some technology that the entire company is unaware of.\xc2\xa0 You have to finish the project in a day.\xc2\xa0 What will you do to succeed in this task and if you fail how and when will you approach your team leader? \xe2\x80\x9d*, *\xe2\x80\x9cYou have a dearth of time and resources and you need to make a quick and critical decision.\xc2\xa0 How will you handle this situation?\xe2\x80\x9d*, and *\xe2\x80\x9cYou have a client who is the owner of a big franchise.\xc2\xa0 He decides to give loyalty points to his customers and once a customer\xe2\x80\x99s loyalty points crosses 1000 points, he gets a free ice-cream immediately.\xc2\xa0 Assuming that the customer himself does not go to an ice-cream shop but necessarily has to get an ice-cream, propose a solution for this scenario.\xe2\x80\x9d*\xc2\xa0 Then she asked me to give examples of how I had worked in teams before, whether I had any leadership experience and how did I handle disputes, if any, in a team that I had led.

Round 4: HR Round (1 hour)

This round began with the basic questions \xe2\x80\x93 *\xe2\x80\x9cWhy do you feel that Microsoft should hire you?\xe2\x80\x9d* and *\xe2\x80\x9cWhy do you want to join Microsoft? \xe2\x80\x9d\xc2\xa0* Then he asked me develop an Object Oriented Model of the Indian Judicial System and gave me 5-10 minutes for it.\xc2\xa0 Upon reviewing it, he pointed out some flaws in the model and asked me the solutions to these problems, sometimes giving his views and opinions on the problems as well.\xc2\xa0 Next he asked me what I had done in my most recent internship.\xc2\xa0 I started explaining the Chatbot which I had worked on and then answered a few questions on chatbots.\xc2\xa0 Then he asked me how I kept myself updated with technology and asked me to explain some of the recent developments in technology.\xc2\xa0 I started with Virtual Reality, answering questions like *\xe2\x80\x9cHow is it better than TVs and Smartphones? \xe2\x80\x9d*, *\xe2\x80\x9cWhy is it a \xe2\x80\x98reality\xe2\x80\x99?\xe2\x80\x9d*, etc. and then proceeded to some recent products by Microsoft like Azure and Microsoft Dynamics.

With this round, my interview was over and in the evening I was among the 5 selected candidates out of 71.\xc2\xa0 A piece of advice to all the students: build a strong vocabulary and keep your cool during the interview.

This article is contributed by\xc2\xa0AAYUSH KUMAR VERMA\xc2\xa0(Batch of 2018, Indian Institute of Engineering Science and Technology, Shibpur).

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 145 (Pool Campus \xe2\x80\x93 Internship)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

Online coding Round \xe2\x80\x93
550 students sat for the online coding round and CGPA cut off was 7. Three coding questions were asked to us and we were given 90 minutes to solve three questions.

Round 1 \xe2\x80\x93 Online assessment \xe2\x80\x93
Platform \xe2\x80\x93\xc2\xa0cocubes.com
Duration \xe2\x80\x93\xc2\xa090 minutes
Format \xe2\x80\x93\xc2\xa03 Coding Questions
Maximum Score \xe2\x80\x93\xc2\xa010 marks

1. Complete the following function \xe2\x80\x93

```
int findMax(TreeNode arr[], int size_of_array)
{
\xc2\xa0\xc2\xa0
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0// code goes here
}
\xc2\xa0\xc2\xa0
// Where TreeNode is a
// structure defined as:
struct TreeNode {
\xc2\xa0\xc2\xa0
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0int feet;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0int inches;
};
```

   The function was supposed to return the maximum value of TreeNode. This was supposed to be done by calculating (12*feet+inches) for each element. It constituted of 2 marks.

2. We have been given two sorted linked lists and we had to combine both inked lists such that the combined list is also in sorted but in descending order. For Example: \xe2\x80\x93
   List 1: \xe2\x80\x93 1 ->3 -> 5 -> 7
   List 2: \xe2\x80\x93 2 -> 4 -> 6
   Result: \xe2\x80\x93 7 -> 6 -> 5 -> 4 -> 3 -> 2 -> 1
3. We had been given a linked list and we had to segregate its even and odd position nodes in such a way that odd position nodes before even positioned nodes and even positioned nodes had to be appended after odd positioned nodes but in a reverse order. We were not allowed to use any extra space.
   Ex \xe2\x80\x93 linked list: \xe2\x80\x93 1 -> 2 -> 3 -> 4 -> 5 -> 6
   Output: \xe2\x80\x93 1 -> 3-> 5 -> 6 -> 4-> 2.

10 students were selected for further rounds of interview from our college.

Group Fly round \xe2\x80\x93 It was a Microsoft pool drive so around 120 students from different colleges came for the pool drive. We were asked 2 programming questions and we were given 45

minutes to solve those questions.

1. We are given three sorted arrays and we had to find three elements from three sorted arrays such that the difference between the maximum and minimum of those three elements should be minimum. All the elements should be from different arrays. For Example: \xe2\x80\x93
   A [] = {1, 4, 10}
   B [] = {2, 15, 20}
   C [] = {10, 12}
   Output: 10 15 10
   10 from A, 15 from B and 10 from C
   Solution: https://www.geeksforgeeks.org/find-three-closest-elements-from-given-three-sorted-arrays/
2. We have been given a number which is represented in the from of a linked list and we have to add one to the number and return the modified linked list after addition.
   For Example: \xe2\x80\x93 num = 123 {1 -> 2 -> 3}
   Result: \xe2\x80\x93 124 {1 -> 2 -> 4}
   Solution: https://www.geeksforgeeks.org/add-1-number-represented-linked-list/

4 students from our college were selected from the group fly round out of 10 for further technical rounds of interview.

Technical Interview (Round 1) \xe2\x80\x93

1. He asked about my introduction as he went through my resume and asked me to introduce myself and then shifted on to technical questions.
2. Given a value N, if we want to make change for N cents, and we have infinite supply of each of S = {S1, S2, Sm} valued coins, how many ways can we make the change? The order of coins doesn\xe2\x80\x99t matter.
   For example, for N = 4 and S = {1, 2, 3}, there are four solutions: {1, 1, 1, 1}, {1, 1, 2}, {2, 2}, {1, 3}. So, output should be 4. For N = 10 and S = {2, 5, 3, 6}, there are five solutions: {2, 2, 2, 2, 2}, {2, 2, 3, 3}, {2, 2, 6}, {2, 3, 5} and {5, 5}. So, the output should be 5. It was a dynamic programming problem and I tried to solve it although I was not aware of the optimized approach.
   Solution: https://www.geeksforgeeks.org/dynamic-programming-set-7-coin-change/
3. Given two integers x and n, write a function to compute x^n. We may assume that x and n are small and overflow doesn\xe2\x80\x99t happen. For Example: \xe2\x80\x93
   Input: x = 2, n = 3
   Output: 8
   Input: x = 7, n = 2
   Output: 49
   It was also a dynamic programming problem but I started with a brute force approach and then a recursive solution but I was not able to reach to the optimized approach.
   Solution: https://www.geeksforgeeks.org/write-a-c-program-to-calculate-powxn/

Only **1** out of 4 students from our college made it to the second technical interview.

Unfortunately, I was also rejected after my first technical interview from my college.
The interview experience was quite good and they focused on all the core computer science subjects. Geeks for geeks was a lot of help to me as it helped me in my placement preparation and provided almost all content that was necessary for placement preparation.

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Microsoft Interview Experience | Set 144 (Pool Campus \xe2\x80\x93 Internship)

- Difficulty Level :\nMedium
- Last Updated :\n13 Nov, 2017

Online coding Round \xe2\x80\x93
550 students sat for the online coding round and CGPA cut off was 7. Three coding questions were asked to us and we were given 90 minutes to solve three questions.

Round 1 \xe2\x80\x93 Online assessment \xe2\x80\x93
Platform \xe2\x80\x93\xc2\xa0cocubes.com
Duration \xe2\x80\x93\xc2\xa090 minutes
Format \xe2\x80\x93\xc2\xa03 Coding Questions
Maximum Score \xe2\x80\x93\xc2\xa010 marks

1. Complete the following function \xe2\x80\x93

```
int findMax(TreeNode arr[], int size_of_array)
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\xc2\xa0\xc2\xa0
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0// code goes here
}
\xc2\xa0\xc2\xa0
// Where TreeNode is a
structure defined as : struct TreeNode {
\xc2\xa0\xc2\xa0
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0int feet;
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0int inches;
};
```

   The function was supposed to return the maximum value of TreeNode. This was supposed to be done by calculating (12*feet+inches) for each element. It constituted of 2 marks.

2. We have been given two sorted linked lists and we had to combine both inked lists such that the combined list is also in sorted but in descending
   order, e.g.,
   List 1 :- 1 ->3 -> 5 -> 7
   List 2 :- 2 -> 4 -> 6
   Result :- 7 -> 6 -> 5 -> 4 -> 3 -> 2 -> 1
3. We had been given a linked list and we had to segregate its even and odd position nodes in such a way that odd position nodes before even positioned nodes and even positioned nodes had to be appended after odd positioned nodes but in a reverse order. We were not allowed to use any extra space.
   Ex \xe2\x80\x93 linked list: \xe2\x80\x93 1 -> 2 -> 3 -> 4 -> 5 -> 6
   Output: \xe2\x80\x93 1 -> 3-> 5 -> 6 -> 4-> 2.

10 students were selected for further rounds of interview from our college.

Group Fly round \xe2\x80\x93 It was a Microsoft pool drive so around 120 students from different colleges came for the pool drive. We were asked 2 programming questions and we were given 45

minutes to
solve those questions.

1. We are given three sorted arrays and we had to find three elements from three sorted arrays such that the difference between the maximum and minimum of those three elements should be minimum. All the elements should be from different arrays.
   For Example :-
   A[] = {1, 4, 10}
   B[] = {2, 15, 20}
   C[] = {10, 12}
   Output: 10 15 10
   10 from A, 15 from B and 10 from C
   https://www.geeksforgeeks.org/find-three-closest-elements-from-given-three-sorted-arrays/
2. We have been given a number which is represented in the from of a linked list and we have to add one to the number and return the modified linked list after addition.
   For Example :- num = 123 {1 -> 2 -> 3}
   Result :- 124 {1 -> 2 -> 4}
   https://www.geeksforgeeks.org/add-1-number-represented-linked-list/

4 students from our college were selected from the group fly round out of 10 for further technical rounds of interview.

Technical Interview (Round 1) \xe2\x80\x93

1. He asked about my introduction as he went through my resume and asked me to introduce myself and then shifted on to technical questions.
2. We are given the stock market prices of a particular stock for a previous day and we had to find out maximum profit that I could generate by buying and selling a stock on that particular day for only one time. I gave him a O(n) approach to buy and sell the stocks at most one time at a particular date and he was quite satisfied by my approach and then later he asked to ode it and he was very friendly and supportive and helped me in writing the code.
   https://www.geeksforgeeks.org/stock-buy-sell/
3. He modified the previous question that the stock prices of a particular stock were given for a particular day and we had to buy and sell the stock at most two times on that particular day and we had to find the maximum profit that could be attained by transacting on that particular day. It was a dynamic programming problem and with the help of the interviewer I was able to reach to the O(n) solution. He was quite satisfied by my approach.
   https://www.geeksforgeeks.org/maximum-profit-by-buying-and-selling-a-share-at-most-twice/
4. He asked at the end do you have any questions for me?
   I asked about different roles and teams at Microsoft and the flexibility of changing the teams according to our interests.

Only **1** out of 4 students from our college made it to the second technical interview.

Technical Interview (Round 2) \xe2\x80\x93

1. The interviewer first of all briefed about himself and told me about his experience about working at Microsoft. He then shifted on to technical Questions.
2. He asked that I have been given a binary tree ad I had to find the maximum path sum in that binary tree such that the path starts and ends at the any node in the binary tree. All the nodes of the binary tree are positive. I explained him the approach for solving the problem and then he asked to code it on paper.
   https://www.geeksforgeeks.org/find-maximum-path-sum-in-a-binary-tree/
3. He asked whether I am comfortable with N-ary tree but I denied and then he asked a bitwise operator problem. You have been given a number and you have to find the next greater number

such that it has the same number of set bits as in the given number.
For Example :-
Number = 4 (100)
Result = 8 (1000)
This was a bit tricky question and first I explained him the brute force approach and then he asked me to further optimize it. He helped me in reaching to the solution and in writing the code.
https://www.geeksforgeeks.org/next-higher-number-with-same-number-of-set-bits/

4. He asked me in the last whether I had any question for him?
   I asked him what should be the future strategy of an intern when he is selected and what should he learn that is beneficial for his professional growth.

Unfortunately I was also rejected after my second technical inter view from my college.
The interview experience was quite good and they focused on all the core computer science subjects. Geeks for geeks was a lot of help to me as it helped me in my placement preparation and provided almost all content that was necessary for placement preparation.

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Microsoft IDC Internship Experience | Set 143 (On Campus)

- Difficulty Level :\nMedium
- Last Updated :\n07 Nov, 2017

Microsoft came on our campus on 5th August 2017.

Round 1: It was an online coding round in which 3 questions were asked. People with 7+ CGPA were allowed to sit. More than 250+ students participated in this round. The three questions asked in my test were (every student got different questions):

1. Find the leaders in an array. Its a geeks for geeks question. Please refer to it.
2. The second question was to find the maximum length of common suffix and prefix in a string.
3. The third question was, a tree was given and along with left and right pointers, a next pointer was given in which we need to connect every node\xe2\x80\x99s next pointer to its right sibling. If a node has no right sibling, make next pointer NULL. It can be solved using a queue. Expected Time complexity: O(n)

It was a 75 minutes coding round and I solved all the three questions in 17 minutes. Only disadvantage or consider that as a challenge\xc2\xa0that Microsoft takes the 1st round on cocubes where when you submit a question, you get to see only 2 test cases. So you have to take care of time complexity here. If you write a code which has bad complexity then it might run for those 2 test cases but may not run for other hidden test cases. So, be careful.

Round 2: \xc2\xa0 Around 50 students got shortlisted and I was one of them for the second round. Microsoft then came on campus on 4th November 2017. It was a group fly round in which 5-6 students are given a mentor and all the students are given 2 questions. We need to solve them on paper pen within 45 minutes. Here, you were asked to write an optimal code, explain the code and write its test cases. Keep on talking with the mentor and try to discuss your approach with them. \xc2\xa0Our questions were:

1. An equation was given like this: 27*63 + n Parts + 337/32. We needed to reverse it and output it like 32/337 + n parts + 63*27. I solved this in O(n) time complexity and O(1) space complexity.
2. This question was little tricky. We were given a 2-D matrix. You can go in 4 directions: up, down, right and left. You needed to find the length of the longest increasing subsequence path. It can be solved using DP, but I was not able to apply DP due to time constraint so I solved it using recursion but my mentor seemed okay with it.

Question was :[[9, 9 ,\xc2\xa04]

[8, 1, 8]

[5, 4,\xc2\xa09]]

So the answer should be 4. \xc2\xa0Longest path is 4->5->8->9.

Round 3:

After 1 hour, results were announced and I was selected. Approx 25 students were selected for interview and after getting selected my interview got started in just 5 minutes.

My interviewer was my mentor during my group fly round. She was a very calm and cool interviewer. She started the interview by asking me to introduce me, then I told her about my Machine Learning

Projects.

- After talking on ML, she started asking coding questions. She told me that as you were stuck in the 2nd question of group fly, I would ask you array questions. I was very happy from inside as I had prepared it really well. So, she asked me a very easy question. It was based on Kadane\xe2\x80\x99s Algorithm.
- First, I told her that it could be solved in O(n^3). Then I told her the kadane\xe2\x80\x99s algorithm approach and gave her O(n) solution. She then asked me to write code for it. Then she told me she wanted to increase the level of the question, so she asked me if I was comfortable in it. I said yes and then she asked me how will you find the length of the longest substring in an array.
- I again gave her the O(n^3) approach. She told me to do it in O(n). So I did solve it in O(n) using Dynamic Programming. She then wanted to confuse me by asking what happens if there are more than 1 substring of maximum length, I told her the answer. T
- hen she asked me what to do if I want to print all those substrings. I gave her the answer. Then she asked me to code it on pen paper. In the End, she was satisfied.
- She asked me the final question that if 2 numbers (digit by digit)are stored in a linked list in reverse order, how will I add them and store it in a new linked list. I told her my answer and coded the same.
- Then she told me to tell all the test cases for it. I gave her the maximum test cases but she was expecting more test cases. Then she herself told that there can be a test case if the numbers are floating point numbers. Then she asked me if I wanted to ask any question to her, I asked her 2-3 questions and in the end, she was satisfied and told me to wait outside.

Round 4:\xc2\xa0 Just after 5 minutes, I got called for the second interview. The interviewer was a 45-50 old experience guy.

- He started the interview by asking HR questions like Why Microsoft should select you?
- Why are you better than other people? He was very impressed by my resume (after seeing co-circular activities).
- Then after 20-25 minutes of HR, he started asking me a coding question.
- The first question he asked me was that there is an infinite stream of numbers and you have to give the median everytime a number is added (question can be found on geeks for geeks).
- First, i gave him O(nlogn) approach but after thinking for some time, I gave him O(logn) time approach using Heap. He was impressed.
- The next question he asked was you are given a number, let\xe2\x80\x99s say 9733, then you have to find the next smallest higher palindrome number i.e. 9779 (must be bigger than 9733 and it should be smallest, like 11111 is bigger than 9733 but definitely 9779<1111, So 9779 should be output). I, first of all, got stuck in this question but then he gave me some hint and I was able to solve it. He asked me to code it. I did it.
- He was very happy. We shook hands and he said that we\xe2\x80\x99ll tell you the results. I was shocked as i was expecting 2 more interviews.
- I asked him that if that was my last interview, he said yes and told me to wait outside.

After 5 mintues, the Microsoft co-ordinator called me and told me that i have been given offer to Microsoft IDC, hyderabad and i was really speechless at that moment :\xe2\x80\x99). Best moment of my life. I just want to give advice to you all that keep practicing coding on GFG (i did GFG very sincerly from 2 months before interview) and now will be going to hyderabad next year. Thank you GFG \xf0\x9f\x99\x82

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Please write comments if you find anything incorrect, or you want to share more information about

the topic discussed above.

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Microsoft Interview Experience | Set 142 (Pool Campus)

- Last Updated :\n02 Jul, 2019

Round 1:
Online Round: It was conducted on cocubes.com. Around 200 students gave the test. It consists of 3 questions and questons was shuffled for every student no two students get the same set of questions.

1. https://www.geeksforgeeks.org/find-number-closest-n-divisible-m/
2. https://www.geeksforgeeks.org/lowest-common-ancestor-in-a-binary-tree-set-2-using-parent-pointer/
3. given a number n check whether its binary representation is palindrome or not.

Round 2:

Around 15 students were shortlisted for group fly round. In group fly round 2 questions were given and you have to write the code for that question.

1.Given 3 sorted arrays we have to find the minimum absolute difference between the min and max among the 3 elements from the arrays https://www.geeksforgeeks.org/find-three-closest-elements-from-given-three-sorted-arrays/

2. Add 1 to a linked list this is quite easy question.

For group fly round you have to write the most clear and understandable code along with all the **testcases** that came in our mind along with the **time complexity** of the code.

After the group fly round 16 students were called for interview and then they

Round 3:

Now the personal interviews starts. Each round was an elimination round.

1st Interview: One question of dp was asked in this round. You have to design the problem and give the various approaches i didnot remember the exact questions.

IInd Interview: In this round first problem was asked to convert a string to an integer(atoi).
Second was to implement queue using single stack and two stack.
Some questions were asked on object oriented programming.
Also some questions like half adder and full adder.(How to draw a circuit diagram) . How to implement a priority queue.
Some os related questions are also asked.

IIIrd Interview: It was technical cum HR interview.

Firstly I have to tell all my previous problem then he gave me the problem similar to coin exchange problem.
Then some questions are asked like Where do you grow? In which field do you want yourself to grow? And finally the Microsoft products you are using like visual studio and then he gave a brief introduction on various fields in the organization.
Finally the interview was over. All the best. Give your best and talk about your as much as you can. In this way you easily brag the offer.

Thank you GeeksforGeeks for preparation.

If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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Microsoft Interview Experience | Set 141 (Off-Campus \xe2\x80\x93 Online Coding Test for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n06 Nov, 2017

The online test was conducted on CoCubes on 2017, 5th November. The test was webcam enabled to avoid any kind of cheating. You cannot open any other tab or minimize the window. It consisted of 3 coding questions.

TIME LIMIT: 75 minutes
(*) Marks(Qn-1) = 2

(*) Marks(Qn-2) = 3

(*) Marks(Qn-3) = 5

Question 1: Write a function which accepts an integer array and its size and modifies the array in the following manner:

```
\r\n1) If the elements of index i and (i+1) are equal then, double the value at index i\r\nand replace the element at i
```

Question 2: Write a function which accepts an integer array and its size and returns the maximum index difference i.e. (i-j) such that array[i] < array[j] and i < j.\nIf there is no such case, return -1 .

```
\r\nInput: 2 0 3 5 6 1\r\nOutput: 4\r\n\r\nThere was only one test case given which is mentioned above. But I am provid
```

Question 3: Write a function which accepts the root of a tree, and returns a Linked List which contains the leaf nodes of the tree from left to right order. Assumptions:

```
\r\n(*) Structure of the node of tree is as follows:\r\nstruct TreeNode\r\n{\r\n    int data;\r\n    struct TreeNode* l
```

Keep practicing questions from GeeksForGeeks.

This article is contributed by **MAZHAR IMAM KHAN**. If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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Microsoft Interview Experience | Set 140 (On-Campus For Internship)

- Difficulty Level :\nExpert
- Last Updated :\n18 Dec, 2018

Written Test:\xc2\xa075 minutes online round (Cocubes) in which 3 simple questions were asked. A pool of questions was there and each person will get random questions in each difficulty level. CGPA cutoff was 7. Nearly, 45 people appeared for the test.

- Given an array of penalties, an array of car numbers and also the date. Output the total fine which will be collected on the given date.(Fine is collected from odd-numbered cars on even dates and vice versa). (2 marks).x

  ```
  Input:\r\nCar numbers = {2375,7682,2325,2352} \r\npenalties = {250,500,350,200}  \r\nDate = 12 \r\nAns = 600\r\n
  ```

- Find the length of the longest proper prefix which is also a suffix.(3 marks).
- Count BST subtrees that lie in a given range.(5 marks).

After submitting, more rigours test cases were run. Extra marks are awarded for time and space optimized solutions. 14 people were selected for the next round.

Suggestion: Check each and every edge case and try to avoid $O(N^2)$ solutions.

Group fly round: It was a pool interview. Around 50 students were selected from different colleges.\xc2\xa0Each group was assigned a mentor and consisted of 6-7 members. He asked 3 questions which were very easy.

- Find the missing number in the array
- Given a linked list. Find if it is palindrome or not. O(1) space.
- Convert the number to words. (0<= n <= 99,99,999).

  ```
  Input: \r\n5708 = five thousand seven hundred eight.
  ```

we have to write the code (complete code) on the paper and the mentor will come to see our approach. The mentors are really helpful and encouraging. They demanded the code with O(N) time and O(1) extra space. 50% of the students are eliminated after this round.

Suggestion: Try to talk to the mentor and discuss your approach with him. Be very fast in this round as everyone will be equally good (Try to complete writing the code first).

Round 1 (Technical \xe2\x80\x93 1h 30min):

\xc2\xa0 The interviewer was a senior guy in Microsoft. He said he has 19 years of experience. He directly started with a question.

- Given two linked lists. Return True if all the elements in the first list are present in the second list.

  ```
  Input:\r\nL1: 1->2->3\r\nL2: 2->4->1->5->3\r\nAns: True\r\n
  ```

  First, I told to use hashmap and to store and compare. Then he said no to use extra space. Then I said to traverse the two lists and delete the node from the second list whenever you find a match. He was satisfied with the approach and asked me to write it.

- Given a sorted rotated array and an element. Return the index of the element. I said O(n) approach first. Then I said to use binary search to find the pivot and then search the element. He asked if I can do it in one pass binary search. After discussing the approach he asked me to write the code.

Suggestion: Take your time. Write neat and proper code. Do rough work on another page. Only if you are sure then start writing the code.

Round 2 (Technical \xe2\x80\x93 1h 30min):

The interviewer was very friendly and jovial. He asked me to introduce my self and meanwhile, he was looking at my cv. He said he will ask one question and I should write the code within 5 minutes.

- Print the level order traversal line by line. I used a queue to solve the problem. He was very much satisfied with my code. so, he asked me a simple question next.
- Given an array and the number. Find two elements whose sum is equal to the given number. First I said\xc2\xa0\xc2\xa0$O(N^2)$ solution. He asked me to optimize. Then I said to use the hashmap. He was satisfied and asked me to write the code. He asked how hashmap is implemented and what is the process inside it.
- He asked for my favorite language. Then he asked me questions on polymorphism and how it is implemented.

This round was very easy. The interviewer just sees your confidence and approach to the problem. While writing the code, don\xe2\x80\x99t be silent try to talk to the interviewer and tell him your approach.

Round 3 (Technical + HR \xe2\x80\x93 1h 30min):

This was the toughest interview. The interviewer was very strict and smart. He saw my projects and asked me to explain one project on machine learning. I started saying but he intervened and said I will ask you only one question. you can answer it and go.

- You are given with a string with scrambled characters and the dictionary. Find all possible valid words which can be formed from the given string. I said to use Trie to store the dictionary and perform DFS to search in it. Then he said not to do unnecessary traversals. Then I asked him in what complexity he want. He said the best I can do. Then I told him to hash all the occurrence of the characters in each string in the dictionary. He asked me to prove that the hash function is collision free. I tried for a long time and he said it\xe2\x80\x99s okay.

Since I couldn\xe2\x80\x99t answer, he asked me few more questions on HR. Finally, he was satisfied with my answers and asked me if I had any questions. I asked him some questions about his role and my work in the internship.

Suggestion: Don\xe2\x80\x99t be tensed if you didn\xe2\x80\x99t get an answer. They will just see how you approach the problem and how can you handle the stress. Keep thinking and asking questions and try to interact with your interviewer with a smile on your face. Don\xe2\x80\x99t walk off immediately, ask some questions in return.

The interview experience was really good. Interviewers were so friendly and smart. They will give you hints if you are struck. Geeksforgeeks helped me a lot in preparing for the interview. Almost all the question were already available on GeeksforGeeks.

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Microsoft Interview Experience | Set 139 (For Internship)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

Around 100 applied for the first round of Microsoft Internship offer. Basic Criteria was to have a CGPA of greater than 7.00.

Round 1:

Three questions were given to everyone. First had a weightage of five marks and remaining two were ten marks. Cocubes conducted this round. Results were announced after 5 days.

- Given an array of integers you have to find the farthest co-prime for all the elements in the array, in the range [2-250].

```
\r\nExample: [2,5,6] answer should be [ 249,249,247]\r\n         [5,57,8] answer should be [ 249,2,249] \r\n         //
```

- Given a linked list where each node has two data values and a next pointer. You have to find number of trends. A trend is said to arise when slope of adjacent nodes do not match.
Also slope formula is given : (y2-y1)/ (x2-x1)

```
\r\nExample : 1,2 -> 2,3 -> 3,2 -> 4,1 ->\r\nNow slope of first two nodes is (3-2)/(2-1) \r\ni.e first and second node.
```

Finally number of trends for the given linked list is the answer.

- Given two binary trees, find second tree is sub tree of first tree if so return the number of nodes in second tree else return -1.

The selection to next round is based on the cgpa and number of questions solved.
Around 40 were selected for the second round. Luckily I cleared this round as I did only one question(10 mark) fully correct and remaining two partially, but I had a good CGPA(9.33).

Round 2 (Group Fly) :

1. Given two linked lists each representing a number, you have to add the two linked list and return the third list as the result. They actually saw how we approached the problem and how we handle all the test cases and also the way in which we write code.

   12 were selected for the next round.

Round 3 (Technical F2F) :

The interviewer was a cool guy. I formally introduced myself.

- First one was a technical question. He drew a tree and asked me how will you do level order traversal. I said I will use queue.
- Then he gave the question \xe2\x80\x9cZig-Zag level order traversal\xe2\x80\x9d which is similar to this
https://www.geeksforgeeks.org/level-order-traversal-in-spiral-form/
I told my approach first then he asked me to write code for my approach. It took me around five minutes to complete the code. Then he asked me to do some test runs for all the edge cases. He is satisfied with my approach.
- He then moved to OS. Something around how paging is implemented and what are the disadvantages of paging. The interview lasted more than 1 hour

.(More about OS)

Within five minutes result was announced and I have to attend second F2F in another 5 minutes.

Round 4 (Technical F2F) :

As usual I introduced myself to the interviewer.

- First question was given a tree print the leftmost node in the last level of the tree. I said that I will find the height of the tree, and then do level order traversal to print the first node in the tree. He said he want the answer in single traversal. After pondering for a while I came up with a solution. He was satisfied with that.
- Second question was reverse every k nodes in a linked list. He asked me to write the code. I wrote the code in five minutes with test cases. I ran few test cases on the code I wrote.
- Then he asked me how will implement newsfeed of facebook? Then we were talking about this topic for around 20 minutes.

After this interview is over, I was asked to wait outside. I was informed that I have final round tomorrow.

Final Round(F2F) :

1. He is really cool(I met him during my internship period). First, he was speaking about my project. He asked me if you were given chance to improve your project what will you do? We were speaking about the project for about 25 minutes.
2. Then he gave a \xe2\x80\x98C\xe2\x80\x99 code and asked me to write test cases for it. He gave me implementation of itoa() function in C. I said this function won\xe2\x80\x99t work for n=0 and it will return null. Also the resultant character buffer which stores and returns the answer is declared local to the function. I pointed those two errors.
3. After this he asked do you have any questions? I asked him what and where should I improve? He said you should concentrate on design part and everything else is okay.

   Tips for preparation :
   Really I would like to thank geeks for geeks for keeping the content in such an organized manner. Do regularly participate in competitive programming. (spoj,codechef,codeforces). Be confident at any stage of interview. Just enjoy the interview process.

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Microsoft Interview Experience | Set 138 (Off-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n18 Jun, 2020

Hi all, I recently gave an interview at Microsoft for a particular team. I got this opportunity via referral.
There were around 30 people who came for the interview process, some were experienced and some were freshers like me. As there were around 30 people, no written round or group fly was taken.
Now coming to the interview process, I went through 4 rounds where each one was an elimination round.

Round 1 (50 min):

1. Find the maximum width of a binary tree.
   Suppose any node is at level k (level of the root is 0), then the level of the right child is k+1, and the level of the left child is k-1. So the maximum width is calculated as maxLevel \xe2\x80\x93 minLevel.
   Ex \xe2\x80\x93

   ```
   \r\n                    1\r\n                    /   \\\r\n                    2     3\r\n
   ```

   Here maxLevel is 3 (node 7) and minLevel is -2 (node 4). So maximum width is 3-(-2) = 5.
   Initially, I did it using some parameters in the function call. Then the interviewer told me to do it without using any extra parameter other than root and currentLevel of the node. And I did it so. And then he told me that there is a field maxWidth in every node and for each node, as a root i need to store the maximum width of the subtree in the field maxWidth.

2. After that he gave me a code in Java and asked me some questions on that code related to OOPS concepts.

Round 2 (75 min):

1. Find the sum of nodes occurring in the longest path in a binary tree.
   I did it using parameters to track the current maximum path length found and its sum. Whenever I found a path length greater than the current maximum path length, I updated the maximum path length and sum. After this, he modified the problem and told me to handle the code for multiple operations like the product, XOR, etc. As I was using function parameters for keeping track of sum, it would not be feasible for taking a parameter for each operation. So I created a class having fields for each operation and was using the object as a parameter.
2. Sort the array containing 0, 1 and 2.

Round 3 (60 min):

1. The interviewer asked me about the things I did in college and based on that he asked me to design an online coding judge (like codechef). He asked me to implement it using classes. He asked me about how to efficiently handle the code written in different programming languages etc. A lot of discussions happened over this question.
2. He asked me to design undo and redo functions of a text editor.

Round 4 (50 min):

1. Given a binary tree, check whether it is BST or not.
2. The interviewer asked me to design a search engine. The search engine has to search for a token in a collection of documents and should be able to find the documents in which the token is present along with the frequency of the token and the position (index) of the token in the document. He asked me to write full working code, I did it using trie data structure.

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Microsoft Interview Experience | Set 137 (For Software Engineer II)

- Difficulty Level :\nHard
- Last Updated :\n18 Dec, 2018

This was for Skype team. 2 Interviews with managers, 1 with partner.

First Round (1.5 hour)

1. Discussion on previous projects.
2. Given a sorted integer array, print all distinct elements in array. The given array may contain duplicates and the output should print every element only once.
3. Given a sorted integer array, print all elements that appear only once in array. The given array may contain duplicates and the output should print every element only once.
   Solution for both problems required space complexity O(1) & time complexity O(n).
4. Design a system which helps to calculate average Skype call duration per day. In which events are tracked from mobile app. Need to take care of all edge cases like events can be logged to server in any sequence & there can be some events missing on server side also.

Second Round (1 hour)

1. Project discussions like most challenging project, most interesting problem I worked upon.
2. Search an element in a sorted and rotated array. Consider all edge cases.
3. Design & Implement LRU cache with all cases.

Final Round (1.5 hour)

1. Past Experience based questions.
2. The Celebrity Problem. https://www.geeksforgeeks.org/the-celebrity-problem/
3. Search Word \xe2\x80\x9cMicrosoft\xe2\x80\x9d in a 2D matrix of characters.
4. There are n petrol bunks located in a circle. We have a car with mileage 1kmpl. The distances between petrol bunks and no of litres petrol available at each petrol bunk is given. Need to find the starting point such that car can visit entire circle.

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Microsoft Interview Experience | Set 136 (On Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

First Round consisted of 3 easy coding problems to be solved on an online platform (CoCubes) . The problems were fairly easy and didn\xe2\x80\x99t require much thought . Extra marks were given for optimized solutions requiring less memory and time . Problems were as follows \xe2\x80\x93

1. Given 2 numbers **m** and **n** , find if the sum **m+n** has the same number of digits as **n** . If true then print **m+n** otherwise print **n.**
2. Given a binary string(a string consisting only of 0s and 1s) find the length of the longest contiguous occurrence of 1s.
3. Third question was to find length of longest AP in given set of numbers.

From those who qualified the online coding round \xe2\x80\x93 14 people were selected for direct interview and 10 people were selected for an additional fly round . From those 10 , around 3-4 were selected for interviews.

First Interview:
The interviewer asked me to give a short introduction about myself and then based on my disciplinary electives ,

- He asked me to design a simple Information Retrieval system. Given a file containing various phrases , he asked me to provide an outline for building a query system such that it autocompletes the query the user is typing . He didn\xe2\x80\x99t ask for any code , just for a basic outline of the functions that would be used and the data structures I thought would be implemented while building such a system.

Second Interview:
Interviewer asked me two questions Algorithms \xe2\x80\x93 one was based on trees and DP and the other was a question on Depth First Search.

Third Interview:
Interviewer asked a simple problem

1. Print all nodes at distance k from a given node

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Microsoft Interview Experience | Set 135 (For SDE II)

- Difficulty Level :\nEasy
- Last Updated :\n18 Dec, 2018

This was for Bing team.

First Round-(Skype Call)
3 PS/DS questions. All of them were questions which involved application of standard problems.

After that I was called to Hyderabad for a day long drive. 3 Interviews with managers, 1 with partner.
First Round-

1. A book is given, write a function where input is line number and output is content of the line. This involved discussion, optimisation where the problem evolved into designing a cache.

Second Round-

1. Function to fill sibling pointer in a binary tree.
2. Design system which tells how many stations exist between 2 stations and trains which run between them.

Third Round-

1. Design a system like one which facebook has, where you get live feeds from your friend.
2. Find an element in an array such that all numbers before it are increasing and after that are decreasing.

Final Round-

1. Past Experience based questions.
2. Process and thread questions.
3. A company which uses mac laptops as well as mac servers, wants to shift to windows server, but doesn\xe2\x80\x99t want to replace mac laptops. Whats can be done?

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Microsoft Interview Experience | Set 134 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2018

First round was a 75 minutes online round in which 3 simple questions were asked.

1. First question was given two numbers n,m find a number closest to n and divisible by m.
2. Second question was given a string consisting of only 0,1,A,B,C where A=AND B=OR and C= XOR. Calculate the value of the string moving from left to right assuming no order of precedence.
   Solution: GeeksforGeeks Link.
3. Third question was to find length of longest AP in given set of numbers.

Second round was a written test in which 2 questions were asked.

1. First question was sentence reversal
2. second question was maximum product subarray.

   Solution to these questions are available on Geeksforgeeks.

Three rounds of interviews were held. These rounds were mostly technical.

In first round

- I was asked to optimize my solution of questions asked in written test. I gave a space optimized solution by reversing sentence in place.
- Then he asked me to explain my project.
- Another question was, given two expressions in the form of a tree. Where each node is either a token or an operator. Check if the given expressions are same. Tokens can not be compared i.e their value in not defined. And the operator behaves similar to addition having properties like commutative and associative. Question was simple I used map to store frequencies of each token and compared them.

In second round

1. I was asked two simple algorithmic questions and one question on Machine Learning

In third round

1. interviewer asked me to design a data structure similar to dictionary.
2. Then he asked me about the kind of work I would like to do.

   Interviews were friendly. They give you sufficient time to think and provide hints if you are stuck.

Thanks to GeeksforGeeks as you can find most of the questions on this platform.

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Microsoft Interview Experience | Set 133 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n31 Aug, 2017

Online coding Round
410 students appeared for the online coding round and cgpa cut off was 7. Three coding questions were asked to us and we were given 90 minutes to solve three questions.
1. We were given an array. Values of the array were memory sizes and the memory that is required by the system can only be represented in powers of 2. We had to return the size of the memory required by the system.
Ex: \xe2\x80\x93 arr = {2,1,4,5}
Total = 12
So, memory required =16

2. Two strings are given and we had to modify 1 st string such that all the common characters of the 2 strings had to be removed and the uncommon characters of the second string had to be concatenated with uncommon characters of the first string.
Ex: \xe2\x80\x93 string 1- aacdb and string 2 \xe2\x80\x93 gafd
output \xe2\x80\x93 cbgf.

3. We were given a linked list and we had to segregate its even and odd position nodes in such a way that odd position nodes before even positioned nodes and even positioned nodes had to be appended after odd positioned nodes but in a reverse order.
Ex \xe2\x80\x93 linked list: \xe2\x80\x93 1 -> 2 -> 3 -> 4 -> 5 -> 6
Output: \xe2\x80\x93 1 -> 3-> 5 -> 6 -> 4-> 2.

12 students were selected for further rounds of interview.

Group Fly round
We were asked only one question in our group fly round.
N rectangles in 2-D space were given to us and we were given (x, y) coordinates of the bottom left corner of each rectangle and height and width of each rectangle. We had to return (x, y) coordinates of the bottom left corner of overlapping rectangle and also give its height and width.

3 students were selected for next round of interviews out of 12.

Technical Interview (Round 1)
1.Started with a brief discussion about my projects. Then he asked which data structure I had studied in my course and whether I am familiar with hashing techniques.
I answered linked list and trees and said that I am comfortable with hashing and then he asked a question on hashing.

2. N flight tickets are given and we had to create the route using these pairs of points from source to the destination. He discussed the approach with me and then asked me to code it.
I started with a hashing based technique and created of hash map First, I found the origin and starting from the origin I reached the subsequent node till I reached the destination by searching in the hash map and stopping when no entry was found in the hashmap and then the final destination was reached.

3. N elements are given to me and n was very large. I had to print the smallest element.

I first gave him a O(n) approach by linear traversal of the array and then he asked whether I could use heap and then I gave him a min-heap based approach.
He was quite satisfied with my approach.

Technical Interview (Round 2)
1.Given a rectangle of size AxB we had to find minimum number of squares that could be formed from that particular rectangle.
I followed a greedy approach first but it failed in few test cases and then I shifted to the recursive based solution and it had overlapping subproblem. So, I decided to use a dynamic programming strategy and then he asked to write pseudo code of my approach.https://www.geeksforgeeks.org/paper-cut-minimum-number-squares/

2. Implement queue (class) and implement Enqueue and Dequeue functions in the class.
I implemented it using a linked list and then he asked me to make class thread safe. It was basically an operating system question and he wanted to test my operating system knowledge.
Then he asked if this queue is used by N machines and each machine has its own view of the queue, how will you maintain the consistency.

HR Round
1.He asked me about my favorite subject. Then he asked difference between virtual addressing and translation lookaside buffer(TLB).
Then he asked as a developer how would you make your programs knowing the fact that the system implements paging.

2.How was your Interview experience till now? Was it according to your expectation and preparation?

3.Do you have any questions? I asked how should I prepare before joining the company? Then he recommended me to work on some open source projects.

The interview experience was quite good. Geeks for geeks was a lot of help to me as it helped me in my placement preparation and provided almost all content that was necessary for placement preparation.

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All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 132 (Software Engineer for Bing Team)

- Difficulty Level :\nEasy
- Last Updated :\n20 Dec, 2018

I recently attended Microsoft Interview for Software Engineer role in Bing Team.

Round 1:
Microsoft Interview Experience | Set 131

Its initial screening round. It has happened through skype.

- Given n*n matrix with some elements in each cell. If there is \xe2\x80\x9c0\xe2\x80\x9d in any cell then we have to make that corresponding row and column to \xe2\x80\x9c0\xe2\x80\x9d
Time complexity: O(n*n) Space complexity: O(1)
- Given an array of elements with size n. You should find the number which is repeated more than n/2 times

Time complexity: O(n)

After screening round, they asked me to come for 4 F2F rounds. I have visited Microsoft IDC hyderabad.

Round 2:

1. Given sorted array of numbers and a sum. we have to find any two numbers whose sum is equal to the given sum.

   Time Complexity: O(n)

2. Given Binary tree with parent pointer and two nodes. Find LCA of the given two nodes in a given binary tree

```
struct TreeNode
{
int data;
TreeNode *left,*right,*parent;
};
```

Parent pointer of each node points to its parent. Root node\xe2\x80\x99s parent pointer points to NULL

Time Complexity: O(logn)

Round 3:

1. Given two linked lists. Find the intersection point of those two linkedlists
2. Its based on Binary tree. I forgot the question \xf0\x9f\x99\x82

3. Design discussion on Search functionality available in smart phones

Round 4:

1. Given a linkedlist with random pointer for each node which points to some random number in the given list. Clone the linkedlist

```
struct ListNode
{
\xc2\xa0int data;
\xc2\xa0ListNode *next,*random;
};
```

2. Design and implement DNS Cache.

   Requirements:
   Cache must be fixed in size and it will be decided by the user who wants to use this cache.
   If the entry is not available in Cache then it should call server to get the details of ipAddress and store it in cache.

Round 5:

1. Print given matrix in spiral order
2. I forgot the question. It is related to arrays
3. Design discussion on Top Trends feature available in facebook.

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Microsoft Interview Experience | Set 131

- Difficulty Level :\nHard
- Last Updated :\n20 Dec, 2018

Round 1 (Written Test) : Test had 3 questions:

1. Calculate the sum of two integers and if the number of digits in sum equal to one of the integer then return sum else return n.
2. Find if a number has binary palindrome and count the number of set bits
3. Connect nodes at same level in a binary tree

Round 2 (Group Fly round) :

They divided all the shortlisted students in groups of 2 and per 6 students one interviewer was assigned. It had 2 questions that need to be solved in 40 mins.
Tip: Ask various questions with you interviewer and discuss your approach.

- Given a 2D array with characters you have to find whether a given string exists in the matrix or not. You can move only in left-> right or top->right direction. (Backtracking/Recursion)
- Given a BST, there is a bad node that violates the property of BST. So you need to find that node and correct it.

Round 3(F2F) :

1. The interviewer first asked me about my project every minute detail of it.
2. Then he asked about the database structure of the project \xe2\x80\x93 every single table and asked me to make it better. He then asked me to write some of the SQL queries related to that database.
3. **Data structure :** Find a duplicate element in the array where the range of elements is 1 to n. I gave that negative element approach but he asked me to optimise it to less than O(n). I couldn\xe2\x80\x99t do that part but he then wrapped up the interview.

Round 4 (F2F) :

1. Design Question for Token management.
   He asked me to design a system where tokens are automatically generated and counters are assigned to them.E.g SBI bank/customer center. He told me to write the classes that are involved for this. The interviewer was very helping and he made me think. He really liked my approach and told me to continue with it.
   Solution : I created 3 classes for the system Counter(counter_id, current_token, state) Token(Token_id) TokenManager (List, List). Methods like assignCounter(), findFreeCounter() etc. were explained. He was very particular about class and method names and told me to change one or the other name. It was 1hour 30 minutes long discussion.
   In the end, he told me it was long though great discussion and it\xe2\x80\x99s good to have you here. \xf0\x9f\x99\x82

Round 5(F2F) :

1. The interviewer was a serious guy and asked me to subtract two strings in a way that the chars in second string should be removed from the first string(in-place). Assume string to be char array.
   Approach 1: Add all the chars of second string to a hashset and for every char that matches

take the substring before it and after it. O(n^2).
Approach 2: Queue based add all the chars that are not present into the queue and add it back to the char array. O(n) time O(n) space.
Approach 3 : He asked me to improve it further and I gave an O(n) solution using 2 pointers.

```
int j = -1;
for (int i = 0; i < n; i++) {
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0if (!set.contains(s[i])
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0{
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0arr[++j] = s[i];
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0}
}
arr[++j] =\xe2\x80\x99\\0\xe2\x80\x99;
```

2. He was happy with my solution and then asked to discuss a design question.
   He then asked me to design an order management system of MC-Donalds. What are the APIs available, which are client, server and how kitchen gets to know about the new order.

And then after 5 minutes we got our results and it was really a very proud moment.
Tip : You need to have a lot of patience because interview rounds takes a lot of time. It was a 12 hours process so be calm and patient. All the best pals\xe2\x80\xa6\xe2\x80\xa6

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Microsoft Interview Experience | Set 130 (Internship)

- Difficulty Level :\nEasy
- Last Updated :\n20 Dec, 2018

Microsoft Internship Interview Experience July 2017:

First round was a 75 minutes online round in which 3 simple questions were asked.

1. First question was given two numbers n,m find a number closest to n and divisible by m.
2. Second question was given a string consisting of only 0,1,A,B,C where A=AND B=OR and C= XOR. Calculate the value of the string moving from left to right assuming no order of precedence.
3. Third question: You are given a binary tree of integers and an \xe2\x80\x99sum\xe2\x80\x99. Return the length of the shortest path beginning at root and ending at a leaf node such that the sum of numbers along that path is equal to \xe2\x80\x98sum\xe2\x80\x99.

Fly round:

Second round was a written test in which 2 questions were asked.

- First question was sentence reversal
- second question was maximum product sub array.

Write neat codes and besides optimizing time complexity, take care to optimize space complexity as well(if possible of course). Use good variable names.

MS interview experience:

Round 1:

1. I was asked to populate the next right pointer in a binary tree. First I used queues but was asked to further optimize it such that it consumes O(1) extra space. Was asked to write the codes for both of them.

Round 2:

1. Difference between a thread and a process?\xe2\x80\xa6 similar kinds of other OS questions.
2. What is abstraction, encapsulation, inheritance etc..
3. Was asked to explain LRU algorithm.
4. I was asked to code the edit-distance problem (geeksforgeeks standard problem).
5. He began with designing an application which will track and plot the other user\xe2\x80\x99s location and gave me various scenarios like for example how I will handle memory overflow if sender went offline. This went on for more than 10-15 minutes.

Round 3:

1. I was asked to implement LRU cache.
2. Further,on how I would implement a hash within one data structure (keys and values are strings), given three operations insert(), get1() and get2(string s), where get1() returns the least

recently used string and get2(s) returns the string mapped to s(the Interviewer had insisted that I reduce get(1) to o(1) as it was a cache).I somehow managed to reduce the complexity to O(log(n)), O(1) and O(log(n)) respectively and he appeared to be convinced.

3. I was asked a lot about my project in Deep learning (Machine Comprehension). Further he asked me what kind of projects I would like to work on during my internship and if I had any questions for him.

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Microsoft Interview Experience | Set 129 (On-Campus for Internship)

- Difficulty Level :\nEasy
- Last Updated :\n20 Dec, 2018

Written Test:

There were three easy questions.

1. Complete a function that takes two integer x and y. you have to return x+y if numbers of the digit in (x+y) are equal to x otherwise, return x.
2. Complete a function that takes a binary string. You have to return the longest size of contiguous substring containing only \xe2\x80\x981\xe2\x80\x99.
3. Complete a function that takes the root of a tree(implemented as linked list and every node containing an integer) and an integer N. You have to return maximum depth of leaf node, such that sum of elements of the node in the path from the root to the leaf node should equal to N.

Fly Round

The fly round was about 45 minutes. The student had to write code for 2 problems on paper.

1. Write a function that takes a sentence. You have to return that sentence having words in reverse order.
   Input: He is not coder.
   output: coder not is He.
2. Maximum Product Subarray.
   According to my thought, Don\xe2\x80\x99t think to solve the question fast (It will be better If you are fast.), You can take your time, Write a beautiful code (clearly understandable to anyone, eg if you are using helping array, then choose the name for this wisely like MinSum[], SmallestInt[],CurAns[]).

Interview

1st round:

The first Interviewer asked me a question, Do you know XML encoding. I said, No sir I never listen about it, I don\xe2\x80\x99t think it was in course ever. Then he describes some thing about it. While listening to the
description, Don\xe2\x80\x99t be silent try to asking questions regarding your doubt and the other corner test-cases try to be smart (don\xe2\x80\x99t ask any silly question). If you feel that question is easy So tell your approaches not the direct solution.
I don\xe2\x80\x99t remember the whole question but I remember the input-output, that was, input: 5 > 4 or 7 4 or 7<9

2nd round:

1. Write the code for finding numbers of zero in N!.
2. The question was you have a website of lottery purchase, simultaneously the people buying lottery from your site. You have to choose a candidate randomly with uniform probability. I have to write the code also. Luckily He was impressed by my previous answers so he gave me lots

of hints to find out the solution for next question. At last, I found the solution. he told me to code it, I write a code but he did not agree, and
told me it is not correct, write other, Then finally I write a correct code. Both were happy and satisfied. Then he asked me the 5-6 question of
Operating system,

3. The difference between mutex and semaphore,
4. The difference process and thread
5. What is the new tab in chrome process or thread
6. What should you do to share the same resources by more than one process simultaneously ,Luckily he was satisfied by my answer and looked impressed.

HR round:

1. He asked me about my project, interest. That was very easy interview.

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Related Practice Problems

Sum of two large numbers

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Microsoft Interview Experience Set 128 | (On-Campus for Internship)

- Difficulty Level :\nHard
- Last Updated :\n20 Dec, 2018

Coding Test
Platform: CoCubes Format: 3 coding questions Time: 75 minutes
They had a pool of questions and three questions(2 + 3 + 5 marks) were given to each student randomly.

1. Given an array A of size m and another array B of size n. Return the product of maximum of A and minimum of B. (2 marks)
2. Given an integer N and an integer M, output a number closest to N which is divisible by M. (2 marks)

   ```
   Input: N = 15, M = 7  =>  Output: 14\r\nInput : N = 17, M = 3  => Output : 18
   ```

3. Given a string containing or \xe2\x80\x98|\xe2\x80\x99 , and \xe2\x80\x98&\xe2\x80\x99 and xor \xe2\x80\x98^\xe2\x80\x99 in between binary bits 1 or 0. Return the output.Evaluation is from left to right.

   ```
   Eg. 1^1|1&0^1, answer is 1.
   ```

   (3 marks)

4. You are given two increasingly sorted linked lists. Return the head pointer of a linked list containing elements of the two linked lists sorted in descending order. Only use constant extra space
5. Given a binary tree. Find the deepest left leaf node (deepest leaf node that is left child of its parent). If there are two such nodes, return the maximum among them. (5 marks) https://www.geeksforgeeks.org/deepest-left-leaf-node-in-a-binary-tree/
6. Longest increasing subsequence. (5 marks) https://www.geeksforgeeks.org/longest-increasing-subsequence/

Group Fly
The fly round was about 60 minutes

1. Given an N-ary tree. Add a new member next pointer to every node in the tree. Connect nodes at same level. Example of binary is given below but we were asked to solve for N. https://www.geeksforgeeks.org/connect-nodes-at-same-level/
2. Given a list of contacts which exist in a phone directory. The task is to implement search query for the phone directory. https://www.geeksforgeeks.org/implement-a-phone-directory/
3. Write the test cases for File Transfer ?
   We have to write the answers and code in paper. The first question was to test our Coding skills, second one for data structure design and third was for debugging.

Interview
I had 3 interviews, in each one of them they asked me to write code on paper.

First one

1. Two nodes of a BST are swapped, correct the BST.
2. Given only a pointer/reference to a node to be deleted in a singly linked list, how do you delete it?
3. Question on your CV. I have done one project using OOP concepts, so he asked me about it.
4. LRU cache.

Second one

1. Matrix chain multiplication https://www.geeksforgeeks.org/dynamic-programming-set-8-matrix-chain-multiplication/
2. Printing brackets in Matrix Chain Multiplication Problem https://www.geeksforgeeks.org/printing-

brackets-matrix-chain-multiplication-problem/

Third one

1. Extract Leaves of a Binary Tree in a Doubly Linked List.
2. Delete Alternate node in linked list.

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Brackets in Matrix Chain Multiplication OldP
Phone directory OldP
Phone directory
Brackets in Matrix Chain Multiplication
Matrix Chain Multiplication

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Microsoft Interview Experience Set 127 | (On-Campus for IDC)

- Difficulty Level :\nEasy
- Last Updated :\n16 Aug, 2017

ROUND 1 \xe2\x80\x93 ONLINE ASSESSMENT
Platform \xe2\x80\x93 cocubes.com
Duration \xe2\x80\x93 75 minutes
Format \xe2\x80\x93 3 Coding Questions
Maximum Score \xe2\x80\x93 10 marks
About 120 students appeared for this test. Questions were random and all students had different sets with a few overlapping questions.

1. Complete the following function-

```
 int findMax(TreeNode arr[], int size_of_array){\r\n    // code goes here\r\n}\r\n
```

Where TreeNode is a structure defined as:

```
struct TreeNode{\r\n   int feet;\r\n   int inches;\r\n}; \r\n
```

The function was supposed to return the maximum value of TreeNode. This was supposed to be done by calculating (12*feet+inches) for each element. It constituted of 2 marks.

2. Complete the following function-

```
Node * findIntersection( Node* head1, Node*head2){\r\n   // code goes here\r\n}\r\n
```

Where \xe2\x80\x98Node\xe2\x80\x99 is the structure of a linked list node defined as:

```
struct Node{\r\n  int data;\r\n  struct Node *next;\r\n}; \r\n
```

The code was supposed to recursively find the intersection between 2 linked list(already sorted) with a condition that no extra space is to be used. This question was for 3 marks.
Example:

```
Input-\r\n1->2->14->15->26\r\n2->10->14->16->18->26->32\r\nOutput-\r\n2->14->26\r\n
```

3. Complete the following function-

```
Node * alternateReverse( Node* head1, Node*head2){\r\n   // code goes here\r\n}\r\n
```

Where \xe2\x80\x98Node\xe2\x80\x99 is the structure of a linked list node defined as:

```
struct Node{\r\n  int data;\r\n  struct Node *next;\r\n}; \r\n
```

alternateReverse() must remove the even number nodes from the linked list and append them to the end in reverse order. No extra space was allowed. It was for 5 marks.
Example:

```
Input-1->2->3->4->5->6\r\nOutput-1->3->5->6->4->2\r\n\r\nInput-1->2->3->4->5->6->7->8->9\r\nOutput-1->3->5->7->9->8->6-
```

ROUND 2 \xe2\x80\x93 GROUP FLY
Around 40 students were shortlisted for this round. This was a pen-paper based test. The candidates were roughly divided into a group of 4-5 and a mentor was in charge of each group. We were given a question and we were asked to write a function-solution in any high-level language (scripting languages like Ruby, PHP, Python were not allowed). We were allotted maximum 45 minutes.

Question-Given two character arrays(not strings) of the same length, and their length as a parameter to the function. We have to find whether the first string is a rotation of the other. We should not use any extra space. The time complexity may be quadratic.

The mentor kept coming to everyone. He first asked what I was thinking. I told him the approach with an example and then wrote my code down. The mentors were helping and motivating. They demanded code only.

ROUND 3 \xe2\x80\x93 TECHNICAL INTERVIEW
Around 25 students were selected for this round.
The interviewer introduced herself and then asked me to tell her about myself. Then she asked me to find longest common prefix from an array of strings. We discussed an approach and then I had to code it down. She also asked me about the time complexity and then asked me to optimise it. I gave another approach and then she asked me to code it and give the time complexity. We optimised the solution further with a new approach and I coded it too. The interviewer was satisfied.
https://www.geeksforgeeks.org/longest-common-prefix-set-1-word-by-word-matching/
She, in the end, asked me if I had any questions for her? I asked her a question. The interview went on for about 1hr 10mins.

ROUND 4 \xe2\x80\x93 TECHNICAL INTERVIEW
The interviewer introduced him and then I did. He gave me 2 questions-

- Check if given Binary Tree is BST or not. Discussed different approaches. Coded one of them. https://www.geeksforgeeks.org/a-program-to-check-if-a-binary-tree-is-bst-or-not/
- Implement using using stack. We discussed approaches and optimised the operations and then coded them. https://www.geeksforgeeks.org/queue-using-stacks/

He asked me if I had any questions for him? I asked him one too. The interview went on for about 45 mins.

ROUND 5 \xe2\x80\x93 HR INTERVIEW
The interviewer has 20+ years of experience in Microsoft. He introduced himself and asked me if I had any questions for him. We then discussed Achievements and Positions of Responsibility from my resume for about 20 mins.

- He then asked me to implement Akinator game. We discussed on how would we start, what will be the problems, what will the database be like, how to choose next question, why to choose it, etc. The discussion went on for about 30mins. He initially mentioned that there was no right or wrong answer to the question and he wanted to just see how my thought-process worked. We both were discussing and thinking out loud. Akinator

- Then he asked me a puzzle. If I have 10 balls and 1 has somewhat lesser weight and I have a weight balance, what is the minimum number of comparisons required to find the \xe2\x80\x9cbad ball\xe2\x80\x9d? We discussed the solution for 10 balls and then for 9 balls. I was then supposed to generalise the solution.

The interview went on for about 1hr. They announced the result the next day and selected 5 students.

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Microsoft Interview experience | Set 126 (On-Campus for Internship)

- Difficulty Level :\nEasy
- Last Updated :\n08 Aug, 2021

Written Test: I am not going to say questions were very easy. Its totally depend on you. So I just want to tell you the type of questions. For doing really best, you should have good knowledge of linked list implementation of the binary tree, BST and some thing related with it. Nothing was random there, I can guarantee it. If you have not good practice with this, then its all depend on your luck or your brain. Basic DP question eg LIS, LCS, knapsack, coin change etc, In Exam time don\xe2\x80\x99t much think about time complexity just do it(It\xe2\x80\x99s my personal suggestion, Time complexity matter but the number of ques matters more. In general O(N2) solution is accepted). Geeks for Geeks is the best placed for practice.

Fly Round

The fly round was about 45 minutes. The student had to write code for 2 problems on paper first of which was related to string manipulation and second was a based on dynamic programming. Both questions were good. According to my thought, Don\xe2\x80\x99t think to solve the question fast (It will be better If you are fast.), You can take your time, Write a beautiful code (clearly understandable to anyone, eg if you are using helping array, then choose the name for this wisely like MinSum[], SmallestInt[], CurAns[]). The selection was not random, why such a good company does mistake like this?

Interview

The best part is an interview, Interviewers are so good and friendly but It also depends on you. Till now you have understood that my English is not good. Trust me the only thing matter is your confidence. Be confident and talk to them frankly.The first Interviewer asked me a question, Do you know XML encoding. With a good smile (with out a fear)I said, No sir I never listen about it, I don\xe2\x80\x99t think it was in course ever. Then he describes some thing about it. While listening to the description, Don\xe2\x80\x99t be silent try to asking questions regarding your doubt and the other corner test-cases try to be smart (don\xe2\x80\x99t ask any silly question). If you feel that question is easy So tell your approaches not direct solution. Like \xe2\x80\x9cSir I think every answer has a common thing it is blah blah, I think it may be a key point for our solution. \xe2\x80\x9d Try to talk to your interviewer while writing code. Don\xe2\x80\x99t be busy in writing code. Let me explain what you can talk to your interviewer while writing code. While writing the code any doubt or confusion come to your mind or any corner test-cases, just ask the interviewer he will really waiting for you. Actually, interviewers do not want a solution they are just checking how you approach a given problem. If interviewer impressed by you than sooner you will called for another one. 10-15 min after the end of first interview I was called for other that guys are very smart he asked me three mathematics question (Related to programming). 1st question he asked me to find the number of zeros in N!. Being over-smart I told the solution in one line And said it is very easy quest, Everyone knows the answer. He just smiles and throws a very hard question of probability on me. I feel f*** up., The question was you have a website of lottery purchase, simultaneously the people buying lottery from your site. You have to choose a candidate randomly with uniform probability. Luckily He was impressed by my previous answers so he gave me lots of hints to find out the solution. At last, I found the solution he told me to code it, I write a code but he did not agree, and told me it is not correct, write other, Then finally I write a correct code. Both were happy and satisfied. Then he asked me the 5-6 question of Operating system, the difference between mutex and semaphore, process and thread, what is the new tab in chrome process or thread, what should you do to share the same resources by more than one process simultaneously etc, luckily he was satisfied by my answer and looked impressed. then the next round was HR round, that was very easy. If you were doing your projects by yourself. You can not fool HR, he was very good in machine learning and

artificial Intelligence.
Do hard work in summer with gfg, you will surely get an internship on 1st day. Trust me if you fail to get an internship on the 1st day, It will be harder to get from next day. CGI matter in everywhere, But talent is also blessed.

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Microsoft Interview experience | Set 125 (On-Campus for IDC)

- Difficulty Level :\nHard
- Last Updated :\n20 Dec, 2018

Microsoft IDC Interview experience

Online Round

Platform: CoCubes
Format: 3 coding questions
Time: 75 minutes

They had a pool of questions and three questions(2 + 3 + 5 marks) were given to each student randomly.

1. Given an integer N and an integer M, output a number closest to N which is divisible by M.

   ```
   \r\nInput: N = 15, M = 7\r\nOutput: 14\r\n\r\nInput : N = 17, M = 3 \r\nOutput : 18\r\n
   ```

   Expected Solution in O(1)

2. Given a string of O\xe2\x80\x99s and 1\xe2\x80\x99s, output the maximum length of a sub-string of all 1\xe2\x80\x99s.

   ```
   \r\nInput: 1011010111101\r\nOutput: 4\r\n\r\nInput : 0110111110111101\r\nOutput : 5\r\n
   ```

   GeeksforGeeks Link
   Expected Solution in O(n).

3. Length of Longest Arithmetic Progression

   Expected Solution in O(n^3)

GROUP FLY ROUND:

40 candidates were shortlisted for the group fly round.
No. of Questions: 2
Time: 75 min.

- *Question 1:*

Find a word in a grid of characters
The problem was a modification of the above problem. We could move in all the 8 directions and zig-zag traversal was also possible. We had to return a list of coordinates(i,j) of the found the traversal. If more than one traversal possible, return any one.

```
\r\nInput: \r\nGrid:  a b c d \r\n       b d e e\r\n       f g r k\r\n       s g s s\r\n\r\nString: geeks\r\n\r\nOutput
```

I solved using DFS.

- *Question 2:*

Imagine a Euclidean plane and N points(x,y) on that plane. You are given a list of such points. You will then receive queries if a particular point is present in the plane or not. Output TRUE or FALSE accordingly.

0 < N < 10^6
-10^6 <= x,y <= 10^6

```
\r\nInput: \r\nPoints: (2,1), (1,2), (1,3), (2,3), (3,3)\r\n\r\nQuery1: (2,3)\r\nOutput1: TRUE\r\n\r\nQuery2: (2,2)\r\n
```

They expected us to optimize the queries. I used unordered_map to store points and output queries in O(1).

PERSONAL INTERVIEW
50% candidates were selected after the group fly round i.e 20 students.

ROUND 1:

The interviewer took my CV and looked at it for at most 2 sec and kept it away. He then gave a puzzle question

- You have the following operators available with you: + \xe2\x80\x93 * / ( )
Insert few of these operators to make the given line as a valid mathematical expression
1 2 3 4 5 6 7 8 9 = 100.

Note: If we don\xe2\x80\x99t insert anything between 1 and 2, it becomes 12. Order of 1 to 9 must remain as it is.

```
Solution: (1 + 2 + 3 + 4) * (-5 + 6) * (-7 + 8 + 9) = 100\r\n\r\nI gave the above solution within 2-3 min. He immediate
```

-

  Design an Elevator System. We discussed this question for about 45 min.

  I asked him few clarification questions which he replied nicely. The interviewer was professional and helpful.

- How many elevators?
  Ans: N elevators. N is more than one.
- How many floors?
  Ans: M floors.
- Do we have one button for each lift or only one button for all the lifts on each floor?
  Ans: Only one button controls all the lifts.
- Do we need to consider things like max number allowed in the lift, etc?
  Ans: No

.

I asked few other questions in the process of designing the system.

Things he wanted me to answer:

- What kind of algorithm should we use to control the movement of lifts?
- Data Structures to be used

.

- Optimization of the algorithm. A workable algorithm is not enough. It had to be optimised for efficient usage, time and power saving.

Follow up questions:

- How will I handle concurrent requests?
- When not in use, on which floor will the elevators rest? Why?
- Will it be same during all hours of the day? Why?
- Will I use the same algorithm during the day and the night?
- How am I planning to save lift operating power?
- Will my algorithm work if one of the lifts becomes faulty?
- If a button is pressed twice on any floor, is my data structure handling that?
- I have been given one-year data on elevator usage. How would I use this data to optimize my algorithm to increase efficiency?

Would you use any ML/AI stuff to optimize this problem? How?

There were many more questions which I don\xe2\x80\x99t remember exactly. I had to give a reason for every design decision. He then asked me to write the object-oriented code for it.

Solution: I had a Central-Manager class to manage all elevators, each elevator was working as a Thread. All data was stored with the Central-Manager. I stored incoming requests in Balanced Binary Search Tree. I had a priority assigned to each request if it comes from inside the elevator or outside the elevator, etc.

He was very professional and experienced. He was very impressed with my answers. He filled my feedback on his laptop while I was writing code. Before I finished writing the code, he said I am done. Not required to write the code.

I was sent directly to the Hiring Manager after this round. One or two more technical interviews were done for few.

ROUND 2(Hiring Manager):

He was a senior guy who worked 13+ years in Microsoft. He was very cool and friendly.
He started by asking me if I have any questions for him regarding Microsoft, etc. I told I don\xe2\x80\x99t have any specific questions but I am curious about what kind of work is done in Microsoft IDC, what is the most interesting project being done, etc. He told me that everything is interesting right now. He told me about the various divisions in IDC and what kind of projects they are doing. He then asked me about my dream company. I told Google. \xf0\x9f\x98\x9b We then had a discussion about the pros and cons of Google and Microsoft. He asked few other questions like which is my favourite subject, etc. Few follow up questions on them. He said fine now solve a technical question.

Question: It was a long problem statement and the solution boiled down to Toposort. I gave him the solution and he told me to write the code.

He was convinced with the code. However, he told me one very small thing about my code which could have been written more elegantly. I agreed with him.

We then discussed my projects. He told me to tell him about the project I did during my internship in Samsung Research Institute Bangalore. He also asked about my personal projects and follow up questions on them. He then asked if I have any questions for him. I said No.

I was surprised that I had to give only 2 rounds so I asked him if there will be any more round after this. He said I am doing great. Relax.

No. of personal interviews varied from 2-4 for the candidates.

Result: Selected.
GeeksForGeeks was a great help during my preparation. Thanks to other students for sharing their interview experience. \xf0\x9f\x99\x82

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Microsoft Interview Experience | Set 124 (On Campus for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n13 Aug, 2017

Microsoft IDC Interview experience

ONLINE ASSESSMENT

Platform: CoCubes
Format: 3 coding questions
Time: 90 minutes

Q1) complete the following function:

```
\r\n  int findMax(Treenode arr[], int size_of_array){\r\n    // code goes here\r\n  }
```

Where Treenode is a structure defined as:

```
\r\nstruct Treenode{\r\n   int feet;\r\n   int inches;\r\n};
```

The function should calculate (12*feet+inches) for all the array elements and return the maximum value.

Q2) complete the following function:

```
\r\n    Treenode* findInorderSuccessor( Treenode * root ,Treenode* node){\r\n        // code goes here\r\n    }\r\n\r\n
```

The function should return the pointer to the inorder successor of the \xe2\x80\x98node\xe2\x80\x99 provided in the function. If does not exist, return NULL.

Q3) complete the following function:

```
\r\nNode * findIntersection( Node* head1, Node*head2){\r\n   // code goes here\r\n}\r\n\r\nWhere node is the structure
```

Return the head pointer to the intersection of the two linked lists. It was mentioned that no extra space to be used and implementation should be recursive.

GROUP FLY ROUND:

40 candidates were shortlisted for the group fly round.

The candidates were roughly divided in a group of 4-5 and a mentor was in charge of each group. We were given a question and we were asked to write a function-solution in any high level language (scripting languages like Ruby, php, python were not allowed). We were allotted maximum 45 minutes.

Ques: Given two character arrays(not strings) of same length, and their length as a parameter to the function. We have to find whether the first string is a rotation of the other. We should not use any extra space. The time complexity may be quadratic.

The mentor kept coming to everyone. He first asked what i was thinking. I told him the approach with an example. Then I wrote the code, sample test cases and a basic approach section in bullets. Though, they demanded only the code.

ROUND 1:

Around 50% candidates were selected after the group fly round.

I was given two coding questions:

Ques 1) given a tree, print all the edges of the tree such that both the following conditions are satisfied:
Only print the node whose right child is NULL,
The node is a leaf node.

I gave a recursive approach. I later realised while explaining that it failed in certain conditions. I asked for some time to rectify it. I finally gave him a code and he seemed fine about it.

Ques 2) given a matrix, traverse the matrix in a zig-zag manner:

```
\r\n    Ex:  \r\n        1 2 3 4\r\n        5 6 7 8\r\n        9 1 1 2\r\n\r\nTraversal: 1 2 5 9 6 3 4 7 1 1 8 2
```

I gave an approach of time complexity O(N X M). He asked me if i can do it in lesser time complexity. I may use extra space. I could not come up with anything very concrete. My round was done.

ROUND 2:
The interviewer asked how was my group fly round. Then he explained to me a situation that I have a fixed 2-D space of NXM. I have been given a set of random numbers(not in running). I have to find an efficient way to store them and such that I can retrieve each element in least time complexity.

With hit and trials we reached an approach where I can store the numbers in such a way that each row is sorted, and the order across the rows is also increasing. Now we can just apply binary search on 1st column to find the appropriate row , and then binary search the number in the obtained row. Time complexity: logM+logN. He asked me to code it. That was it for the second round.

The interviewer was very helpful and jolly.

ROUND 3: (FINAL)
I was called for round 3 after 15 minutes. It was supposed to be HR but it was predominantly technical. I was asked about all my projects and my role in them.

Then he gave me a question and said that we would discuss only the approach ,and there was no need to code it.

The problem was similar to the below geeksforgeeks problem:https://www.geeksforgeeks.org/divide-and-conquer-set-7-the-skyline-problem/

I struggled a bit but he helped me. Then we discussed the final solution and approach.
Since it was 8:30 pm, I was done for the day. After the round was over, I was told that I am done with all the rounds and need not come the other day.

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Microsoft Interview experience | Set 123 (Off-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Round 1
Online test on CoCubes contains 3 Coding Questions (Only Function to complete)

1. Given a number N find the binary conversation of node is palindrome or not if yes return set bit in that number else return -1.
   Using of extra space is not allowed

   ```
   \r\nExample - \r\nif n = 7 \r\nAnswer: 3\r\n
   ```

2. Given an array and a number x find the numbers of pairs of numbers of 3 no. With sum equal to x else return -1;

   ```
   \r\nExample - \r\na = 6 7 8 9 10 11 12 & x = 27\r\nAnswer: 3\r\n
   ```

3. Given linked list segregate even & odd node reverse even node and append at the end of odd node.

   ```
   \r\nExample \xe2\x80\x93 \r\n1 ----2 -----3-----4-----5-----6\r\nAnswer: \r\n1-----3-----5------6-----4-----2
   ```

After this round 11 are shortlisted for direct interview. I was one of them.
Many are selected form Group Fly round where they were asked to do paper coding.
After Group Fly 4 more are selected for interviews.

Round 2

Face to Face Technical Interview Round (35 minutes)

1. Tell me about yourself?
2. How was the first round?
3. Encode the string in place-

   ```
   \r\naaabbbcdefaa\r\na3b3cdefa2
   ```

4. Encode the string in place-

   ```
   \r\naaabbbcdefaa\r\na3b3c1d1e1f1a2
   ```

   (Check all the boundary cases length is >10& use relloc to provide extra space)

Out of 15 only 5 are selected by Microsoft IDC. I was not one of them. Most of us are eliminated after First Technical Interview.

In coding round the selection is based on time taken to make the code (Since codes are easy) & efficiency of the code. So try to complete as early as possible.

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Microsoft Interview experience | Set 122 (Off-Campus)

- Difficulty Level :\nExpert
- Last Updated :\n08 Aug, 2017

Round 1 \xe2\x80\x93 Co Cubes Online Test(75 min) \xe2\x80\x93
1-) Given a Array for Strings in Sorted Order with null strings in between and a Target String, find wheather the target string is present or not.
e.g. \xe2\x80\x93 arr[] =
{\xe2\x80\x9c\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9dabc\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe
Target = \xe2\x80\x9cxyz\xe2\x80\x9d;

2-) Given a Binary Tree and a target integer. If a leaf node is present with that integer, then delete it and also recursively delete the newly formed leaves too.
3-) In a given linked list which contains zero values in some nodes calculate sum of values between two zeros and replace the zero value in the linked list by that sum.
Eg: 7 0 4 5 6 0 1 1 will become 7 15 1 1.
The zeros are always present in pairs.

Round 2 \xe2\x80\x93 Onsite (Written pen and paper)(45 min)
1.) Largest product subarray in a array of integer.
2.) flatten a link list in sorted order.

Link to the problem : https://www.geeksforgeeks.org/flattening-a-linked-list/

Round 3 \xe2\x80\x93 Interview
Find the cycle in a directed graph. Further he asked me to find the no. Of cycles in the graph.
After that he asked me to implement it using classes and objects.
Then he asked me to test it for various corner conditions like self loop , multiedge e.t.c.
Code approach should be clear to you and also how the time complexity came to be O(V+E).

Round 4 \xe2\x80\x93Interview
1.) If in your computer a virus Duplicated all the files in your system, and changed the name of the file, its extension and its location. Give a Heuristic Approach if you have to identify the original file and the duplicate file, how will you do it.
A lot of discussion happened over this Question, he kept changing the scenarios like if the files were too big then how will you identify.
If the files were media file, txt file , exe file then what will your approach will be.

2.) Maximum profit by buying and selling a stock.

3.) Given a Array of strings, you have to identify the longest length String in the array which is formed by concatenating 2 or more string of the same array.
E.g. arr[] =
{\xe2\x80\x9cpq\xe2\x80\x9d,\xe2\x80\x9dabc\xe2\x80\x9d,\xe2\x80\x9dxyz\xe2\x80\x9d,\xe2\x80\x9dkbc\xe2\x80\x9d,\xe2\x80\x9dkbcxyzpq\xe2\x80\x9d,\xe2\x80\x
Ans will be \xe2\x80\x9cabcxyzkbc\xe2\x80\x9d as it is formed from 2 or more string and has the largest length.

Note that if a string is formed even with 2 strings and has the largest length then it will be the answer.

Number of String it is formed Doesn\xe2\x80\x99t matter, it has to be atleast 2 strings only rest answer will be dependent on the length of the string only.

Solved it using Tries and also was asked to write the working code.

4.) Test the function which takes a email id and checks wheather it is correct or not.

Round 5 \xe2\x80\x93 Interview
A hash table was given which contain string to symbol conversion mappings.
E.g.
\xe2\x80\x9c;gt;\xe2\x80\x9d will be mapped to \xe2\x80\x9c>\xe2\x80\x9d
\xe2\x80\x9c;lt;\xe2\x80\x9d will be mapped to \xe2\x80\x9clt;xyz\xe2\x80\x9d
\xe2\x80\x93> str = \xe2\x80\x9c;lt;;gt;\xe2\x80\x9d \xe2\x80\x93>\xe2\x80\x9d\xe2\x80\x9d
He only focused on the corner cases.
After then he asked me to write the code for the problem. He asked various versions of the problem like if the length of the mapping strings is same or if they are variable, if all of them started and ended with \xe2\x80\x98;\xe2\x80\x99 and if they are random strings.

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Microsoft Interview experience | Set 121 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Round 1:

We were given 3 coding questions.There were many different sets.Most questions were implementation based.Some of them were based on data structure like linklist and bst. They were:-

- Inorder successor of given node in bst
- merge two sorted linklist in reverse order
- longest increasing subsequence

Top 45 were selected after this round; from which top 5 were called directly for personal interview and rest went for group fly.Time 75 minutes.

Round 2(Group Fly):

In this round all candidates were asked to write code on paper for given problem.

- The problem was:- Given an array,find the maximum average of elements in a window of size \xe2\x80\x98K\xe2\x80\x99.

Time 25 minutes.Top 10 students were selected for personal interview.

Personal Interview 1:

It was a technical round.I was asked to write code for two questions.

- First was to reverse a given string.
- In second question I was asked to print each character appearing in string with its frequency in lexicographical order
- Then he asked difference between array,stack and heap.
- After that I was asked what should I test if I am tester of an application.
- At last he asked me to write an SQL query.

Some of students were shortlisted for next interview.

Personal Interview 2:

It was HR/Technical Round.
He asked me to introduce myself and also asked about my hobbies.He gave me two coding questions.

- First was to longest palidromic substring in given string.
- Second was to traverse a matrix in spiral order.
- Then he asked me about my project.

- After that he asked a puzzle on how to divide a 10 m rope into 5 equal parts without using any measuring instruments
- At last he asked me the difference between multi threading,multi tasking and multi programming.

6 students were shortlisted for next interview.

Personal Interview 3:

This was the last round.

- In this round interviewer asked me about uses of heap and hash.
- Then he asked me to explain 4 normal forms and the requirement for de-normalisation.
- At last he asked some questions on my project.

All 6 students were selected for the internship.

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Microsoft Interview experience | Set 120 (For Senior SDE)

- Difficulty Level :\nMedium
- Last Updated :\n06 Aug, 2017

1. Smallest non negative number in a array
2. Given a grid with costs in each cell.You can enter through any item in Row 0 and exit through any row n-1. Find the minimum cost path

1. Connect all nodes at same level in a Binary Tree
2. Median in a running stream of numbers

1. Design a group chat both front end and back end.

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All Practice Problems for Microsoft !

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Microsoft Interview experience | Set 119 (For Internship)

- Difficulty Level :\nHard
- Last Updated :\n06 Aug, 2017

Microsoft visits our campus every year as a part of the intern hiring program in the Day 1 slot. The procedure consists for three major steps-

- Online Coding Round
- Written Coding Round
- Interviews

Now, moving up the ladder in sequential steps-
*Note:*I am writing just the questions such that you literally visualize yourself into this interview. I will be discussing the answers if there arises a demand for so.

- **1st Coding Round**

  It was an online coding round with 3 questions and hosted on cocubes.com. Just a matter of fact, everyone got a different set of three questions, better run-time and space complexity was awarded higher marks.
  The set of three questions for me was \xe2\x80\x93

  - *Given n and m, find the nearest number to n which is divisible by m. If there exist two numbers at same distance, output the greater one.*
  - *Given an integer n, if the binary representatino of this number is a palindrome, then find the number of ones. You are required to accomplish the task without using any data structure.*
  - *Given a binary tree, find the length of the smallest path from the root to a leaf node with a given sum, in constant space.*

  A lot of students were shortlisted from this round as doing all the three questions wasn\xe2\x80\x99t too tough here.

- **2nd Coding Round**

  It was an offline written coding round with 2 questions. Do write clean and correct codes, with appropriate names for variables and proper indentation.
  The questions were \xe2\x80\x93

  - *Given a string as \xe2\x80\x9cBeing in an IIT worths a lot\xe2\x80\x9d, convert it to \xe2\x80\x9clot a worths IIT an in Being\xe2\x80\x9d. Don\xe2\x80\x99t use string library functions.*
  - *Given an array of integers, find the subsrray with the maximum product.*

  35 students were shortlisted from this round. An alert to be ready for surprises \xe2\x80\x93 the selection procedure wasn\xe2\x80\x99t transparent enough for you to be confident in getting an entry to the next round. What I mean to say is, many among those who were shortlisted did it Wrong, and many others who did everthing fine weren\xe2\x80\x99t granted an entry.

- **Interviews**

I went through three rounds of interviews with different persons, with around 2 questions in each round. The third round also had a discussion over my projects.

The standard ones \xe2\x80\x93

- *Join all nodes at same level in a binary tree. Do this iteratively with constant extra space.*
- *Find whether u and v are connected in a directed graph, if yes, print the path.*

A bit interesting than those above-

- *Do the first question of the written coding round without using ANY extra space, in O(length of string).*
  It\xe2\x80\x99s intersting just bcoz it\xe2\x80\x99s something different.
- *How would you implement a LRU cache?*

Apart from these things, they also considerd the CGPA for the final shortlisting.

This article is contributed by **Shivam Dubey**. If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview experience | Set 118 (On-Campus for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n05 Aug, 2017

Around 100 applied for the first round of Microsoft Internship offer. Basic Criteria was to have a CGPA of greater than 7.00.

Round 1:
Three questions were given to everyone. First had a weightage of five marks and remaining two were ten marks. Cocubes conducted this round. Results were announced after 5 days.

Question 1 : Given an array of integers you have to find the farthest co-prime for all the elements in the array, in the range [2-250].

Example : [2,5,6] answer should be [249,249,247]
[5,57,8] answer should be [249,2,249] //because farthest.

span style=\xe2\x80\x9dfont-family: Times New Roman,serif;\xe2\x80\x9d>Question 2:

Given a linked list where each node has two data values and a next pointer. You have to find number of trends. A trend is said to arise when slope of adjacent nodes do not match.

Also slope formula is given : (y2-y1)/ (x2-x1)

Example : 1,2 -> 2,3 -> 3,2 -> 4,1 ->

Now slope of first two nodes is (3-2)/(2-1) i.e first and second node

Now slope of second node and third nodes is (2-3)/(3-2) which is not equal so there occurs a trend.

Continuing like this slope between third and fourth node is (1-2)/(4-3) which is equal to the previous slope so there is no trend. Continue for the remaining lists.

Finally number of trends for the given linked list is the answer.

Question 3 :

Given two binary trees, find second tree is sub tree of first tree if so return the number of nodes in second tree else return -1.

\xc2\xa0

The selection to next round is based on the cgpa and number of questions solved.

Around 40 were selected for the second round. Luckily I cleared this round as I did only one question(10 mark) fully correct and remaining two partially, but I had a good CGPA(9.33).

\xc2\xa0

Round 2 (Group Fly) :

Given two linked lists each representing a number, you have to add the two linked list and return the third list as the result. They actually saw how we approached the problem and how we handle all the

test cases and also the way in which we write code.

12 were selected for the next round.

Round 3 (Technical F2F) :

The interviewer was a cool guy. I formally introduced myself. First one was a technical question. He drew a tree and asked me how will you do level order traversal. I said I will use queue. Then he gave the question \xe2\x80\x9cZig-Zag level order traversal\xe2\x80\x9d which is similar to this

https://www.geeksforgeeks.org/level-order-traversal-in-spiral-form/

\xc2\xa0

I told my approach first then he asked me to write code for my approach. It took me around five minutes to complete the code. Then he asked me to do some test runs for all the edge cases. He is satisfied with my approach.

He then moved to OS. Something around how paging is implemented and what are the disadvantages of paging. The interview lasted more than 1 hour.(More about OS)

\xc2\xa0

Within five minutes result was announced and I have to attend second F2F in another 5 minutes.

\xc2\xa0

Round 4 (Technical F2F) :

As usual I introduced myself to the interviewer. First question was given a tree print the leftmost node in the last level of the tree. I said that I will find the height of the tree, and then do level order traversal to print the first node in the tree. He said he want the answer in single traversal. After pondering for a while I came up with a solution. He was satisfied with that.

Second question was reverse every k nodes in a linked list. He asked me to write the code. I wrote the code in five minutes with test cases. I ran few test cases on the code I wrote. Then he asked me how will implement newsfeed of facebook? Then we were talking about this topic for around 20 minutes.

After this interview is over, I was asked to wait outside. I was informed that I have final round tomorrow.

Final Round(F2F) :

He is really cool(I met him during my internship period). First, he was speaking about my project. He asked me if you were given chance to improve your project what will you do? We were speaking about the project for about 25 minutes. Then he gave a \xe2\x80\x98C\xe2\x80\x99 code and asked me to write test cases for it. He gave me implementation of itoa() function in C. I said this function won\xe2\x80\x99t work for n=0 and it will return null. Also the resultant character buffer which stores and returns the answer is declared local to the function. I pointed those two errors. After this he asked do you have any questions? I asked him what and where should I improve? He said you should concentrate on design part and everything else is okay.

\xc2\xa0

Results :

Results were announced after four hours. Four made it and I am one among them!.

Tips for preparation :

Really I would like to thank geeks for geeks for keeping the content in such an organized manner. Do regularly participate in competitive programming.(spoj,codechef,codeforces). Be confident at any stage of interview. Just enjoy the interview process.

\xc2\xa0

\xc2\xa0

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Microsoft Interview experience | Set 117 (Off-Campus)

- Difficulty Level :\nHard
- Last Updated :\n02 Aug, 2017

I applied off campus for Microsoft Software Engineer position through CoCubes.The selection procedure involved a coding round, group fly followed by 3 interviews.

Round 1
This round had 3 questions and was hosted on cocubes.We had 75 mins to code.

1) Given an array containing integers, zero is considered an invalid number and rest all other numbers are valid. If two nearest valid numbers are equal then double the value of the first one and make the second number as 0.At last move all the valid numbers on the left.
Eg:
Input : 2 4 5 0 0 5 4 8 6 0 6 8
Output : 2 4 10 4 8 12 8 0 0 0 0 0

2) In a given linked list which contains zero values in some nodes calculate sum of values between two zeros and replace the zero value in the linked list by that sum.
Eg: 7 0 4 5 6 0 1 1 will become 7 15 1 1.
The zeros are always present in pairs.

3) Given a linked list with each node containing coordinates of x,y plane. Remove middle points.

```
Input:  (0,10)->(1,10)->(5,10)->(7,10)\r\n                                    |\r\n                                    (7,5)-
```

Round 2 Group fly
There were 2 questions which had to be coded on paper.
1) Given a sentence . Print in vertically without using equivalent amount of extra space.

```
\r\nInput:  "Welcome to Microsoft" \r\nOutput : \r\nW  t   m\r\ne   o    i\r\nl         c\r\nc        r\t\r\no       o\
```

2) Given an arbitrary lexical order of character \xe2\x80\x9d b s a z c \xe2\x80\xa6 \xe2\x80\x98ng\xe2\x80\x99 \xe2\x80\xa6 \xe2\x80\x98st\xe2\x80\x99 \xe2\x80\xa6 \xe2\x80\x9d

Here ng and st are to be considered as single characters.

You are given this order and two strings and you have to output

+1 is str1 str2

0 if str1 == str2

Round 3
The interviewer was very cool.He made me feel very relaxed.He asked me about my project which was

about reinforcement learning. I answered his queries.

Then he gave me 2 simple questions to code. I coded both of them easily.

1) Print boundary traversal of a binary tree.

2) Reverse a linked list in sets of k nodes.
He asked me about corner cases and what all test cases will I try when testing this code. He asked me if I had any questions, I asked a couple.

Round 4
This time the interviewer seemed strict and asked me how my previous rounds went.

I answered they were good but he seemed to doubt me.

Then he gave me a question to code.

Count all possible paths from top left to bottom right in a m X n matrix.

I directly jumped to the dp solution which required O(m X n) space.

Then he said if I knew the question , I said yes then he told me that I should have told him I knew the question.

He did not seem pleased with my answer and asked me to do it in less space O(m)

I did that then he added to the question that some grid points contain obstacles and we cannot go through those.

I solved this too. Then he asked me to do it in O(1) space.I told him that we can do it recusively but that would shoot up the time complexity.

He said that I code it and show him the answer.I did it but he still did not seem satisfied and asked me \xe2\x80\x9d Are you sure this will work\xe2\x80\x9d

I said that I\xe2\x80\x99ll do a dry run for the code and I drew a recursion tree for the same. After that he said that the time is up and I should wait outside.

Round 5
This was a technical + HR round. He asked me the generic question \xe2\x80\x9cTell me about yourself\xe2\x80\x9d.

Then he asked me about grep function in Unix which searches a string in set of files.

He asked what approach I would use to search a string in a set of files.

I told him about Tries and Ternary trees, I also mentioned that Windows performs indexing which makes search faster and this is stored in the secondary memory.
then he told me that tries and ternary trees are stored in the primary memory and will vanish after rebooting the system,so how will i store them into the secondary memory.

I told him about serialzation and deserialization process and gave an example of a binary tree.

He seemed satisfied and did not ask me to code.

I would like to Thank GeeksforGeeks for helping me in interview preparation.

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Related Practice Problems

Transform the array

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Microsoft Interview experience | Set 116 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n02 Jul, 2017

Microsoft IDC came to our campus to recruit summer interns. The selection procedure involved a coding round, group fly followed by 3 interviews.

Round 1
This round had 3 questions and was hosted on cocubes.
1) Given two numbers find the number of carries while adding them.
2) Given an array of distinct integers and a number \xe2\x80\x98m\xe2\x80\x99, find the number of triplets with product equal to \xe2\x80\x98m\xe2\x80\x99.
3) Given 2 arrays, swap corresponding elements so as to sort both the arrays. Print minimum number of swaps and -1 if arrays can\xe2\x80\x99t be sorted this way.

Around 22 people were selected for the next round

Round 2
This had a single question and we were supposed to code it in 20 mins after discussing the approach with the mentor.
Given an arbitrary order of alphabets and two strings, tell which one is greater, smaller or equal according to the given order.
We had a campus pool, so each batch had 18 students and around 9-10 were selected from each.

Round 3
This was a technical interview which started with a small discussion on projects and a question on pointers which I could not answer exactly.
Q1 \xe2\x80\x93 Implement the hint function in the Bubble Breaker game. I was asked to write the code which I did flawlessly.
Q2 \xe2\x80\x93 Implement the code to solve sudoku(by trial and error). He only asked the approach.

Round 4
This was another technical interview and the interviewer was extremely cool unlike the last one. He started with a simple question \xe2\x80\x93 find the nth node from the end in a linked list and asked me to code it covering all corner cases. He also asked me to write test cases for the same. He was quite happy with my code and approach.

Round 5
This was the HR round and the interviewer was extremely calm and supportive. She started off with the introduction and introduced herself as well. Then she asked me to write the code for iterative level order traversal. After doing this quickly, she asked me to write another code for constructing a binary tree from its inorder and postorder traversals. I did this quite easily too.
The results were announced after a couple of days and I was selected \xf0\x9f\x99\x82

For questions like that in Round 5, GeeksforGeeks helps a lot, but other than that it is the regular practice and your interest in coding that helps you sail through. Thanks gfg \xf0\x9f\x99\x82

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Microsoft Interview experience | Set 115 (4 Years Experienced for IDC)

- Difficulty Level :\nHard
- Last Updated :\n13 May, 2017

1st Round :
1)https://www.geeksforgeeks.org/maximum-product-subarray/
2)https://www.geeksforgeeks.org/sort-an-almost-sorted-array-where-only-two-elements-are-swapped/
3) Delete all nodes whose value is greater than K

2nd Round (1 hr 30 mins)
1) Clone a Binary Tree
2) There is a rack of shelves having balls of red and blue in each row . Retrieve all identical rows.
3) There is a rack of shelves having balls of red and blue in each row . Retrieve all unique rows.
4) How u will remove duplicates in an stream of Integers
5) What Data structure you will use to identify unique elements and discard duplicates.

3rd Round (1 hr 30 Mins)
1) Given an Infinite stream of strings as AAAAABBBCCDDDEEE\xe2\x80\xa6 How will you arrange characters so that string become unique without duplicates . Return true if it is possible to arrange else return -1. Ex . AAABBCCDEF \xe2\x80\x93 O/p ABABCDCEF : Possible . AAAAAAAAAAAAAAAAAAAAAAB : Not possible

4th round
1) Given Co-ordinates of x and y in an input array Identify if square can be formed at any point of time via coordinates if so return true;
2) Given a Pre-Order Traversal of BST convert it into BST.
3) Identify Leaves of BST through Pre Order without constructing it.

It gave me a Lot of Learning to think out of Box. Thanks GFG .

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Microsoft Interview experience | Set 114 (2.5 Years Experienced for SDE2)

- Difficulty Level :\nHard
- Last Updated :\n20 Dec, 2018

1st Round :- (1 hr)

1. There is a graph where each node represents a city and it contains specific no. of people. A tournament is going on and each match is playing in one city. All city\xe2\x80\x99s people gather to watch match. Traffic department wants to manage how many people travel through city x if match is playing in city y for each x. City x and y can be any city.
   Code & edge case
   Soln :- DFS with optimization O(n)
2. Torch problem : There is a bridge and N no. people takes (a1,a2,\xe2\x80\x94an) time to cross it and there are K torch and at any time x no of people can pass the bridge and it takes maximum of x people to cross it. Minimum time required to cross it.
   Devise algo and write down code
   Solution :- Sort array take x min pass it from one end to another. Bring min among them to one side send x maximum to other side and again bring 2nd min from other side again send x max follow it in cyclic way If all x min reached to one end again send x min to another side. DS used Dequeue.

2nd Round :- (1hr)

1. Program to calculate x^y in log(y) .
   There focus is on all edge case he want me to write down all test case and validate my code.
2. Design bus booking system:- Each row has x seat. If customer wants K seats if you have K consecutive seats available, reserve them. Otherwise give seats from any row.
   Focus on DS & code
   Solution :- Create adjacency list like 1 seat available in which row. 2 seats available in which row and so on and do the operation for each reserve call

3rd Round :- (1.5hr)

1. Change characters of strings to another set of characters in place. You can increase length of string one time.
   ab->bc
   cd->ki
   Focus on Code & Edge case
2. An array is increasing upto a number and then decreasing find the the pivot number.
   All edge case & program. Your program should handle all edge case.
   I propose if it contain duplicate Or if whole array is large it can\xe2\x80\x99t fit into memory and their solution.
   They wanted to see about edge case being handled.
3. E-commerce architecture related to my past experience. I had taken marker and explained it on white board. It will give you more advantage .

4th Round :-(1hr)

1. String matching problem one string contains wildcard characters. Code & edge case & recursive diagram. All test case and validate it .

2. Maximum length of Sub-array contain increasing then decreasing . Code & Edge case

5th Round :- Engineering Manager (45 min)

1. Design a crawler to fetch code from n system and merge it
   Speak aloud what are you thinking about..
2. Class design, Operation, Entity
   Solution : Like Github with version & Conflict & Backup & Job
   Engineering Manager really impressed with my Scalable design approach

6th Round :- Hiring Manager (1hr)

1. There are n no of pages and when a user visits page x it is writing in a log file. Recommend each user a page from his past experience .
   Solution : Treat page as a node and weight is how many times he visited from page x to page y. Maintain map of user and adjacency list and do the operation.
   Code & edge case & Most important they try to create some hostile environment to judge you how much you are fit for any environment & But if you tackle it they are very friendly.

   Tips : Ask questions if you have any confusion .

Thanks to GeeksForGeeks. Whole process took around 1 month .

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Microsoft Interview experience | Set 113 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n27 Apr, 2017

Written test 1 (Objective), 30 minutes
First written test was conducted by some third party company. It consisted of 15 objective questions from C, Sorting, Data Structures, Big O, compiler and state machine. We were given 30 minutes. Cut off was 12 out of 15 questions. 77 out of 400 students made it.

Written test 2 (Coding), 60 minutes
Three problems to be solved in 60 minutes with no use of compiler. One problem on Linked List, second on heap and third on array. I coded all problems from scratch including main method. I also wrote flexible methods that could work on any kind of inputs (instead of deleting nodes from 4 to 6, it would delete nodes between \xe2\x80\x98M\xe2\x80\x99 and \xe2\x80\x98N\xe2\x80\x99) and handle all corner cases. The result was announced after 20 days. 30 out of 77 made it.

F2F Interview #1, 60 minutes
We were interviewed in groups of 6. Each one of us in a group was given same problem to solve. I couldn\xe2\x80\x99t code the perfect solution in an hour. All I had discussed 6 different ways to solve the problem. I was afraid that I might be rejected in first round. The interview lasted for 60 minutes.

14 out of 30 were selected.

F2F Interview #2, 60 minutes
This was the easiest round. They asked one problem on Linked List and other on Tree. Both easy. The interviewer kept on twisting the problem and accordingly I had to communicate what changes needed to done in the solution. The interview lasted 60 minutes. 10 out of 14 were selected.

F2F Interview #3, 90 minutes
This was hell of an interview. 4 years it\xe2\x80\x99s been and I still remember every minute details of the talk I had, every single line I spoke and every response I got in return.

The interviewer was from Visual Studio team and was very experienced. The interview started with a design problem. He told that I have already proven to be a great coder (they were passing feedback for each round among each other) and he wanted to check my other skills.

\xe2\x80\x9cSo, Aashish! I want you to design a program beautifier. You know what it is? \xe2\x80\x9d. Well, I heard it the first time. I had no clue. I was blank. He showed me on notepad about what he expected from me. I started creating finite machine. When I was half way, he asked me to stop and code it. We discussed Gap Buffer Data Structure. After coding, followed the design of test suit. I wrote three pages of test cases. That\xe2\x80\x99s where things went unexpected. \xe2\x80\x9cYou seem to be very good at testing as well\xe2\x80\x9d. Then he asked about my choice of role at Microsoft. I always wanted a development position. He said that I can be fit for any role. But it\xe2\x80\x99s the test role I would make best impact at. I was unsure of that. I always loved writing code, developing features and fixing bugs.

\xe2\x80\x9cI see a lot of passion for coding in you. But where is the passion for technology? At Microsoft, we need both. Otherwise, the job will become boring.\xe2\x80\x9d I went on to talking about various technologies, Linux and Windows environment and why I liked one above the other. We talked about GeeksforGeeks, Ideone and Project Euler. After a pregnant pause, he told me that he saw same passion in me as he witnessed in one of his friends at Microsoft and he was doing

great.

The interview lasted 90 minutes. This was the round which was meant to cut down the number of candidates going forward to next rounds.

5 out of 10 made it. We were told to come next day for 2 more round of interviews.

Skype Interview, 75 minutes

I was told to come next day at 12. I was supposed to face two round of interviews. But they directly scheduled an interview with the hiring manager, skipping one round. The hiring manager had 20 years of experience at Microsoft and knew hell lot of things. He asked me to read out my resume and asked few questions about my project. Then I was asked to design a social network. I had read about the graph APIs of Facebook sometime back and had few ideas on how Facebook maintains data structure of each user. We then discussed about big data handling, graph representations and their pros and cons. He asked me to code the tweaked version of degree of connection feature of LinkedIn followed by discussion on time and space complexity followed by designing test cases.

The interview lasted 75 minutes. He asked me if I have any question. \xe2\x80\x9cYeah, plenty\xe2\x80\x9d, I said and bombarded him with all.

23 days later, the result was announced. They hired 2 students out of 5. I was one of them!!

This article is contributed by **Aashish Barnwal**.\xc2\xa0If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview Experience | Set 112 (For 4.5 Years Experienced)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Round 1:

1. Common Node in 2 Linked List
2. Clone Linked List which has random pointer

Round 2:

1. Spam Filter design
2. LCA of Binary Tree
3. LCA of BST

Round 3:

1. Number between twin primes is divisible by 6 or not. Proove it
2. Question on Threads
3. Scheduler Design

Round 4:

1. Detect Misspelled localities from the 1000s of given addresses
2. Data structure design for \xe2\x80\x98Auto complete feature for search of file names\xe2\x80\x99
3. A 2D matrix of size mxn is given. User will select 4 positions in matrix. Determine those positions are contiguous or not. Contiguous can be in terms of Row-wise, column-wise, diagonal-wise.

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Microsoft Interview Experience | Set 111 (For 1.5 Years Experienced)

- Difficulty Level :\nExpert
- Last Updated :\n27 Dec, 2016

Position: Software Engineer \xe2\x80\x93 2(Big Data Team, Bangalore)

I applied through referral. Got a call within a week.

Round-1(Skype-Bangalore)(~45Mins)
The interviewer directly asked me to explain about my current project. 5-6 questions from there.
My project was based on cloud computing so, He asked me some basic questions about cloud computing. About
three layers(IAAS, PAAS, SAAS), etc..
The difference between CloudStack and OpenStack(CloudStack(CS), The product I am working on).
OpenStack is a similar product. Scenarios where CS is used (how customers are benefited from CS).
Then, He moved to Algorithm section. How will you differentiate the questions from google code jam and
facebook hacker cup(As I participated in both competitions)
He asked me to give him a problem. I told, To find the longest palindromic substring in a string of characters.
Then, he asked me the solution, Gave Manachar\xe2\x80\x99s algorithm. Asked the algorithm detailsInterviewerand time, space complexity.

Round-2(F2F-Bangalore)(~1Hour 15Mins)
The interviewer started with my Introduction. He then scanned my entire CV, all projects,
even covered my school projects, etc..
The difference between Java and C++. Advantages and disadvantages of each.
Which language you are most comfortable with. Rate yourself out of 5.
After that he asked, how the run time polymorphism works in C++. How C++ resolves it. I explained about
Virtual stuffs and associated VPTR and VTABLE.
Then, He asked details of my last project. Some here and there questions from the project.

He moved to algorithm section.

Q-1: Given MxN binary matrix, find the largest sub-square matrix with all 1\xe2\x80\x99s.
I came up with a DP solution. He asked me to explain the algo first then told me to write code on paper. I left some validation cases, so he asked to handle those, then asked me about time, space complexity and to write all test cases.

Q-2: Find the row which contains most number of 1\xe2\x80\x99s in a MxN binary matrix, Where in each row 0\xe2\x80\x99s are always followed by 1\xe2\x80\x99s. Gave him the binary search algorithm, but he asked me to optimize further. Then, I came up with the stepping linear time algorithm with O(M+N). (Same, asked to write code on paper then test cases). Time and space complexity.

Round-3(F2F-Bangalore)(~1Hour)
The interviewer started with my Introduction. It was kind of Design round.
He asked me to design your own BitSet API. All the methods like flip, set, reset, countOnes, etc..
What data structure will you use. He then, put a constraint like what if multiple threads access the methods. I gave solution to use mutex lock. He asked me the difference between semaphore and mutex, and
how to handle deadlock situation. I told about maintaining locks in 2-phase. (Growing and shrinking phase). Then asked the implementation details. Wrote all codes on paper. Testcases and time, space
complexities of each operation.

Round-4(F2F-Bangalore)(~1Hour)
Introduction. Why Microsoft, Why do you want to leave, Asked details of my last project.
He then asked me to design LRU cache on white board. Asked to write code for searching a key on LRU. As usual, Time, space complexity and Testcases.

Algo Question:
Check if given binary tree is binary search tree? How to handle the multiple thread case?
Some discussion on that. Wrote code on white board, testcases and asked time, space complexity.

Round-5(F2F-Bangalore)(~45Mins)
Introduction, Asked about the product. Asked to draw the architecture of the product. Some discussion of each component of the architecture. What you explored outside of your current work. I talked about docker container. Some discussion on that. Explained about their work in detail. What is expected from the position, etc\xe2\x80\xa6

Round-6(Skype-Redmond)(~45Mins)

It started with my Introduction. The interviewer asked the detail of my current project.
What was the duration of the project, and how many members involved?
How many programming languages used? How many programming languages do you know?
Which one are you most comfortable with? Rate out of 5.
He then asked me the difference between class and structure in C++. How to implement an interface in C++.
etc..

Algo Question:
Given two linked lists sorted in ascending order, merge them into one linked list(Maintain Sorting). Do it in place. He asked me to write in a text editor, shared my screen. Asked me to listout all test cases, and time, space complexity.

Round-7(Skype-Redmond)(~45Mins)

Introduction. Asked me the project details. Some discussion on that.

Algo Question:
Sort 1 billion integers with limited memory. I told about sorting them chunk by chunk and then merging. He then asked me how to decide the chunk size. I explained with an example. Asked about time
complexity. Then, Asked whether this will take the same amount of time if we have infinite memory. I told about the access time difference in primary memory and secondary memory. Asked details

about
secondary memory, About disk technology, sector, seek time, rotational delay, etc..

Round-8(F2F-Bangalore)(~45Mins)
Again started with my Introduction. He asked my project details. He was the engineering director of the team.

Algo Question:
Find median of an infinite stream of integers with limited memory. I came up with a solution where we have infinite memory. I started with insertion sort and then optimized to min-heap and max-heap method. But he was more interested in limited memory algorithm. I tried hard, but couldn\xe2\x80\x99t come up with one. He told me to write code for my solution on white board. As usual asked to write test cases, time and space complexity.

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Microsoft Interview Experience | Set 110 (Internship)

- Difficulty Level :\nHard
- Last Updated :\n20 Dec, 2018

Round 1
It was an online coding round conducted on cocubes.com. It was a 75 minutes round consisting of 3 coding questions only.
Questions were:

1. An array of integers is given which represents the heights of n buildings.Sun start falling from the left side. If there is a building of certain Height, all the buildings right of it having lesser heights cannot see the sun. Find the no. of buildings which can see the sum.
   Solution: GeeksforGeeks Link
2. Rearrange a given array in-place such that all the negative numbers occurs before positive numbers.(Maintain the order of all -ve and +ve numbers as given in the original array)
3. Find the sum of leaf nodes at minimum depth of a tree. Return -1 if root is NULL.

   Students doing all the questions correctly and some students doing 2 questions correctly cleared this round. Total 16 students out of around 150 were selected for further rounds which were conducted at NSIT Delhi.

Round 2: Group Fly Round

In this round only 1 question was given and 30 minutes was the allotted time. It was a paper based coding round.

- **Ques:** Write a string comparison function.(Return 0 -if strings are equal, 1 -if string 1 is greater else -1). The increasing order of priority of characters was given:
a,b,c,d,e,k,f,g,h,l,j,l,m,n,\xe2\x80\x99ng\xe2\x80\x99,o,p,q,r,s,t,u,v,w,x,y,z
(\xe2\x80\x98ng\xe2\x80\x99 combination has to be considered as a single character).

According to me, in this round apart from writing correct & working code one should try to communicate with the mentor a lot and make him understand your code.
From a group of 12 students, 6 were selected for further rounds.

Round 3: Technical Interview

Firstly there was a 15 min discussion on my project. He asked me about the project details like implementation, technologies used and time spend on the project etc. Then he gave me only one coding question\xe2\x80\x93

1. **Ques** \xe2\x80\x93 Given k sorted arrays. Merge them into a single sorted array.
   I directly gave him the min. heap solution so he asked me about other methods also.Then he asked me to derive the time and space complexity for the min. heap solution. Then he told me to write code for the same.

   The interviewer was not at all cooperative. He kept asking questions when I was writing the code.

Round 4: Technical Interview

The interviewer was cool and asked me some direct questions after the discussion about my project.

- **Ques 1:** Find intersection point of 2 linked list.
- **Ques 2:**Detection of loop in a linked list.

He asked me to write the code of the above 2 questions. He told me that the evaluation of the code would be according to the code correctness, proper indentation, time taken etc.

- Then he asked me about the knapsack problem(fractional as well as 0-1)and some graph related problem. I told him that I was not comfortable in writing graph codes so he asked only the implementation of these problems.

Round 5: Technical Interview

> It was meant to be an HR interview but the interviewer asked me some technical questions also. Firstly she asked me about the project and then some basic HR questions and then gave me 2 coding questions and told me to code them.(correctly and neatly)

- **Ques 1:** Given pre-order and in-order traversal of a BST. Construct the BST.
- **Ques 2:** Given a string. Encode it.

```
Ex: input = wwwwaaabcccdd\r\nOutput = w4a3bc3d2
```

I gave her the best solutions for both the questions.

Then she asked if I have any questions for them, so I did asked some questions.

Thanks to GeeksForGeeks for providing such a vast content to study and practice.

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All Practice Problems for Microsoft !

Related Practice Problems

Arranging the array
String comparison

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Microsoft Interview Experience | Set 109 (2 years experienced)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Round 1 (Telephonic)

1. What is LRU. How to Implement it.
2. Find kth smallest element in an array.
   Solution: GeeksforGeeks Link
3. In a file, there are two columns, first column has some word (String) and 2nd column has some value (Double).

   ```
   Example :-\r\nABC 23.4\r\nERF 34.89\r\nWERT 122.9\r\n\r\nNow user wants some arithmetic operations like \r\n1) ABC +
   ```

4. Design an efficient DS for these kind of operations.

Round 2 (F2F)

1. Asked about current Project.
2. Given a string str. You have to make this string to square string with maximum length. A square string is of the following format:
   str = x + x; where x is any string. Return length of this square string.

   ```
   Example \r\nstr = ababa\r\nMax length square string = 4;\r\nstr = abcd\r\nMax length square string = 1;
   ```

Round 3 (F2F)

1. Asked about current project. Asked to draw architecture of my project. Then Asked to design a new feature that is currently not there in my project.
2. Design undo and redo operation in Microsoft Word like text editor.
3. Design Hit Counter. (Design Hit Counter)

Round 4 (F2F)

1. Asked about current project.
2. You are given a text file. You have to return the list of starting index of the given word in text file. Design an efficient DS for that.

   ```
   Example :-\r\nText file content : "geeks for geeks"\r\nword : "geeks"\r\nList : {0,10}
   ```

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Microsoft Interview experience | Set 108 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Round 1: Aptitude
Round 2: 2 questions from data structure

Round 3: Group fly round

1. Find the least common ancestor of two nodes in a binary tree.
   Determine if the current root value matches one of the key values. If so, this root is returned. Else the procedure is recurred for left and right subtrees. The node which has one key in left subtree and the other key in its right subtree is the LCA. If both keys lie in left subtree, the first node whose value matches one of the key values is LCA. Similarly for right subtree. Time complexity is O(n). The interviewer asked for optimization. I suggested a better approach for BST.
2. Given two sorted arrays (with repetitive elements) find the kth minimum number from both arrays.
3. Maintain an index for each array, both initialized to the first element of their respective array. Loop k times and in each iteration find the minimum element among the current indices and increment the index of the array containing the minimum. If the elements are equal, increment both indices. Time complexityis O(k).

Round 4:

1. Given a node in a BST, delete it. Parent link is not a part of the node structure.
   If the node is a leaf node, delete the node.
   If the node has one child replace the value of the node with the child\xe2\x80\x99s value and recursively delete the child.
   If the node has two children, find the inorder successor, replace the current node\xe2\x80\x99s value with the inorder succesor\xe2\x80\x99s value and recursively delete the inorder successor.
   Time complexity is O(h). Interviewer suggested a possible optimization for one child case, that recursive deletion is not needed for one child. We only have to copy its left and right child pointers to the node which we are trying to delete.
   Related Article: GeeksforGeeks Link
2. Puzzle \xe2\x80\x93 there are nine coins, out of which one is defective (differing in weight from the others). Find the maximum number of iterations to find the defective one.
   I suggested a divide and conquer approach, with maximum of 5 iterations.

Round 5:

1. Discussion of project
2. A program is running in an infinite loop in the system. If we try to run another good program while this infinite loop is executing, will the good program run?

   I answered that the program will run, but the CPU utilization will be reduced.

3. Write a code to implement the strtok() function in C.
4. Maintain an index to represent start of next token, initialized to 0. Search the string linearly, if a match for the pattern is found, store the substring from the start index to the previous position of the pattern in a string array and update the start index for next token. Time complexity is O(n).

Interviewer wanted to know why I had used malloc() instead of static allocation.

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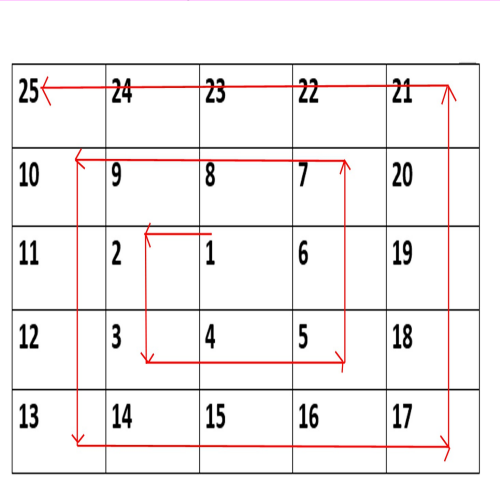
Microsoft Interview experience | Set 107 (On-Campus for Internship)

- Difficulty Level :\nHard
- Last Updated :\n08 Feb, 2018

Round 1: Coding
Q.1 A 5*5 matrix of spiral order is



Now for an N*N spiral matrix filled similar to one given above, find element present at [R,C] position where R=row\xe2\x80\x99s number, C=column\xe2\x80\x99s number.
Constraint: You can\xe2\x80\x99t create matrix itself. Print number without creating matrix explicitly.

Q2. Given a string S and two indexes i & j, modify the string in a pattern such that:
characters from [0 to i] index are now at back of the string.
characters from [j till end of string] are in front of string.
e.g. S = \xe2\x80\x9cabcdef\xe2\x80\x9d and i=1, j=3.
Output should be: \xe2\x80\x9cdefcab\xe2\x80\x9d
Constraint: Constant Space.

Q3. https://leetcode.com/problems/simplify-path/

Round 2: Group Flyer
Q1. Given an array of positive integers, sort the array in a manner such that when all the elements of new array are concatenated in a string, the number formed is maximum.
e.g. input: [12,9,32]
output: [32,9,12]

Q2. In a native language alphabets are in this order:
a b d c k l g h ng q r
given two string str1 and str2, find which one is larger among the 2. (larger means rankwise more e.g. if \xe2\x80\x9cda\xe2\x80\x9d and \xe2\x80\x9cc\xe2\x80\x9d are given then \xe2\x80\x9cda\xe2\x80\x9d > \xe2\x80\x9cc\xe2\x80\x9d as d comes first).
write this function:

```
\r\n   bool compare(char* str1, char* str2);\r\nreturn 1, if str1 > str2.\r\nreturn -1, if str2 > str1\r\nreturn 0, oth
```

Interviews: We needed to write our code on a paper.

First F2F round:

Q. https://leetcode.com/problems/letter-combinations-of-a-phone-number/
I did it using recursion and then he asked me to think about iterative approach. One que of DBMS, I told him I am from ECE and haven\xe2\x80\x99t studied DBMS. Then he asked what courses I have done from CSE dept. I told him OOP, DS, Architecture, Network.
Finally he asked if I have any questions. I asked about diff b/w MSIDC and MSIT.
Second F2F Round:

Q1. https://www.geeksforgeeks.org/find-longest-path-directed-acyclic-graph/
He gave me this que and asked to solve it in 45 minutes. First he asked about approach. I told him the approach and procedure how I am going to code it.

Then he changed the question I don\xe2\x80\x99t know why and next ques was:
Q2. In a degree \xe2\x80\x98N\xe2\x80\x99 tree. Find LCA of 2 given nodes. All elements are unique in tree.
First I gave him a general solution. He didn\xe2\x80\x99t seem convinced because of space complexity and told me to think more. I answered approach in which we can store path from root node to given nodes and match the path. He was convinced then and told me to wait for 5 minutes before 3rd round.

3rd F2F Round:
He asked me about myself. Then he asked what part I like most in DS. I said trees, linked list.

Q1. Given 2 numbers \xe2\x80\x98N\xe2\x80\x99 and \xe2\x80\x98M\xe2\x80\x99 where \xe2\x80\x98N\xe2\x80\x99 > \xe2\x80\x98M\xe2\x80\x99 and last a range of indexs [i,j] between (1,32) which denotes indexes in binary representation of \xe2\x80\x98N\xe2\x80\x99, change all the bits in this range to bits of number \xe2\x80\x98M\xe2\x80\x99. Also (j-i) is equal to most significant bit of \xe2\x80\x98M\xe2\x80\x99
e.g. N=9 :: (binary) 000000\xe2\x80\xa60001001
and M=2 :: (binary) 000000\xe2\x80\xa60000010
and (i=1,j=2) implies 1 to 2 bits of N has to be changed such that they are equal to M\xe2\x80\x99s bits.
expected output: 10 :: (binary) 000000\xe2\x80\xa60001010
where (\xe2\x80\xa6) = 19 zeros
First I didn\xe2\x80\x99t get it but then he explained with above example.
Answered it in O(32) in second go.

Q2. Populate next pointer in a binary tree in O(1) space.

Connect nodes at same level using constant extra space

Q3. Something about Deadlock. I asked about the subject and He said OS. I told him I haven\xe2\x80\x99t studied this. He calmly said \xe2\x80\x9cOhh Okay no problem\xe2\x80\x9d \xf0\x9f\x98\x9b

Finally someone from their team told me \xe2\x80\x9cWe are done for the day, You can leave\xe2\x80\x9d \xf0\x9f\x98\x9b

Total 11 students were selected.

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Microsoft Interview experience | Set 106

- Difficulty Level :\nMedium
- Last Updated :\n07 Sep, 2016

1. Phone Interview

- Tell me about yourself
- Questions related to kernels(difference between linux OS/kernel and windows OS/kernel)
- Difference between Process and thread

```
// 32 bit architecture\r\nbool isPowerOftwo(int no)\r\n{\r\n    int i = 1;\r\n    int state = 0;\r\n    int k = 0;\r\n\
```

2. F2F

- How many storage types are there in C.
- How many data types are there in C.
- Given a file with many strings. Find how many unique anagrams exists. (Hash table, BST and finally TRIE approach).
- How will you handle large data in a distributed way for the above question.
- How will you handle large data in one reducer.
- What are the properties of distributed systems.

3. F2F

- Implement map reduce program very similar to word count.
- How will you handle large data in one reducer.
- How will you distribute data across cluster and data centers.
- Internals of hadoop.(saving of intermediate files after map phase)

4. F2F

  - Compress a string \xe2\x80\x9caaabbcdddd\xe2\x80\x9d to \xe2\x80\x9ca3b2c1d4"
  - What this program actually does internally

    ```
    void fun() {\r\n\r\nint a = 5;\r\nint * b = new int(10);\r\n\r\n}
    ```

- What is the effect of this program to multiple threads.
- Design distributed file system.

5. Leadership round

- Why you want to change?
- Discussions around azure business model, revenue model, details of job profile, etc.
- Given binary tree\xe2\x80\x99s root and a node, find all the ancestors of the node.

\xc2\xa0

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Microsoft Interview experience | Set 105 (Global Delivery)

- Difficulty Level :\nMedium
- Last Updated :\n28 Jun, 2021

Online-screening test: It was of around 90 minutes and was divided in 3 individual tests as follows:

- **1st test:** Non-technical **mcq**(40 minutes: 40 questions)
  Quantitative aptitude mcq including questions on percentages, ratios, speed/distance, ages, pie charts, probability etc. Questions on vocabulary, coding/decoding, round table arrangements, sentence correction, Statements and conclusion etc. were also present. Questions were easy but lengthy. I solved around 70% of them.
- **2nd test:** Technical mcq (30 minutes: 30 questions)
  Questions were from dbms, c, data structures (mainly binary trees), OS and Networking. Questions like whether relational calculus is procedural or non-procedural language, tell no of leaves if no of internal nodes is given in binary tree etc. Practice them from GeeksQuiz.
- **3rd test:** Essay writing test (20 minutes: one essay 250-300 words)
  Need to write essay on the topic : \xe2\x80\x98Is social media a right platform to discuss political issues\xe2\x80\x99 Topic was not same for all. Others got topic like: \xe2\x80\x9cCricket is declining other sports\xe2\x80\x9d, \xe2\x80\x9cInternet is everything\xe2\x80\x9d etc.
  After this online test, they shortlisted 36 out of more than 100 students.
  Then there were 3 rounds of interviews; every round was elimination round.

Round 1: Technical interview (70 -80 min)
Interviewer asked favorite subjects apart from data structures and algorithms. I told him dbms and oops.

1. Define joins in SQL and explain them. I explained him inner, left, right and outer join. Then he asked me about axis join.
2. \xc2\xa0Define keys. Surrogate keys, primary keys, foreign keys, candidate keys and super keys. Then he named around 4 more keys which I didn\xe2\x80\x99t know.
3. \xc2\xa0What is encapsulation? Explain with example. How is it useful?
4. \xc2\xa0If one class B is inheriting a class A which has a private function, what keyword will you append in function definition to use that in class B? I said by making that function friend. Some more follow up questions on it.
5. Convert binary tree to doubly linked list (https://www.geeksforgeeks.org/in-place-convert-a-given-binary-tree-to-doubly-linked-list/)
6. Longest incremental subsequence (https://www.geeksforgeeks.org/dynamic-programming-set-3-longest-increasing-subsequence/
7. \xc2\xa0Swap two numbers without using temp variable: Asked 3 approaches (https://www.geeksforgeeks.org/swap-two-numbers-without-using-temporary-variable/)
8. \xc2\xa0Check linked list is palindrome or not(https://www.geeksforgeeks.org/function-to-check-if-a-singly-linked-list-is-palindrome/)
9. \xc2\xa0In-place rotate n*n matrix to 90 degrees (\xc2\xa0https://www.geeksforgeeks.org/inplace-rotate-square-matrix-by-90-degrees/)
10. \xc2\xa0Find two rectangles overlap (https://www.geeksforgeeks.org/find-two-rectangles-overlap/)
11. \xc2\xa0Print 1 to 100 without using recursion and loops. Give generic solution
12. \xc2\xa0Test cases for water bottle. And some more questions on strings and software testing which I am not able to recall.

2nd round Tech + HR: (50- 60 min)
Basic HR questions. Where do you see yourself in 5 yrs, why do u want to join Microsoft etc. Print all prime nos from 1 to 100. Design elevator algorithm which responds in least possible time. SQL query to find nth highest salary of an employee. Explain IOT in layman terms, cryptography, software testing methods, how do you handle stress, strategy to study the tough subject, what if we do not select you etc. Discussion on my projects.

3rd round: HR (60 \xe2\x80\x93 65 min)
Tell me about yourself, discussion on my projects, why I used a particular technology in project, what other technology I could choose, asked almost everything from the resume, priorities in life, why Microsoft, what people say about you: positives, negatives and how you are working on it, what if we don\xe2\x80\x99t select you etc. Interviewer was awesome and it was fun talking to him.

My whole experience was amazing. Study DBMS, SQL and data structures thoroughly. Also do give a look at puzzles. If you do not know anything, say no simply. Be confident.

I would like to thanks GeeksforGeeks.org and GeeksQuiz a lot for wonderful collection.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to review-team@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview experience | Set 104 (On Campus for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Microsoft (IDC) had come to my campus to recruit FTEs and summer interns. The selection procedure involved an online coding round, Group-fly round and 2-3 interviews.

Round 1 (Online coding round):

This round was the online coding round in the co-cubes portal. There were three questions carrying 25marks (5+10+10) of total. 1 hr and 30 mins were given for this round.

- Given the numbers n and k, change the k th bit of the number n to \xe2\x80\x980\xe2\x80\x99 if it is \xe2\x80\x981\xe2\x80\x99, else return the number n itself

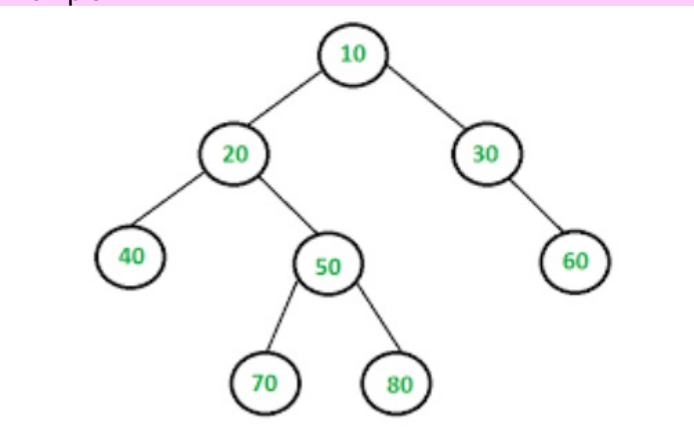
```
Example:\r\nFor n=13 (1101) & k=2, return 13\r\nFor n=13 (1101) & k=3, return 9 (1001)
```

- Return the sum of two binary numbers represented as strings

```
Example:\r\nFor n1=111 & n2=10011, return 11010
```

- Return the sum of all the leaf nodes at minimum level in a binary tree. If there exists no tree, then return -1

Example:



For the above binary tree, return 100 (40+60)
After the first round, 5 of them were selected for the interviews directly and around 12 of them were selected for the group fly round. As all the questions were quite easy, the selection was based on the efficiency of the code.

Round 2 (Group-fly round):

1. Given a number n, print the number in words.

   ```
   Example: For n=125, print One hundred and twenty five.
   ```

Technical Interview 1:

1. I was asked the same question as in the group fly round. (As I was selected directly to the interview, my interview happened at the same time the group fly round was going on)
   First the approach was discussed and after the interviewer was satisfied with my approach, I was asked to write the code for the same.
   He then asked me to write down the test cases for the same problem. I came up with all the possible test cases. I then realised that I had not written a code to include all these test cases and asked the interviewer if I had to correct my code, for which he said it was not required.
2. There\xe2\x80\x99s a system that takes a stream of numbers. When each new number arrives, find the median of the set of numbers that we have so far. I gave a solution using AVL trees and wrote the code for the same. I was also asked to evaluate my solution.

Technical Interview 2:

1. Given a BST and a number n, find two numbers in the tree that sums up to n. This was to be done in place i.e.

without any extra space.
I came up with a brute-force solution and two more solutions using extra-space. I was asked to write the code for one of them.

2. In facebook, given a person p, find the number of connections till the kth level. The friends of p form the 1 st level, friends of friends of p the 2 nd level and so on.
   The data structure and the algorithm to be used were discussed and code was to be written for my approach.

Last interview:

This one was called as the AA(As-Appropriate) round in which the interviewer looks for uniqueness, technical knowledge and soft-skills too.

- The whole interview was about the mini-project I had mentioned in my resume. A deep discussion on other approaches and about storage that would make the search efficient was done.
- General HR questions like \xe2\x80\x98Why Microsoft?\xe2\x80\x99 were asked.

Finally 2 of them were selected. In all the interviews, rather than the correct solution, the approach and uniqueness of the solution was weighed more.

I thank geeksforgeeks.org for providing a great support for my placement preparations.

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Microsoft Interview experience | Set 103 (On Campus for IDC)

- Difficulty Level :\nHard
- Last Updated :\n28 Jun, 2021

Microsoft came to our campus to recruit FTEs for MS-IDC. The selection procedure involved a total of 5 rounds, at the end of which 5 candidates were selected.

Round 1 \xe2\x80\x93 Online Coding Round
The first round consisted of 3 coding questions on Cocubes with a time limit of 75 minutes. Only the function body had to be coded.

- Given an array of n numbers, replace each element with it\xe2\x80\x99s farthest coprime in the range [2, 250]. Example, the farthest coprime for 2 is 249 and for 243 is 2.
- Given a number n, return the factorial of the number as a string. (The number was passed as an integer parameter and the string had to be returned.)
- Given two trees, tree A and tree B, return the size of the subtree if B is a subtree of A. Otherwise, return zero.

Round 2 \xe2\x80\x93 Group fly
This was a written round with 2 questions.

- Given a sorted integer array and a number X, find the number of unique pairs in the array that sum up to X. (similar)

  ```
  Request format: "GET "\r\nResponse format: "DATA "
  ```

  Give test cases for the above request-response query.
  Example, a base case could be fetching data from a file on the server and comparing the data with the local copy of the same file.

Technical Interview \xe2\x80\x93 3 rounds

My first round was a design round. I was given 3 scenarios.

- Design a personal assistant like Cortana for your B.tech courses.
- Given the heights and states of all the students in your college, what kind of analysis and grouping will you perform on the available data?
- Consider a client-router-server network. Clients request for information from the server via the router. Every server has a backup in case it fails. How will you ensure data consistency after using the backup server when the main server fails?

My second round had 2 coding questions

- Given a binary tree, print it\xe2\x80\x99s level order traversal with each level on a different line. Every line had to be prefixed with \xe2\x80\x9cLevel: (level number)\xe2\x80\x9d.
- Given the root and two nodes of a binary tree, find the Least Common Ancestor (LCA) of the given nodes. How will you modify the approach if every node has a parent pointer.

Last Round

The last round had a very simple question. Given a string, report if the string contains all unique characters or not. We were asked to write industry level code and provide test cases as well.

I would like to thank **geeksforgeeks.org** for providing such exceptional placement support. I did all my preparation from the website alone.
\xc2\xa0

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Microsoft Interview experience | Set 102 (On Campus for IDC)

- Difficulty Level :\nExpert
- Last Updated :\n12 Aug, 2016

Around 150 students appeared for the test.

Round 1 (75 minutes):

Online coding round hosted on HackerRank . Three coding questions were asked.

1. Given a Linked List of integers, write a function to modify the linked list in-place such that all odd numbers appear before all the even numbers in the modified linked list. The relative order of even and odd numbers should remain the same. \xe2\x80\x93 https://www.geeksforgeeks.org/segregate-even-and-odd-elements-in-a-linked-list/
2. Given a floating point number, calculate its square root without using in-built sqrt() function.
3. Given a pattern string and a test string, implement RegEx substring matching. If the pattern is preceded by a ^, it will match with the starting position. Similarly, if it is preceded by a $, it will match the ending position. If no such markers are present, it will check whether pattern is a substring of test.

```
Ex : ^coal\r\ncoaltar\r\nResult : True\r\ntar$\r\ncoaltar\r\nResult : True\r\nabcd\r\nefgh\r\nResult : False\r\n
```

25 students were selected for the next round.
Round 2(paper coding round):

1. Print boundary traversal of Binary tree in clockwise direction.(Note: check for leaf nodes in left and right traversal for a given tree). \xe2\x80\x93\xc2\xa0https://www.geeksforgeeks.org/boundary-traversal-of-binary-tree/
2. Rotate a square image 90 degree clockwise. Optimize as much as u can.\xc2\xa0Similar Question: https://www.geeksforgeeks.org/inplace-rotate-square-matrix-by-90-degrees/

8 students were selected for further rounds.

Round 3 \xe2\x80\x93 Personal Interview 1

1. Discussed about the 1st question asked in paper coding round, i.e., Boundary traversal of Binary tree.
2. How to merge two BSTs . Asked me all the approaches that I was able to implement . Then asked me to do in O(logn), where n is total no. of nodes .
3. Asked me to write code to find a no. occurring greater than n/2 times in an array . Then asked me to prove the written algorithm , basically , he was asking how I was able to write that code and why is it working .
   7 students were selected for further rounds.

Round 4- Personal Interview\xc2\xa02

1. Asked me to implement seat booking process in BOOKMYSHOW.com . How to handle the cases where two persons are trying to access the same seat at almost same time . He told me to write class based solution asking about different functions that should be used to solve all the cases for booking procedure .
2. What is singleton class?
3. \xc2\xa0How to find the point of intersection of two line segments . Two end points of line segments were given.
4. How to find no. of 2\xe2\x80\x99s between nos. 1 to n . He gave me few hints and finally , he was satisfied with my approach
5. Implement fibonacci series considering every possible solution .

And few more questions were asked , but I don\xe2\x80\x99t remember them.\xc2\xa0**6** students were selected for further rounds.

Round 5- Personal Interview\xc2\xa03

1. \xc2\xa0Write function for inorder traversal of Binary tree without recursion. That was easy !!
2. Asked me a puzzle question. An n*n board is given and one of the given cells is black .Also , L shaped pieces are given (equivalent to 3 cells of given matrix) , considering all possible rotations. I had to fill the entire grid using those pieces . Pieces can\xe2\x80\x99t be placed on the black cell and no two pieces should overlap , not even partially . I gave an answer where I tried to increase the size of unaccesiblecells(black cells and already placed pieces on board) to the size of the given board , but he asked me few cases where my answer failed. Then I said him we can do the exhaustive search of combinations using backtracking but it will take too much time . Then he gave me clue that instead of growing the size of unaccesible cells, try to decrease it. Finally , I concluded that it divide-n-conquer based solution considering base case as 2*2 board with 1 black cell.

4 students were selected for further rounds.

Round 6- Personal Interview 4

He\xc2\xa0told me to implement LRU Cache . I gave him all the solutions that can be possible . He was very helpful . He found flaws and told me to optimize it. I gave him 3 solutions and the final one is the one which you can find anywhere on the internet. But before that , he asked me to swap two nodes of a DLL using hashmap . I didn\xe2\x80\x99t know what Lru Cache is initially .haha

Round 7- Personal Interview\xc2\xa05

1. \xc2\xa0What\xe2\x80\x99s your passion ? What you want to do in your life ? Hr-type question .
2. He designed a new language with the words of English and stored them in an array of strings . Then he gave me two strings and told me to design strcmpfunction . I told him the best method in one go , but he tried to confuse me and he was successful . He gave me 5 mins to come up with another solution and tried new one .Lastly , I implemented the first approach I had in mind and he was satisfied with it.
3. How to serialize and deserialize an n-ary tree . I told him the function for serializing and deserializing a binary tree but couldn\xe2\x80\x99t come up with solution for the given problem.

3 students were finally selected for MS-IDC. I was one of them. :p
P.S : I was not comfortable with OS and DBMS , so I told them clearly but they tried to ask indirectly all the basic questions of OS and DBMS , and told me to implement them using C/C++.

Questions asked to my friends :

- Developing an algorithm for crossing bridges problem , where no. of elements is n.
- Intersection of two linked lists.

- Find if loop is present in linked list and also ,find the start node of the loop in it .
- Class design for banking system.
- Reverse linked list using both recursion and iteration etc etc

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Microsoft Interview experience | Set 101 (On Campus for IDC)

- Difficulty Level :\nExpert
- Last Updated :\n20 Dec, 2018

Recently , Microsoft visited our campus for recruiting FTE for MS-IDC division.
Around 150 students appeared for the test.

Round 1(75 minutes):

Online coding round hosted on HackerRank . Three coding questions were asked.

- Given a Linked List of integers, write a function to modify the linked list in-place such that all odd numbers appear before all the even numbers in the modified linked list. The relative order of even and odd numbers should remain the same.

Solution: Segregate Even Odd nodes in a Linked List

- Given a floating point number, calculate its square root without using in-built sqrt() function.
- Given a pattern string and a test string, implement RegEx substring matching. If the pattern is\xc2\xa0preceded by a ^, it will match with the starting position. Similarly, if it is preceded by a $, it will match\xc2\xa0the ending position. If no such markers are present, it will check whether pattern is a substring of test.

Ex : ^coal
coaltar
Result : True
tar$
coaltar
Result : True
abcd
efgh
Result : False

25 students were selected for the next round.

Round 2(paper coding round):

1. Print boundary traversal of Binary tree in clockwise direction.(Note: check for leaf nodes in left and right traversal for a given tree).
2. Rotate a square image 90 degree clockwise. Optimize as much as u can.
   8 students were selected for further rounds.

Round 3 \xe2\x80\x93 PI1

1. Discussed about the 1st question asked in paper coding round, i.e., Boundary traversal of Binary tree.
2. How to merge two BSTs . Asked me all the approaches that I was able to implement . Then asked me to do in O(logn), where n is total no. of nodes .
3. Asked me to write code to find a no. occurring greater than n/2 times in an array . Then asked me to prove the written algorithm , basically , he was asking how I was able to write that code and why is it working .
   7 students were selected for further rounds.

Round 4-PI2

1. Asked me to implement seat booking process in BOOKMYSHOW.com . How to handle the cases where two persons are trying to access the same seat at almost same time . He told me to write class based solution asking about different functions that should be used to solve all the cases for booking procedure .
2. What is singleton class?
3. How to find the point of intersection of two line segments . Two end points of line segments were given.
4. How to find no. of 2\xe2\x80\x99s between nos. 1 to n . He gave me few hints and finally , he was satisfied with my approach .
5. he asked me to implement fibonacci series considering every possible solution .
   And few more questions were asked , but I don\xe2\x80\x99t remember them.

   6 students were selected for further rounds

.

Round 5:PI3

1. Write function for inorder traversal of Binary tree without recursion. That was easy !!
2. Asked me a puzzle question. An n*n board is given and one of the given cells is black . Also , L shaped pieces are given (equivalent to 3 cells of given matrix) , considering all possible rotations. I had to fill the entire grid using those pieces . Pieces can\xe2\x80\x99t be placed on the black cell and no two pieces should overlap , not even partially . I gave an answer where I tried to increase the size of unaccesible cells(black cells and already placed pieces on board) to the size of the given board , but he asked me few cases where my answer failed. Then I said him we can do the exhaustive search of combinations using backtracking but it will take too much time . Then he gave me clue that instead of growing the size of unaccesible cells, try to decrease it. Finally , I concluded that it divide-n-conquer based solution considering base case as 2*2 board with 1 black cell.

   4 students were selected for further rounds.

Round 6 : PI4

1. he told me to implement LRU Cache . I gave him all the solutions that can be possible . He was very helpful . He found flaws and told me to optimize it. I gave him 3 solutions and the final one is the one which you can find anywhere on the internet. But before that , he asked me to swap two nodes of a DLL using hashmap . I didn\xe2\x80\x99t know what Lru Cache is initially . haha

Round 7 : PI5 and final round

1. What\xe2\x80\x99s your passion ? What you want to do in your life ? Hr-type question .
2. He designed a new language with the words of English and stored them in an array of strings . Then he gave me two strings and told me to design strcmp function . I told him the best method in one go , but he tried to confuse me and he was successful . He gave me 5 mins to come up with another solution and tried new one . Lastly , I implemented the first approach I had in mind and he was satisfied with it.
3. How to serialize and deserialize an n-ary tree . I told him the function for serializing and deserializing a binary tree but couldn\xe2\x80\x99t come up with solution for the given problem.

   P.S : I was not comfortable with OS and DBMS , so I told them clearly but they tried to ask indirectly all the basic questions of OS and DBMS , and told me to implement them using C/C++.

Questions asked to my friends :

1. Developing an algorithm for crossing bridges problem , where no. of elements is n.
2. Intersection of two linked lists.
3. Find if loop is present in linked list and also , find the start node of the loop in it .
4. Class design for banking system.
5. Reverse linked list using both recursion and iteration .

And many more.

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Microsoft Interview experience | Set 100 (On Campus for Internship on IDC and IT)

- Difficulty Level :\nHard
- Last Updated :\n28 Jun, 2021

Microsoft Visited our campus \xc2\xa0for Internship selections on IDC and IT profile.\xc2\xa0There were three rounds for the selection process of IDC profile

First Round :Coding round
3 Questions were asked in different sets . Out of which people who solved 2 and more are shortlisted . People who solved 3 were shortlisted for Personal Interview , while the one\xe2\x80\x99s who solved 2 were shortlisted for Group fly round.

Questions were :

1. You will be given buildings of certain height that lie adjacent to each other . Sun starts falling from left side. If there is a building of certain Height, all the buildings right of it having lesser heights cannot see the sun . You need to find the total number of such buildings that receive sunlight .
   Find the increasing subsequence (Not strictly) with 1st building as the starting building.
   Solution: GeeksforGeeks Link
2. You will be given two arrays of equal size and you need to maximize the first array with the second array elements (swap the first array elements with second array elements . Once swapped , you cannot use the element anymore)

   ```
   For ex: A: 3 4 6 8 9 and A : 5 7 3 6 8
   \r\nB : 6 7 8 8 9 B : 3 4 6 9 10
   \r\nOp: 9 8 8 8 9 Op : 10 9 6 6 8
   ```

   Solution: GeeksforGeeks Link
   Sort the second array and start swapping if the a[i] < b[i] . else wait for the next a\xe2\x80\x99s element which is less than b[i] and swap (naive merge procedure)

3. You will be given two trees t1 and t2. You need to check if t2 is a subtree of t1. If it is a subtree ,you need to return the size of t2(number of nodes in it).
   If either of t1 or t2 are NULL, return -1 .
   If t2 is not a subtree of t1 , then also return -1
   Most Efficient Solution was :
   Any Tree has \xc2\xa02 unique traversals . (Either it be (preorder,inoder) ,(in,post) ,(post,pre)) .\xc2\xa0So , Traverse them and store any two traversals for both the trees \xc2\xa0Check first traversal of both trees (String Matching using KMP O(N+M)) and similarly for the second traversal.If they both come out to be true (I mean pattern exists in text). Then you are done . Else return -1
   This Complexity is O(N+M) and space O(N+M) .\xc2\xa0If you want to do without space , Try for the recursive approach which in worst case takes O(N*M) complexity

Apparently , I was shortlisted for Personal Interview , so I didn\xe2\x80\x99t attend the Group Fly round.

Personal Interview \xc2\xa0rounds\xc2\xa0
1st round(Technical) : \xc2\xa0\xc2\xa0
Interviewer was bit cool and asked me questions directly

1. Find the median of an Unsorted array . I told him to sort it and find it as per the parity of N(even or odd) . NLogN solution . He asked me to optimize it . Then I told him about the median of an unsorted array in worst case O(N) method \xe2\x80\xa6 (you can find it in gfg).He asked me if I can do it using Quick select .. I told him the way to do so and suggested him that the worst case might shoot up to O(N^2) \xc2\xa0.He told me its fine and asked me to \xc2\xa0write the code. My code was bit tedious but I was able to get correct code finally .
2. Then he asked me regarding hashing (chaining and open addressing \xe2\x80\x93 Insertions ,deletions etc) and c++ maps and their complexities

2nd Round(Technical)\xc2\xa0
Interviewer was very cool and asked me questions regarding my project and I explained him briefly .Then he asked me coding questions .

1. \xc2\xa0You are given an unsorted array where any element can repeat any number of times. Elements ranges are > size . N is too high (10^7) .So , I Gave him O(N)time \xc2\xa0and O(N)space \xc2\xa0hashing solution using unordered_map solution . He was satisfied .
2. Next the question is to validate a date so that it is in the format expected \xc2\xa0and should be 20 years less than current date. You need to throw exception \xc2\xa0if it is invalid.\xc2\xa0First , I encountered all possible exceptions and after that I wrote an accepting method. \xc2\xa0He asked me to write code. This time I wrote a clean code covering all \xc2\xa0 \xc2\xa0 \xc2\xa0 possible \xc2\xa0exceptions . He was satisfied. and told me that the motto of these technical rounds are to check if we can write correct codes and can grasp basics and analyse our strength in them.

3rd Round(HR round)

The manager was very very cool and asked me questions like . Why do you want to join microsoft? Why should we hire you and related stuff about me\xc2\xa0and he asked me to solve this question.\xc2\xa0Find the majority Element (element that repeats more than (N/2) times in an array . If it doesn\xe2\x80\x99t exist , return -1.\xc2\xa0I told him the way to solve it in O(N) time and O(1) space using Moore\xe2\x80\x99s voting algorithm\xc2\xa0And after these rounds , I was given offer for the Internship for IDC profile.

Though I was selected for GolmanSachs Interview too , I had to take up this offer and I didn\xe2\x80\x99t sit for GS personal Interview.

Thanks to GeeksforGeeks for helping me revise all the concepts and practice them with the help of\xc2\xa0**practice.geeksforgeeks.org\xc2\xa0.\xc2\xa0**My Last 15 days before the Intern were completely spent solving problems and revising them in GeeksforGeeks.

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Microsoft Interview experience | Set 99 (On Campus for IDC and IT)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2018

Recently, Microsoft visited our campus for recruiting interns for their IDC and IT divisions.
Round 1

It was an online coding round hosted on HackerRank. It was 75 minutes long and had three coding questions.

- **Q1:** Given a Linked List of integers, write a function to modify the linked list in-place such that all odd numbers appear before all the even numbers in the modified linked list. The relative order of even and odd numbers should remain the same.
For Example:

```
Input: 1->8->2->10->5->4->7->6->NULL\r\nOutput: 1->5->7->8->2->10->4->6->NULL\r\n
```

- **Q2:** Given a floating point number, calculate its square root without using in-built sqrt() function.
- **Q3:** Given a pattern string and a test string, implement RegEx substring matching. If the pattern is\xc2\xa0preceded by a ^, it will match with the starting position. Similarly, if it is preceded by a $, it will match\xc2\xa0the ending position. If no such markers are present, it will check whether pattern is a substring of test.
For Example:

```
^coal\r\ncoaltar\r\nResult: True\r\n$tar\r\ncoaltar\r\nResult: True\r\nabcd\r\nefgh\r\nResult: False\r\n
```

Around 50 people qualified for the next round. From a total of 40 test cases across the three problems,\xc2\xa0successfully passing 20 test cases ensured qualification. All three problems had tricky, hidden edge cases\xc2\xa0and very few candidates could pass all the test cases in even one problem.

Round 2\xe2\x80\x93 Pen and Paper Round: Two coding questions were given whose solution was to be submitted\xc2\xa0on pen and paper. A total of 45 minutes was allocated for this round:

1. **Q1:** Rotate a square image 90\xc2\xa0degree\xc2\xa0clockwise
Similar Question: GeeksforGeeks Link.
2. **Q2:** Given an array of integers and a target sum, write a function to check whether there exists a pair of\xc2\xa0integers whose sum equals the target. Use extra space to reduce the time complexity as much as\xc2\xa0possible.

A total of 17 students qualified from this round.

Round 3-\xc2\xa0Personal Interview 1: This was a technical round. There was a brief discussion on interests and\xc2\xa0project followed by two coding questions:

1. **Q1:** Write a function to reverse the order of the words in a string
My initial solution had a small bug, which I fixed later on.
2. **Q2:** Given a linked list and an integer n, write a function to remove every nth node from the list.

```
For Example, 1->2->3->4->5->6->NULL n=3;\r\nResult: 1->2->4->5->NULL
```

Round 4\xe2\x80\x93 **Personal Interview 2:** This was the second technical round. A brief discussion on coursework\xc2\xa0was followed by three coding questions.

1. **Q1:** Given a binary tree and a target sum, return all the root-to-leaf paths which have the target sum.\xc2\xa0After solving this, the interviewer asked for some cases which could be used to test whether the code\xc2\xa0was working perfectly or not. Once he was satisfied, he modified the problem and now wanted to check\xc2\xa0whether any node-to-leaf path had the target sum. I briefly discussed my approach and it was good\xc2\xa0enough.
2. **Q2:** Given a string of length n, generate all possible substrings of the string. I initially misunderstood the\xc2\xa0problem, thinking all the 2n\xc2\xa0possible combinations of the string. Seeing the solution to this, the\xc2\xa0interviewer said that I am overcomplicating the solution and explained the problem once again. He\xc2\xa0seemed happy with the final solution I gave.
3. **Q3:** Imagine you have to build an API which would allow customers to book a hotel from all the available\xc2\xa0ones. How would you approach the problem and what data structures would you use for each\xc2\xa0functionality. It was an OOP problem and he was looking for a class design which could enable a\xc2\xa0customer to view hotel details and book one hotel.

Round 5- Personal Interview 3:

This was the HR round. There was a detailed conversation regarding the\xc2\xa0project followed by basic questions.

- He asked me what books I had read and what was the toughest\xc2\xa0assignment I had completed in college and what were the problems I faced during it.
- After this, he asked\xc2\xa0me what would be the optimal way to search an element in an array. It was a rather vague question and\xc2\xa0I answered that for smaller arrays, linear search would be efficient enough but binary search would be\xc2\xa0more efficient for larger arrays.\xc2\xa0
- Then I was asked to implement a library system which could allow anyone to issue or return a book and\xc2\xa0find the corresponding dues left. He kept adding certain functionalities as time went on which were to\xc2\xa0be implemented by modifying the classes as per the needs.

In the end, a total of 5 candidates were selected for MS-IDC and 3 for MS-IT.

All in all, it was a memorable experience for me. The entire procedure from start to end was carried out\xc2\xa0very professionally and the interviewers were friendly and supportive. They were more interested in\xc2\xa0looking at how a candidate could practically apply the concepts he/she knew instead of seeing how\xc2\xa0many diverse concepts he/she is aware of.
My suggestions for other candidates would be to keep their cool during the process and to maintain\xc2\xa0their self-belief at all times. Keep your basics strong and learn to develop solutions from scratch instead\xc2\xa0of remembering several difficult algorithms. Providing correct approaches and thinking clearly matters\xc2\xa0more than actually giving the perfect solution.

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Related Practice Problems

Reverse each word in a given string

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Microsoft Interview experience | Set 98 (On Campus for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n28 Jun, 2021

Round 1 : (1hr 15 min)

Online test on CoCubes contains 3 Coding Questions

1. Calculate difficulty of a given sentence. Where difficulty of a word is:
   Word is hard if it has 4 consecutive consonants or number of consonants are more than number of vowels else word is easy. Difficulty of sentence is defined as 5*(number of hard words) + 3*(number of easy words).
   Solution: GeeksforGeeks Link
2. \xc2\xa0Linked list is given where a node has x and y value. You have to calculate changes in slope. So if m1 is slope between p1 & p2 and m2 is slope between p2 & p3 then if m1 is not equal to m2 then there is a change in slope. Total number of changes in slope were expected as return value.
3. \xc2\xa0Find the sum of all nodes that have no child at minimum level. Return -1 if root is NULL

   Example \xe2\x80\x93

   ```
   5\r\n   / \r\n  2   6\r\n /  /\r\n7 3  9 4\r\n/ \r\n8 3\r\n
   ```

   Answer: 14 (7+3+4)

   After this round 8 students were selected for direct interview and 22 for group fly round. They asked two coding questions related to strings and trees in group fly round.

Round 2 (Group-fly):
Was called directly for round 3.

Round 3 (Technical Interview):
The interviewer asked me 6 technical questions for which he helped me getting the most optimized approach.

1. Write a C program to calculate pow(x,n).
   But he asked me not to use recursion.
2. Detect and remove loop from a Linked List. I was asked to count the nodes in loop as well.
3. Connect nodes present at the same level. Asked me to do it without queues.

I can\xe2\x80\x99t recall the rest questions.
Then he asked me a simple DBMS design question. I had to implement student and subjects relation. Then asked me to\xc2\xa0normalize the schema. He also asked some theory questions from OS and DBMS.

Round 4 (Technical Interview):
The Interviewer asked me 3 coding questions and a lot of theory questions from DBMS and OS. Determine if two rectangles overlap or not. If they do, then separate them in a given size of screen. The program should print appropriate message if separation is not possible. He basically wanted a mathematical approach. He also asked all the possible orientation of the rectangles.

1. Maximum Path sum in a Binary Tree. I couldn\xe2\x80\x99t give a proper solution, so he changed the question to find the maximum sum path with or without including root and leaf.

2. Check if given Tic \xe2\x80\x93 Tac- Toe configuration is valid or not . \xc2\xa0He wanted me to handle all the edge cases.

The interviewer helped wherever I got stuck.

Round 5 (AA):

The interviewer asked me to implement strtok() function.
Then he asked me to implement first reader\xe2\x80\x99s problem. This round was very chill. Interviewer helped me wherever he could. He then asked a few HR questions.

After this 3 got selected as FTE\xe2\x80\x99s\xc2\xa0Overall, the experience was nice. And the interviewers were friendly.\xc2\xa0**Thanks GeeksForGeeks!!**

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Related Practice Problems

Difficulty of sentence
Connect Nodes at Same Level
Power of Numbers
Tic-Tac-Toe

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Microsoft Interview experience | Set 97 (On-Campus for IT Internship)

- Difficulty Level :\nMedium
- Last Updated :\n30 Jul, 2019

Round 1 \xe2\x80\x93

> It was on online coding round hosted on cocubes.com. It was a 75 mins round consisting of 3 coding questions only.

- given a number n and k. If the k bit in the binary representation of n is 1 then we have to make it 0 and return the new number formed else return n as it is.
- given a link list where each node in the link list represents a point in the xy plane, each node has 3 data members int x, int y, and a next pointer. We had to print the number of changes in slope if we start from the beginning and take two adjacents points and repeat it till the end.
- http://www.spoj.com/problems/AGGRCOW/

students doing 2 or more questions correctly headed towards the next round. From the total of 150 students around 30 of them cleared this round.

Round 2\xe2\x80\x93

> it was a group fly round, where 2 questions where given and 30 mins were the allotted time. It was a pen-paper round.

- Puzzle 16 | (100 Doors) exact question just there where 500 doors and people instead of 100.
- find the length of the biggest palindromic substring present in a string and print the palindromic string.

People doing one question correctly and the other one partially correct were shortlisted for the next round. 8 students were selected after this round.

Round 3-

> it was a technical interview round.
> Firstly the interviewer asked me to introduce myself and then asked around 3-4 questions regarding my project. Then one by one the interviewer asked me 3 coding question they were-

- given an array of length (n-2) consisting of elements from 1 to n except for 2 elements are missing, find the missing elements.
- print all the possible permutations of a string.
- given a number, reverse it .

Then the interviewer asked me a few questions on OOPS and even told me to implement them on paper. He then asked me a few questions about OS. Then he asked to subtract 2 numbers without using arithmetic operators and even the ++ and \xe2\x80\x94 operators. Then he asked me a puzzle and ended the interview. The interview lasted for around 45 mins.

Round 4\xe2\x80\x93 It was the HR round.
HR was a very cool guy. He asked me questions regarding my project. Then a few puzzles. He then asked some theory questions from around everywhere such as DBMS, OS, networking. Surprisingly he did not ask any coding question. He then asked me about my future plans and why I had such a

low cgpa(8.31). He then asked me if I had any questions for him, then we had a 10 mins discussion on my question. The interview lasted for around 80 mins.

Finally, 3 people were given an internship at our college. My suggestion is to keep your calm in the whole interview process, even if you don\xe2\x80\x99t answer any one of the questions just don\xe2\x80\x99t panic and try to give your best in the next question.

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Microsoft Interview experience | Set 96 (On-Campus Internship for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Round 1 : (1hr 15 min)

Online test on CoCubes contains 3 Coding Questions

1. Find the number of times \xe2\x80\x9ccarry\xe2\x80\x9d is 1 while performing addition on two numbers

   ```
   \r\nInput:  56  99\r\nOutput:   3
   ```

2. Given an array of integers, shift all the numbers that are \xe2\x80\x98-ve\xe2\x80\x99 to the left and \xe2\x80\x98+ve\xe2\x80\x99 to the right \xe2\x80\x98in-place\xe2\x80\x99 (maintain the order of all the -ve numbers same as of the given array and the order of all the +ve numbers same as of the given array)

   ```
   \r\nInput: 10 7 -5 9 -12 15\r\nOutput: -5 -12 10 7 9 15
   ```

3. Find the sum of all nodes that have no child at minimum level. Return -1 if root is NULL

   ```
   \r\nInput: (Root of the tree is passed into the function) \r\n\r\n         5\r\n        / \\\r\n       2   6\r\n
   ```

   Around 65 students were selected to Round2

Round 2 : Group Fliers(around 45 min)

1. We have to take \xe2\x80\x98n\xe2\x80\x99 polynomials as input and we had to write functions for

   Sort(P), Add(P1,P2), Sub(P1,P2), Multiply(P1,P2)

   (Implemented Sort function according to the indices of the polynomial and all the functions optimized by space and time)

   Around 28 students got selected for technical interview

Round 3 : Technical Interview(around 40-45 min)

1. Tell about yourself
2. What are the courses you have done?
3. Suppose you have details of some stock market(Day & price were given), you will earn profit only if you buy stocks cheaper than the amount you sell them for.Write a program to find maximum profit that could be attained (using only one loopO(n) time and O(1) space)

   ```
   \r\nInput:   \r\nDay  :  1  2  3  4  5  6  7\r\nPrice: 60 10 5 12 8 40 9  \r\n\r\nOutput:  35 (40-5)
   ```

   GeeksforGeeks Link

4. Difference between Processes & Threads?
5. Suppose there is a sorted array and you are given the array by rotating k units.Find k by writing a program (O(logn) time)

   ```
   \r\n    Input:    5 6 7 1 2 3 4\r\n    Output: 3(3 rotations happened)
   ```

Round 4 : HR INTERVIEW(around 30 min) (On skype)

1. Tell about yourself
2. Previous intern experience and the details of the work assigned
3. What are the courses you have done and favourite course
4. Explain all sorting algorithms and decide which one is better
5. What projects have you done
6. Languages used.
7. Which was the most difficult task while doing your projects
8. How do you implement a library of books in json data(which fields were needed and stuff like that)
9. Why Microsoft & Do you think you are eligible for it
10. Goals and things you would like to achieve in future

Overall, the experience was nice. And the interviewers were friendly.

Thanks GFG.

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Microsoft Interview experience | Set 95 (On-Campus for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Microsoft came for Full Time IDC recruitment in our campus.

Round 1

Online test on CoCubes contains 3 Coding Questions (Only Function to complete)

1. Find the nth number that contains the digit k or is divisible by k. (2 <= k <= 9)
   Example \xe2\x80\x93
   if n = 15 & k = 3
   Answer : 33
   (3, 6, 9, 12, 13, 15, 18, 21, 23, 24, 27, 30, 31, 32, 33)
2. Add two binary number represented as strings.

   ```
   Example -\r\nnum1 = 101101 & num2 = 1011\r\nAnswer : 111000
   ```

3. Find the sum of all nodes that have no child at minimum level. Return -1 if root is NULL
   Example \xe2\x80\x93

   ```
   \r\n          5\r\n         / \\\r\n       2\xc2\xa0  6\r\n      /\\\xc2\xa0\xc2\xa0 /\\\r\n     7  3 9  4\r\n
   ```

   Answer: 14 (7+3+4)

   After this round 11 are shortlisted for direct interview. I was one of them.
   Many are selected form Group Fly round where they were asked to do paper coding.
   After Group Fly 14 more are selected for interviews.

Round 2

Face to Face Technical Interview Round (35 minutes)

1. Discussion on Project?
2. Difference between Process & Thread?
3. How web browsers use process & Threads, which is faster firefox or chrome and how?
4. How a Quad Core processor works?
5. What is tail command?
6. Given a very large file of unknown size, how will you print the last n lines (Number of lines not known)?
7. Write a program to connect next left node in a binary tree. Also first node of each level should be pointing to last node of next level? (Without using Queue)
8. Write a program to reverse a linked list in group of given size?

\xc2\xa0

Some Questions asked to my Friends \xe2\x80\x93

1. Write a program for LRU Scheduling Implementation?
2. How a task manager works in Windows?

\xc2\xa0

Out of 25 only 2 are selected by Microsoft IDC. I was not one of them. Most of us are eliminated after First Technical Interview.

In coding round the selection is based on time taken to make the code (Since codes are easy). Mine were not efficient. So try to complete as early as possible.

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Microsoft Interview experience | Set 94 (Internship)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

First round\xc2\xa0(online round,)

It had some 15 mcq questions, most of it was technical, had questions from almost all CS subjects we learnt in college. I was lucky enough to guess most of the questions correctly and so was called for the coding round.

Second round
For the selected students, there was a coding round which had 2 standard questions in data structures, from GeeksforGeeks.org. I solved one question fully with all test cases working, and later results were out after 1 month. I was lucky again to get through this round without having the solve one program by solving only one program\xe2\x80\xa6.

Third round
The next round was a group fly round(written programming round) which was to be followed by technical in person interviews. These rounds were held in Bangalore.

1. Find the least common ancestor of two nodes in a binary tree.
   I asked the person assigned for my group if i could change the structure of the node, making the tree having parent pointers, and that person told ok. So, i changed the structure and made it have parent pointers, and also used a boolean flag variable, then it was very simple; when two nodes have any common node in its path from itself to root, then that node is the ancestor for these two nodes. So i assumed the function was given three parameters, root, node1 and node2\xe2\x80\xa6). And first i made an assumption that flag of all nodes zero, later i traversed from one node to root, making every node in that path have the flag variable set to 1. Later traversed from second node to root, and while traversing i checked if flag variable was 1 for any of the nodes already, if it was, then i returned that node as the ancestor of these two nodes\xe2\x80\xa6. Time complexity is O(h) (I THINK SO)\xe2\x80\xa6
   I explained this well with all test cases\xe2\x80\xa6.so that the person assigned to my group was happy with my solution.
2. Given two sorted arrays (with repetitive elements) find the kth minimum number from both arrays.
   My approach to this problem was, Maintain an index for each array, both initialized to the first element of their respective array. Loop k times and in each iteration find the minimum element among the current indices and increment the index of the array containing the minimum. If the elements are equal, increment both indices. Time complexity is O(k).
   I explained this well again with all test cases and made sure the person assigned to my group was happy with my solution.
   As i made sure i took care of corner cases, and most importantly satisfied the person assigned to my group with the solution i gave, i was called for the in-person interview.

In \xe2\x80\x93 Person Interview
A quick-brief introduction. We spoke In and out about my project, and also he wanted to see my app in my phone. He asked few basic questions about the project implementation.
Later he gave me a technical question, Fold and merge a linked list\xe2\x80\xa6.I was comparatively little less nervous now, but was still not very good in paper coding\xe2\x80\xa6..made lots of mistakes but somehow wrote some code\xe2\x80\xa6.but there were few mistakes here and there which i found and corrected when he pointed it out to me\xe2\x80\xa6But this time i

wasn\xe2\x80\x99t lucky enough and was rejected after this round.

\xc2\xa0

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Microsoft Interview experience | Set 93 (4 Yrs Experienced for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

1. Find square root of number without using sqrt function
2. Given a directed graph. Construct another graph from given graph such that if path exists from vertices A to vertices B and from B to C, then path from A to C and from C to A also should exists.
3. Write function which takes array of elements A and array of elements B and outputs (A-B)U(B-A).
4. Implement hashmap on your own. Write good hashing function for string.

Last round on some design questions.

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Microsoft Interview experience | Set 92 (1.8 Yrs Experienced for IDC)

- Difficulty Level :\nHard
- Last Updated :\n14 May, 2017

My resume was forwarded to Microsoft through a consultancy firm. I was called for a day long interview process at Microsoft IDC, Bangalore.

Round 1 (1 hour+):
Question 1: https://www.geeksforgeeks.org/median-of-stream-of-integers-running-integers/

I first gave the insertion sort algorithm, he told me to improve upon it. I was stuck for some time so he gave me another problem: https://www.geeksforgeeks.org/k-largestor-smallest-elements-in-an-array/. I was able to solve this in a few minutes using the Min Heap method, so he then told me to think on similar lines for the original question he gave me. After around 20-30 minutes of brainstorming I was able to solve`it using the Heaps method.

Question 2: https://www.geeksforgeeks.org/count-possible-paths-top-left-bottom-right-nxm-matrix/

I solved this question pretty quickly. He asked me if I had come across this question before; didn\xe2\x80\x99t lie, told him I already knew this.

This was followed by discussion on what happens in the Bing Team at Microsoft.

Round 2 (1 hour+):
Question 1: Given a large text file, find an efficient algorithm to find the least distance(measured in number of words) between any two given words.

Solved this using hashing; he then extended the problem saying that this program would be executed a large number of times (to find distances between many pairs of words), so I need to improve my algorithm such that the time complexity is reduced after the first iteration of problem solving. Solved this using hashing and then using binary search to find the nearest index of the second word to the index of the first word in the hash.

Question 2: He first gave a background on how the autocorrect feature in phone keypads work, explaining that the probability of the autocorrected word would be greater than the typed word. He told me to find an algorithm to find the most probable word of length n that can occur given that there are m possible characters. The probability that a word can occur is give as: P(1st letter) * P(2nd letter given that 1st has been pressed already) * P(2nd letter) * P(3rd letter given that 2nd has been pressed already) \xe2\x80\xa6. and so on.. All values of individual terms in this equation is already given.

Think of the problem as a mxn grid where each element in a column is connected to every element in the next column by some weight. Solving this problem by bruteforce would O(m^n). By storing the solutions of subproblems the complexity would reduce to O(m*n) which is the solution the interviewer wanted.

Round 3 (1 hr): Hiring manager round:Generic question but was a bit unexpected. Started off by asking about my current jobs and why I wanted to change, then the conversation went towards why I had chosen a non-CS course in my undergraduate, the conversation then took off on a completely different path about what computers can do and what computer science cannot do until it reached all the way upto The Turing machine. To be honest I was most nervous after this round.

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Microsoft Interview experience | Set 91 (2 Yrs Experienced for IDC)

- Difficulty Level :\nHard
- Last Updated :\n19 Oct, 2021

This is the main forum where I did all my preparation. Thanks a lot GeeksForGeeks! Here\xe2\x80\x99s giving back.

I had got a call from the Bing team in IDC. I have 2 years of job experience post a BTech in CSE. I had 5 interviews in all, as described below.

1) The first one was a fly/ no fly round. At first, there was some discussion around my previous work experience, with the interviewer asking me some technical and design questions here and there. Then I was asked to write code to find the smallest subarray to sort that would sort an entire array. The answer is available at https://www.geeksforgeeks.org/minimum-length-unsorted-subarray-sorting-which-makes-the-complete-array-sorted/. I had to write optimized code for this.
The second was to do an ER diagram for a furniture scenario. The important part here being that Material of a furniture can be a separate class, rather than a property in furniture items like bed, chair, table. So Material can have associated properties like IsFlammable, IsWaterResistant, etc.

2) I got just one question in this interview which I was asked to solve on the board. The question was to add a digit to a number that is represented by a linked list, where each node is a digit of the number. The constraint here was that the linked list couldn\xe2\x80\x99t be modified, except the digits to be modified in answer and the number could be infinitely long. So you had to avoid the problem of memory overflow. So no recursion, no stack, no copy of linked list, no change to original linked list, as suggest the solutions on geeksforgeeks. To keep track of carry to be added to previous digit iteratively, you basically have to keep a track of the digit before the last consecutive 9 that precedes the last digit. For example in 9719938996, this would be the 4the digit from right, that is 8. So now in a single pass, you can figure out such a position of 9(if any) and also the last digit. Then the required digits can be changed easily.

3) In this round, the interviewer opened a console app on his PC and asked me to code there. I believe he was actually taking note of the time I took to write the code and whether it compiled in the first time or not. I paid more attention to accuracy of code than to the time I took. The questions I was asked are:
Check if a number Nis a power of another number X. Then we spoke of the case where X was 2. For this case, we discussed how this could be done by checking the bits.
Check if two binary trees are identical. I also had to initialize and run it with a test case. There was a discussion on line wise optimization after completing the code.
Rotate a matrix by a given distance. A similar answer where distance to rotate is 1 can be found at https://www.geeksforgeeks.org/rotate-matrix-elements/
Then there was a design discussion on designing a library\xe2\x80\x99s online portal. After I gave him a basic architecture, he asked how I would implement the search feature. I suggested doing that with the book\xe2\x80\x99s name, author, ISBN, etc. He asked me how to do it based on a book\xe2\x80\x99s content. I told him I\xe2\x80\x99d store tags for each books that could be used while searching. He liked the idea, but prodded me about how I\xe2\x80\x99d do a proper text search. I told him about using a hash table and blobs. Perhaps he was looking for tries, but since I was not much familiar with them, I avoided that. He seemed satisfied and ended the interview.

4) He asked me to introduce myself, talk about my projects and of the greatest technical challenge that I had faced. Then asked me to write code on paper for the LinkedIn feature where we are

shown what is the connection depth of two people. The solution was a version of shortest path algorithm for a graph. He asked me to optimise my answer for O(1) extra space (besides the space of the graph structure).
The next scanario included a series of questions. I was to give the informal schema of Customer, Item, Order for an online retailer like Amazon. Apart from the foreign key relationships, he was interested in how I\xe2\x80\x99d store the orders because each purchase order can have multiple items purchased. The answer was to have a relational table like ItemizedOrder which stored mappings of the order and item Ids. Then he asked me to write a query to get all customers who had not bought a certain item by a given date. Then he said that for any item like a book, the company will have to get their books from many book sellers who will have different schemas and ways of storing the books\xe2\x80\x99 information. He asked me to design a system that will allow handling such variation. I gave him a portal or a web service as an end point where the different vendors could upload their data. Then my web service would have a rule engine which would map different schemas, assign default values wherever possible for missing values like Subtitle, ignore missing values of unimportant fields like NoOfPages, else return error messages for items that had insufficient mandatory data, like Price. This rule engine would then store the processed input in our DB in our schema.

5) This was with a very senior guy, but was more of a formality. The interviewer told me I was selected in the first 10 minutes and then was just trying to analyze my work and preferences for a suitable team and set my expectations. He answered some questions I asked and ended the interview in half an hour.

In general, I was asked 2 common questions every time- Describe your previous work experience and why do you want to join Bing. I did not get the approach to most questions instantly, but I spoke of my thoughts aloud. They all guided me when I got stuck and prompted me towards optimizations possible. Twice, I was also given examples of scenarios which my code did not cover. Since I knew I was interviewing for Bing, I asked the interviewers relevant questions after each round. Each interview was scheduled for 1 hour, though the third one got stretched to 1.5 hours and the last one was quite short. Except for the first interview, the outcome of the others is collective. So even if you don\xe2\x80\x99t do very well in one, if you can manage the others decently, you will be hired. All the best!

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Microsoft Interview Experience | Set 90

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2019

I recently attended an interview at Microsoft. Following was my experience:

Round 1:
This was a written round. Everyone was given the following two questions:

1. Find all the nodes at a distance k from a given node
2. Given an array, arrange the elements such that the number formed by concatenating the elements is highest. E.g.: input = [9, 93, 24, 6], the output should be: [9,93,6,24]. This is because if you concatenate all the numbers, 993624 is the highest number that can be formed.

40 minutes was given for this round. However, if you request, they were giving extra time. After this round, lunch was served.

Round 2:

This was a face to face round. Almost everyone from first round was called in for the F2F interview. After a brief introduction, he asked me this question:

1. Given an array with huge data (say n, where n can be upto a million), the values in the array are in the range of 1-k where k<<<n, sort the array. I gave a solution with binary trees but then he asked for more solutions and finally was satisfied when I gave him a solution with O(k) extra space.
2. He asked another question about thread safe singleton class and asked me to write a code for it and explain it.
3. Then a few questions were asked about why Microsoft and similar stuff.

Round 3:
I don\xe2\x80\x99t remember the question properly but it was something about arrays and swapping and finding the minimum cost possible.

Round 4:

1. Longest Palindrome Substring set 1

   However, the interviewer wasn\xe2\x80\x99t interested in the code. He asked me to do a TDD for this problem. So he asked me to write test cases for this problem. He wanted to see if I can really analyze and find the various possible cases for this problem. After some struggle, I was able to find various different type of test cases. I gave a brute force solution.

Round 5:

1. Maximum difference between two elements such that larger element appears after the smaller number

   However, I gave a different solution than the one mentioned in this page.

Round 6:

1. Write the implementation of String class. Implement any four methods of your choice.
2. Write a code for the tail method of linux where you have to read some x lines of huge files from

the end without reading the entire file. I gave some solutions based on indexing. The interviewer was very friendly and helped a lot in arriving at the solution.

Since it was quite late by the time this interview was over, they arranged a cab for me to go back home.

Overall, the experience was very nice. The interviewers and the HR were very friendly.

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Microsoft Interview Experience | Set 89 (For SDE-2)

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2019

First of all I thank GeeksForGeeks for giving right direction in Making my dream true.

Got short listed from a consultancy and They have shared a link of Microsoft where I have to submit the online test.

Online test has 2 questions need to be completed in 1hour

1. Did not remember
2. BST Tree Inorder is given need to print all possible BST trees from the above tree which have same elements.

Submitted psudo code and got short listed for interview.

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10-30 AM interview started.

1. String is given need to print maximum length of string (sub string) which is not palindrome
   Solved o(n^2) asked for optimization and code followed by test cases.
2. Discussion on abstration and interfaces

11 \xe2\x80\x93 AM

1. Double linked list swap pair wise data
2. Double linked list swap pair wise links
3. Test cases (i told list can have bad links)
4. verify for list is proper or not then loop detection
5. discussion on projects

2 PM

1. tool kit of nuts and bolts need to find the matching pairs of all.
   given o(n2) asked for optimization and code.

4-30 PM

1. discussion on projects
2. Compression algo for image data
3. Thread synchronization for producer many consumers (extension of producer consumer problem)
4. Find near to me restaurants approach (told some approach using graphs which i also did not satisfy \xf0\x9f\x99\x82).
5. Server is replaced with MS server in place of MAC server then how MAC client can use MS services design (told adapter way).

5-30
Offer discussion \xf0\x9f\x99\x82 \xe2\x80\xa6..

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Microsoft IDC Interview Experience | Set 88 (For SDE-2)

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Total experience : 8 Years.
Interviewed for : SDE-2

Face to Face Round 1:

1. Tell us about your project and specific contributions.
2. How to find intersection of link list.
3. Length of the longest substring without repeating characters.

Face to Face Round 2:

1. Tell us about your project and specific contributions.
2. Remove characters from the first string which are present in the second string.

Face to Face Round 3:

1. Given a linked list and integer K, reverse the link list in K size slots.
2. Print a binary tree in spiral order.
3. Find if a string is interleaved of two other strings. Str3 is said to be interleaving Str1 and Str2, if it contains all characters of Str1 and Str2 and order of all characters in individual strings is preserved.

Face to Face Round 4:

1. Explain one problem of the conducted interviews and explain how you solved it.
2. In a BST, two nodes are swapped. Find out these nodes and swap it.

A big Thanks to GeeksforGeeks for providing such a brilliant platform for interview preparation. Keep up the good work \xf0\x9f\x99\x82

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Microsoft IDC Interview Experience | Set 88 (For SDE-1)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Position : SDE BING TEAM
1.\xc2\xa0Skype round :

1. \xc2\xa0Brief about agile software development process (as mentioned in my CV)
2. Detect whether the linked list is circular.
3. Check whether the number is a power of 2.
4. Check whether two trees are identical.
5. Given an array which is first increasing and then decreasing, find the index where it changes from increasing to decreasing.

2. F-F round 1\xc2\xa0

1. Find the LCA in a binary tree.
   I gave the recursive solution as given in geeksforgeeks. Then he asked to give a solution without recursion. Then on asking for hints he said something related to heights and some modification is allowed in tree. So i did it using the \xc2\xa0parent pointer.

3. F-F Round 2\xc2\xa0

1. Clone a linked list with a random pointer.
2. Given an array , find a subarray with the sum closest to zero (i gave O(nlogn) solution).
   The interviewer was very co-operative. He gave a lot of hints to optimize the solution.

4. F-F Round 3

1. Given two sets of strings A and B. Find the (A-B) U (B-A) (U = union). The answer should be in lexicographical order and A\xe2\x80\x99s elements should appear before B\xe2\x80\x99s.

5. F-F Round 4\xc2\xa0

1. He asked about my current project and since i am in android app development currently. So he asked questions like how many active users do u have.Whats the size of the app. Why such a big app?. How can u increase the usability?He wanted to check the ownership skills.

Don\xe2\x80\x99t ignore this round. Be prepared for such questions. Do ask for hints each time. The interviewer will guide you to the solution.

Thanks a lot geeks for geeks

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Microsoft Interview Experience | Set 87 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n07 Feb, 2016

15 MCQs on c/c++ output based, 1 java questions was also there.

Coding Round:
1. Convert a binary tree to its sum tree (https://www.geeksforgeeks.org/convert-a-given-tree-to-sum-tree/).
2. Count number of binary strings without consecutive 1\xe2\x80\x99s. (https://www.geeksforgeeks.org/count-number-binary-strings-without-consecutive-1s/).

Group fly round (for MSIDC):
1. Sort a string according to the order given by another string.

Group Fly round (for MSIT):
1. given a matrix with all cells black or white, write code to find the maximum sized sub-matrix with all border cells black (the interior cells need not be black).
2. Given an array of stock prices of different days, Maximize profit by buying and selling share at most twice.

Got selected for MSIT F2F interview:

F2F interview round 1:
Interview started with \xe2\x80\x9cTell me about yourself\xe2\x80\x9d. She went through my CV thoroughly and asked to explain one of the project. She asked my contribution, most challenging part, and few technical questions to this project.
Then She jumped to questions
1.explain types of database normalization (1NF, 2NF, 3NF, BCNF) with example.
2.Suppose you are given a database having a table with two columns, one is \xe2\x80\x9cname\xe2\x80\x9d and another is \xe2\x80\x9cid\xe2\x80\x9d. name column is already filled and id column is empty. Write an sql query to populate the id column with unique ids. (she was interested in logic only not in sql syntax.)
3.Given a linked list and two integers x and y, traverse x nodes and delete next y nodes repeatedly until you reached to the end. and return resultant linked list.
4. Name few sorting algorithms with their time complexity and space complexity. Which is the best in terms of time complexity.
5. explain logic and write code for merge sort.
6. Check whether a binary tree is balanced or not. Discussed about self balancing binary trees (AVL tree).
7. there was one more easy coding question, sorry i forgot.
8. What is the difference between abstract class and interface. She was very nice and supportive. She was very quick as she has limited time of 1 hrs only.

F2F interview round 2:
It was more of HR round than technical round.
1. Tell me about yourself.
2. Do you have interest in sports? Which sport?
3. Usually What technical and non-technical things do you do in your free time?
4. Given a statement, write a program to check whether it is a palindrome or not.
5. Do you follow technology news? Which technology is trending in IT industries?
I told Machine Learning, then further he asked about machine learning, How much do I know ML,

Whether I have done any ML project and then discussed my ML project. (It seems he was not judging me on ML things)
6. Given a linked list, check whether it has a loop or not, if yes find starting point of loop and length of loop.
7. I am done with interview, Do you have any question? I asked many question and discussed about work culture, promotions, whether I can switch to IDC or not etc. this discussion was too long (around 20 mins) and he was impressed by my questions.

He was very experienced guy, He was helping me while writing code and supporting me in all the discussions.

I would like to thank geeksforgeeks as I majority prepared from here only.

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Microsoft Interview Experience | Set 86 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n20 Dec, 2015

Coding Round :
1. https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/

2. Do not remember second question but it was on binary tree.

Group-fly round :
Remove repeating charaters from a given string in O(1) space and O(n) time , where n is the length of the given string.

F2F Interview 1 :
The interviewer firest disccused about my projects , specially my data mining project.

Then he asked me to write standard edit distace code and then to optimize it in terms of space, I did it in O(2*n) instead of O(n*m).

Aecond question was this : https://www.geeksforgeeks.org/majority-element/

F2F Interview 2:
1. https://www.geeksforgeeks.org/how-to-design-a-tiny-url-or-url-shortener/
2. Question on linked list and involved swapping of nodes, do not remember the exact question.

F2F Interview 3 :
1. https://www.geeksforgeeks.org/level-order-traversal-in-spiral-form/
2. https://www.geeksforgeeks.org/write-a-function-to-get-the-intersection-point-of-two-linked-lists/

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Related Practice Problems

Majority Element

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Microsoft MSIT Interview Experience | Set 85 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n09 Dec, 2015

Coding Round :

1. Binary tree was given. Return a tree such that each internal node stores sum of all its child nodes. Each leaf node stores zero.

2. One DP question : https://www.geeksforgeeks.org/count-number-binary-strings-without-consecutive-1s/

\xc2\xa0

GD Round for MSIDC :

1. Reversal of Linked List in groups of K.\xc2\xa0 https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/

2. Peripheral Traversal of Binary tree. https://www.geeksforgeeks.org/boundary-traversal-of-binary-tree/

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GD Round for MS-IT :

1. Given numbers from 1 to 1000. Given a specific number, make guesses to reach to that specific number. In each guess, person will tell you specific number is less or more with the guess made. Find the minimum number of guesses.

2. Each day, Microsoft search engine bing posts some informative image. How will you ensure each day image is different from the beginning of posting? (Note the word \xe2\x80\x93 informative). \xe2\x80\x94\xe2\x80\x93> Do not distinguish on basis of color, texture, background etc. Think in terms of text. Even if orientation is different but text is same then image is same. Don\xe2\x80\x99t think for RGB value either.

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F2F Interview :

1. How will you implement linked list with 1 million nodes? How will you access 999999 th node? Give some optimal design strategy and implementation.

2. A graph with 1 million nodes. How to handle?\xc2\xa0 http://www.graphviz.org/Documentation/GH10.pdf

3. Design the technology architecture for bookmyshow application.

4. Explain your MTP Project.

5. Asked CSP projects. Thread Library, DOTA Game and Chord implementation.

6. Round Robin Scheduler Working.

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This article is contributed by Surbhi Jain. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft MSIT Interview Experience | Set 84 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n07 Dec, 2015

Online test:

Part 1: Written
Platform: Cocubes
15 MCQs 30 min
2 questions 1 hour
1) Longest Even Length Substring
Given a string of digits. Find the length of longest even length substring
such that the sum of left part = sum of right part. Return 0 if no such substring exists.e.g. given string 1523457. The longest even length substring will be 5234 so output= 4

2) Minimum difference of subarray
Given an array of length n. Divide the array between two subarrays such that diff between sum of each subarray should be minimum. for even n: subarray lengths should b n/2 exact for odd n: subarray lengths should be (n-1)/2 and (n+1)/2 e.g. given array 5,6,11,13,14,25 two subarrays: {5,6,25} and {11,13,14} diff between sums = 2 so output 2.

Part 2: Group Discussion(sort of Group fly)

(Here we discussed code with MS officials for given question 45 min)
Given a timestamp in hh:mm:ss format find whether second hand lies in larger or smaller area formed by hour and minute hands.

Part 3: Interviews

1. Simple questions on algorithms (20 min)
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 a. Swap 2 objects of different type without using third object
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 b. factorial of very large number (larger than big data)
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 c. Generate all permutations for a given string

2. Questions and logical puzzles, anagram finding, given a code correct it using just one operation from replace/delete/add a char.(20 min)

3. View about new technologies, whats your preference IDC or MSIT(15 min)

Overall interviewers were friendly and chill.

Thanks to geeksforgeeks. It helped me a lot in my preparation.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft IDC Interview Experience | Set 83 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n11 Oct, 2019

I recently got placed in Microsoft IDC .Here\xe2\x80\x99s my Interview Experience \xf0\x9f\x99\x82

The first two rounds were conducted by Cocubes.com in our campus. The other rounds were onsite. Microsoft was declared a dream company in our campus, students of streams CSE/ECE/MCA/MTech were eligible to sit.It had come for both Internship and Full time Positions.

Round 1 : Technical Aptitude

The first round consisted of 15 questions to be done in 30 mins.
The MCQs were based on C.C++,Java and some Operating System questions. Around 200+ from our college sat for this round.

Round 2 : Online Coding Round

After the first round around 100 (consisting of the internship students as well) students were shortlisted for the second round.This round had two coding questions to be done in 90 mins. Everyone got different sets of questions. The questions I got were :

1. Given two arrays were digits of one array represent a number,maximize the number by replacing it with elements of second array.
   eg:
   arr = {3,1,4,5,6}
   rep = {1,9,5,2,3}

   after replacement
   arr = {9,5,4,5,6}
   one digit of rep can be used to replace only once.
   For this almost everyone who got this question used a brute force method.But I had used a different approach .I constructed a max heap of rep array.And ran a loop checking if the max element of rep was greater than the element in arr and then replaced it in arr and deleted the same from the maxheap.

2. Given a matrix ,where each cell represents a value of strength.The value could be positive negative or zero. At each cell the strength value is added.You have to reach from point (0,0) to point (m-1,n-1) if at any point the strength becomes zero or negative then you cant proceed further.Find the minimum strength required before starting to reach the end of the matrix.
   eg . {{ 1,-3,0},
   {-2,1,-1}} Ans: 2 ((2+1+(-2)+1+(-1)=1 path taken)
   I gave a DP solution but was unable to pass a few test cases in this question.

After this round around 15 students were shortlisted (including me \xf0\x9f\x98\x80) . After some days we got these results and then we received an invitation for On-site interview at MSIDC, Hyderabad

Round 3 : Written coding round

Around 30 students consisting of students from other colleges as well were called On-site. This was a written round.Everyone was given around 45 mins and 1 question.

1. Given the root to a binary tree, a value n and k.Find the sum of nodes at distance k from node with value n. This is similar to this question on geeks ->https://www.geeksforgeeks.org/print-nodes-distance-k-given-node-binary-tree/
   I was able to do this quite quickly \xf0\x9f\x98\x80 I even explained my answer to the HR and he asked me to write different types of test cases to exhaustively check if my code works on all of them.

After this round around 14 people were shortlisted.

Round 4 : Technical Interview
This was a personal interview round .The interviewer asked me about myself and the projects I have done so far.We briefly discussed those projects.
Then he gave me two questions to solve :

1. Find and element in a rotated array https://www.geeksforgeeks.org/search-an-element-in-a-sorted-and-pivoted-array/
2. Given two linked lists both represent a number. Create a linked list that contains its sum Same as ->https://www.geeksforgeeks.org/sum-of-two-linked-lists/

These were fairly easy questions . I knew the solutions and explained it to the interviewer.He asked a few questions on them , seemed satisfied.Asked me if I had any questions for him . Well one thing I realized after giving interviews was when they ask the candidate for any questions then you should always ask something , shows that you are interested. So I asked him about the different technologies that a new SDE would work on and things like that. I had a pretty good discussion with him he told me many things from his end too.
I made it to the next round then \xf0\x9f\x98\x80

Round 5: Technical Interview

This round was about Design questions . If you go through the previous interview sets , you will notice that Microsoft does asks Design questions to test the candidates ability to solve a real life problem. Everyone got different questions in their personal interview. The question I got was :

1. You have to design a Text Editor like notepad . You are concerned about the following functionalities \xe2\x80\x93 insert, delete, and search.You can assume the other functionalities of the text editor like save , display of text,etc are handled by some other developer. You just have to suggest what kind of data structures you would use to carry out the concerned functionalities efficiently

   \xe2\x80\x93 He told me to take my time and give the solution. I gave him a solution of considering the text as a linked list of words . Where each node in the linked list contained the word string and an index .And for every node in the linked list I will have Trie structure. I used trie for efficient search.What I suggested was that I use the trie whenever the user enters a word and insert it into the trie and the leaf of that word will contain the index of that word plus the pointer to that node in the linked list . If suppose the trie already has the word then i increase the word count in the leaf and the leaf will contain a vector that has the list of indexes where the word has occurred and the list of pointers where the word is present in the list.I wrote the code and explained how it can handle all corner cases . We discussed the solution and he asked me certain questions on different test cases . My approach handled them well. He seemed satisfied . He added to the question that the search query could contain words or phrases . So my use of indexes could handle the phrase search \xf0\x9f\x99\x82 . I also suggested that instead of Trie data structure we could use a Ternary Search Tree as that would be more space efficient.

I was a bit doubtful about this round but I made through \xf0\x9f\x98\x80 After this round only few

students made through to the final round .

Round 6: HR+Technical Interview

The interviewer was quite experienced and very pleasant. He asked me how my previous rounds went.He was going through my performance review from the previous rounds. He took a glance though my CV and asked me about the projects I did. He saw that I had interned at IITB so he asked me a lot on that project. He also asked me some basic HR questions like Why should Microsoft hire you ? Where do you see yourself in the next 5 years ?.He was very impressed with my academic record and my AIEEE rank. Asked me how I handled my 12th board exams and entrances.He made it very comfortable and was almost chatting and getting to know about me.

1. Then he asked me about the question given to me in the previous round i.e Text Editor . I gave him a brief explanation on my approach . He then gave me another question based on Text Editor. He asked me how could I retrieve K most Frequent words from the text efficiently. Thankfully I was just going through this question just before this round \xf0\x9f\x98\x80 . I suggested the solution using Trie and Min Heap.
   Similar to -> https://www.geeksforgeeks.org/find-the-k-most-frequent-words-from-a-file/
   He asked me to write the code for the same. I wrote it down and explained it to him.
2. The next question he gave me was :- Given a binary search tree , print the path which has the sum equal to k and has minimum hops. i.e if there are multiple paths with the sum equal to k then print the path with minimum number of nodes.
   First I gave him the brute force approach . Similar to ->https://www.geeksforgeeks.org/root-to-leaf-path-sum-equal-to-a-given-number/
   But I knew it wasnt using the fact that we have a Binary Search tree . So the interviewer gave me some hints \xe2\x80\x93 like what is main criteria of a BST . I immediately figured out that the minimum path will always be on the right side of the node because it has the larger value. I told him the solution he seemed satisfied..

He then asked if I has any questions for him . So I asked him about where I can improve myself , he said I didnt need any improvement I am doing very well and that I should jus keep doing what I am doing \xf0\x9f\x98\x80 That certainly made my day \xf0\x9f\x99\x82 I asked a couple more questions about Microsoft and then left.

Finally after a week the results came I received the mail that I had been shortlisted for a Full Time Position \xf0\x9f\x98\x80

Tips :

- Have a good grasp on Data Structures. Solve as many problems possible from Geeks4Geeks
- Be confident in the interview . Have a smiling face and be adaptable to the question . The interviewer can anytime change or twist the question just to confuse you.
- The interviewers are very helpful , if you feel stuck communicate with them ..explain your approach they will give you hints.
- When the interviewer gives the question listen to it carefully do not immediately rush to writing the code .. ask him about the different criteria and restrictions pertaining to the question.
- Check your code with all possible test cases and list them.
- Lastly , even if you arent able to get the right solution then just explain your approach . Recruiters analyse how you tackle the problem not necessary that you have to have the accurate solution.

Thanks to geeksforgeeks it really helped me through my placement prep. The wide range of questions on Data Structures certainly helped a lot.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your

article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft IDC Interview Experience | Set 82 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n02 Dec, 2015

Here, I would like to share my interview experience for Microsoft IDC Software Engineering profile. It was On-Campus.

Primary round:
There were two test rounds, one was MCQs (15 Qs) on C++ basics and the other was Coding (2 Qs). Test was conducted on cocubes platform.

First round was easy. It had Qs on C++ o/p, algos, classes, struct and union, DS and one was on Java. All were shortlisted for the coding round.

Coding round:

Q1) find the sum of all cousins of a given key in a binary tree.

Q2) Reverse a linked list in groups of size k.

Prepare linked list and trees Qs from geeksforgeeks, that would suffice to crack this round.

GroupFly Round:
120 students were shortlisted for this round. we were divided into groups of 10. Each group was given a coding Q and we had to solve it in 20 mins. They want you to discuss the approach with them and write proper code. List out all the boundary cases clearly. Keep clarifying yourself by asking any query regarding the Q given.

Questions:

1) Given a sorted array, with some unknown rotation, i.e, the smallest element is shifted circularly. Find the smallest element.

2) Swap two given elements in a singly linked list

3) Design an algorithm for storing Tiny urls mapped to large ones. You are given a pool of tiny urls and you are asked to maintain their record of map against the large urls. 3 functions to be implemented: ASSIGN: it has to assign a tiny url to the large one which is taken as an argument to the function. ACCESS: it has to return the corresponding large url for the tiny url passed as an argument. RECLAIM: It has to remove all the large urls which were not accessed since mentioned time(which is passed as an argument) from the map and make the corresponding tiny urls available. You have design a system to do this and all the operations should take O(1) time complexity.

Technical Interviews:

There were 3 rounds of technical interviews, one coding Q in each round.

Round 1 : Q) Given a sorted array, with some unknown rotation, i.e, the smallest element is shifted circularly. Find the smallest element.

Round 2 : Q) Write the code for \xe2\x80\x98strtok\xe2\x80\x99 function (it\xe2\x80\x99s a C function)

Round 3 :

Q1) It was based on my internship. He asked me to explain the work I was involved in.

Q2) Some random Qs on my internship topic.

Q3) He asked, how would I detect a cycle in a singly linked list, then to mathematically prove that algo.

Q4) Some random Q on math and programming.

Q5) How to evaluate an infix expression. Write the code.

It was great conversing with them. They were very friendly. They encourage you all time giving hints and appreciating your progress. They were very active and generous at the same time. They look for your approach more than the way you write the code.

Tips:

Speak out the way you are thinking and the way you solve it. They want your approach. Clearly understand the Q. Ask for any query you get in mind. In fact you keep clarifying youself, they like that.

List out all the different boundary cases and handle them.

They will ask you to optimize the code, so gain experience by solving more and more Qs \xf0\x9f\x99\x82

There was nothing like HR round.

Just be confident in all the rounds. That will suffice.

Company is going to see how good your approach is. They wont check how much information you know, they look how well you are able to solve problems. Look for all the various cases possible and try to write error free code.

Just keep solving Qs from geeksforgeeks and learn the funda. Solve some competitive coding Qs from Hackerrank and other websites. That will suffice. Happy preparation! \xf0\x9f\x99\x82

Thank you \xf0\x9f\x99\x82

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Microsoft IDC Interview Experience | Set 81 (For Internship)

- Difficulty Level :\nMedium
- Last Updated :\n09 Mar, 2016

First round was technical aptitude. Around 120 students sat for it. 15 MCQs were asked- Everyone had different sets. All sorts of questions were asked, I had each question on C, STL, sorting, Java, Computer Architecture and OS.

Second round- Coding.
Around 60 students were shortlisted and coding round was conducted the same day. Everyone had different questions. Two problems were given and I had-
1. Find sum of data of all leaves of a binary tree on same level and then multiply sums obtained of all levels.
2. Two linked lists are given each containing a positive number find the difference of the two number and store it in a linked list and return reference to the head of the resulting linked list.
Eg: LinkedList1: 6 -> 5 -> 3 -> 0
LinkedList2: 4 -> 5 -> 2 -> 0
Output -> 2 -> 0 -> 1 -> 0

People who solved both and some with one were shortlisted. Results were announced after a month.
25 people were shortlisted after second round and were called to Bangalore.
Many students from different colleges were present for process there.

Third round- Group fly.
This was elimination round. Two questions were to be solved in one hour. A mentor was assigned to each group of 8-9 students. We had to discuss our approach and then code it and submit.
1. Remove duplicates from string in place in O(n).
2. Check whether given binary tree is balanced or not. Definition was no two leaves should have height difference of greater than one.
People who solved both were shortlisted.

Fourth round \xe2\x80\x93 Technical interview (45 min to 1 hour)
Interviewer was responsive and very co-operative.
First 15 min discussion on my projects. Then he asked me a question on arrays.
Given three arrays(arr1, arr2, arr3) each containing distinct positive numbers find three numbers a,b,c each from arr1, arr2, arr3 respectively such that (abs(a-b) + abs(b-c) + abs(c-a)) is minimum.
I gave an nlogn approach for it and then I was to write the code on paper.
Final round was HR
Apart from the HR questions I was asked about to explain Overflow and Underflow Arithmetic Exception and write code to detect it.
Overall experience was very good. The final results were declared 10 days after the interviews got over.

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Microsoft IDC Interview Experience | Set 80 (For Internship)

- Difficulty Level :\nMedium
- Last Updated :\n09 Mar, 2016

Recently Microsoft visited our campus for IDC internship program and following is my interview experience.

Online MCQ Round: It consist of 15 MCQ Questions on Cocubes.com.This was an easy round and consists of mainly output questions of c++/Java .
Apart from this some questions on OOPs and Operating Systems.

Online Coding Round:

Two coding problems in one hour,again on Cocobues.com

1. Given two arrays of numbers. The numbers are from 0-9 you have two maximize the first array by using the elements from the second array.

```
the elements can be used only once.\r\n   e.g. arr1[] = {5, 2, 3, 6, 7};\r\n\tarr2[] = {9, 2, 8, 4, 5};\r\nYou should o
```

2.Given a matrix of characters and a word.
you have to count the number of occurrences of that word in that matrix. you can move to any of the eight valid directions from current position.

```
  e.g.  word="HELLO";\r\n\tmatrix[][5] = { {\'H\',\'E\',\'L\',\'L\',\'O\'},\r\n\t\t      {\'E\',\'H\',\'E\',\'A\',\'B\'
```

I was lucky enough to get selected.
All other rounds were taken at Microsoft IDC hydrabad centre.

Elimination Round:

One Coding question was given to all the students ,You have to code and explain it.
You are given an string as input which represents a path. You have to normalize that path inplace(NO EXTRA SPACE).

```
\te.g.\r\n\t     input : "\\a\\b\\c\\..\\..\\file.txt"\r\n\t     output: "\\a\\file.txt"
```

Hint: Double dot(..) means you have to skip the previous parent.

Interview Round I:
Firstly,Tell me about yourself and some discussion on projects and what i have learnt till now.

Coding Question on pen & Paper: You have a Binary tree having numbers>=0 and a numeber N.
Print all downwards paths from any node having the sum of elements equal to N.
I gave a simple recursive algorithm then he ask me to optimize, then after around 10 min i gave him another solution a little bit optimized. He again ask me to optimize more. I tried but can\xe2\x80\x99t do more optimisation ,So he ask me write code and said the main purpose of the interview is to write the correct code.

Interview Round II:
The interviewer asked me what i have done in technical till now, and saw my resume for a while, then gave me a question which i have to code and explain.
You have a cuboid (m*n*p) each block of the cuboid is having a metallic ball.
Now we are passing X-ray from front face and getting a bool matrix1 of m*p the elements are set if there is a black spot.(as we are passing X-ray) and another matrix2 of n*p by passing X-ray from right face.
Now you have to print the co-ordinate (i,j,k) where mettallic balls are present.
Is it possible to get the accurate result from given data or you need more data. If you need more data then what data you need ?

I explained my approach to him , made a code and asked him to provide me more data (The m*n matrix) to get the more accurate result.

A Big Thanks to GeeksForGeeks.

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Microsoft IDC Interview Experience | Set 79 (For Internship)

- Difficulty Level :\nHard
- Last Updated :\n09 Mar, 2016

First round was technical aptitude. Total 65 students were eligible. 15 MCQs were asked- Everyone had different sets. All sorts of questions were asked, I had each question on linked lists, binary tree, B tree, STL, sorting, Java and OS.

Second round- Coding.
Around 40 students were shortlisted and coding round was conducted the same day. Everyone had different questions. Two problems were given and I had-
1. Find max index difference j-i such that a[j]>a[i] and j>i.
2. Find sum of data of all leaves of a binary tree on same level and then multiply sums obtained of all levels.
People who solved both and some with one were shortlisted. Results were announced after 3 weeks.
14 people were shortlisted after second round and were called to Bangalore.
Many students from different colleges were present for process there.

Third round- Group fly.
This was elimination round. Two questions were to be solved in one hour. A mentor was assigned to each group of 8-9 students. We had to discuss our approach and then code it and submit.
1. Remove duplicates from string in place in O(n).
2. Check whether given binary tree is balanced or not. Definition was no two leaves should have height difference of greater than one.
People who solved both or at least gave proper approach for both were shortlisted.

Fourth round \xe2\x80\x93 Technical interview (45 min to 1 hour)
Interviewer was polite and responsive.

First 15 min discussion on my database project, he asked me questions like what technologies I used for front end and back end. I explained all the functionalities.

Then he asked me a question on binary tree.
Connect nodes on same level in a binary tree. Initially I gave him level order approach where I used recursive function to access each level but as it was O(n^2) he told me to optimize the solution.
Then I gave him iterative approach of following-
https://www.geeksforgeeks.org/connect-nodes-at-same-level-with-o1-extra-space/
He said the code will be complex and there will be many cases, so he told me to think of another approach. I wasn\xe2\x80\x99t able to give another approach other than these.

Final round was HR but I wasn\xe2\x80\x99t called for it.

Overall experience was good and mentors, interviewers were very polite.

Thanks to geeksforgeeks team for putting such good content on website. I would advice to go through problems on website as it improves thinking and approach.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview Experience | Set 78 (Telephonic for IT)

- Difficulty Level :\nMedium
- Last Updated :\n06 Nov, 2015

Following questions were asked in the second round of telephonic interview:

1. Asked about some questions related to Design patterns.

2. Find a loop in linked list
https://www.geeksforgeeks.org/detect-and-remove-loop-in-a-linked-list/

3. Length of the loop
Soln: Once the loop is detected, keep the slow pointer as it is, but move the fast pointer with a count variable until it reaches the slow pointer.

4. Variation of find a largest sum of contiguous array
https://www.geeksforgeeks.org/largest-sum-contiguous-subarray/

5. Given two nodes in a graph, check if they are connected or not. Pre processing can be done but the result should be computed real quick
Soln: Create a hash map with key as a single node and value as a list of all connected nodes

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Microsoft Interview Experience | Set 77 (For IDC Internship)

- Difficulty Level :\nMedium
- Last Updated :\n18 Dec, 2019

Recently Microsoft visited our campus for IDC internship program and following is my interview experience.

Online MCQ Round: It consist of 15 MCQ Questions on Cocubes.com.This was an easy round and consists of mainly output questions of c++/Java .Apart from this some questions on Virtual functions and Operating Systems.

Online Coding Round:

Two coding problems in one hour,again on Cocobues.com

1. Save all leaf nodes of a Binary tree in a Doubly Linked List by using Right node as Next node and Left Node as Previous Node.

https://www.geeksforgeeks.org/connect-leaves-doubly-linked-list/

2.Given an array,find the maximum j \xe2\x80\x93 i such that arr[j] > arr[i] .

https://www.geeksforgeeks.org/given-an-array-arr-find-the-maximum-j-i-such-that-arrj-arri/

It took me 40min to code both the Questions.

Group Fly Round:

Since I was among top 4 student till second round therefore I was selected directly for Interviews. But yeah according to my friends this was a bit tough round.Only 3 students were shortlisted from the remaining students.

Interview Round I:

Firstly,Tell me about yourself and some discussion on projects.

Coding Question on pen & Paper: Convert a String to Integer considering **each and every damn corner case**.

Interview Round II:

Shortest Round among all,One Coding Question on pen & paper:

Remove **Alternate** Duplicate characters from a **char array** you have to do it **in Place**.Like keeping **only the odd occurrences of each character**.
Example:

Input: \xe2\x80\x9c*you got beautiful eyes*\xe2\x80\x9d

Output: \xe2\x80\x9d*you gtbeaiful es*\xe2\x80\x9d

Allowed Time Complexity was **O(n)** and Space Complexity was **O(1)**.It took 10min to come up with an algo.The interviewer was satisfied with my algo and said \xe2\x80\x9cno need to write the code\xe2\x80\x9d.

Hint : Use two Pointer Method and Bool array of length 256.

A Big Thanks to GeeksForGeeks.Except the Last question all questions were from GeeksForGeeks

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Microsoft Interview Experience | Set 76 (On-Campus)

- Difficulty Level :\nExpert
- Last Updated :\n19 Oct, 2015

Recently Microsoft visited our campus for recruitment and following is my interview experience.

MCQ Round-
15 MCQ questions from C , C++ , java (1 question) , aptitute , etc on cocubes.com. There was no negative marking. Very few students eliminated in this round.

Coding Round \xe2\x80\x93

2 coding questions \xe2\x80\x93

Q1.You are given a matrix of size M x N and only possible values in the matrix are
0 ? representing empty position
1 ? representing a fresh apple
2 ? representing a rotten apple
A rotten apple converts all the fresh apples to rotten ones which are adjacent to it in 1 unit of time. Given an input the matrix and you have to calculate the amount of time in which all the fresh apples become rotten. Also determine whether all fresh apples could be made rotten in finite time or not.(10 marks)

```
\r\nInput\r\n2 1 0 2 1\r\n1 0 1 2 1\r\n1 0 0 2 1\r\n\r\nAfter 1 time unit, the matrix will be transformed to\r\n2 2 0 2
```

Hence output should be 2 time units. (Definition of adjacent only included the left , right, bottom and upper cell and NOT diagonal cell)
Q2.Find all nodes at k-distance from a given node in a binary tree \xe2\x80\x93 https://www.geeksforgeeks.org/print-nodes-distance-k-leaf-node/. (10 Marks)

Some students were short listed for Microsoft IT , some for Microsoft IDC and some for both.

Group fly round was conducted for some students and some students were directly selected for interviews.

Group Fly Round \xe2\x80\x93

For Microsoft IDC \xe2\x80\x93 Remove all duplicates from the input string https://www.geeksforgeeks.org/remove-all-duplicates-from-the-input-string/
For Microsoft IT \xe2\x80\x93 Design name , role and permission system in which whenever user enters his role and name then permission granted to him (read ,write or execute) will be output.

Interview 1 \xe2\x80\x93

1.Tell me about yourself.
2.In a file there are 1 million words . Find 10 most frequent words in that file. https://www.geeksforgeeks.org/find-the-k-most-frequent-words-from-a-file/

I gave the solution using trie and min heap.He asked me to write program assuming that insert and deletion of trie and heap is given.
Then he asked me about what should be test cases.
The following are the test cases \xe2\x80\x93
a)if file contains a word which is in inverted commas like \xe2\x80\x9cabc def\xe2\x80\x9d. Here \xe2\x80\x9cabc def\xe2\x80\x9d should be considered as a single word but my program was taking \xe2\x80\x9cabc def\xe2\x80\x9d as two different words \xe2\x80\x93 (i) \xe2\x80\x9cabc (ii) def\xe2\x80\x9d .
b)if file contains characters like tab (t) , r etc. then my program would not work.
3.Some questions based on virtual memory concepts.
4.Write name and average case running time complexity of any 6 sorting algorithms.
5.When merge sort should be used ?
6.Any question about Microsoft ?

Interview 2 \xe2\x80\x93

1.Find the first circular tour that visits all petrol pumps \xe2\x80\x93 https://www.geeksforgeeks.org/find-a-tour-that-visits-all-stations/.
First i gave a brute force solution. Start with Every petrol pump and check if circular tour is possible. This solution takes O(n^2) time complexity then he asked me for optimised solution.
I was unable to optimise but when he gave some hints then I gave O(n) solution. After that he asked about running time complexity of the problem and then he asked me to code.
2.What is the use of indexing in relational table ?
3.If join is applied on two tables \xe2\x80\x93 table1 and table2.Suppose table1 has more number of rows than table2 then table1 joins table2 takes more time to execute or table2 joins table1 takes more time to execute ? (Assume that there is no indexing in both the tables)

3.Some questions based on my projects.
4.In which technology do you have passion ?
5.Any question about Microsoft ?

Interview 3 \xe2\x80\x93

1.Are you comfortable with linked list ?
I said yes then he asked two questions from linked list.
2.Clone a linked list with next and random pointer \xe2\x80\x93 https://www.geeksforgeeks.org/a-linked-list-with-next-and-arbit-pointer/.
3.Serialise and Deserialise a linked list with next and random pointer.
Serialise and deserialise a linked list means to save a linked list in a file and then using that file make same linked list again.
First I gave O(n^2) running time solution then he asked for optimisation. Then I gave O(n) running time solution using hashing.
He was giving me hints whenever I got stuck.

Interview 4 (HR) \xe2\x80\x93

1.Why Microsoft should hire you ?
2.What did you do in this summer ?

3.Some questions based on my project.
4.Construct a binary tree from given inorder and preorder traversals. https://www.geeksforgeeks.org/construct-tree-from-given-inorder-and-preorder-traversal/
5.Any question about Microsoft ?

In interviews they were giving sufficient time for thinking solution and they were helping whenever I got stuck.

My primary source for preparing for placement is GeeksForGeeks. Almost all the questions asked in all rounds are there in GeeksForGeeks. I thank a lot GeeksForGeeks for providing very nice materials for preparation for placements.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Related Practice Problems

Node at distance
Construct Tree from Inorder & Preorder
Circular tour
Rotten Oranges

All Practice Problems for Microsoft !

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Microsoft Interview Question for Internship

- Difficulty Level :\nHard
- Last Updated :\n09 Mar, 2016

Round 1- Coding round

You are given a matrix nxm filled with integers. There is a robot which has to travel from the cell (1,1) to cell (n,m) and the robot can move only one cell to the right or downwards. The robot requires strength to travel from one cell to another. He can only move forward if his strength is positive. When he moves to a cell , the cell value is added to his strength(value can be negative or positive). Calculate the minimum strength you have to give to the robot initially so that he can make it to the last cell.

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Microsoft Interview Experience | Set 75 (For SDE II)

- Difficulty Level :\nMedium
- Last Updated :\n19 Oct, 2015

I recently attended Microsoft Interview for their CRM team in Bangalore.

F2F Round 1:
Design and Implement: Producers and Consumer Problem. Producers produce different kind of messages and Consumers register themselves for different kind of messages. Need to design and implement Producer, Consumer and a Delegator which is responsible for storing and delivering the messages to appropriate listeners.
Changed the question to handle millions of messages.
Changed the question to handle different priority messages.
Threading model for Producer, Listener and Delegator.

In the end he asked me to code 2 methods of Delegator.
1: which adds the message from Producer to its internal queue.
2: Delegate, which delivers the message to appropriate listener.
My Opinion: There is no right or wrong answer for design question, in fact the interviewer also told the same thing. Start with something simple, a minimalist design and improve/change as requirement changes.

F2F Round 2:
1. A MxN matrix containing integers (positive, negative and zero\xe2\x80\x99s). For every position containing 0, mark the corresponding row and column as 0.
Told him the queue approach. But he wanted with O(1) space complexity in O(n) time complexity.
2. Variation of https://www.geeksforgeeks.org/find-the-k-most-frequent-words-from-a-file/

F2F Round 3:
1. Implement Power(x,y) without loop. Interviewer wanted all test cases covered like Power(x,0) and most optimized solution.
2. Rotate MxN matrix by 90 degress. This is where my luck ran out, The interviewer gave me hint, but still couldn\xe2\x80\x99t come up with solution.

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Microsoft Interview Experience | Set 74 (For Software Engineer in IT Team)

- Difficulty Level :\nMedium
- Last Updated :\n15 Oct, 2015

Have been interviewed for Microsoft India, Hyderabad location for their IT team for Software Engineer role.

Following questions were asked in the first round telephonic interview

1. How is C++ better than C?
2. When do you use overloaded functions and when do you use overrided functions?

3. I have a list of customer objects which in turn can contain a list of Order objects which in turn can contain a list of Item objects. Need a Reporting module that will be total amount of purchase done by each customer and total amount of purchase done by all the customers. What modifications has to be done in the classes?
Ans: Gave few approaches but he was not satisfied.

4. There are three different types of users \xe2\x80\x93 employee, admin and manager. Each user should have different permissions. How will you achieve this?
Ans: Users will be the base class. Employee, admin and manager will be the derived classes. I was not sure of how to do this in the interview. But, thinking now. We can have overriden functions in each class of admin/employee/manager such that if the user does not have permission the function in that particular class can just return error without performing any action. If the user has permission, the actions can be defined in that function.

5. Given a linked list, reverse the nodes from (n-x)th node. Given only x.
Ans: Have two pointers. One pointer will be at the head node, increment the second pointer until it reaches xth node. Now increment both the pointers until the second pointer reaches end of the linked list. Now reverse the linked list from the first pointer location onwards

6. In class car, accelerate() is a method that increases the velocity variable each time the method is called. The requirement is to alert the user when the velocity reaches it\xe2\x80\x99s maximum limit.
Ans: I told that we can change the accelerate() method to return a bool var of True whenever the limit is reached. He asked for other ways. I told the user can keep polling every time if the maximum limit has reached or not. He is not satisfied.

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Microsoft Interview experience | Set 73 (On-Campus for IT SDE Intern)

- Last Updated :\n15 Oct, 2015

MSIT visited our campus. 5 days before the visit, there was an online assessment which included two processes both hosted by cocubes:

1. MCQ round: It had 15 questions from c,c++ and java to be done in 30 minutes.
Mcq were easy but long so time consuming.There was no negative marking. I solved around 8-9.

After half an hour results were announced.54 students got selected out of 110 almost.

2. Coding round: 54 students wrote online coding questions. Everybody had different questions, some had same. two questions to be solved in 60 minutes.
Compiler: you cannot use standard template library.You can only write functions.So if you need push or pop functions you have to write it from scratch. They gave you prototype of function. And you write its body.

1st question: Given two linked lists represent two no. Subtract the second one from first one. No memory should be allocated. You can alter the given linked lists. Head node of answer linked list needed to return.
https://www.geeksforgeeks.org/add-two-numbers-represented-by-linked-lists/
this question\xe2\x80\x99s approach can be useful to solve this question.

2nd question: Sum of the boundary nodes. It was solved by using boundary traversal approach.
https://www.geeksforgeeks.org/boundary-traversal-of-binary-tree/

Microsoft team came with the result. They selected almost 25 for group fly and 6 (who performed well in coding round) for direct technical interviews.

Group fly:
I was among the direct ones. So I don\xe2\x80\x99t know the question.

Technical interview:

Interviewer was amazing and supportive. My interview is of 80-85 minutes.
He asked me about coding round questions. Asked how many I solved. Which approach I used. How could I make it better.
Then he asked me to find no of palindrome in the a paragraph. I did it. He helped me while writing the code. He asked some questions on hash map, sql and arrays.Then he started discussing my projects and interview ended up in the discussion.

HR:
Normal hr round. Interviewer was serious but not demoralizing. Asked to implement library management system. Discussed my projects. one Idea to innovate at Microsoft. This went well.

I really want to thank geeksforgeeks for its amazing collection.

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Microsoft Interview Experience | Set 72 (For Software Engineer)

- Difficulty Level :\nMedium
- Last Updated :\n14 Oct, 2015

Online Round on Hackerrank \xe2\x80\x93 1 Hr:

1. Maximum product sub-array.
https://www.geeksforgeeks.org/maximum-product-subarray/

2. Building bridges across cities. Find the maximum number of bridges that can be built.

Round 1:

1. Find the median of two sorted arrays.
https://www.geeksforgeeks.org/median-of-two-sorted-arrays/

2. Store a mirrored matrix (Mat[i][j] == Mat[j][i]) efficiently.

Round 2:

1. Stream of urls coming, find out top trending topics
General discussion around designing such a system in a distributed setup.

2. Discussion on designing a spam email detection system.

Round 3:

1. Rotate a given array.
https://www.geeksforgeeks.org/array-rotation/

2. Count frequencies of elements in an array.
https://www.geeksforgeeks.org/count-frequencies-elements-array-o1-extra-space-time/

Round 4:

1. Connect nodes at the same level in a binary tree.
https://www.geeksforgeeks.org/connect-nodes-at-same-level/

2. Design a LRU cache
https://www.geeksforgeeks.org/implement-lru-cache/

3. Find a given word in a board of characters
https://www.geeksforgeeks.org/boggle-find-possible-words-board-characters/

Would like to thank geeksforgeeks for the big collection of relevant interview questions.

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Microsoft Interview Experience | Set 71 (Off-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n27 Sep, 2015

Written test:
They conducted written test in HackerRank and an hour duration. They asked me to implement the functions for the following two problems.
1) Maximum product Sum of an Array.
https://www.geeksforgeeks.org/maximum-product-subarray/

2) Building bridges problem.
https://www.geeksforgeeks.org/dynamic-programming-set-14-variations-of-lis/

Technical Interview 1:
He is very friendly and given hints to me while solving problems.
1) First he asked me about an overview of my current project then most challenging thing faced in the project. After my response, he asked me what you learnt from that challenging thing.

2) Given an array of integers of the size of n, it contains zeros in random positions, we need to move all zeros to end of the array in a single scan without extra space.
https://www.geeksforgeeks.org/move-zeroes-end-array/

3) Merging point of two linked lists.
https://www.geeksforgeeks.org/merge-two-sorted-linked-lists/

4) questions related to programming languages
\xc2\xa0\xc2\xa0\xc2\xa0 a) about inheritance
\xc2\xa0\xc2\xa0\xc2\xa0 b) about classes and interfaces
\xc2\xa0\xc2\xa0\xc2\xa0 c) abstract classes and virtual functions, \xe2\x80\xa6

5) He given a situation and asked me to design required classes and functions which are useful to program that situation.

6) The last question is given a number we need to find the next nearest number in 2^n.
input: 127 output: 128
input: 129 output: 256

Technical Interview 2:
He asked me very simple questions, but he wants to cover each and every corner case.
1) Reverse group of elements in a linked list
https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/
2) perform push,pop and min operations of stack in O(1) time.
https://www.geeksforgeeks.org/design-and-implement-special-stack-data-structure/

Some suggestions:
1) Practice on paper, don\xe2\x80\x99t practice on the computer.
2) While practicing, we should try do the question our own then see the answer, don\xe2\x80\x99t go directly to the answer.

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Microsoft Interview Experience | Set 70 (On-Campus for IDC and IT)

- Difficulty Level :\nHard
- Last Updated :\n20 Sep, 2015

Microsoft recently visited campus to hire interns for IDC and IT profiles.
I\xe2\x80\x99d like to share my experiences.

1. **Online MCQ Round** \xe2\x80\x93 about 15 questions and 30 minutes \xe2\x80\x93 MCQ questions on cocubes.com
   Problems were mostly output type questions in C and Java with a few questions on Combinatorics.

   .

2. **Online Coding Round** \xe2\x80\x93 Two coding questions on cocubes, one hour provided.
   First question was given a binary tree, write a function that returns a linked list of the leaves of the tree such that
   a) Nodes in the linked list are in the order of left-most leaf to right-most, i.e, head is the left-most leaf
   b) Using constant (O(1)) memory \xe2\x80\x93 storing the pointers etc not allowed
   Second question was, given an array and a window size that is sliding along the array, find the sum of the count of unique elements in each window.

   ```
   \r\n    For example, if the array were 1 2 1 3 3 and window size was three\r\n\r\n    First window -      1 2 1 - or
   ```

   Few people solved it in O(n) but most solved it in O(nk) where n is the size of the array and k is window size.

   .

3. **Group Fly Round** \xe2\x80\x93 Two problems were given, to be solved in about twenty minutes (maximum)

   The problems were :
   a) Given a sorted array that has been rotated, find the index upto which array is sorted.

   For ex : 3 4 5 6 1 2, the answer would be 3, because index of element 6 is 3.

   b) Given an array of numbers, find the largest product of three numbers in the array

   We were expected to code our solution, write the approach, time complexity and test cases.

   For the first problem, they expected a O(log n) solution, where n is the size of the array.
   For the latter, they primarily wanted to check if the applicant accounted for negative numbers in the array and that the product could either be of three positive numbers or two negative and one positive number.

   .

4. **F2F interview I** \xe2\x80\x93 Few theory based questions like abstraction in C++, volatile keyword.
   Was given a problem \xe2\x80\x93 \xe2\x80\x9cGiven an array of numbers, write a function that returns a balanced binary tree\xe2\x80\x9d . He also asked me to modify it to return a binary tree that is as close to symmetric as possible.

   .

5. **F2F interview II** \xe2\x80\x93 Was first given a simple pattern printing problem \xe2\x80\x93 for example, if 16 is given, to print :

   ```
   \r\n    16 11 6 1 -4 1 6 11 16\r\n\r\n    if input was 10\r\n\r\n    10 5 0 5 10
   ```

   The challenge was to not declare any variables or use any loops. Gave a simple recursive function that used stack implicitly to print the pattern. He was satisfied.

   Second problem was, given two sorted arrays, to merge them in linear time and without using extra space, i.e, given an array with enough extra space to hold a second array and a second array, both of them sorted, to merge second into first and return it in O(m+n) time and O(1) space complexity, where m is size of first and n is size of second array.

   .

6. **F2F interview III** \xe2\x80\x93 This was partly a HR interview too, where we discussed Microsoft and its services/ work culture / competition.

   The only problem was given a dictionary of all words, to print all sets of anagrams together, in time linear to the number of words in the dictionary.

   The interviews were really thought provoking and the interviewers were helpful and friendly. It felt like solving problems as a team and not at all like a test. The interviewers were quite receptive to our questions and patient.

About 70 people wrote the online MCQ round and about 30 made it to coding round. Some were called for interview directly and some had to go through group fly. Most of the candidates selected were those who went through group fly.

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Microsoft IDC Interview Experience | Set 69 (For SDE)

- Difficulty Level :\nMedium
- Last Updated :\n19 Sep, 2015

Position : SDE BING TEAM

1. Online round :
This was for screening and had 2 questions:
i) max sum product of an array -> (take care of negative no.)
ii) Bridge building problem across cities.

2. F-F round 1
i) interviewer asked me why microsoft and why bing.
ii) reverse linked list in size of k
iii) design question on array of finding an element in an infinite array
iv) search element in a pivot and sorted array.

3. F-F Round 2
i) same question why microsoft and some project of current company
ii) if 2 diagonally opposite coordinates are given of a rectangle, tell where they overlapp or not.
iii) find longest substring without repeated character

4. F-F Round 3
i) why bing ? what do you know about bing?
ii) design how will you implement the most viewed bar in bing search, different approaches
iii) how to merge 2 unsorted arrays .(gave 3 solutions with complexity)

5. F-F Round 4 (AA round :- as appropriate)
i) discussion started with my college and studies and grades.
ii) moved on to how bing can scale up to google ? can it defeat
iii) whats the probability that it can defeat google.
iv) What are new features that can be implemented
v) views on bing fighting google.

Thanks a lot geeks for geeks \xf0\x9f\x99\x82

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Microsoft IDC Interview Experience | Set 68 (For SDE)

- Difficulty Level :\nEasy
- Last Updated :\n02 Sep, 2015

Hi, Following is my interview experience for SDE position in Bing Team.

\xe2\x80\x93 **Online Round :**
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 Total questions 2.

1. The question was big, like a story but it ultimately boils down to Longest Common Subsequence.

2. Don\xe2\x80\x99t remember the question but it was a mix of level order traversal + searching.

\xe2\x80\x93 **Onsite : Round 1 : Duration around 1 hour**

1. Given a binary tree, connect all node in the same level. Node structure is : left, right, data, next. Each level next should point to the next right node in the level. For last node in each level, next should be NULL

    - Then, the question was extended : Toggle the linking every K level. Means, you will be given a tree root node and a number K. For first K level, you should link to next right node. Next K you should link to next left and so on.
2. Given a city containing n people, a mayor candidate is one who does not like anybody but everybody else likes him. You are given a function Likes(x,y), where x and y are people in the city.
    - Likes(x,y) = 1 if x likes y, O otherwise.
    - Question was to find the mayor candidate. O(n) solution was required.
3. Some discussion on app based taxi booking services, overall idea about how they are implemented, how it can be improved. Just general idea.

\xe2\x80\x93 **Onsite : Round 2 :**

1. Discussion about MTech project, previous work, my contribution etc.
2. What could you have done better in the last round?
3. How can you transfer a binary tree from one machine to another. How will you dump it efficiently in a file. How you will encode and decode it. Long discussion of different approaches.
4. Designing a parking lot system, how will you design the databases etc.
5. Reverse every alternate quarter of a linked list. For example, if the list has 12 nodes, then 1-2-3, 7-8-9 should be reversed, rest remains same. Code with all edge cases checked requited. Test cases for the same.

\xe2\x80\x93 Onsite : Round 3:

1. Discussion about previous work. Challenges faced.

2. Given a 2 D array of size mxn (say) and a location (i,j), write a function TraverseSpiral(arr,m,n, i, j) which will traverse the array spirally starting from location and moving clockwise.
   Working code with edge cases checked required.
   Test cases for the same
3. Stream of words are coming : ate, geek, tea, for, sam, eat. Build a data structure to store these such that, if a query was made to search a word: sat tea, it should return all the

anagrams : tea, ate, eat present in the store. Long discussion on possible approaches.

\xe2\x80\x93 Onsite Round 4: With Bing team GM

1. Long discussion about dissertation, previous work. With stress given to contribution and challenges faced and how did I decided to resolve them

- Why do I want to leave present company?
- Some discussion about UI, what are the things to keep in mind while designing a mobile APP like amazon or flipkart. Which is better among them. What would you like to do to make them more user friendly.
- Some discussion about multi thread system and synchronisation among them. Various approaches and their trade-off discussed.
- High level discussion on how India Railway reservation system works catering to millions of request at a time.
- Any questions from my side \xe2\x80\x93 I asked various aspects of work being done in Bing team. I emphasised on scenarios where a bing search gives more relevant results than a google search.

Overall, it was a great experience. Great food and snacks throughout the day. The interviewers were friendly, giving hints and all. I would also like to thank geeksforgeeks for being there always. I have been greatly benefited hence I am taking time in sharing a detailed and thorough description of the process from my perspective.

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Microsoft IDC Interview Experience | Set 67 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n09 Mar, 2016

Microsoft had come to my campus for recruitment for both IT and IDC. Few selected students were given a preference between them. IF they didn\xe2\x80\x99t qualify in one, they could go to the Other. I had chosen Microsoft IDC.

First Round:
It was conducted in cocubes.com. comprise of c,c++ and one java and one aptitude question. around 200 people were shortlisted for second round.

Second Round:
Two questions were asked.
1) Given two arrays were digits of one array represent a number,maxmise the number by replacing it with elements of second array.
eg:
arr={3,1,4,5,6}
rep={1,9,5,2,3}

after replacement
arr={9,4,4,5,6}
one digit of rep can be used to replace only once.

2)convert the leaves of a binary tree to a linklist using its right pointer.(in place)

I had solved both and was selecetd to the next round along with 29 others

Round three
Find all substrings of a given string.
space can also be part of the substring

I had topped this round giving the most efficient solution.

Round four: (Face to face)
All contestant were asked the same question.

1)https://www.geeksforgeeks.org/search-in-row-wise-and-column-wise-sorted-matrix/

i gave the answer but was asked to justify my approach and was also asked to code in another approach.There were several questions asked to know the various approaches it can be done in.

2)find sum pair in a sorted array.
Again, i was asked questions regarding my approach

Round 5
Three of us were taken to a room. we were asked to code a DFA which checks the correctness of grammar of a sentence in C. The mentor was very helpful and friendly.

Round 6
HR round. Normal HR question like why should Microsoft hire you? etc.

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Microsoft IDC Interview Experience | Set 66 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n17 Aug, 2015

There were 4 rounds in all

First Round
There were total 15 MCQ questions based on c, c++ pointers java output and one was on resource allocation graph. This round was on cocubes

Second Round
Around 60 people were selected and there were two coding questions
1. In a given array find i & j such that arr[j] > arr[i] and j-i is maximum
2. In a binary tree find product of all sum of values in a leaf node at same level
This round was again on cocubes

Third Round
Around 35 people were selected two questions were asked
1. In a BST two node values are swapped . Restore original BST
2. Given a sorted array find pairs such that their sum is closest to the given value
This one was on pen paper

Fourth Round
Around 20 people were selected for it
There was a single question it was expected to write code on a paper
Given a number find next bigger number by permuting its digits
After i solved this interviewer asked me to modify my algorithm for negative numbers

Final Round
There were 15 people
Interviewer questioned every one personally
Here are the few questions
1. Given a stream of running characters you have to identify anagrams and store only unique strings in a file
2. Given inorder and preorder traversals construct BT
3. Link-list is given it contains red, blue and green balls only sort it in place

Then some general questions were asked. Interviewer asked us to ask him something about microsoft and what will be work etc.

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Microsoft Interview Experience | Set 65 (On-Campus for Internship IT and IDC)

- Difficulty Level :\nMedium
- Last Updated :\n09 Mar, 2016

Microsoft visited our campus for hiring FTE\xe2\x80\x99s and Interns. I had opted for both Microsoft IT and IDC. The first couple of rounds were online rounds and were hosted on Cocubes.com

Round 1
It comprised of 15 MCQ Questions and time allotted was 30 mins. Every student had a unique set of questions which comprised of C,C++ (I/O), Data Structures, Java, and Aptitude. The questions required a decent amount of thinking.

Round 2 (Online Coding)
1. You are given a matrix of dimensions m*n where each cell in the matrix can have values 0,1 or 2 which has the following meaning :
0:empty cell
1:cells have fresh oranges
2:cells have rotten oranges
So we have to determine what is the minimum time required so that all the oranges will be rotten. A rotten orange at index [i,j] can rot other fresh orange at indexes [i+1,j] ,[i,j+1] ,[i-1,j] ,[i,j-1]. If it is impossible to rot every orange then simply return -1.
This was to be done without allocating any extra space.

2. Connect all leaf nodes of a binary tree to make a LL. (Without allocating any extra space for the linked list).
Now, around 30 students were shortlisted for Microsoft IT and around 40 for IDC. There were some people who got short listed for both. I was lucky enough to sit for both of them.
From here I will write the processes for IDC and IT separately.

FOR IT
Round 3(Group Fly Round)
Some people who had a high score in the 1st and 2nd rounds did not have to appear this round. They were promoted for the next rounds.
There were two questions.

1. Given a string (Assume that its case insensitive and has no spaces), find the length of the largest palindromic substring.
   While the brute force solution would have O(n^2) complexity, with some thinking you can arrive at a O(n^2) solution.
2. Given a string , return the length of the longest substring which comprises of consecutive characters.
   Ex: abcxy
   Output:
   3
   abc

Discuss your approach with your mentors and be very clear about it. Write comments on the paper code.

Round 4 (Technical PI)

The interviewer was nice and made me feel extremely confident. He went through my resume and asked me a few basic questions on data structures that we use. Also know the efficiency of using each data structure and there pros and cons.

He first asked me to write a code to implement the \xe2\x80\x9cEvaluate Function\xe2\x80\x9d of Microsoft Excel. I gave him the solution where we convert the expression from infix to postfix and then evaluate the postfix expression. However, I was aware that this solution would not work for 2 digit number (or results). So I suggested an improvement by taking input as a string and then converting the string into an integer. The interviewer was satisfied with the logic.

He then asked me if I knew anything about encryption. Though I didn\xe2\x80\x99t have a very clear idea but I told him about some ciphers that can be used.

I had only one project on my resume. We had a 15 minute discussion of the challenges faced in making it and how it could be further improved.

The interview lasted for around 40-45 mins.

Round 5 (As Appropriate AA)
Now people who did relatively well in the previous technical round qualified for this.

The interviewer was again very warm. Though my CGPA was high, it kept decreasing every semester. He asked me the reason for this.

Then we discussed about my experience and work at one of the earlier places that I had interned. And he asked a few other questions like \xe2\x80\x9cWhy Microsoft? \xe2\x80\x9c and \xe2\x80\x9cWhat I can do to improve Microsoft?\xe2\x80\x9d.

Just be honest and confident about what you speak. And this round should go smooth.

FOR IDC
It followed a very similar structure like the IT interviews. The interviews here focused more on coding and databases. There were two Technical PI rounds instead of one after the group fly round.

The question tested the fundamentals and data structures.

There was a question on implementing a data structure to store a word along with all of its acronyms from a dictionary such that we can search it efficiently.

Thanks to GeeksforGeeks for building such a repository. I have learned a lot from this forum in the last one year. Awesome platform. And I would urge others who gain from this platform to contribute their experiences as well.

Cheers.

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Microsoft Interview Experience | Set 64 (For SDE-2)

- Difficulty Level :\nEasy
- Last Updated :\n09 Aug, 2015

First Round (F2F) 1 hour:
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x9
Write code for below 2 qns , not exact but concepts are 99% same.

https://www.geeksforgeeks.org/sort-an-array-of-0s-1s-and-2s/

https://www.geeksforgeeks.org/find-number-of-islands/

Second Round (F2F) 1.5+ hour(Design round):
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x9
Asked me to design a URL shortening site like bitly. After few discussions i gave a soln like below method
https://www.geeksforgeeks.org/how-to-design-a-tiny-url-or-url-shortener/

Then there was lots of related questions of hashing , what to do to make it scalable, Design the server side.

But i didn\xe2\x80\x99t had any WEB experience so i could not give proper answers for them how ever i tried answering all questions and told them that these are my ideas how ever i don\xe2\x80\x99t ave any web experience so answers may be wrong .

Third Round (F2F) 1.5 hour+(Design round):
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x9

Started with what are the things you will consider for scheduling a meeting with say 5 -6 persons .

What are the things you will consider .

Prioritize each of them . Then for each person you have these inputs .

based on that find out best possible time slots for scheduling a meeting .

Also give priority to each of the slots .

Then questions on that .

other questions of why you want to join how u will cope up with the works which are different that the work you are doing .

Fourth Round (F2F) Hiring Manager \xe2\x80\x93 15-20 mins:
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x9

Questions on why you want to join how you will work then below question .
https://www.geeksforgeeks.org/largest-sum-contiguous-subarray/

I had justify lot of questions on why i want to change the domain after spending considerable amount of time etc,..

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Microsoft Interview Experience | Set 63 (For Internship)

- Difficulty Level :\nHard
- Last Updated :\n09 Mar, 2016

This is my first time writing an article so here goes. Microsoft came to our campus yesterday. I sat for both the IDC and IT process.

Round 1:
It was an MCQ round, 15-20 requestions. Mostly recursive questions, some aptitude and I/O.

Round 2:
Online coding i got two questions.
1. Window of k size in arr of size n, find all distinct element counts in those windows.
2. Connect all leaf nodes of a binary tree to make a LL. (Don\xe2\x80\x99t allocate any memory just set the right child pointer as next node)

Round 3:
Group Fly round.
We got two questions:
1. Length of longest palindromic substring in a string. I got an O(n^2) solution. Mentor asked me to optimize i tried but i couldn\xe2\x80\x99t.
2. Merge two sorted arrays. Optimized from O(n) extra space to O(1) to no extra space.
Write all your approaches on the sheet even the pseudo code towards the end. Write comments. Discuss with mentor. He should know who you are. Indent and write neatly.

Round 4:
Technical Interview.
OS questions.
1. Insert in a BST.
2. Find element in BST closest to k.
Some threading and java questions.
Be confident. Interviewer wasn\xe2\x80\x99t responsive.

Round 5:
Technical Interview.
Basic DS questions, asked me what has been taught what has not been taught, what you know and what not. I told him i have done heaps also so he asked me basics of heap.
Next question proper code he wanted for finding 2nd largest element in array was helpful and wanted me to check edge cases and fix. I missed one and i thought i wouldn\xe2\x80\x99t get through.
They understand your code easily so don\xe2\x80\x99t think they will miss anything.
PLEASE INDENT. I wasn\xe2\x80\x99t doing it initially so he was confused.
Asked about OOP and basics and stuff. I answered explained everything with examples. Run time polymorphism, Inheritance, encapsulation and stuff.

Round 6:
HR Interview.
Best round ever. The person was really very very nice and frank. Loved every bit of interaction.
Gave puzzles like hour minute angle difference, some tricky ones like how many points lie west of north pole (Answer is none) since there is nothing there.
Asked me to implement a scalable device which can incorporate additional shapes later on. The

device would output a shape on a matrix if input is shape name. He pushed me towards a hash table approach with O(1) lookup and the table containing the coordinates for matrix traversal.

Ultimately he offered me an internship in MS IDC.
I was offered an internship along with 4 others.
I sat through the MS IT procedure before IDC, the interviewer wasn\xe2\x80\x99t very nice and made me feel demotivated. When i found an error in the solution he was trying to give me he was impressed. So be on your toes. Try and solve both questions in 2nd round as i was offered a bypass in IT. I skipped round 3 with 7 others.

I want to thanks Geeksforgeeks for everything. Every minute of my last few weeks was just GFG. It was an amazing feeling to get an internship.

Thanks a lot GFG! Amazing platform. Amazing articles.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview Experience | Set 62 (On-Campus for IDC)

- Difficulty Level :\nHard
- Last Updated :\n07 Aug, 2015

Microsoft visited our Campus recently for IDC as well as IT Profiles.

Round 1 (MCQ):

It was an Online MCQ Round. There were 15 Questions in all. Time Duration was 30 Minutes. The Questions were mainly focused on C, C++ and JAVA. Only 1 Aptitude Question was there. There were different sets for different students.

Around 60-65 students were shortlisted.

Round 2 (Online Coding):

Round 2 was held on the same day. It was Online Coding Round. There were 2 Problems.

1. Given a Binary Tree. Create a Linked List of all the Leaf Nodes of the Tree using the Right Pointer of the Tree Node as the Next Pointer of the Linked List Node. Return the Head Pointer of the Linked List. We were not supposed to use any extra memory.
2. Given an array of Numbers and an integer K. Find the total number of Distinct Elements in the contiguous sub-arrays of size K each.

13 were shortlisted after this Round for the Interviews. While some 25-26 were shortlisted for an additional GROUP FLY Round. I was selected directly for the Interviews.

Round 3 (Group Fly Round):

I was selected directly for the Interviews from Round 2.

Round 4 (Technical Interview 1):

The Interviewer was quite friendly. He tried to make the environment comfortable for me. This round went on for around 1 hour and 40 minutes.

1. Tell me something about yourself.

2. Given a Binary Tree. Find the maximum width of the Tree. I told him that I will use Level Order Traversal approach, keeping the track of the level. He asked me to think of another approach. So I told him that I will store the Tree Data in an Array and the Left View of the Tree in another Array. After this, I will count the number of members between the two consecutive elements of the Left View Array. Then he moved on to the next question.

Round 5 (Technical Interview 2):

I was called for the Second Interview after half an hour. The Interviewer was quite friendly again.
1. She asked me to explain my Project. We had a long discussion on the Project.

2. Given an n-digit Number and a number k. You have to remove \xe2\x80\x98k\xe2\x80\x99 digits from the Number and give the shortest number from the remaining \xe2\x80\x98n-k\xe2\x80\x99 digits such that the sequence of digits remains same. For example, if the number is 637824 and k = 3. So you have to remove 3 digits from the given number. The number formed from the remaining

digits should be the smallest possible and the sequence of digits must not be changed. So the output should be 324. I gave her an approach. But it failed. Then I used Dynamic Programming for this (Longest Bitonic Subsequence Concept).This Interview went on for 2 Hours and 15 Minutes approx.

Round 6 (HR Interview 1):

I was called within 2 minutes of my last interview for this Round. He asked me in which Programming Language I am comfortable. I said C. So he asked me a very basic question on Preprocessors. I told him the answer. But he told me that it is wrong. Basically, he was trying to check my confidence. But I remained with my answer and explained him how I got it. He smiled.
Then he asked me a question to check my Problem Solving ability. Given a soft copy of a Dictionary. You have to print all the unique subsets of the Anagrams together. Unique means that {eat, tea, ate} should appear only once. I gave him many approaches but he wanted the approach from a layman point of view. We discussed on this single question for 50-55 minutes. Then he gave me the statement \xe2\x80\x98I am not very happy with your Problem Solving Ability\xe2\x80\x99. But that was just to make me feel nervous.
Then he asked me the 3 Switch 3 Bulb Puzzle. I answered it. Then he asked me the Preferred Profile \xe2\x80\x93 IT or IDC. We had a discussion on this.

PS: Be honest with the Interviewer. Be open and ask questions.

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Microsoft Interview Experience | Set 61 (On-Campus for IDC)

- Difficulty Level :\nMedium
- Last Updated :\n06 Aug, 2015

Microsoft visited our campus recently.

Round 1: (MCQ) 30min.

It was an online round with 15 MCQ and time given was 30 min. The round was hosted on cocubes.com Questions were mainly from C,C++,Java,OS.

Around 60 people were shortlisted in this round.

Round 2 : (Coding) 60 min

This round was also hosted on cocubes.com and had two programming questions.

1. Given an array of size n and an integer k we need to return the sum of count of all distinct numbers in a window of size k. The window slides forward.

e.g. arr[] = {1,2,1,3,4,2,3};

Let k = 4.

The first window is {1,2,1,3}, count of distinct numbers is 2\xe2\x80\xa6.(1 is repeated)
The second window is {2,1,3,4} count of distinct numbers is 4
The third window is {1,3,4,2} count of distinct numbers is 4
The fourth window is {3,4,2,3} count of distinct numbers is 2

Hence sum is 2+4+4+2 = 12.
It was also given that the array elements are between 0 to 100.

2. Given a binary tree we need to make linked list out of the leaf nodes. Constraints were that it was supposed to be done using O(1) extra space. Also we can use node->right pointer to connect the linked list.

Around 30 people were shortlisted from this round.

Group Fly Round:

1. Given a linked list, Reverse it in k-chunks.
https://www.geeksforgeeks.org/reverse-a-list-in-groups-of-given-size/

Around 12 students were shortlisted in this round.

Personal Interview Round 1: (45 min)

1. Given an infinite stream of binary digits (0,1) and an input number n, determine if at any point the number is divisible by n.

I found the question actually tough\xe2\x80\xa6 I first solved for some specific cases like n = 2 and n = 3. Then by discussions with interviewers I was guided towards DFA Based Division.
https://www.geeksforgeeks.org/dfa-based-division/

Complete code was required in this round. To solve this one it took nearly 30 min with discussion.

2. Assume you are manufacturer of a pen, what all parameters will you check to test a pen.

3. Continuing above how will you test the address bar in a Browser.

Both these questions were open ended. He just wanted to see how many cases I can think of.

Personal Interview Round 2: (60 min)

1. Print a matrix spirally.
https://www.geeksforgeeks.org/print-a-given-matrix-in-spiral-form/.

He then added further constraints such that if I want to print the matrix in a spiral way in clockwise and anti-clockwise sense. Also he added the constraint that he can start at any corner of the matrix. Detailed discussion on my approach was done. He was actually happy with the way I approached the solution.

Personal Interview Round 3: (60 min)

1. Detailed discussion on my Machine Learning Project which I had done in my internship.

2. Given an integer write a function to convert it into a string.

3. Given a string replace all spaces with \xe2\x80\x98%20\xe2\x80\x99
Took some time to solve this one but managed to solve it completely. He wanted me to check all the base cases.

HR Round :

1. Normal HR questions.

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Microsoft Interview Experience | Set 60 (On-Campus for Internship)

- Difficulty Level :\nExpert
- Last Updated :\n09 Jan, 2019

Microsoft came to our campus. Branches eligible was CS and IT. There were a total of 4 rounds.

Round 1: MCQ round
In this round there were a total of 15 MCQ\xe2\x80\x99s and the time alloted was 30 mins.The questions were mainly from C/C++/Java output finding, pointers and references and basic puzzles.
I was able to solve 12 + mcq\xe2\x80\x99s. I managed to qualify this round.

Round 2: ONLINE CODING ROUND
In this round 2 coding questions were given to us which need to be solved in 1hr time.

1st question:
minimum time required so that all oranges become rotten

2nd question:

You are provided with a binary tree and given two integers n and k.You have to determine sum of data of all the nodes which are at a distance of k from the node which has data n.
I managed to solve question no. 2 completely .Both using BFS.Here is my way of how I did it:-

1. Use BFS directly to traverse the array once and can obtain the solution in O(n^2) only.

2. Form a graph out of the tree with the found node as the source point and then do BFS Sum to find the required answer.

Round 3: Face To Face Interview Round(150 mins)
1. A brief discussion on my projects.(About 2048 game in JAVA and some other projects I did.)

2. To tell something about me and elaborate my hobbies .

3. List of stations and distances between them are given and find all pairs shortest distance.(Floyd warshall algorithm in O(V^3).)

4. Given 1 billion numbers.Remove duplicates in O(n) and the range of numbers are till 10^5.(I used A[abs(A[i])] method to change sign and remove.It impressed the interviewer a lot.)
5. Implement Dictionary(I asked about the basic layout and was told that lot of words have been already entered each having its definition,synonyms and antonyms).(I started from vector < vector< string> > , then HashMap, then Set <string,pair > and then RB Tree approach too.)

6.I was asked to write the pseudo code for each of the above data structures and their complexities of search,insertion and updation.
-I gave all the answers in this round .

Round 4: Technical Round(90 mins)
1.I was asked to throw some light on some trending technologies.(I explained about Cloud,Big Data etc.) It took 30 mins and he looked impressed.

2. Next I was asked that if I were placed at IDC or IT then which one I will prefer and why.It was

interactive session and finally I opted for MSIT mentioning him the reasons and he gave his final feedback on me.
-I gave all the answers in this round .

Hope my experience helps everyone.
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Microsoft Interview Experience | Set 59 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n29 Jul, 2015

Microsoft came to our campus. Branches eligible was CS and IT. There were a total of 5 rounds (and 1 additional group fly round).

Round 1: MCQ round
In this round there were a total of 15 MCQ\xe2\x80\x99s and the time alloted was 30 mins.The questions were mainly from C++/Java output finding, pointers and references and basic puzzles.

I was able to solve 8-9 mcq\xe2\x80\x99s. Luckily I managed to qualify this round \xf0\x9f\x99\x82 .

Round 2: ONLINE CODING ROUND
In this round 2 coding questions were given to us which need to be solved in 1hr time.
1st question:
You are given a matrix of dimensions m*n where each cell in the matrix can have values 0,1 or 2 which has the following meaning :
0:empty cell
1:cells have fresh oranges
2:cells have rotten oranges
so we have to determine what is the minimum time required so that all the oranges will be rotten.A rotten orange at index [i,j] can rot other fresh orange at indexes [i+1,j] ,[i,j+1] ,[i-1,j] ,[i,j-1] .If it is impossible to rot every orange then simply return -1;

2nd question:
You are provided with a binary tree and given two integers n and k.You have to determine sum of data of all the nodes which are at a distance of k from the node which has data n.

I managed to solve question no. 2 completely and in question no. 1 segmentation fault came.

GROUP FLY ROUND(ADDITIONAL) :
The question given to each and every candidate was to design the user interface of Indian Railways website .

Round 3: Technical round
1. A brief discussion on my project.
2. How will you test a parachute ?

3. Real life situation -suppose you have developed a software and you have delievered it to some of your client .If your client is facing some problem with the software then how will you solve the issue.Discussion on it.

4. Given 1 billion numbers.Find the median of these numbers -i gave min & max heap soln ,O(n) median finding algorithm soln. Then he asked me to explain the median finding algo to a layman .I gave sorting soln.

5. One simple SQL query- given a table containing employee id,manager id,city and employee name.The manager himself is an employee who has an entry in the table. You have to print the details of the employee whose managers city is same as his city .

6. Questions related to DBMS-Normalisation,Denormalisation,Indexing structures etc.
7. Difference between object based and object oriented programming language.
8. Some other problems which i dont remember.

Round 4: Technical Round
1. Explain polymorphism to a layman-I explained with example of the word-bat
2. Under what circumstances we go for array and when we go for linked list.
3. Practical use of stack data structure.
4. Implement Push and pop functions in stack using linked list.

5. Given a number n you have to print all squares of number from 1 to n.
Ex-say n=5
output: 1 4 9 16 25
first I gave o(N^2) soln then He asked me to give O(n) soln-I did it .

6. Given a string .Find the maximum palindrome substring in the given string. I told him I have 3 solns for it -dp soln,find longest palindrome at every index soln,using suffix tree.He asked me to explain dp soln and to tell him best and worst case for it ?

7. Questions on why I used free() to free a memory allocated via malloc- questions related to garbage collection, single and double pointer,pointer as reference and pointer by value etc.

8. Then he asked a riddle-given three opaque containers and you have 3 labels on them.1 has label \xe2\x80\x9cmangoes\xe2\x80\x9d 2nd has label \xe2\x80\x9cApple\xe2\x80\x9d and 3rd has label \xe2\x80\x9cMango+Apple\xe2\x80\x9d. You are told that every label is wrong. You can open any container from top and can see content inside it by not every item-means if you open container having apple+mango in actual you may see only apple or mango or both.So which box you will open to correct all the labels.You can open only 1 container from the top and see its content.
9.Discussion related to my project-I have made a rail reservation system using HTML+php+CSS .So he asked what is in your project so that visitors will visit your site instead of Indian Railways site.Discussion related to it.
-I gave all the answers in this round :).

Round 5: Technical Round
1. Detailed discussion on my project.

2. Suppose you receive 1 million reservation requests at the same time and you have only 50 seats remaining to be allotted .how will you handle such situation. Long discussion on it. I gave him lots of solutions for it but he discarded all of them as there was some faults in every soln of mine. Finally I gave a soln using shared variable which stores no of seats available and the server spawns separate threads for separate requests. Then using a semaphore variable so that only 1 thread can access the shared variable at a time.He was convinced with the solution.

3. Given a number as input .Write a function which prints the number in string format .Ex-1234 will be written as \xe2\x80\x9cone thousand two hundred thirty four\xe2\x80\x9d. I gave a hardcoded solution. He asked me if I can reduce the program length to 1/3rd. I told him that I can use a function to reduce the solution length. He didn\xe2\x80\x99t try to find bug in my solution. So he was ok with the solution of mine.

4. A lot more questions which i don\xe2\x80\x99t remember.

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Microsoft Interview Experience | Set 58 (For Software Engineer)

- Last Updated :\n28 Jul, 2015

Microsoft Interview for Software Engineer Hyderabad.

Round 1: (1 hr)
1. Given 3 sorted arrays. Find the common element of all the arrays in O(N) time and no extra space. If there is none, return false.
2. Double linked list: 1 goes to the next node and 1 to the random node. Copy this list. Extra space can be used.

Round 2: (45 mins)
1. Power of a number (x**n) in O(log N) time
2. Given an array which has a duplicate except for 2 elements. Find them. We always have 2 such element.

Round 3: They said me a bye \xf0\x9f\x99\x82

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Related Practice Problems

Common elements

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Microsoft Interview Experience | Set 57 (For SDE)

- Difficulty Level :\nExpert
- Last Updated :\n08 Jul, 2015

Round 1 (45 mins)
1) There was a detailed discussion on the project i did at Microsoft and also over the two projects mentioned in my resume.

2) There is a Bing log file containing the domain names. Design a cache memory system for faster dns look ups.(i suggested a Trie and a min heap based solution).
I was asked to make it space efficient. (I replaced trie with map)

3)There is a turn based 2 player game in which there are 9 pins and each player is allowed to pick either 1, 2 or 3 pins only. The last player to pick the pin is the loser.
Design winning strategy for such a game.

4) Generalize the above solution for n pins.

Round 2 (45 mins)
1)There is a large file with system memory limitations. How will you store it (i suggested Distributed system) and how will u work on it.

2)Suppose the large file contains name, address, Dob, pan no etc as attributes. Design class interface for such a system.The question was re framed again with more conditions which i am unable to recall now.

2)There was a detailed discussion over how the stl map data structure is implemented.

3) Discussion over hashing and collision resolution techniques.

Round 3(40 mins)
Discussion over my project followed by these questions:
1) Write the code to delete nodes in a binary tree which don\xe2\x80\x99t lie in any path from root to leaf with sum>=k.

2)There is a rotated and pivoted array. Write the code to determine how many times the array is rotated. (i did it in O(log n)).

All thanks to geeks4geeks for helping me prepare for technical interviews.

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Microsoft Interview Experience | Set 56 (For SDE 2)

- Difficulty Level :\nExpert
- Last Updated :\n30 Jun, 2015

First Round (F2F) 1 hour:
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94-

1. Given an image with a lot of pixels, find all the pairs of pixels that are strongly connected.

2. Given an N-ary tree with thousands of nodes, pair the leaf nodes which do NOT SHARE the common path. i.e. Two Leaves can be Paired only if they do NOT have a common edge that was used in a previous pairing.

```
\r\nFor example, \r\n       A\r\n    /  |  \\\r\n   B   C   D\r\n /   / | \\\r\nE   F  G  H \r\nLeaf nodes: E, F, G, H
```

Note: If we pair(join) say, (E-F) then we can NOT pair any of the (D-G) or (D-H) as they SHARE the COMMON path from A to C.

```
\r\ni.e. E-B-A-C-F \xe2\x80\x94> (E-F) pair\r\n       D-A-C-G \xe2\x80\x94> (D-G) pair\r\n       D-A-C-H \xe2\x80\x94>
```

So the above case is NOT possible

I tried using a couple of solutions.
Later on used Mathematical Induction (upon his hint)
Basically, a pairing for n = 2 leaf nodes is true
Assume a pairing exists for n = 2k leaf nodes (k > 0)
Now you need to prove a pairing exists for n = 2k+2 leaf nodes

So basically you just have to see the cases where you can insert the new nodes differently
I will probably try to contribute with an article on this.

Code was asked for both the questions.

Second Round (F2F) 45 mins \xe2\x80\x93 1 hr:
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x9
1. Given a tree, and a pointer to some node in the tree, print the left most element in the same level as that node
2. Given a C-string, convert it into its ascii string. Ex: \xe2\x80\x9cCAR\xe2\x80\x9d -> \xe2\x80\x9c676582\xe2\x80\x9d (C-67, A-65, R-82)
Conditions are that you have to write it in C and you have to do it in place.
3. Lots of questions on programs, Inter process communication, pthreads, java garbage collector etc that went for around 20 mins

Third Round (F2F) 1 hr :
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94
1. Reverse k-alternate nodes in a Linked List
2. Given two strings s1 and s2, find if there exists a substring in s1 which contains an anagram of s2 (in O(n))
3. Given an input of the calendar objects of 10,000 microsoft employees, input is a time interval T and an employee[] array, find the first interval where all the employees in the employee[] array are free for a minimum time interval T (i.e schedule the meeting)
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 I did this question using B+ trees and a Hash, I was told that max flow algorithms can be used.

Fourth Round (F2F) Hiring Manager \xe2\x80\x93 1 hr:
\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x94\xe2\x80\x9
1. Project/previous work
1. Design whatsapp\xe2\x80\x99s back end systems: (we should be able to handle 1 million requests a second and transmit data with least latency)
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 I had used a lot of distributed systems concepts like message queues, sharding, CDNs, monitoring, InnoDB/MongoDB etc

Preparing questions on Scalability and Distributed Systems is highly recommended.

This site helped me a ton and I hope others will find their dream jobs too !
Thanks geeks \xf0\x9f\x99\x82

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Microsoft Interview Experience | Set 55 (For Software Engineer 2)

- Difficulty Level :\nEasy
- Last Updated :\n12 Feb, 2018

Skype round 1: (10 min)
Print a tree in zigzag order. For Example for the given input tree:-

```
\r\n                1\r\n             2         3\r\n         4         5 6         7
```

The output would be:-

```
\r\n1\r\n3 2\r\n4 5 6 7
```

Code for the logic in any language that you are comfortable in.

Skype Round 2: (10 min)
Find if two given strings are anagrams of each other or not.
Anagrams example: LISTEN and SILENT.
Code for the same. Test cases for the code. (Positive and negative)

They called me to Hyderabad for an F2F immediately after Skpe rounds, (I managed to postpone it to the next week).

Face2Face Round 1: (45 min)

Question 1:
Given a character array which each position is filled with either a single digit numbers or a comma,
Array of 22 characters:-

1	3	5	6	,	4	9	7	3	,	2	3	,	7	7	,	2	2	,	9	9	,	1

Write a code to reply true if we find a set of three set of numbers separated by a comma such that
X , Y, Z and Z = X + Y
In the array above 77+22 = 99 so return true.Code for the same with negative test cases.

Question 2:
If in a given Doubly Circular Linked List a couple of next pointers are corrupted, give the logic to rectify them all.

Face2Face Round 2: (1 hour)
Given a number in an int variable, write a code print its value in words, covering all possible corner cases.
Ex \xe2\x86\x92 34567 = thirty four thousand five hundred and sixty seven.
Negative test cases for the same.

Face2Face Round 3: (1 hour 15 min)
Question 1:
Given a scheduler arrangement with some jobs having unique job ids and every job id has a number of tasks with unique task ids for that job.
Example:-

```
\r\n Job id : 500    Task id : 700\r\n      Task id : 300\r\n      Task id : 350\r\n Job id : 600    Task id : 400\r\n
```

Write a Code for listing the job ids + task id combination in round robin fashion.
Example:-

```
\r\nJob id : 500    Task id : 700\r\nJob id : 600    Task id : 400\r\nJob id : 1000    Task id : 800\r\nJob id : 200
```

Choose any data structure of the input (array of structures or linked lists or queue).
Design Test cases for the same.

Question 2:
Given a BST, create a Doubly Linked List from the same in place.
Tree node -> left pointer = DLL node -> previous pointer
Tree node -> right pointer = DLL node -> next pointer

Face2Face Round 4: (with the Director) (1 hour approx)
He asked typical HR questions like
Why Microsoft?
Where do you yourself 10n years from now? Blah blah.

Question 1:
Given a mess of 3 balls (colored red blue and white) write an algorithm + program with the most efficient way to sort them color wise. (Dutch National Flag Problem)

Question 2:
Given a string print the string with alternate occurrences of any character dropped.

```
\r\nExample:-  input string    \xe2\x86\x92 It is a long day Dear.\r\n       Output string \xe2\x86\x92 tisalongdyDea.
```

Modification:- Consider alphabets with both cases as same occurrence.

```
\r\n       Output string \xe2\x86\x92 Itsalongdy ea.
```

Position was software Engineer 2. MSFT does not have SDE and SDET anymore, All roles shall be SE from now on.

Thank you geeks for geeks. This site is a Marvel for job aspirants.

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Related Practice Problems

String Ignorance

All Practice Problems for Microsoft !

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Microsoft Interview Experience | Set 54 (For SDE)

- Difficulty Level :\nMedium
- Last Updated :\n22 Jun, 2015

Round 1 (45 mins):
Tell me about yourself.

1. Given an array of strings with **R**, **G** & **B** as characters. **Sort** the array such that all R comes first, followed by Gs & followed by Bs. Do it in **O(n)** time complexity. (**Paper Code**)
\xc2\xa0\xc2\xa0\xc2\xa0For eg. array is:
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 **I/P: G G R B R B B G R B R**
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 **O/P: R R R R G G G B B B B**

Hint: Same problem as sorting strings of 0s, 1s & 2s.

Done using the same logic as that of sorting 0s, 1s & 2s in no time. Interviewer was happy. *:) happy

2. Can you do the same above program using **Singly Linked List (SLL)** & **Doubly Linked List (DLL)** in **O(n)** time complexity.

Done it using DLL comfortably.
But using SLL I got stuck as we\xe2\x80\x99ve to keep track of PREV pointer every time. He wanted it to be done in a SINGLE PASS if possible. Was not able to do this for SLL.

Round 2 (1.30 hrs):

Tell me about the projects you\xe2\x80\x99ve worked on.

1. **Matrix Multiplication** of 2 matrices. Both of the matrices are **Distributed** across a cluster of nodes. And matrices are of huge size (**BigData**). How can you multiply these matrices efficiently. He wanted to know the approach only but not the actual code.
(He asked me this Distributed problem esp. as I\xe2\x80\x99ve worked on **Apache Spark & Hadoop Distributed architecture** in my project. So he was very keen to check my knowledge in the Distributed & BigData domain.)

Hint: Think in terms of **MapReduce** jobs.

My approach: As we know that in matrix multiplication, ith row is multiplied with jth column, (i+1)th row is multiplied with (j+1)th column, & so on till (n-1)th row with (m-1)th column.

Map each ith row to jth column, (i+1)th row to (j+1)th column & so on till (n-1)th row to (m-1)th column.
The idea is to make **Keys as ROW** index **& Values as Column** index.
While doing the **Reduce** operation, Multiply the respective Rows & Columns using above Mapped Rows & Columns. B\xe2\x80\x99coz generally in the Reduce operation of MapReduce jobs, Spark/Hadoop brings all of the mapped data into one Server to do the computation & stores the result. So in the Reduce operation, Spark/Hadoop will bring only the mapped Row & Column while doing the actual multiplication. We need NOT to bring all Rows & Columns data at once.

This was my approach. One can think of the other approach also & share their better approach too.

Laterally he asked me about MapReduce jobs in further details & asked me about Hadoop & Distributed architecture (NameNode, DataNode, etc.). Some questions on Scalability.

2. Given an **N-ary tree** with **thousands of nodes** in it. **Pair** (Join) the **Leaf nodes** which do **NOT SHARE** the common path. i.e. Two Leaves can be Paired only if they do NOT have **Intersecting path**.

For example,

```
\r\n        A\r\n    /  |  \\\r\n   B   C   D\r\n /   / | \\\r\nE   F  G  H
```

Leaf nodes: E, F, G, H & D

Possible Pairs in O/Ps:
\xc2\xa0\xc2\
(E-F), (G-H) or
\xc2\xa0\xc2\
(E-G), (F-H) or
\xc2\xa0\xc2\
(E-H), (F-G) or
\xc2\xa0\xc2\
(E-D), (F-G) or
\xc2\xa0\xc2\
(E-D), (G-H) or
\xc2\xa0\xc2\
(E-D), (F-H) or
\xc2\xa0\xc2\
(D-H), (F-G) or
\xc2\xa0\xc2\
(D-G), (F-H) or
\xc2\xa0\xc2\
(D-F), (G-H)

Note: If we pair(join) say, **(E-F)** then we can NOT pair any of the **(D-G)** or **(D-H)** as they SHARE the COMMON path from A to C.
i.e. E-B-A-C-F \xe2\x80\x94> (E-F) pair
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0D-A-C-G \xe2\x80\x94> (D-G) pair
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0D-A-C-H \xe2\x80\x94> (D-H) pair

So the above case is **NOT** possible.

Also if there are **EVEN** number of Childs, then exactly n/2 pairs are possible. In case of **ODD** number of Childs, 1 of the Childs will be left **Unpaired**.

I\xe2\x80\x99ve told him using **BFS** as it traverses each Edge exactly **ONCE**. The idea was while doing BFS traversal, Pair Childs of a Visiting node if both of their Childs are Leaf nodes.
If the Visiting node has only **ONE** Child (Left Child or Right Child only) then store this Child in the TEMPORARY array (Array of Pointers to the Childs).
Once the BFS traversal ends, Pair the remaining Childs in the **TEMPORARY** array one by one.
Again he was NOT satisfied as BFS works **LEVEL-WISE**. So he told me what if some of the nodes have **SKEWED** sub-tree with thousands of nodes.
I got stuck. \xf0\x9f\x99\x81

He told me to apply **Mathematical Induction**.
If we can prove for the Base Case that at least **2K** Childs can be Paired. Then we pair & prove it for **2K+2, 2k+4, , , , , , ,2K+n** Childs too.
I was Blank in MI concepts.
Was **NOT** able to solve this problem. \xf0\x9f\x99\x81

He was so impressed *:) happy with my 1st problem\xe2\x80\x99s approach using MapReduce. He was a little bit satisfied with the 2nd problem\xe2\x80\x99s approach. So I\xe2\x80\x99ve been forwarded to 3rd round.

Lunch time. Soooooooo Good. Food was so good. Really liked it.

Round 3 (50 mins):

He had quickly looked at my CV. Then he asked me to tell something about the projects that I\xe2\x80\x99ve worked on & working on. As I\xe2\x80\x99ve worked mostly on **Machine Learning** & **NLP** domain, he asked me few questions about **NLP**. How will you Scale your current project.

1. Given a sentence, Reverse it **Word-by-Word**.
\xc2\xa0\xc2\xa0\xc2\xa0For example,
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0**I/P: \xe2\x80\x9cMicrosoft Azure is one of the best Cloud solutions\xe2\x80\x9d**
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 **O/P: \xe2\x80\x9csolutions Cloud best the of one is Azure Microsoft\xe2\x80\x9d**

\xc2\xa0\xc2\xa0\xc2\xa0So easy. Given on GFG. \xf0\x9f\x99\x82
\xc2\xa0\xc2\xa0\xc2\xa0Done it in no time.
\xc2\xa0\xc2\xa0\xc2\xa0He asked me do it in a **SINGLE PASS**. As the solution requires **2 PASSES** of the sentence. (1st for reversing each individual word & 2nd for reversing WHOLE sentence).
\xc2\xa0\xc2\xa0\xc2\xa0Got stuck. \xf0\x9f\x99\x81 Taken a long time to think about this. Couldn\xe2\x80\x99t able to do this. Finally he asked me another question.

2. Detect a **Loop** in a **Singly Linked List**. *:) happy
\xc2\xa0\xc2\xa0\xc2\xa0Given the GFG approach. He was Happy.

3. **Remove** the Loop in above SLL.
Again given the same GFG solution. \xf0\x9f\x99\x82

I\xe2\x80\x99ve been told to wait for the 4th & Final round.

Round 4 (Design Round):

What do you know about **Cloud Computing**.
Do you know anything about **Microsoft Azure**.

Design a **WindowsBox** just like **DropBox** Cloud storage.

Provide all the services **IaaS**, **PaaS** & **SaaS** using **Service-Oriented Architecture (SOA)**.
Have given very Low-level design. NOT up to his expectations. As I\xe2\x80\x99ve NOT worked on Cloud Technology earlier. \xf0\x9f\x99\x81
NOT able to perform well in this round. \xf0\x9f\x99\x81

Advise:
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0Prepare for the **Design** questions **& Scalability**.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0One can go through this link: https://www.quora.com/How-should-I-prepare-system-design-questions-for-Google-Facebook-Interview
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0Watch out this video. Its very good.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0They look for the basics of **Data Structures & Algorithms**. (esp. Linked Lists & Tree)

Lastly, GeeksForGeeks is the best source for all. GFG really helped me a lot in the preparation.

Thanks \xf0\x9f\x99\x82

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Microsoft Interview Experience | Set 53

- Difficulty Level :\nExpert
- Last Updated :\n17 Jun, 2015

Round 0 \xe2\x80\x93
Second max element in BST

Sort an array of integers such that \xe2\x80\x93
\xe2\x80\x93 All odd numbers are in left side and sorted in increasing order.
\xe2\x80\x93 all even numbers are sorted in decreasing order and start where odd numbers end.
Eg \xe2\x80\x93
I/P \xe2\x80\x93 2, 3, 4, 5, 8 , 10, 12, 11
O/P \xe2\x80\x93 3, 5, 11, 12, 10, 8, 4, 2

I used quick sort partition logic to separate odd and even numbers and then ran quick sort on both halves.

Round 1 \xe2\x80\x93
Assume an RAM of size 1024 bytes. There are multiple processes running on the system. Your application will get this information \xe2\x80\x93
(Thread Id, Memory Block, time, R/W) \xe2\x80\x93 which essentially tells that the thread T was using memory block M at time t and operation could be read or write.

Memory conflict is defined as \xe2\x80\x93
\xe2\x80\x93 Let x be standard unit of time measurement.
\xe2\x80\x93 Multiple read operations at the same location are not cause of conflict.
\xe2\x80\x93 One write operation between x+5 to x-5 to location M, will be cause of conflict for a thread accessing location M at time x.
\xe2\x80\x93 Example \xe2\x80\x93 If thread T1 accessed memory location M at time x+1 and if a thread T2 accesses location M before time x+6 then T1 and T2 are candidate of conflict given one of then do write operation.

You are given with the list of threads accessing memory locations, you have to find conflicts.

Example \xe2\x80\x93
(1, 512, 1, R)
(2, 432, 2, W)
(3, 512, 3, R)
(4, 932, 4, R)
(5, 512, 5, W)
(6, 932, 6, R)
(7, 835, 7, R)
(8, 432, 8, R)

O/P \xe2\x80\x93
Thread 1 & 3 conflicts with thread 5
All other operations are safe.

Round 2 \xe2\x80\x93
https://www.geeksforgeeks.org/turn-an-image-by-90-degree/

Level order traversal ->

Using queue
Using recursion

Round 3 \xe2\x80\x93
http://stackoverflow.com/questions/746082/how-to-find-list-of-possible-words-from-a-letter-matrix-boggle-solver
> My solution was mutation of this \xe2\x80\x93 https://www.geeksforgeeks.org/mobile-numeric-keypad-problem/

Round 4 \xe2\x80\x93
3D boggle solver and 3D cross word solver.
Design data structure to store and give a solution.

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Microsoft Interview Experience | Set 52 (Fresher)

- Last Updated :\n22 May, 2015

Round 1 (Microsoft College Code Competition)
There were 6 problems to be solved in 1h30, if I recall correctly. My team solved 3 of them and ended in 2nd place.

80 people from my university participated in the contest. Microsoft selected around 6 for the final interview round.

Round 2 (Final interview, on-site)
3 interviews of 45min each, with 15min of interval in between. In these breaks, we talked to the recruiter. If you do okay in one of the interviews, but not great, you get one extra interview.

1) Run-length string encoding.
Link: https://www.geeksforgeeks.org/run-length-encoding/

However, there were additional restrictions:
(a) resulting string shall be written to the input string.
(b) maximum extra memory allowed is (length of string \xe2\x80\x93 1) bytes.
(c) if the resulting string will be longer than the input string, the algorithm can abort and leave the string dirty.

Behavioral: I was asked about my background.

2) Lowest common ancestor and Reverse words in string
Links: https://www.geeksforgeeks.org/lowest-common-ancestor-binary-tree-set-1/
https://www.geeksforgeeks.org/reverse-words-in-a-given-string/

Behavioral: talk about the most interesting project, and what I learned from it.

3) Given a list of events with start time and end time, find the events which have conflict with any other.

How would I decide which feature should be implemented next in an operating system.

Behavioral: talk about my favorite project and one instance where I had to convince other people,

Additional comments:

1. Overall experience was pretty nice. Microsoft paid for all expenses for us to visit their office. The recruiter looked after us as well, really no complaints.

2. Two of the interviewers were very down to earth, despite all their experience and high positions. Conversation with them flowed naturally, and I had a great time.

3. One of them (from question #1), however, had a very bad attitude toward the candidates. He didn\xe2\x80\x99t study the problem well enough to assess solutions that weren\xe2\x80\x99t similar to his, and made disrespectful comments about our ideas to solve the problem in our own way. This is not just my opinion, as I also asked other candidates.

I perfect\xe2\x80\x99d interview 2, did good in interview 3, but was not good enough in interview 1 (for the reasons already stated). I was not given an offer then.

What I can say is: no matter how well you prepare, you still rely on the interviewers. Study hard and hope to get interviewers that are nice and don\xe2\x80\x99t want to lower you.

Good luck to you all.

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Microsoft Interview Experience | Set 51 (For SDE Intern)

- Last Updated :\n27 Sep, 2018

Recently Microsoft visited our campus for SDE intern. The process took over 4 months.

Round 1 (Online MCQ\xe2\x80\x99s)
Time-30 mins
This round consisted of 25 questions on C,C++,Aptitude(Probability) and OS.
60 students out of 150 were shortlisted for the next round.

Round 2 (Online Coding Round)
Time-90mins
1) Write a function to check whether the string is valid or not.(Check Balanced Parenthesis{},[],()).
/header Stack.h was added in C++/
https://www.geeksforgeeks.org/check-for-balanced-parentheses-in-an-expression/

2) Write a recursive function to form a list containing intersection of two given linked list without creating new nodes.

https://www.geeksforgeeks.org/intersection-of-two-sorted-linked-lists/
https://www.geeksforgeeks.org/union-and-intersection-of-two-linked-lists/

Students who solved both the questions were selected and some who solved one question were selected too.
37 students were shorlisted for the next round.

Round 3 (Telephonic interview)
Time-27 Min
-Firstly , the interviewer introduced himself. Then asked me to do the same.He asked to me bring a pen and a paper.
-He asked me to briefly describe everything I had written in my resume.
-Questions on my project
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -Random Funtion
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -Questions on Sql and Oracle
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -What difficulties I faced during my project
-Asked me to whether I would like to answer Question on DS or puzzles.I said both.
-DS
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -Height of tree in O(n).
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 \xe2\x80\x93 Find the minimum level where leaf node is found.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -When would height of tree and minimum level leaf node be equal.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -What is a height balanced tree.
-Puzzle
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -Given a tray of red and blue balls.Separate red on left and blue on right with minimum swaps.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -Solve the same with Red, blue and green balls.(traversing only once!)

Only 9 were shortlisted for the further interviews. I was lucky enough to be one of them.
We were called to Microsoft India Development Center, Hyderabad. There were total 23 students from IIT indore, IIT hyderabad,

IIIT hyderabad and some other institutes.

There were 3 f2f interviews.

Round 4 (Technical) (30 mins)
1)Resume discussion.
2)Write an algorithm to merge two sorted linked list in place.I wrote an algorithm then he asked me to
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -do it without using double pointer.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -without a dummy node
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -asked me how would i test my solution.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 -all possible test cases and how would my code respond to them.
https://www.geeksforgeeks.org/merge-two-sorted-linked-lists/
General discussion about project.
\\Simplest round!
Soon after the fourth round some of us were called for the next round.

Round 5 (Technical) (35 mins)

1)Nodes at K distance from the root.He asked me to write the test cases. I wrote around 15.He was satisfied.
2) What is deadlock?
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 Conditions of deadlock.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 Write a code to show deadlock.
\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0 Explain Bankers Algorithm.
3)Given a column number, find its corresponding Excel column name.
https://www.geeksforgeeks.org/find-excel-column-name-given-number/
He told me That i have good coding skills.

Round 6 (Was supposed to be HR but Technical!!) (30 mins)
He asked me how my previous interviews went.
Asked me terms like
-Garbage collector
-Unicode
-Ascii etc.. (around 10!)

1)Given n (no. of elements of array){1,2,3,4,5,6,7,8} , K (no of elements in one row or column as specified)(eg. 3)
and A boolean variable Col & Row. When Col =True We have to print elements of array like-
1 4 7
2 5 8
3 6
And when row= True
1 2 3
4 5 6
7 8

2)Assume a computer screen.All the pixels are colored black. Given (x1,y1) and (x2,y2) you have to color the line joining these

two points Black.
(Hint:The line is not always going to be a diagonal straight line. Sometimes we may have to go vertically up and then sideways)
The interviewer was helpful and patient.

The experience was Grand! The people were so down to earth ! Every interview felt like a simple peer to peer conversation.

All i would suggest is Geeks For Geeks And u need Nothing to do \xf0\x9f\x98\x80

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Microsoft interview Experience | Set 50

- Last Updated :\n20 Dec, 2018

R1 Telephonic

1. Given a large int array, sort it. The ints are in the range 1-10.
2. In a 2-D array of 0\xe2\x80\x99s and 1\xe2\x80\x99s find the row with max 1\xe2\x80\x99s, given that the array is sorted row wise.

R2 F2F

1. Find the maximum contiguous sum in an array. Had to write test cases as well.
2. don\xe2\x80\x99t remember

R3 F2F

1. On a screen, there are multiple rectangles drawn, when a user clicks on any point, find the smallest rectangle enclosing this point.
2. Design poke feature in Facebook

R4 F2F

1. Implement file read operation asyncronously.
2. there are N large log files in sorted by timestamp. Merge them.
3. there are N large files containing operations sorted based on name to be done on an address book.
   Address book is stored as name value pair in another file which is sorted based on name. Apply these operations and store in a new address file.
   Had to write code and test cases for this.

R5 F2F (Hiring Manager)

1. some discussion on foreground and background thread.
2. What is common in 2 threads of the same process and what is the difference.
3. how would you communicate between 2 processes.
4. can we create connection between 2 processes similar to tcp connection.
5. difference between tcp and udp.
6. are packets lost in tcp if network is never lost.
7. create a macro for reversing an int in terms of byte e.g. an int has 4 bytes numbered 1234 the macro should return 4321.
8. in a 2-D array of chars, if a user selects any 4 boxes, check if these are continuous or not. continuous boxes are those which lie in 3\xc3\x973 sub array surrounding the box.
9. design auto complete feature.
   Some other OS questions on threads only.

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Microsoft interview Experience | Set 49 (For Internship)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Recently Microsoft visited our campus for SDE intern. The process took over 4 months.

Round 1 (Online MCQ\xe2\x80\x99s)
time- 30 minutes.

This was conducted on CoCubes.com ,there were around 25 questions of varying level of difficulty. Topics: C , C++ , Aptitude.

Around 60 students out of 150 were shortlisted for the next round.

Round 2 (Online Coding Round)
time \xe2\x80\x93 90 minutes

This was conducted on the same day. There were two questions of data structure.

- Write a function to check whether the parenthesis (\xe2\x80\x9c( )\xe2\x80\x9d, \xe2\x80\x9c{ }\xe2\x80\x9d , \xe2\x80\x9c[ ]\xe2\x80\x9d) in a given string are balanced or not.
GeeksforGeeks Link
- Write a recursive function to make a list from two given Linked lists, that contain intersection of the elements present in the given lists inplace.

37 students were shortlisted for the next round.

Round 3 (Telephonic interview)

time- 33 minutes

- I was asked to introduce myself.
- Then there were couple of questions on the project i was working on. As my project was in java as the front end and oracle as the back end, i was asked few questions on multithreading and sql.
- I was then asked to explain the logic and the code to traverse a binary tree level by level but in spiral form.
GeeksforGeeks Link
- Logic and the code for the lowest common ancestor in a binary search tree.
GeeksforGeeks Link
- Complexity of both the above codes and why such complexities.
- i was asked questions on OS-
  - Differentiate between mutex and semafore variables?
  - What does a thread and a process share in common?
  - What is a deadlock ?
- There were few questions on C++.
  - Polymorphism and runtime polymorphism.
  - What is a virtual destructor?

I was asked if i had any queries and i asked about the work that interns will get to do in microsoft and the interview ended.

Only 9 were shortlisted for the further interviews. I was lucky enough to be one of them.
We were called to Microsoft India Development Center, Hyderabad.

Round 4 (Technical)
Time- 35 mins

The interview started with my introduction. Then there was a long discussion on my project. He told me the flaws in my project and asked me to tell how would i deal with them.

- Given two arrays of integers(in random order), how would u determine the rank of an element.

```
For ex: let the two arrays be    \r\n\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa0\xc2\xa046 32 16 73 57 2 and\r\n\xc2\xa0\xc2\xa0\x
```

i don\xe2\x80\x99t remember the exact question but it was similar to this. Fairly simple. I suggested some approaches and i was expected to come out with the best approach.
then i was asked to code my solution and design the test cases for the same.

- I was asked about my favorite subject.
- Write and explain the code to connect nodes at same level in a binary tree.

Soon after the fourth round some of us were called for the next round.

Round 5 (Technical) (30 mins)

1. Given a Y- linked list. Find the node at the intersection point.
2. Given a string of containing lower case letters and upper case characters. Find the number of occurrences of each character.
   The question was further modified to include the special characters as well. I was asked to design the test cases for the same.
3. Remove duplicate characters from a given string keeping only the first occurrences (i.e order should not change). For ex- if the input is \xe2\x80\x98bananas\xe2\x80\x99 the output will be \xe2\x80\x98bans\xe2\x80\x99.
   https://www.geeksforgeeks.org/remove-all-duplicates-from-the-input-string/ (second method).

5 of us were called for the next round.

Round 6 (HR) (30 mins)

There were questions like-

- Brief me about your academic history.

- The project you are currently working on and why did you choose this?
- What improvements can you do in your project? Are you working under a professor or just out of interest?
- How would your peers describe you?
- How would your professors describe you and what are your weaknesses according to them?
- How are you trying to improve?
- What keeps you motivated?
- What are your Short term and Long term goals?
- Why Microsoft?

There were few other questions which i can\xe2\x80\x99t recall now :p
It was the last round. It went pretty well.

The experience was awesome and i found that the people over there are very humble and i really liked their helping attitude.

Some interview tips-

1. Stay calm, CONFIDENT and keep yourself motivated.
2. Be honest.
3. Try to keep your approach clean and don\xe2\x80\x99t mess up things in your\xe2\x80\x99s as well as interviewer\xe2\x80\x99s mind.
4. Don\xe2\x80\x99t think about the results, just enjoy the interview process with a free mind \xf0\x9f\x98\x80
5. Focus on building your concepts strong.

A big thanks to GeeksforGeeks for providing such a brilliant platform for interview preparation. Keep up the good work \xf0\x9f\x99\x82

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Microsoft interview Experience | Set 48 (For 1.5 Years Experienced)

- Last Updated :\n09 Mar, 2016

Here goes my experience.

Skype Round:

1) Level order traversal of a binary tree. Extend or modify the code to zig zag traversal.

https://www.geeksforgeeks.org/level-order-tree-traversal/

https://www.geeksforgeeks.org/level-order-traversal-in-spiral-form/

Face to Face Round 1 :

1) Questions about my previous work.

2) Sort an array of 0\xe2\x80\x99s, 1\xe2\x80\x99s, 2\xe2\x80\x99s.

https://www.geeksforgeeks.org/sort-an-array-of-0s-1s-and-2s/

Face to Face Round 2 :

1) Print last n lines of a file

https://www.geeksforgeeks.org/print-last-10-lines-of-a-given-file/

2) Right and Top view of a binary tree

https://www.geeksforgeeks.org/print-right-view-binary-tree-2/

https://www.geeksforgeeks.org/print-nodes-top-view-binary-tree/

Face to Face Round 3 (Hiring Manger) :

1) Questions about my previous company work and why would I want to shift.

2) Given a matrix which is spirally sorted. Remove an element and insert another element without messing up with the sorted order. More importance was given to coding

Face to Face Round 4 (Bar Raiser) :

1) Given an array filled up with 1 to n^2 in randomized order. Fill it in a square matrix of size n.

2) Give test cases for atoi function.

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Microsoft IDC interview Experience | Set 47 (For 1.7 Years Experienced)

- Difficulty Level :\nMedium
- Last Updated :\n02 Feb, 2015

For Microsoft Bangalore CRM team.
Experience: 1.7 years.

Round 1:(Written test)
Question 1 : Given a binary search tree . Print its level order traversal in reverse order level wise .eg if level order is 1234567 then required output was 1327654

Question 2: Given a binary search tree , Print its zig zag traversal .

Complete syntactically correct code was required with all corner cases covered .

Round-2(Technical)
He asked me to Introduce myself and then started asking me about my project

1. Print the given matrix in spiral order .

https://www.geeksforgeeks.org/print-a-given-matrix-in-spiral-form/

Code should be syntactically correct with all corner cases handled in a single attempt.

2.Count all possible decodings of a given digit sequence .

https://www.geeksforgeeks.org/count-possible-decodings-given-digit-sequence/

Initially I started off with a recursive solution and came up with Dynamic programming solution afterwards. Full working code was required without any corner case missing.

He asked to list down all the possible test cases for the given scenario . He was very particular about the Test cases .

Round-3(Technical)
He asked me to introduce myself.

1.He asked me about the current project which i m working on.. and a few questions on the technologies which were used in the project.He was very particular about my project discussion.

2. Given a linked list consisting of String in each Node . Given just a pointer to the head Node , I was required to find whether the resultant String formed by combining all the Nodes of the linked list is a palindrome or not .

eg \xe2\x80\x93 Consider this linked List structure

\xe2\x80\x9caba\xe2\x80\x9d -> \xe2\x80\x9ccd\xe2\x80\x9d -> \xe2\x80\x9cefe\xe2\x80\x9d -> \xe2\x80\x9cd\xe2\x80\x9d -> \xe2\x80\x9ccaba\xe2\x80\x9d

Hence this structure is palindrome . Was required to check for palindrome online as Linked List length could be infinite at any point of time .

I was required to discuss and write full code on the whiteboard starting from Node structure to the end logic .

After that i was required to list down Test Cases for the same .

Round-4:(Technical)
He asked me to walk him through my resume.

1. Why Microsoft?
2. Why do u want to leave your current company?
3. Deep discussion on the current project which I\xe2\x80\x99m working on.
4. Write code for the crossword puzzle game .I said I have not played it earlier .

He then asked me to discuss and write code for Sudoku game in whiteboard. I wrote it using Backtracking

https://www.geeksforgeeks.org/backtracking-set-7-suduku/

5. Suggest some improvement which u can carry out in Microsoft Office .

Round-5 (HR)
1.Discussion on current compensation etc.

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Microsoft Interview Experience | Set 46 (Onsite)

- Difficulty Level :\nMedium
- Last Updated :\n30 Jan, 2015

I had my onsite rounds with Microsoft.

There were 4 interviews.

Round 1. Given a circular buffer, write Get( ) and Post( ) methods . Get(n) should return the n characters in the string, if \xe2\x80\x98n\xe2\x80\x99 elements are not present, it should throw an exception. Put(string s) should put each of the characters of string s into the buffer without overwriting anything which hasn\xe2\x80\x99t been read by Get()

Round 2 Longest common substring from 2 given strings. As I couldn\xe2\x80\x99t give optimal solutions, asked me to write a strcmp(str1, str2) method

Round 3 Write a secure and safe strcpy( ) method . Asked me some theoretical questions about indexing and triggers for sql

Round 4 Write a program which generates XLS column numbers given the column number in decimal.
e.g.

```
\r\nInput Output\r\n1        A\r\n2        B\r\n26      Z\r\n27      AA\r\n52      AZ\r\n53      BA\r\n...
```

Good Luck to future interviewers

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Microsoft Interview Experience | Set 45

- Last Updated :\n19 Jan, 2015

Round 1:

Written coding test:

Given a number in a linked list find the next greater permutation.

Round 2:

F2F 1:
With senior developer:

1. given an array. write a function to find if the array satisfies the condition min^2 < max is satisfied. That is it should return 0 or 1 accordingly\n2. Given an operation delfirst() which deletes the first element of the array. Given an array. how many such operation is needed to get an array which satisfies the condition 1.\n3. Given an operation delfirst() and dellast() which deletes the first element and last element of the array respectively. Given an array. how many such operations is needed to get an array which satisfies the condition 1.\nF2F 2:\nwith hiring manager:\n1. Given a SLL find the longest palindrome in it.\nF2F 3:\nwith director:\nnon technical. about myself why i am interested in a switch etc etc\nIt was a hiring drive for MBS group bangalore location.. The interview process was easy and well structured. Though the questions are easy the interviewer explored all the intricacies and I had to write full code for all the cases. Taking care of corner cases and optimizing time and space complexities. Each round went for 45min to 1 hr.\nMy suggestion will be brush up your basics. Don\'t try to write down the optimized code at the very beginning. give a simple solution first and gradually optimize it.\nIf you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft IDC Interview Experience| Set 44

- Last Updated :\n16 Jan, 2015

I recently got an internship offer from Microsoft IDC and would like to share my interview experience. It\xe2\x80\x99s a little long because I\xe2\x80\x99m sharing my experience, not just the questions.

First round (Online): This was common for both Microsoft IT and IDC. There were 2 coding questions (1 hour) and 20 MCQs (30 minutes). MCQs were mostly based on data structures, C/C++ and a few on OS. In the coding questions we were given the main function, we just had to fill in the code for the functions.

Coding Question 1: Find the point of intersection of two linked lists. (Bonus points for checking if the given linked lists are circular)

Coding Question 2: Given a matrix which consists of 1\xe2\x80\x99s and 0\xe2\x80\x99s, a pool is defined as a collection of 0\xe2\x80\x99s completely surrounded by 1\xe2\x80\x99s. Example,

1 1 1 1 1 1 0 0 0 0 1 1 1

1 1 1 0 0 1 1 0 0 1 1 1 1

1 1 0 0 0 1 1 1 1 1 1 1 1

1 1 1 1 1 1 1 1 1 0 0 0 0

This matrix contains only one pool since only one group of 0\xe2\x80\x99s is completely surrounded with 1\xe2\x80\x99s

Find the number of pools in a given matrix

I solved both the questions but could not pass all the test cases for the second question. But I solved the bonus problem in the first question and my overall score became high. So if you get any bonus questions, do not ignore them. They may help you score really well.

Second Round (Telephonic): The interviewer started with talking about Indore (my hometown), my weaknesses, my hobbies etc. So basically he was trying to calm me down (Tough I wasn\xe2\x80\x99t panicking. I\xe2\x80\x99ve no idea why he thought I was :-P). Then he began with the questions.

Question 1: Suppose you are the in-charge of a project in which you need to develop an online railway ticket reservation system. What are the things that you would consider while planning out the project and why?

I was excited since I had prepared this answer already. Basically it\xe2\x80\x99s the kind of question where they wish to check the scale at which you think and how much you keep yourself updated with the latest technology. Firstly I talked about how our requirements would help in determining which technology to use. I told him about my projects in php & ASP.NET and then compared the two in terms of cost, scalability, support, ease of use etc. Then I told him a little bit about UI/UX and then finally about the factors that could cause our website to crash. We talked about database backup, restore etc. in short. There is no perfect answer to this question, you just need to show them that you think about the \xe2\x80\x9cBig Picture\xe2\x80\x9d while designing the

system. When he was fully convinced, we moved on to the next problem

Question 2: You are given a pointer to a node in a linked list (Not the pointer to the Linked List!). How will you delete this node?

Frankly, I never heard this question before. It came to me as a big surprise that this question was quiet common but I missed it during my preparation! I got nervous at this point. But I remembered that I should let the interviewer know what\xe2\x80\x99s going on in my mind, so I kept talking. But after 5 minutes he moved on to the next question and told that we would come back to this question again.

Question 3: You are a project manager & you have 100 hours to complete a project. How much time will you give to planning, coding and testing?

At this point I regretted sleeping during the Software Engineering Lectures. I thought making wild guesses would give a very bad impression. So instead of giving him numbers I told him that according to my experience coding would take maximum time, followed by planning and then testing. He laughed at my answer (Ohh yeah\xe2\x80\xa6 they do that -_-). But maybe he thought of me as a kid who hardly has any experience and was kind enough to tell me that it\xe2\x80\x99s not how projects in industry work. They give maximum time to planning because if the planning is done properly then coding hardly takes any time! (I know most of you are with me on this :-P)

But while he was telling me all this, I got the time to think about the second question. But the problem was that my answer wouldn\xe2\x80\x99t work when the node was the last node in the list. And this is exactly what I told him before answering the question. Surprisingly my answer was correct. He asked me what I will do in case the node was at the end? I said I had no idea. Then he told me about \xe2\x80\x9cdummy node\xe2\x80\x9d but he told me that he was satisfied with my answer.

So my interview took more than 45 minutes (unlike my friends\xe2\x80\x99 which went for 20-30 minutes! :-O). I thought I messed up a lot & won\xe2\x80\x99t be selected for the next round. But I was (I guess others messed up more than I did ;-))

Round 3 (Face-to-face in Microsoft IDC, Hyderabad Campus): So the campus is huge, great interior, facilities etc. Within half an hour, I was called for my first round.

F2F 1: The interviewer himself came in the waiting area and took me to the interview room. Well it was a big hall with 8 interviewers sitting far away from each other. They all had their laptops, pens and few blank sheets with them.

Interviewer: Why don\xe2\x80\x99t you tell me something about youself?

I gave him a breif introduction about myself (laid special emphasis on the fact that I am a Microsoft Student Associate ;-))

Interviewer: Okay so let\xe2\x80\x99s jump on to the questions\xe2\x80\xa6 You are given a string that consists of Rs, Gs and Bs. You need to sort the string so that all the Rs come towards the front, Gs in the middle and Bs towards the end.

Approach 1: Brute force i.e. simple selection sort

Approach 2: Use 3 counters r, g, b and count the number of Rs, Gs and Bs in the first parse and put those many Rs, Gs and Bs in the second parse. (he smiled and said it\xe2\x80\x99s a good solution but he wants a different answer)

Approach 3: In the first parse, bring all the Rs towards the front. The remaining string would have only Gs and Bs. Similarly, in the second parse, collect all the Bs at the end (he said I can do better)

Approach 4: It took me a little time to think about this but he gave me hints and I finally came up with an algorithm. He asked me to code it and started doing his own work. I walked him through the code (and tried highlighting how I took care of the invalid inputs, corner cases etc. :-P)

Interviewer: Well\xe2\x80\xa6 that\xe2\x80\x99s all from my side. Do you want to ask me any questions?

Well I didn\xe2\x80\x99t mind a bit of chit chat \xf0\x9f\x98\x9b So I started asking him about the most challenging project he did in MS and about the development strategy that they follow for development of cross platform apps. He was nice and told me everything with a lot of interest.

F2F 2: 2 of my friends were rejected in the first round itself, while the rest 3 of us went to the next round. This interviewer looked very serious.

Interviewer: Tell me something about yourself\xe2\x80\xa6

With his expressions he didn\xe2\x80\x99t seem to be interested in my answer at all and quickly gave me a question.

Interviewer: Okay so you are given a string that consists of vowels, consonants and other chars. You need to sort the string so that all the vowels come towards the front, consonants in the middle and other chars towards the end.

I couldn\xe2\x80\x99t be more happier at that moment \xf0\x9f\x98\x80 I didn\xe2\x80\x99t tell him that I had been asked this question in the previous interview & told him my approach (Approach 4 from last interview). But he understood that I knew the answer and so he changed the question \xf0\x9f\x98\x9b

Interviewer: You are given a matrix that consist of chars and you need to search for a string in that matrix. Now the string can be formed by going into any direction from a particular matrix position. So the only constraint is that the cells\xe2\x80\x99 corners must touch.

This was an easy problem and I told him my method

Interviewer: Now I\xe2\x80\x99m putting one more constraint over this. You can not traverse an element more than once.

This was again easy. I just used a dummy character (*) in place of the chars that had already been visited and restored the char back after the recursive step. He got a little confused by this dummy char concept but then I explained him why it would work and he was satisfied with my answer. He asked me to code it then. I made a few mistakes which I corrected later but overall this round was good \xf0\x9f\x99\x82

F2F 3: This was the final round & was supposed to be an HR round. But since they had to finish off the interviews they sent me to a technical person! (I peeked into his laptop and saw that he had the feedback of my previous rounds and also the questions which were asked to me!)

Interviewer: Tell me something about yourself

I again gave the same answer (ofcourse with emphasis on MSA thing :-P)

Interviewer: What could you have done better in any of your previous interviews?

I told him about a small bug in my code. I forgot to increment a variable and the interviewer ignored it.

Interviewer: So I see you have worked on Hadoop. Can you tell me what you did in your project?

I was expecting this question and gave him a good explanation on this. My project was on network intrusion detection systems using big data.

Interviewer: Since you\xe2\x80\x99ve worked on IPs, let me give you a small problem. Convert the following number into IPv4 format.

It was fairly easy and I wrote the code. I made a few mistakes in my code (I was really nervous this time) but corrected them later

Interviewer: Okay so tell me something about garbage collection\xe2\x80\xa6

Told the definition

Interviewer: In which language do we have garbage collection?

I told C++ (yes\xe2\x80\xa6 that\xe2\x80\x99s what you do when you are under so much of pressure -_-) He gave me a strange look and then I realized what I told him! But I guess he understood that I was panicking

Interviewer: Okay\xe2\x80\xa6 what are unicode strings?

I never expected this question in an interview and I gave a very bad definition. He didn\xe2\x80\x99t looked impressed at all.

Interviewer: Umm\xe2\x80\xa6 let me give you a coding problem. You are given a canvas and you have to draw a line from point A to B. How would you go about doing this problem?

Phew\xe2\x80\xa6 this question would save me (atleast that\xe2\x80\x99s what I thought). But I didn\xe2\x80\x99t consider the corner cases. He gave me a hint and luckily I could solve the problem successfully.

Interviewer: That\xe2\x80\x99s it from my side. Do you have any questions for me?

Yes ofcourse! I asked him about the most challenging project that he did but he seemed to be a bit confused about what to answer. So I explained him my question again and gave him a few examples of what other interviewers answered (It felt awesome at that moment because he was in the same position as I was 10 minutes back then :-P)

The experience was good because they focused only on technical stuff & the questions were also good. I really liked the helping attitude of people there.

I would like to thank geeksforgeeks for helping me out in the preparation for this interview. I think you guys are doing a great job helping out students \xf0\x9f\x98\x80

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Microsoft Interview Experience | Set 43

- Last Updated :\n11 Jan, 2015

For Microsoft Bangalore CRM team.
Experience: 1.8 years.

Round 1:(Written test)
1. Given a sentence say, \xe2\x80\x9cthese are twelve pens and thirty two sheets\xe2\x80\x9d convert this sentence to \xe2\x80\x9cthese are 12 pens and 32 sheets\xe2\x80\x9d. We were asked to do it inline. The interviewer called each one of us and asked us to explain the approach.we were asked to minimize the space and time complexity.

Round-2(Technical)
He asked me to Introduce myself and then started asking me what do I know about CRM.(Go through the website before attending the interview)

1. Given a client and a server and each of them has a queue in it. Client has to copy the contents of the queue to the server once the internet connection is up. The amount of data which it can copy at one go is fixed(Say 5 units). Design an approach for this. Let\xe2\x80\x99s say input queue is partitioned as 2MB,4MB,10MB,6MB and the fixed size of the window is 5MB. The output queue also has the same partitions as the input queue. (He was basically testing how i can use operating systems concepts, designing approach and data structures together).

2.Deep discussion on the current project which i\xe2\x80\x99m working on currently.

3.Permutation of string with test cases.

Round-3(Technical)
He asked me to introduce myself.

1.He asked me about the current project which im working on.. and a few questions on the technologies which were used in the project.

2. Given N prisoners who are standing in a line and M hatred relationships among them say,P1 hates P2, P3 hates P1, P3 hates P5 etc.. If any of the hate relation contains invalid cases like P1 hates P3 and P3 hates P1 then return false. Output the final order in which the prisoner should stand in the line so that they don\xe2\x80\x99t hurt each other. say, if P1 hates P3, P3 should stand behind P1 so that P1 cannot hurt him. He asked me to code for the same.

3.Given a root, particular node and distance in a binary tree,.. say (struct node *root, struct node *n,int k) print all nodes which are at a distance of \xe2\x80\x98k\xe2\x80\x99 from node \xe2\x80\x98n\xe2\x80\x99. He asked me to write the code.

Round-4:(Technical)
He asked me to walk him through my resume.

1. Why Microsoft?
2. Why do u want to leave your current company?
3. Deep discussion on the current project which I\xe2\x80\x99m working on.
4. Given a binary tree how to construct the mirror tree out of it. I gave a recursive solution. He asked me to write the code for it. He asked me to write the same without using recursion and test cases for the program.

Round-5 (HR)
1.Discussion on current compensation etc.

Overall, it was really a good experience. GeeksForGeeks, you guys have made our lives so easy! Thanks a lot. \xf0\x9f\x98\x80

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Microsoft Interview Experience | Set 42 (For SDE1)

- Last Updated :\n09 Jan, 2015

I received interview call from Microsoft (Bangalore) for CRM team, SDE1 position for 1.5 year experience.

Round 1: 1 hour

It was a GD like interview, with multiple people in same room given same question and interviewer was discussing individually with every person.
Given 2 arays if integers, sort the first array based on order of 2nd array.
<https://www.geeksforgeeks.org/sort-array-according-order-defined-another-array/>
I started with brute force approach, then optimized to binary seacrh and then hashmap

Round 2: 1 hour

Same as previous round, one interviewer, multiple candidates same question individual discussion.

If you have a stream of incoming characters, reverse and print the string as soon as input is finished. Write a code for same

Round 3: F2F 1 hour

One-on-one

Flatten a multi-level linked list
<https://www.geeksforgeeks.org/flatten-a-linked-list-with-next-and-child-pointers/>

Took a while to solve this one.
First I used a stack and then formed an algo without stack an without recursion.

Round 4: F2F 1.5 hour

A printed sheet of a c-program was given, had to find syntactical and logical error in program.

Connect all nodes of a binary tree which are at same level.
You can not store level information
<https://www.geeksforgeeks.org/connect-nodes-at-same-level/>
<I used a variation of level order traversal>

Round 5: Hiring Manager <1 hour

Detailed discussion on current work, was grilled a lot

Reasons to leave current company

Reasons to join Microsoft

and other such questions

Tips:

Keep thinking loud and discussing your thought process with interviewer. They will keep giving hints for you to reach solution.

Find a solution, any solution, and keep optimizing it.

Hope this helps. \xf0\x9f\x99\x82

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Microsoft Interview Experience | Set 41 (On-Campus)

- Difficulty Level :\nExpert
- Last Updated :\n06 Dec, 2014

MCQ Round:
15 MCQS were asked on c,c++, OS.

Coding Round:
1) Given a linked list of co-ordinates where adjacent points either form a vertical line or a horizontal line. Delete points from the linked list which are in the middle of the line

```
\r\nEg:\r\n   (0,10) -> (1,10)->(5,10) -> (10,10)\r\n                                    |\r\n
```

2) Given a sorted array,convert it into bst

Group Fly Round:
https://www.geeksforgeeks.org/a-linked-list-with-next-and-arbit-pointer/

The code should be written on paper and should be error free. No extra space should be used.

Interview 1:
1) Given a linkedlist of moves of 2 players in tic-tac-toe game . Find who has won the game.

Interview 2:
1) Given a pile of 9 objects. 2 players take turns to pick 1 , 2 or 3 objects . The last one to pick is the looser. What is the winning strategy? wining strategy for 9 coins

2) Asked to how to design a cache for dns records. I have told different approaches like First-in-First-Out, less frequently used,least recently used\xe2\x80\xa6 He asked me to tell the strategy and code it. I told LRU and implemented this.
https://www.geeksforgeeks.org/implement-lru-cache/

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Microsoft Interview Experience | Set 40 (Off-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n02 Dec, 2014

I got mail one day that I have an Interview scheduled on next day in Bangalore.

Round 1 onsite:
I think this round was just to check whether I take care of all boundary cases for problems and also my speed? Problems were quite easy then what I expected but they made it very lengthy to check my speed

General questions 1 :Tell me about yourself?

GQ 2 : Tell me about your work in your current Organization ?

Q1: You have given an array of 0\xe2\x80\x99s and 1\xe2\x80\x99s. Write the code to swap only two elements in the array so the number formed by this array keeping all the elements in same order should be largest one.

I/P: 11000101 O/P: 11100100

Now he modified the question: Let\xe2\x80\x99s say instead of array, a number is given. Swap two bits of this number find out the maximum number formed after swapping thse two bits

Again he modified that Lets the array elements are decimal numbers (Not 0s and 1s). Swap two elements and find out maximum no formed. Write the code.

Again he modified the same questions that lets say a number is given, swap two digits of the number and find the maximum number formed by it.

He was just checking my coding speed and making sure whether I check all boundary cases.
Q2: Pairwise swap elements of a given linked list (of course by changing links). After looking at my code he said that I have made a segmentation fault but I try to convince him that I wrote the code correctly and he was convinced.

After this round HR got a mixed feedback so he decided to go ahead with my next round.

Round 2:

This round was basically focusing on my problem solving abilities. Coding was not tough but thinking and approach was critical.

Q1: A directed graph was given. I had to make a function which take a value of node as input and print all the nodes which had incident edge on the input node and also print all nodes to which input node has a direct edge. He kept ignoring the solutions I told because he wanted it to solve in a particular way.
Q2 : Find the largest rectangular area in a Histogram. I read this question long before but couldn\xe2\x80\x99t remember it but fortunately I was able to solve it with few difficulties.

Round 3:

Q1: basics of computer science: Multithreading, long discussion on dynamic memory allocations, memory leak, some OS fundamentals. Some compiler design questions where he helped me and

finally we reached to the solution.

Q2: You have a stream with millions of words in it. Find most frequent 10 words in that stream at every instance

Q3: How will you store a very big number if it can\xe2\x80\x99t be store in any data type?

Round 4:

This was a designed round and interviewer was principal development manager.

Again round started with \xe2\x80\x98tell me about yourself and the work in the current Organization\xe2\x80\x99.

Question 1: He opened the site msn.com and asked me to design a part of \xe2\x80\x98stockscreener\xe2\x80\x99 hierarchy using my OOPs and MVC understanding. And asked me write a class which will show the user that if stock market is open or closed. If it is closed then I have to print when the market is going to open in future. To find the future date he gave me a list of Holidays, Half days and obviously market will be closed on Weekends. So store this information in a proper Data structure and use it in finding future date.

This question took around 35-40 minutes of time

Q2: For a Sudoku game, I had to design a screen using OOPs and MVC understanding. Where a column can be empty where you can put a editable number in future or an editable number which you can change as per your requirement or a fixed number(inserted by system only and user can\xe2\x80\x99t change them). This question was an easy one so hardly took 15 minutes.

Q3: Simplest of all, for a given BST I had to print all the number in ascending order which lies in a given range in best possible optimum way.

Round 5:

This was the last round and the interviewer was \xe2\x80\x98Partner Development Manager\xe2\x80\x99. I knew he has veto power and today he is the one who will decide my fate, so I was more nervous and conscious but he made me so comfortable and welcomed. For first 10 minutes or so we were just chatting about our views on movies and asked me who do I think most underrated actor in Bollywood? I said Jimmy Shergill and he said he also think the same.

Asked about my college life and achievements? What is the biggest achievement so far? Why do I have less percentage in 10th class? Why are you changing the company?

Then he moved to puzzles.

Q1: There are N people in a room and one of them is a celebrity. In the room everyone knows the celebrity and celebrity doesn\xe2\x80\x99t know anyone in the room. You have 1 question \xe2\x80\x98do you know him?\xe2\x80\x99 and you can ask this question N times to anyone in the room. The person to whom you are asking question will reply \xe2\x80\x98Yes, I know this guy\xe2\x80\x99 or \xe2\x80\x98No, I don\xe2\x80\x99t know this guy\xe2\x80\x99. By asking the same question N times to whoever you want to ask you have to figure out who is celebrity in the room. If A knows B doesn\xe2\x80\x99t mean B knows A.

After that He asked my 2-3 more puzzles which I knew already and I told him so he asked the solution and moved on.

Q2: A Matrix of 1s and 0s is given, all zeros are water and 1s are land, first find out the number of ponds in the array (Reverse of islands problem). If one change can convert 1s in to zero then find

out minimum number of changes that we need to make so that there will be only one pond in matrix.

In the end, he asked me whether I am preparing for other interviews or higher study so I knew all the puzzles. I said No but I like puzzles and I am good in them.

This was all. A big thanks to GEEKSFORGEEKS, you guys made our life so easy. You are Google for me as far as an interview preparation is concerned.?

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Microsoft Interview Experience | Set 39 (On-Campus)

- Difficulty Level :\nExpert
- Last Updated :\n28 Oct, 2014

?I like to thanks geeksforgeeks.org for my ?entire journey in placement.

Round->1 (multiple choice questions)
1. Intersection of two linked list.
2. There is a 2 d array. 0 signifies water and 1 signifies land. an island is connected 0s(in all 8 direction) and no 0 should be on the outer edge of two array. You have to count the bumber of such possible array.

You have to solve both coding question to enter in 2nd round

In round 2 interviewer were very cool and supporting. try to shake hand while entering and ask every detail of problem.

Round 2:
1. Explain yourself.
2. A backtrack problem on sudoku.
write full code on paper in any language. write failure case of your code.
3. Discussion on projects.
i had done a project on big data on frequent itemset.they were really interested in each and every detail of big data paradigm.
4. Your strength and weakness and extra curricular interests,

Round 3:
1. there is a 3 million character string. u have to print the count of occurrence of each node.
do not jump on to the question. wait for him to complete. i gave count sort pf O(n) solution but he was focusing on more optimized one.

2. again he jump to my big data project. he gave me a real life scenario and asked to design it.
you are giving the information of about 10,000 sites about their users and the product they had bought. you are a consultant. give a big data solution to find out the places where users had bought the jewellery in large amount. also give the name and details of users who had bought jewellery in large amount.

he was quite impressed by my design. we discuss the design for about 30 minutes. then instantaneously they told me that i am selected for 3rd round.

Round 4: (HR round)
HR was very cool
1. tell me about yourself.
2. why Miscrosoft.
3. tell any 4 of your favorite product of Miscrosoft
4. tell 2 good and 2 bad points of Microsoft.
5. Why you opt for your college.
he was trying to check my planning skills to compare 2 entities.
6. Why computer science.
7. Tell any 1 social problem that bothers you the most.
8. Suggest 3 solution to above problem as a technical guy.
9. what is big data

10. what will you do if your colleague is not working
11. what if you are not agreed with your senior

My tips is to stay cool and enjoy the interview. carefully tell your weakness. Don\xe2\x80\x99t worry to ask questions from interviewer. Take proper use of the time. Big data helps me a lot in every round.focus on designing problems along with data structure.

geeksforgeeks,org alone is sufficient.

Best of luck to all guys who are preparing.

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Microsoft IDC Interview Experience | Set 38 (For Internship)

- Difficulty Level :\nHard
- Last Updated :\n28 Oct, 2014

I completed my internship at MS-IDC this summer. Here is my interview experience.

Round 1(Online MCQ):
Varying level of difficulty. 15 MCQs. Topics: C/C++, data structures, DBMS, OS, Networking

Round 2(Coding test-online):
Two coding questions were given. Fairly simple. One was to print nth element from last in a linked list. Other was to convert a number to base 4 number

Round 3(Telephonic Round):
He asked me about myself, and a couple of questions from ethical hacking(I had written about it in my CV). Then he asked me to develop an online chess game. The entire class definition, data structures to be used and graphics implementation etc were discussed.

The interviews were held in a college in Delhi.

Round 4:
Firstly he asked me about myself, then my projects. Then he asked me to write a code to remove comments from a C file. Then he asked me the approach to detect a loop in a linked list. Then he asked me to design a system that would add two polynomials.

Round 5:
He gave me a very tough question of graphs. It was similar to a traveling salesman problem but had two paths, one path or no path to every other city. One possible way of reaching the other city was via plane and the other was a taxi. The salesman had a fixed number of coupons for both taxi and plane. He had to save maximum coupons at the end. Then, test cases for this problem. I wasn\xe2\x80\x99t the only interviewee in this round. I had another person sitting next to me. He was rejected while I made it through.

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Microsoft IDC Interview Experience | Set 37B

- Last Updated :\n02 Jan, 2016

Microsoft conducted their first round of shortlisting for placements and internship. The online coding round was organized by CoCubes like last year.

The test was for 1.5 hrs and had 2 coding questions. Allowed programming languages were C, C++ and Java.

The questions were as follows:

1) Given the head of two linked lists , find the merging point of both the linked lists. In case the linked lists do not merge then return NULL.

2) Given a 2d array of 0s and 1s where 0s represent water and 1s represent land. A connected patch of 0s count as one single water body and if a water body is covered by 1s all around it then it forms one pool. Write a function to return the total number of pools in the 2D matrix. In case a water body is present on the boundary of the array immediately return -1.

Sample test cases :-

```
\r\n\r\nInput :\r\n11111\r\n10101\r\n10111\r\n11111\r\n11111\r\nOutput : 2\r\n\r\nInput :\r\n11110\r\n11111\r\n11011\r\
```

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Microsoft Interview | Set 37 (For SDE-1)

- Last Updated :\n17 Sep, 2014

Skype round:
1) Print the last n lines of a file (Hint : treat it like a linked list)
2) Length encoding \xe2\x80\x93
Input: aaabbc Output: a3b2c1

F2F round 1:
1) Given a few points in first quadrant \xe2\x80\x93 (x1,y1) \xe2\x80\xa6..(xn,yn) and given another set of points (a1,b1\xe2\x80\xa6..an,bn), determine whether all the points (a1,b1\xe2\x80\xa6an,bn) have already occured in (x1,y1)\xe2\x80\xa6..xn,yn)

2) Given a graph where every two nodes are either friends or enemies with each other. Find a way to go from one node to the other.
Restrictions:
1) You can also travel from one node to next if they are friends with each other
2) You have some \xe2\x80\x9cmagic potions\xe2\x80\x9d. You can convert an enemy path to a friend path with a magic potion.

Find the path with min number of magic potions required.

F2F round 2:
1) Discuss one good, one bad feature of facebook. How you will redesign it to improve it?
2) Implement auto complete.
3) Given numbers a1\xe2\x80\xa6an find the minimum index, whose element occurs twice in the array. Do it in one pass of the array (or less that O(n) if possible?)
e.g 3 2 4 4 2
Output : 1 (is the lowest Index) since, \xe2\x80\x982\xe2\x80\x99 repeats twice.

Follow up:
Return the element that repeats at the earliest in the array. Output: 4

F2F round 3:
With GM. General discussions about projects/work culture/goals.

I got a call after two days that I\xe2\x80\x99ve been selected. Many thanks to geeksforgeeks.

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Microsoft Research India Interview | Set 36 (On-Campus for Internship)

- Difficulty Level :\nBasic
- Last Updated :\n09 Mar, 2016

Recently Microsoft research india invited application for internship.They shortlisted based on CV (projects related to your topic of interest and CGPA).

After shortlisting I had one telephonic interview of about 40 minutes:
Main focus was on the project I did. I had to explain every thing I did in my project its basic utility and model.Interviewer asked me key challenges faced, key aspects used and many other things related to my project.
Then he asked me one data structures question:
Given n numbers you need to find min and max.How many comparisons are required.. optimize the approach
(https://www.geeksforgeeks.org/maximum-and-minimum-in-an-array/)

Then he was satisfied with the answers, he asked few more questions based on my project. I pushed some codes of project on github and provided link of the same in my cv so he asked about who came up with the design and how did you do this and that..

Finally the interviewer offered me internship offer at MSR India.

Special tips:
Be confident during whole interview.
Have positive attitude and talk with the interviewer while solving any question.

I want to thank geeksforgeeks for providing such a useful bank of questions.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft IDC Interview | Set 35 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n10 Oct, 2019

Online test: This test was organized by cocubes.com, and had to be completed within an hour.

There were two coding questions:

1. There is a linked list whose node is defined as follows

```
    struct node\r\n    {\r\n        int x,y;\r\n        node* next;\r\n    };
```

We had to implement a function which takes the head of linked list, and if any three consecutive points lie on same horizontal or vertical line, we had to remove the middle node. The linked list will either be empty or will contain atleast two nodes. The function prototype was:

```
    void remove(node* head)\r\n    {\r\n\r\n    }
```

Example:

```
Input: (1,2)->(2,3)->(2,4),(2,5)->(3,4)\r\nOutput: (1->2)->(2,3)->(2,5)->(3,4)
```

2. Given a sorted array, convert it into a height balanced binary search tree. A height balanced tree is one in which for every node, the height difference of left and right subtree is at most 1. Node of binary tree was:

```
    struct node\r\n    {\r\n        int data;\r\n        node* left;\r\n        node* right;\r\n    };
```

Function to be implemented was:

```
    node* binary_tree(int* ar, int len)\r\n    {\r\n\r\n    }
```

Interview:
There were 3 rounds of interview, and we had write code on paper.

Round 1:
There were two questions:
1. Given a string, remove all continuous occurrences of \xe2\x80\x98a\xe2\x80\x99 and any occurrence of \xe2\x80\x98b\xe2\x80\x99.
Example: Input: \xe2\x80\x9caacbccdbsssaba\xe2\x80\x9d, then output: \xe2\x80\x9cacccdsssa\xe2\x80\x9d

2. What data structure should be used if we have to implement insert and delete functions in a text editor? The functions should be as fast as possible.

Round 2:
Question 1: Given a string and two positions in that string, shuffle the string, that is, move the given substring to the front. Example:
Input: abcdefgh, 4,6
Output: defabcgh
This has to be done inplace with O(n) time complexity.

Question 2: How to implement dictionary data structure in C++? What kind of hash functions shall we use? How to manage collisions?

Question 3: How would you implement vector data structure in C++ on your own? What would be the accessing time complexity? How can you make it O(1)? How to resize the structure?

Round 3:
Question 1: Given a k-ary tree, how to print the elements layer wise?

Question 2: Given a singly linked list and a number \xe2\x80\x98n\xe2\x80\x99, write code to reverse every \xe2\x80\x98n\xe2\x80\x99 elements of the linked list. Example:
Input: 1->2->3->4->5->6, n=3
Output: 3->2->1->6->5->4

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Microsoft Interview | Set 34 (On-Campus)

- Difficulty Level :\nEasy
- Last Updated :\n13 Sep, 2014

1st Round (Online)

15mcq 30mins \xe2\x80\x93 Most from C/C++. Few from OS

2nd Round: Coding Online (1 hour)

1st quest: https://www.geeksforgeeks.org/intersection-of-two-sorted-linked-lists/

2nd quest: https://www.geeksforgeeks.org/check-for-balanced-parentheses-in-an-expression/

13th august:

Top 20 students were selected for the next round. 8 had direct interviews while the rest 12 of us had another elimination round. The selection was done using the total score of both the online rounds

Elimination Round: Pen and Paper (20 mins)

Write the code implementing a queue using stacks.

Interview 1: Technical (1 hour 15 mins)

The interviews were on in parallel and when I went for my 1st interviews some were already rejected while some even had their 2nd and 3rd interview rounds.

Asked about myself and my history followed by technical questions.

1. Suppose you have an array of elements which has duplicates except 1 number, ex. 1,2,3,4,3,2,1. You need write a pseudo code to find the unique number. Here ans \xe2\x80\x93 4. Also asked the complexity of my code which was O (n).
2. Tell the pseudo code to reverse a linked list.

I started to make the logic for O (n) but he said it might not be possible to do it in 1 iteration so not an issue. But I gave him the logic of O (n) and 1 iteration.

3. You have a matrix a[m] [n]. Transpose it into a matrix b[n] [m] in minimum iterations. I could think of m*n/4 at most.
4. Questions on OOPS
5. Difference between OOPS and C
6. Difference between abstract classes and interface. Gave cases for me to tell the error or right ans in abstract classes.
7. DBMS: 5th largest salary of employees from a given table. I answered using rownum and then limit but he wanted a general ans. So all I could tell was using nested query.
8. Puzzles:

\xe2\x80\x93 There are 25 horses. Only 5 can run together at most. You have no timer. Min no. of runs reqd. to find the fastest horse.

\xe2\x80\x93 There are 4 people who want to cross a bridge. Minimum time they take to cross a

bridge is 1, 2, 7 and 11 respectively. There is only 1 torch and at most 2 people can cross a bridge at a time. But no one can cross the bridge without torch (Someone has to come back to give the torch). Find minimum time in which all 4 cross the bridge.

2nd puzzle I 1st answered 22 but then corrected myself and answered 18 (1 and 2 cross. 1 comes back. 7 and 11 cross. 2 comes back. 1 and 2 cross \xe2\x80\x93 total time 2 + 1 + 11 + 2 + 2 = 18).

I was informed 5 minutes after my interview to be ready for the 2nd Round.

Interview 2: Technical (20 mins)

Was asked about self, my project on cloud computing and questions related to it.

1 technical question.

Write a code to delete x elements after 1st n elements.

I wrote the code but missed the case where n = 0. So as he was checking the code I told him the case I had missed. He was confused if the code would work if there were less than n + x elements but I showed him that it would.

Was a short interview compared to others and was scared of being rejected but finally was called for the hr interview in sometime.

Interview 3: HR (20 mins)

He first told me about the code I had written in the elimination round that it was the best code he got in the day. Following it were typical hr questions.

Tell about myself, my strengths and weaknesses. Why do I want to join Microsoft?

Why should Microsoft hire me?

About my college project and my summer internship project.

What would you like to improve in yourself 3 years from now (other than knowledge)?

Finally after the whole day of interview I was selected with 1 more guy from our college. Thanks to geeksforgeeks.org and geeksquiz.com for helping me prepare and crack the interview.

Important Points:

1. Always show a lot of energy in the interview.
2. Microsoft gives great importance to values and ethics so stick to them in your questions.
3. Speak out whatever approach you think in the interview. The interviewers do not want to sit idle. They love to understand how you think.
4. Do try showing company\xe2\x80\x99s goals as yours.

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[TopTalent.in] Exclusive Rapid Fire Interview with Gritika Who Got a job offer from Microsoft

- Last Updated :\n08 Aug, 2021

For Gritika, and for many others like her, Microsoft is a dream company. As she recalls \xe2\x80\x98I sat for Microsoft as a part of my campus recruitment.
Microsoft has always been my dream company. After getting placed, I didn\xe2\x80\x99t sit for any other company.\xe2\x80\x99 Being relived at the thought sign off a recruitment season at a high, her biggest moment to savor was seeing a smile on her parents\xe2\x80\x99 face.

We at TopTalent.in spoke to Gritika from Jadavpur University about her experience of a Microsoft interview and what others can learn from her experience. You can also download her resume to see her detailed profile.

My toughest interview was the third round of my Microsoft interview, after which I was asked to leave. But, seems like I was destined to get the job and was called back Even the HR round was quite grilling, the interviewer was very friendly still the answers he expected had to be prompt and precise.

Your Preparation Strategy: I worked on data structures. I feel if you have a sound knowledge of the various data structures, it helps in optimal problem solving. But practicing codes is also very important, as it enables us to identify all possible bugs and test cases.

Resources: Geeks for Geeks, I owe my success to that site. My college seniors were also very helpful. They guided me, which enabled me to only study the relevant topics from the pool of available topics.

Your Skills: Writing codes efficiently (on paper as well), this helps in the PI rounds as we can develop linear program writing skills. Identifying test cases, as we know Microsoft puts great emphasis on test cases.

Advice: Have a mind of your own. Don\xe2\x80\x99t just mug up efficient solutions to problems, try to come up with your own solutions. This is what makes you stand out from the others when you are confronted with an unknown/unexpected problem.

Resume: Keep it precise (within 2 pages). Highlight your skills and achievements. Doing project work is certainly helpful as it demonstrates that you are capable of developing something useful from just a list of requirements.

In case you missed, you can also download her resume to see her detailed profile.

This article is powered by **TopTalent.in** \xe2\x80\x93 A high end Job portal for students and alumni of Premier Colleges in India. Sign up now for free exclusive access to top notch jobs in India and abroad. Get in touch with them via facebook, twitter or linkedin. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to review-team@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 33 (On-Campus for Internship)

- Difficulty Level :\nHard
- Last Updated :\n26 Nov, 2019

Recently Microsoft IDC had visited our Campus for Internship. There were 6 rounds in total for me.

Objective Round :-
The objective round was taken in Cocubes.com, there were 15 questions (1 question was repeated in my set). There was a question about \xe2\x80\x9cRectangular Collisions in an array\xe2\x80\x9d which I had no idea about.

Coding Round :-
There were two coding questions :-
1) Find an element in a sorted array which has been rotated circularly at only one location in O(logn) time.
(Refer https://www.geeksforgeeks.org/search-an-element-in-a-sorted-and-pivoted-array/)

2) Find the inorder successor of a node in a Binary Search Tree.
(Parent pointers were present in the BST). (Refer Method 1 of https://www.geeksforgeeks.org/inorder-successor-in-binary-search-tree/)

Group Interview Round :-
First 10 minutes, he asked about what we expect to be the next big thing in technology. Then he gave two questions :-
1) Given a string, you have to check if it is a valid number or not.(The number can be signed, floating point/integer). If it is a number return true else return false.
The constraints were :-
i) No decision statements allowed (No if-else,no switch-case).
ii) No ternary conditional operators allowed (? : not allowed).
iii) No looping statements allowed (No for/while/do-while).

(My solution was a recursive implementation returning a bool having only one return statement using relational operators and two global variables, one for checking if it is the first occurrence of a \xe2\x80\x98.\xe2\x80\x99 and other for checking if the sign \xe2\x80\x98+\xe2\x80\x99/\xe2\x80\x99-\xe2\x80\x98 occurs in 1st location or not).

2) Bing wants to improve the experience of users by giving reward points to users. Devise an algorithm to assign reward points to different users.

Personal Interview Round I :-
1) You are given a string containing only \xe2\x80\x98(\xe2\x80\x98 and \xe2\x80\x98)\xe2\x80\x99, check if the string is well formed,i.e. check if the parenthesis is well matched.
(Either have a count of \xe2\x80\x98(\xe2\x80\x98 or use a stack for pushing \xe2\x80\x98(\xe2\x80\x98 and popping when \xe2\x80\x98)\xe2\x80\x99 is encountered).

2) There is a Bot Class with the following prototype :-

```
class Bot {\r\n// private data members\r\npublic :\r\n bool moveleft(); // The bot moves one block left and returns tru
```

You are given a bot and the dimension of a maze having walls and some blocks having gold, check if the bot can reach a block containing gold.

(Use dfs graph traversal using the recursive implementation and return true if the current position has gold and return false only if you cannot move any further).

Personal Interview Round II :-
1) You are given the roots of two binary trees, check if the trees are isomorphic or not.(Initially he framed the question for a tree (not a binary tree) and gave me two random nodes instead of the roots).

(Refer https://www.geeksforgeeks.org/tree-isomorphism-problem/)

2) You are given an array of n X m dimension. You start from (0,0)th location. You can move from (i,j) to any of (i + 1,j),(i,j + 1),(i + 1,j + 1)th locations. Find the total number of paths starting from (0,0)th to (i,j)th position.

(For all i and j,dp[i][0] = dp[0][j] = 1, dp[i][j] = dp[i \xe2\x80\x93 1][j \xe2\x80\x93 1] + dp[i][j \xe2\x80\x93 1] + dp[i \xe2\x80\x93 1][j]).

Personal Interview Round III :-
1) Given a dictionary, group the anagrams together.
(Sort each string in dictionary, as anagrams will have same representation after sorting, use a hash map to store the groups of anagrams).
2) He asked questions related to my project.

Thank You geeksforgeeks.org.

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Microsoft Interview | Set 32 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n13 Aug, 2014

Recently Microsoft conducted an on-campus interview at my college. It consisted of 5 rounds which were all on-campus. They were as follows:

Round 1(online)(30 minutes):
Consisted of 15 mcqs mostly related to c/c++ and probability. It was fairly easy and very few people were eliminated.

Round 2(online)(1 hour):
We had to write two programs in this round.

1.A sorted list of strings interspersed with NULL in random indices is given. Return the position of a given search string. Return -1 if string not present.
ex:\xe2\x80\x9da\xe2\x80\x9d,
\xe2\x80\x9cb\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9dc\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d\xe2\x80\xa6. find
\xe2\x80\x9cb\xe2\x80\x9d . o/p: 2

Just a simple linear search will suffice.

2. Given an array of integers where all the elements occur odd number of times except 3 elements which occur even number of times, find the 3 elements.

A brute force solution is fine. You may also use a hashmap.

The above two rounds were hosted by cocubes.com.

Round 3(Group fly round)(30 minutes) :

Groups of 5 were made amongst the remaining candidates. Each group was assigned an interviewer and we were given a problem to solve.

Write a program to rotate a square matrix 90 degrees clockwise using constant space.

Round 4(F2F)(90 minutes):
The interviewer asked a lot of questions about my projects. Spent about 30 minutes on questions related to NLP and machine learning. Asked me about SVMs, neural nets, back propagation etc.

Then he moved on to programming questions. I was asked to program a regular expression(regex) matcher. Given a pattern string and an input string return true if the two match. The regex special characters like * and ? had to be taken into consideration. Basically if there is a \xe2\x80\x98?\xe2\x80\x99 in the pattern string any character in the input string can take its place. Same goes for \xe2\x80\x98*\xe2\x80\x99 but in this case any number of characters can replace it in the input string.

```
\r\nExample: a*b matches acdb\r\n         a?b matches acb\r\n         a*b does not match bca\r\n         a?b does not m
```

The rest of the interview involved making modifications to this program. For example, modify the program so that it returns true on a partial match, i.e. even if the pattern is present inside the input string.

Round 5(F2F):
This round started with questions like why do you want to work for microsoft? Tell something about yourself etc.
Then came the final round of technical questions.
I was asked to write 2 programs and answer some theoretical questions.
1. Given a MxN matrix of 0s and 1s convert all rows and columns to 0 which have at least one 0 in them. You can use O(m) space.
2. Given a matrix of characters and an input string, return true if the string is present in the matrix.

```
\r\ninput string = ABCDE\r\nMatrix =  A    T   G\r\n          B   E    H\r\n          C   D    V
```

Output: string is present.

Some final questions:
1. Some questions about b trees. Don\xe2\x80\x99t remember the exact questions.
2. Describe an algorithm to balance a binary search tree.
3. Describe another algorithm for the same.

This was the final round.

I would like to thank the geeksforgeeks team for providing us with such a fantastic platform.

Hope this helps at least some of you.

Thank you.

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Microsoft Interview | Set 31 (On-Campus)

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2019

Recently Microsoft came to visit our campus for offering SDE positions. Here is my interview experience.

Online Rounds: These were organized by CoCubes.

Round 1 \xe2\x80\x93 There were 15 simple MCQ\xe2\x80\x99s. Most of them are from GeeksQuiz. Most of the students cleared this round.

Round 2 \xe2\x80\x93 There were 2 coding questions

1. Given a sorted list of strings that may contain NULL in random indices , return the position of a given search string. Return -1 if string not present.
   ex:\xe2\x80\x9dat\xe2\x80\x9d,
   \xe2\x80\x9cbat\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9dcar\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\x9d,\xe2\x80\x9d\xe2\x80\
   \xe2\x80\xa6 find \xe2\x80\x9ccar\xe2\x80\x9d . o/p: 4
   I initially tried a modified binary search, but something went wrong, So did a simple linear search. My bad \xf0\x9f\x98\x9b
2. Given an array of integers where all the elements occur odd number of times except 3 elements which occur even number of times, find the 3 elements.
   Similar Article :GeeksforGeeks Link

They shortlisted 39 students for a Group Fly Round.

Group Fly Round:

Students were divided into groups of 3 or 4 and were assigned a mentor. Everyone was asked the same question and was expected to write a clear and neat C/C++ code with comments wherever possible.

- The question was that an 1-D array contained N*N elements. Assuming that the N*N elements form a matrix, you have to rotate the matrix in-place.

A group of 16 students were selected from this round for Personal Interviews.

F2F : Round 1 \xe2\x80\x93 30 mins tops

1. What is your favourite subject ?
   \xe2\x80\x93 OOP
2. What are the basic aspect of OOP ?
   \xe2\x80\x93 Polymorphism, Encapsulation, blah blah
3. Explain Polymorphism to a layman
   \xe2\x80\x93 More blah blah
4. How and when is it implemented ?
   \xe2\x80\x93 Run time and Compile time, via Overloading and Over-ridding
5. He asked me to write sample code for each, which i did.
6. Given a linked list which has got a loop, how do u detect the loop. ?
   \xe2\x80\x93 Floyd\xe2\x80\x99s cycle detection algorithm
   He asked me to code it. He was happy; I had put checks for all corner cases.
7. Count the number of full nodes in a binary tree. Full nodes are those which have both non-null left and right children.
   \xe2\x80\x93 I gave a pretty easy recursive solution. He asked me to do it iteratively using a different traversal. So i did a level order traversal.
   He asked me to give all kinds of corner cases. He was happy.
8. Have you implemented thread library ??
   \xe2\x80\x93 Yes in Java and C++
9. Difference between thread and a process ??
   \xe2\x80\x93 Blah Blah.

F2F : Round 2 \xe2\x80\x93 45 mins

The interviewer was very serious and directly went into coding questions

- Given an array containing elements where all elements have even occurrences except two elements, find those elements.

\xe2\x80\x93 I gave him the xor approach where you have to find the rightmost set bit and then divide into two groups. He was waiting for that and went directly to bit representation, i.e. Little Endian and Small Endian.
Followup : Check if the given machine architecture is Little or Small Endian.

- Given two Strings, find the minimum length window in the first string containing all the elements of the second string.

-Did it pretty quickly. He kept tweaking the questions and asked me to make necessary changes in the code. Finally he asked me to give some good test cases.

F2F : Round 3 \xe2\x80\x93 45 mins

This was my final round with the AA Manager.

- He first asked me about my dismal CGPA :3

Then we discussed a little about my projects.

- He asked me about semaphores and we had a little discussion about the types of semaphores.
- Then he asked me to write the Signal() and Wait() functions.
- Finally he asked me to implement mutual exclusion in critical section. I gave the Peterson\xe2\x80\x99s algorithm.

He moved on

- Given an array of elements arrange the elements such that the odd elements are in the odd position and even elements are in the even position.

\xe2\x80\x93 I gave him a two pass approach where i segregate first and then separate accordingly. But he asked the one pass solution. This was when my luck ran out. I know its pretty easy, but messed it up. And the guy was also adamant because even after 15 minutes of trial and error, he asked me to go on.

Though I didn\xe2\x80\x99t get the job, it was a wonderful experience to be interviewed by such experienced people from the industry.
A few points that i thought would be worth mentioning \xe2\x80\x93

* Think out load, let the interviewer know that you have actual depth in the matter
* Always ask questions about a problem if you are not sure
* Always think about the corner cases and uncommon test cases before you start writing your code

Also, a big thanks to the entire GFG team for their constant efforts \xf0\x9f\x99\x82 Keep Coding, Keep Rocking.

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Microsoft Interview | Set 30 (On-Campus)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Online Round:
15 MCQ\xe2\x80\x99s and 2 coding questions organized by CoCubes.
Coding questions \xe2\x80\x93

1. Given a list of strings separated by space, return the position of the required string. Return -1 if string not present.

   ```
   ex:"at", "bat","","","car","","","","dog" ... find "car" . o/p: 4
   ```

2. Given a list of numbers find the numbers occurring even no. of times.

Group Fly Round:

1. Rotate a 2-d Matrix clockwise by 90 degree (inplace)

Round 1:

1. What do you understand by polymorphism?
2. What are constructors?
3. When are copy Constructors used?
4. What are virtual Destructors? Why do you need them?
5. Detect whether a linked list has a loop. Find the length of the loop.
6. Print the values of the Full Nodes in a Binary tree. (A node is said to be full if it has both right and left children).

Round 2:

1. Tell me something about yourself
2. What does the word \xe2\x80\x98System\xe2\x80\x99 mean in System.out.println in Java?
3. Given 2 sorted arrays, find the median element. (without extra space)
   Search for an element in an array. (He just wanted n comparison i.e. I was using a for loop which has a comparison and another comparison within the for loop to find the element., he counted them as 2 comparisons. Hence 2n comparison.)
4. First Normal Form. If a schema has a date attribute is the schema in 1NF.

Round 3:

1. Tell me something about your project.
2. Find the index of the element which is greater than the given number(the number may or may not be present in the array). The array is sorted , contains duplicates .
3. Delete n elements after m elements in a linked list, continue till the end of the list.

Round 4:(HR round)

1. Why do you want to work for Microsoft?
2. He gave a list of functions that can be used in a file. Find the last n lines in the file using those functions only. (Have you heard this question before? Have your friends discussed it with you? If you were in place of your friends would you tell them about your questions?)
3. Given a 2-d Matrix sorted row wise and column wise . Find the k-th smallest element.(Not the

min heap method, he needed a more optimized method. He guided me through the question.) Note: The panellist were quite experienced they will understand whether you know the question or not. So just own up. Test Cases are very important.

Microsoft has an amazing set of panellist. They are only interested in the basics. They won\xe2\x80\x99t ask very difficult questions, because they want to understand whether you can come up with a solution.

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Microsoft Interview | Set 29 (On-Campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Recently we had microsoft interview for internship in our campus.

Online Test
It was the technical + few aptitude test. There were around 4-5 set of mcq for all students at Cocubes.com. i was lucky to have a easy one.

Then i was selected for 2nd round .

Round 2 : (online judge)

Around 200 people were selected for 2nd round. This round contained 2 question.

1. Given a linked list which contains series of numbers seperated by \xe2\x80\x9c0\xe2\x80\x9d. Add them and store in the linked list in-place.

   ```
   for eg : i/p linked list is 1->2->3->0->5->4->0->3->2->0\r\no/p Linked list is 6->9->5
   ```

2. Given a binary tree and value V. delete all the leaf nodes whose values are equal to V. It must handle all cases for example if u delete both leaf from a node Say B. Then the node B also becomes the leaf node.
   This round was pretty easy one . first one can de done in O(n) and 2nd one can be done by postorder traversal.

   I was confident that i will be selected for next round. after one week results was announced and 24 students were selected for next round.

Round 3: (group interviews Written test)

This round for the only 17 students and first seven were allowed to enter directly 4th round. i was one among the seven. The ranking was based on the scores of first two round. so each and every round matters in microsoft.

2 question were asked for this interview.

1. Delete alternate nodes in a doubly linked list.
2. Convert a string into a string without duplicates without changing the order of characters IN PLACE. EG: Input: Bananas Output: Bans

.

Many of them were easily eliminated from this round. Neatness and indentation also matters.

Round 4: (technical round)

This round was the toughest round of all. The interviewr seems to be little strict. He called me and one more boy inside for interview.
I thought he will select one among us for next round. but actually thy don\xe2\x80\x99t compare in these ways. first question they asked me was

- given a 2d character array and u r allowed to move down, left, diagonal down and form a string and check whether that string is present in the dictionary or not.

ans. i gave him backtracking approach and he saw that and he asked whether i can improve it little more. i gave binary search solution for searching in the dictionary and he told me that i can use prefix checks also. then i made use of it. Then he moved to second question.

- given a chess board nXn size and knight and u start from position (a,b) and have to reach (C,d) in minimum number of steps and there can be wall in some squares boxes also which blocks knight.

GeeksforGeeks Link
i was really nervous and in tension i gave him DFS solution. he kept on asking me that can i improve it or not and finally i told i can apply djksthra algorithm. but i dint mentioned the word BFS. i came out and i thought i won\xe2\x80\x99t be selected for next round.

Meanwhile the questions asked to my friend were

- topological sort
- box stacking dynamic programming problem .

Round 5 (personal interview) :

> They called my name and i went inside. i have my resume to him and he went through it and then he was impressed by my groupon internship during 2nd year. then he asked me Why Microsoft? and then we talked for a while about games programing (Xbox) and he asked about cloud computing. Then he saw in my resume that i was mentor in Data structures for Weak students so he asked my question in Linked list.

- Given a singly linked lists of 2n size. First n and second n are sorted. Sort the entire linked list. he asked for all possible solutions. i told him solutions for

  - swaping by node
  - swaping by data
  - merge sort method
  - hashing (counting sort method)
    it was not too hard one .

Round 6 (final round)

> I think it was stress interview. the interview called me inside with one of my friend . he asked us about previous two round. Then he gave me 2 question

- Design LRU cache. (i read this just a day before)
- Find and replace in a string.

Finally i was selected for microsoft internship. The people from microsoft were also very good and friendly. I read few websites before Interviews and geeksforgeeks is one of the best among them. Its really good to prepare for interview from geeksforgeeks and each and every round matters in microsoft.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 28 (On-Campus)

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Microsoft Interview Experience(On Campus)

1st Round :
Online test was taken in the morning by cocube with 15 MCQ. Time was given for this 30min.
I had some problem (can\xe2\x80\x99t write here) so I did in 10 min and rush back to room. (I think u understand why I came back to room.)
After 2 hour result announced and was in the shortlisted of 78 students.

2nd round Begin : (time 70min.)

> Again an online coding round begin with 2 question given.

- Q.1: An array of string is given in sorted order but it can have any no of null sting in between. One another string you have to search in that array of string. If string found then return the index of that, otherwise return -1.
- Q.2: An integer array is given which consisting integer no\xe2\x80\x99s, But in that array 3 unique no are there whose no of occurrence is even.

Print those three no and the sequence in which the appear in the array.
I did both of the question one I did myself and another one with the help of my friend.

Result Declared after two day on Friday. My name also were there with 28 students.

Round 3 Begin: (Group Fly Round):

> They assembled us in a room and gave same problem to everyone and ask to right the algorithm for that.

- Question: word reversing of the string.

Eg. \xe2\x80\x9cMicrosoft visited your campus\xe2\x80\x9d.
Expected Output: \xe2\x80\x9ccampus your visited Microsoft\xe2\x80\x9d.
Question was pretty simple everyone knows how to do it.

I don\xe2\x80\x99t know on which base the selected only 12 out of 28 students, and I was one of them who selected.

Round 4 (F2F) : (Time 1hr.)

> It was technical round.
> Firstly he went through my resume and asked about my project (Done in c++) which I mentioned in my Resume.

- They ask which oops concept you used in your project. I told and explained everything whatever I had used\xe2\x80\xa6
- Then he asked me by which oops concept you can improve your project\xe2\x80\xa6I told about STL and explained how I\xe2\x80\x99ll do.

Then he came to data structure and ask very few simple questions\xe2\x80\xa6.

- Q.1 : an array of 1\xe2\x80\xa6N no is given to you, but one no is missing, how will you find that.

I think everyone knows how to do it..

- Q.2 : A string is given to you, and you have to find out first non-repeating char.

I had done before this question from geeksforgeek. So no problem at all.
Then some optimization discussion on different assumption\xe2\x80\x99s like\xe2\x80\xa6if you string consisting Bytecode char and all.

After one hour they announced the result of Round 4, I was the one of 7 students out of 12.

Round 5 (F2F) : (Time 1hr.)

It was another technical Round.

- Firstly he gave me his intro then I\xe2\x80\xa6..

Then he gave me my page on which I had written algorithm in Group Fly Round. And asked me to code it.
I did and explained.

- Then he asked me\xe2\x80\xa6. For implementing a dictionary which data structure you will use..???

I answered I\xe2\x80\x99ll use Trie .
He spelled \xe2\x80\x98T\xe2\x80\x99\xe2\x80\x99R\xe2\x80\x99 \xe2\x80\x99E\xe2\x80\x99 \xe2\x80\x99E\xe2\x80\x99\xe2\x80\xa6
Then I said no sir \xe2\x80\x98T\xe2\x80\x99 \xe2\x80\x98R\xe2\x80\x99 \xe2\x80\x98I\xe2\x80\x99 \xe2\x80\x98E\xe2\x80\x99\xe2\x80\xa6
I explained with structure of trie how it is useful, beneficial and efficient.

- He told me to implement it in Tree.

I did that\xe2\x80\xa6By BST

- Then he made a loop in my BST by connecting two child node. And asked me to remove it..

I loop is not possible in a BST.
He asked me to proof it\xe2\x80\xa6and I proved.

Then he came to Puzzles\xe2\x80\xa6\xe2\x80\xa6

- He gave a puzzle of \xe2\x80\x9c8 coins and a balance scale\xe2\x80\x9d

I knew it because I had done already.
But don\xe2\x80\x99t know why I couldn\xe2\x80\x99t solve there.
He gave me some hint after some time he told me the ans and how to do\xe2\x80\xa6
It can be done by using balance scale two time.
Mine answer was 3.

\xe2\x80\xa6\xe2\x80\xa6
\xe2\x80\xa6\xe2\x80\xa6.
After some time result came out\xe2\x80\xa6.

5 students were selected out of 7 for final HR round\xe2\x80\xa6But this time I was in those 2 who went out..
\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6Thanks a lot to GeeksforGeeks for helping me.

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[TopTalent.in] Exclusive Interview with Prashanth from IIT Madras who landed a job at Microsoft, Redmond

- Last Updated :\n01 May, 2017

Armed with a dual degree from IIT, Madras, and a very strong resume, Prashanth Srikanthan was destined to land a lucrative offer from one of the big recruiters. So when Microsoft\xc2\xa0came calling he converted his potential into a Rs 60 Lakh package as a Software Engineer.\xc2\xa0TopTalent.in\xc2\xa0brings you his opinions and advice about dealing with interviews.\xc2\xa0

TopTalent: How does it feel to be selected by Microsoft?

Prashanth: It felt good to be recognized for the effort put in. It was definitely a proud moment to be hired by a company with such a rich history. After a few years of lacklustre activity in the spectrum of consumer products, I believe Microsoft is finding its way again, so this is an exciting time to join the organization.

TopTalent: Which companies did you get an offer from apart from Microsoft, Redmond?

Prashanth: I received an offer only from Microsoft Redmond. I was interviewed by Google MTV (Mountain View), Epic Systems Wisconsin and Oracle California besides Microsoft Redmond. My interviews with Oracle were left incomplete due to lack of time. Although I had excellent interviews with Epic Systems, I asked the HR to not extend an offer to me as I was uncomfortable with the fact that they had an office only in the US, and therefore being unlucky in the H1B-visa lottery would make the job offer worthless for at least a year.

TopTalent: Can you give us a brief account of what you felt was the toughest interview?

Prashanth: I think toughness of an interview is subjective to a certain extent. Having said that, the toughest interview for me was undoubtedly the final interview for Google MTV. They asked me a challenging set of questions, mostly open-ended. Overall, I would say Google had the toughest interviews.

TopTalent: What was your preparation strategy?

Prashanth: Preparation aimed specifically towards interviews was done in the 3-4 months leading up to the placement season. Apart from the resources I consulted, I also asked a couple of\xc2\xa0friends to suggest problems to think about during my free time. Whenever I encountered an algorithmic problem, I would try my best to solve it without consulting the web or a friend. Then I would code it up, since fast coding is often a great advantage during placement interviews.

TopTalent: What resources did you consult? Where did you practice problems from?

Prashanth: I read a few chapters from \xe2\x80\x9cCracking the Coding Interview\xe2\x80\x9d by Gayle Laakmann McDowell, which I would suggest as a first resource for anyone appearing for a coding interview. Besides the book, I used to look up online resources like GeeksforGeeks and Leetcode from time to time. The tutorials at topcoder are also a fine resource. For a couple of years, I had been solving problems from codechef, codeforces and topcoder sporadically out of interest which helped me break into the mindset of an algorithmic problem solver.

TopTalent: What kind of skills do you think helped you getting this job?

Prashanth: The obvious answer is, first and foremost, algorithmic problem solving skills. Additionally, I was working, at that time, on two significant, interesting projects which I was very enthusiastic about, and spoke enthusiastically about them to my interviewers which I believe was a non-trivial factor in creating a favorable impression.

TopTalent: What is your advice to students who are aiming for similar placement offers as yours?

Prashanth: For the interview questions, practice a lot of problems and don\xe2\x80\x99t feel lazy to practice writing code. In my case, the interviewers (from Microsoft and Google) were very interested to hear about the research work that I had carried out and was planning to pursue in my final semester. I would advise students to take an initiative to undertake projects that interest them, because it will give you an edge in the interviews.

TopTalent: What should one keep in mind while preparing a resume?

Prashanth: I spent a considerable amount of time preparing my resume. My rule of thumb was to not exceed 2 pages. It is always a good idea to scrutinize your resume from the perspective of an interviewer and ask yourself how you can make it better, more concise, more appealing. Never claim to know something you don\xe2\x80\x99t. Do not be afraid to deviate from a fixed resume template (that your institute might suggest, for example) if you feel a different arrangement represents your case better. Advertise your achievements and projects well, and be thoroughly prepared to answer questions on every point mentioned in your resume.

TopTalent: Please add other details that you want our readers to know.

Prashanth: I want to emphasize a couple of points. First, always remember that the company you are interviewing for wants to hire you as much as you want a job offer from them. Remembering this simple fact helps in maintaining confidence and avoiding panic during the interviews. Second, never try to deceive the interviewer. Try to be as honest as possible and if you do not know something, admitting it is far better than any alternative.

You can\xc2\xa0login and download\xc2\xa0Prashanth\xe2\x80\x99s resume from TopTalent.in.\xc2\xa0

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Microsoft Interview | Set 27

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Round 1: (1 h)
==========

1. Q1. Design a Garbage collector like java. How would you detect depended reference loop?
   Hist : Class design, Cycle detection algorithms for disjoint graph(List of connected graph)
2. Q2. Find an element in a sorted rotated array in O(logn) complexity.

Round 2:(1.h 15min)
==========

1. Q1. Given a sorted array having duplicate elements,how would you find first index of a given element in O(logn).
   Write code for it. Change the condition to find out last index of that elements.
   [Hint Binary search]
2. Q2. You have a dictionary of words. Given a word, print all anagram are in dictionary . State the data structure to be used to solve this problem.
3. Q3. Design a Chip-Encryption system. Which will do following operation:
   - Take a word from user
   - Encrypt the word by some Private or public key cryptography or any other algo.
   - Transmit the encrypted word by TCP or UDp or SSL.
4. Design the class diagram using OOD. Which design pattern you are using to achieve this.

Round 3:(1.h 15min)
==========

1. Q1. In a plane n points (X and Y) is given. How will you find out maximum co-liner points. Extend this algorithms. it for point(x,y,z) in 3D plane.
2. Q2. Reverse a 32-bit integers. write code for it.
3. Q3. What the different issue in multi-threading ? What is the difference between mutex and semaphore.
4. Q4. You have a file with million words in it. Find most frequent 10 word in that file. Node that you can store all word in memory.
   (Note : Min-Heap + List)

Round 4 :
Skipped \xe2\x80\xa6 \xf0\x9f\x99\x82

Round 5(2h 30 min)
==========

1. Q1. You are given a Text, where all space, full stop and all punctuation mark is removed. You want to reconstruct the text by putting spaces between words.
   A dict is given and following API is also given.
   - Decide if the text can be converted a sentence with valid words or NOT.
   - Find how many way you can do the reconstruction of the text.
   - Find what is the minimum number of space can be used for this reconstruction.
   - For case (c) find out the indexes where you suppose to put a space.
   - Now recover the text to sentence in place .

Subsequent Question:

- 1. Why Greedy technique will not work for this?
- 2. yes ! Backtracking will work, what is the problem of using backtracking ?
- 3. Illustrate and explain how the solution is contracted from the Dynamic table ?
- 4. Write the correct working code for (c),(d),(e).
- Q2. Given a BST, find out the minimum length form root to leaf with sum S. Note that:

  - Path from root to leaf node.
  - Sum of node of the path is S
  - if multiple such path exist, print minimum length path.
  - What is advantage of BST rather than BT used for this algorithm, how it improve the performance. in BST, is it required to explore both side ?
  - Write working codes for it.

Status: Selected ! (The interview call was for SDE-I, but they offer me for SDE -II(L61) position)

Many many congratulations to the author. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft\xe2\x80\x99s most asked interview questions

- Difficulty Level :\nHard
- Last Updated :\n07 Jul, 2021

Like other product based companies, Microsoft also asks data structures and algorithms as part of their technical interview. Below is a of questions prepared from different Microsoft interview experiences.

Most Asked Questions

- Check if a Binary Tree is BST or not \xe2\x80\x93 Practice here
- Remove duplicates from a string, do it in-place \xe2\x80\x93 Practice here
- Given a rotated array which is sorted search for an element in it \xe2\x80\x93 Practice here
- Given two linked lists that represent two big numbers (numbers that can not be stored in an int or long long int), write a function that adds the numbers and store the result in a third list.
- Variations of above question like subtract two numbers or multiply two numbers represented by linked lists. \xe2\x80\x93 Practice here
- Print last 10 lines of a big file or big string.
- Clone a linked list with next and arbitrary (or random) pointer
- Connect nodes at same level. Practice here.
- Least common ancestor of a binary tree or a binary search tree
- Test case questions like test an ATM.
- Run length encoding. \xe2\x80\x93 Practice here
- Detect cycle in a linked list. Practice here.

- Given a sorted array of size n. Each element in array is unique and lies from 1 to n+1. Find the missing element. Write code and test cases for the same. \xe2\x80\x93 Practice here

- Check if a binary tree is balanced.
- Validate a given IP address

- Why do you want to join Microsoft?

- Two of the nodes of a BST are swapped. Correct the BST

- Draw a circle without floating point arithmetic

Important Links

- Microsoft\xe2\x80\x99s most frequently asked interview questions | Set 2
- Microsoft Interview Preparation
- Microsoft Interview Experiences
- Microsoft Practice Questions
- Top topics for Interview Preparation
- Recent Microsoft Interview Experiences

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Microsoft Interview | Set 25 (On-campus for Internship)

- Difficulty Level :\nBasic
- Last Updated :\n10 Jan, 2019

Microsoft IDC Internship Selection Process
Hi everyone! I sat for Microsoft IDC Internship Selection Process. The whole process comprised of 6 rounds as follows:

Round 1
This round was taken on-campus and it included 15 aptitude questions containing mostly problems related to general programming in C. The round was hosted on CoCubes.com. 46 students were shortlisted from around 150 students.

Round 2

> This round was also taken on-campus and hosted by CoCubes.com. We were given to solve two coding problems on an online judge. The questions were:

- To check a tree is BST or not.
- Change one string to another with minimum number of changes (Sorry! I don\xe2\x80\x99t remember the exact one).

22 students were shortlisted from this round.

Round 3 (Telephonic)

> The interviewer started with the introduction and went on asking questions from my resume. You must prepare your resume well and go through it thoroughly. Then after asking questions from my resume for around 20 minutes he asked a coding question. The question was:

- Given a series of numbers, print which number is repeated how many times?

I gave brute force solution first by using arrays. Then he asked if we have million of numbers and negative numbers as well then which data structure will be used. I said hash table. He asked certain questions on hashing. Then he said if don\xe2\x80\x99t care about time complexity and want to find in-place solution then what will be another method. I said first sort it and then count.

He appeared to be impressed and I was selected for the 4th round. From our institute 9 students were shortlisted for the next round. For next rounds students from all over the country were called to Delhi and Bangalore. I was called to Delhi.

Round 4

> There were around 60 students. They were divided into two groups of 30 each. I was in the latter group of 30. We were given two coding questions to be solved on paper. The questions were:

- Compress a string in-place.
- Define BST. Check a tree is BST or not.

A total of 5 students from us were selected and I was lucky enough to be one of them. 10 students were selected from the former group of 30 students.

Round 5 (Personal Interview)

The interviewer started by asking a coding question:

- Given a rotated array, find the first element of the former un-rotated array.
- Then he asked some questions from Operating Systems.
- He then asked how to implement a queue from stacks.

I was not lucky enough to clear this round but it was a motivating experience. \xf0\x9f\x99\x81

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Microsoft Interview | Set 24

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Hello everyone, I recently got selected for the internship at Microsoft IDC. GeeksForGeeks helped me a lot in preparing for the coding tests as well as for interviews. The positions that they were interviewing for were SDE and SDET(Testing).

1st Round. \xe2\x80\x93 Online \xe2\x80\x93 30 mins
The first & second rounds were online rounds which were hosted on cocubes.com . There were 15 MCQ questions. For me most of the questions were from C++, C. For others very few questions were from microprocessors, aptitude.

2nd Round. \xe2\x80\x93 Online \xe2\x80\x93 30 mins

This was a coding round in which two problems were given.

- **Problem \xe2\x80\x93 1**: Given a singly linked list,in which the last node points to the middle node,delete the middle node and remove the loop.
- **Problem \xe2\x80\x93 2**: Given an array of size n, find the majority element.Majority element is one which gets repeated for more than n/2 times.

3rd Round \xe2\x80\x93Telephonic interview- 45 mins

1. Tell about yourself? [Don\xe2\x80\x99t tell ur fathers name, etc tell about ur Hobbies, extra-curricular activities, accomplishments, ur strengths, ambition, etc.,]
2. Tell about any challenging task that you met in your life.[I told about the difficulties met in my project, it took 30 mins]
3. Tell about your achievements.
4. What is a good coding.
5. Why do you want to work for Microsoft?
6. Any questions?[Ask some interesting questions,it is a plus]

4th Round \xe2\x80\x93 Interview[conducted in Bangalore IDC]-45 mins

1. Given an address of a node in a singly linked list,delete that node.
2. Find the nth node from the end of a singly linked list.
3. Check whether a binary tree is a BST.
4. About project
5. Any questions?

5th Round \xe2\x80\x93 Interview[conducted in Bangalore IDC]-30 mins

1. About project
2. Why do you want to work for Microsoft?
3. What is the disadvantage that you think that gmailhas?How will you overcome it?[for these types of questions if you have not used the product for which you were asked to find a disadvantage, you can tell the interviewer so that they \xe2\x80\x98ll be suggesting you some other product]
4. Insert a node in a doubly linked list.
5. Any questions?

6th Round \xe2\x80\x93 Interview[conducted in Bangalore IDC]

1. Given a rotated array which is sorted search for an element in it.
2. Why do you want to work for Microsoft?
3. Tell about your strengths.
4. Any questions?

My tips to crack Microsoft interview:
While answering the questions remember the following:

1. Be yourself.
2. Show excitement and interest in solving the questions.
3. Think aloud.
4. Clarify doubts regarding the question.Don\xe2\x80\x99t assume things.
5. Cover all the test cases in your code.
6. Don\xe2\x80\x99t interrupt.
7. Be up-to-date about the company.This will help you in asking some interesting questions about the company
8. Don\xe2\x80\x99t write about things that you are not sure about in your resume.
9. Enjoy the interview.Don\xe2\x80\x99t be nervous.

Books and websites that I referred:
1.\xc2\xa0\xc2\xa0www.geeksforgeeks.org
2.\xc2\xa0 Cracking The Coding Interview by Gayle Laakmann McDowell (a very good book) If you get selected for internship, you also have a chance to get converted into an employee over there,if you do the project given there well and if you perform well in the interviews that they will be conducting after completing your project.

All the best!!!

I would like to thank GeeksForGeeks for mainting a high quality problem set for coding tests and interviews.

Many Many congratulations to the author. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

Related Practice Problems

Majority Element

All Practice Problems for Microsoft !

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Microsoft Interview | Set 23

- Difficulty Level :\nMedium
- Last Updated :\n15 Jul, 2021

Written Test: First round was an online test on cocubes platform (not good for coding). This test is based on C, C++ and DS. The shortlisted students in this round were selected for next round which is coding round. Coding round had two questions:\xc2\xa0

\xc2\xa0

1. In a Tic-Tac-Toe game two players are playing where player 0 is denoted as 0 and player 1 is denoted as 1. Given a linked list of moves made by the players ,determine who is the winner and in how many moves he required for winning.\xc2\xa0
   \xc2\xa0

   ```
   Struct Move {\r\n   int p; \xc2\xa0 \xc2\xa0//Player number\r\n   int x; \xc2\xa0 \xc2\xa0//x and y pos in the tic-t
   ```

   Solution: GeeksforGeeks Link

2. Given an array if in a position let a[i][j] =1 then print all it\xe2\x80\x99s row and column 1. You should not consider a position 1 after you made it 1 in your past computation.\xc2\xa0
   Note: In this question it is asked to not use any extra space.\xc2\xa0
   \xc2\xa0

   ```
   sample(input):\r\n(i) 00100 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0 \xc2\xa0(ii)10\r\n    00000 \xc2\xa0 \xc2\x
   ```

Group Fly/Activity:\xc2\xa0
\xc2\xa0

1. Check if a binary tree is balanced or not.
2. remove duplicates from a string inplace.

\xc2\xa0

Interview Round-1:\xc2\xa0
\xc2\xa0

1. Interviewer asked me to optimize the code for the question 2 in\xc2\xa0previous round (Not in terms of complexity but in terms of number of\xc2\xa0assembly instructions, time taken to execute each instruction)
2. Some simple questions based on LL. Sorry I couldnt recollect \xf0\x9f\x99\x81
3. Recognize power of two using bit operations

Interview Round-2:\xc2\xa0
\xc2\xa0

1. A node which has following fields\xc2\xa0
   \xc2\xa0

   ```
   a) data\r\n  b) next_ptr\r\n  c) prev_ptr
   ```

   can be used to represent doubly linked list, binary tree or none. Given\xc2\xa0a random pointer recognize whether it forms DLL, Binary Tree or none. I\xc2\xa0pointed out that for Binary tree root node has to be given then he asked\xc2\xa0me to assume the same.

\xc2\xa0

Interview Round-3:\xc2\xa0
\xc2\xa0

1. 2 numbers each reperesented by linked lists, write a function which \xc2\xa0gives difference of these numbers.
2. Consider a webpage which has a big single image and another page in\xc2\xa0which the previous image is divided into 6 parts, which one loads faster? \xc2\xa0
   Now propose a solution reducing the loading time.(There are no bounds for\xc2\xa0this question to think, I proposed a solution which includes concepts from\xc2\xa0vision, networks and multimedia. The interviewer was very much impressed\xc2\xa0and immediately told me that I am going to have a next round)

Interview Round-4:\xc2\xa0
\xc2\xa0

1. Copy a linked list with next and arbit pointer..\xc2\xa0
   I told him that I knew this question, then he asked me for the approach and test cases and moved to the next question.
2. Given two sorted arrays. Second array has enough extra space to accommodate elements in first array. Give the resulting sorted array obtained by merging two arrays without using extra space.
3. Consider a binary tree for which root node and a target node are given to you. Give the next sibling of the target.(let the target be in level k, then you need to give the immediate node which is in level k)
4. Other questions were based on arrays, linked lists and binary trees (mixture of these).

All the interviewers were very cool, helpful etc etc\xe2\x80\xa6 They understand our tension and try to make us feel as comfortable as possible. The first interviewer even put his arm over my shoulder during our little walk from canteen to interview room.\xc2\xa0

And yes hired!!! Thanks to GFG.\xc2\xa0

Many Many congratulations to the author. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to review-team@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.\xc2\xa0

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Microsoft Interview | Set 22

- Difficulty Level :\nEasy
- Last Updated :\n28 Apr, 2017

Hi, PFB my on campus interview experience with Microsoft.

Written Test:
First round was an online test which contains 20 MCQs on C & C++. Based on this test, they shortlisted some students and the next round was taken. The next round was a coding round which had two questions:

Q1. Print last 10 lines of a very large string.

Q2. Trim all the nodes in a BST which are not in the range of (minValue, maxValue).

The codes were checked on their online compiler with their test cases.

Group Activity:
The night before the day of interview, we had a group activity round. We were given to solve one question on our own, and the other one we had to solve discussing with Microsoft mentor allotted to you.

Q1. Insert an element in a sorted circular singly linked list. Pointer to any node of the list (may be denoted as the head) and pointer to the new node will be given as input. Generate test cases for your code. Check for all corner cases.

Q2. An MxN matrix is given. If a cell contains 0 (zero) make that row and column zero. We had to discuss this question with Microsoft mentors. Discussion was important and they pointed out flaws and ask you to optimize algo (Space complexity).

Interview Round-1:
Q1. After a brief introduction the interviewer asked me to solve the puzzle of 100 bulbs. There are 100 bulbs (initially all switched off). At i-th iteration all the switches of i\xe2\x80\x99s multiple are flipped. Finally, after 100 such iterations, how many bulbs will be still switched on?? I didn\xe2\x80\x99t know the solution. The interviewer gave me a hint. Then after doing some maths, I finally gave him the solution (Perfect squares). Then he asked me to prove it. Somehow, I proved it (I was feeling lucky :P).

Q2. In continuum to the previous question, he asked me to write a function which will take a number as input and return all of it\xe2\x80\x99s factors. I solved it in O(sqroot(N)). Then he asked me to check whether I missed any edge case. So, I put a checking for negative numbers. He was happy with it.

Q3. Then he asked me to write the code for DFS traversal of a tree. I asked him about the tree structure. He told me to write for an N-ary tree. Did it, using a vector (C++) of children pointers. This time, I didn\xe2\x80\x99t miss a corner case (coz, there was almost none :P). He was happy with it.

Interview Round-2:
Interviewer was very cool and very frank. He went through my CV thoroughly asked me one question in SQL and two algorithm questions:

Q1. He gave me an Employee table with Id, Name and ManagerId columns in it and then asked me to write an SQL statement which will output all the manager names who have at least 2 subordinates

under them. I know, it\xe2\x80\x99s very easy :P.

Q2. He asked me to write the code to clone a singly linked list with next and random pointer and told me not to worry about any space complexity. \xc2\xa0A fairly easy one. Solved it using a hash.

Q3. In continuum to the previous question, he asked me to rewrite the above code without using any hash. Did it very quickly :P. He was really happy and chatted with me for a while. I even chewed a gum after taking his permission. He was very impressed by my handwriting. Yeah you heard me right, I was feeling lucky :D.

Interview Round-3:
Interviewer was funny and he continuously asked me not shout (though, I really wasn\xe2\x80\x99t in a mood to shout ;)).

Q1. He asked me to write a function which will connect all the nodes in a binary tree at the same level. I told him, I knew it and explained it in brief. He was cool and asked me whether I wanted to have a new question or just write this one. I said, \xe2\x80\x9cAs you wish\xe2\x80\x9d. So he moved on.

Q2. He explained an use case of MS Excel: we can select multiple columns in excel file and drag them together left or right. He then asked me to write the code to implement the aforementioned scenario on arrays. The input will be, an array, left and right index of a sub-array (multiple columns) and a destination index (either in left or right of the sub-array). After scratching for a few moments, I gave him an O(n) solution with left and right shift using flip method. He was really impressed and praised my handwriting once again (God is great :)).

Q3. He quickly moved to the last question. A file with numbers from 0-9999999 (each number in a line) is given. How to sort the content. I gave him a solution with radix sort (as maximum 7 digits are possible for each number). Then he posed a constraint of very less RAM available. I discussed a modified external merge sort like algorithm with him. But then he told me to minimize the huge time taken by external merge sort. Then he gave a hint as \xe2\x80\x9cUse bits\xe2\x80\x9d. So I told him, to use a 10^7 size vector (which actually uses one bit for one boolean). He was okay with it.

Finally I was HIRED !!! \xf0\x9f\x98\x80 \xf0\x9f\x98\x80

I am really really grateful to the geeksforgeeks team. How much I say about it, it will definitely be less. Keep up the great work \xf0\x9f\x99\x82
\xc2\xa0

Many Many congratulations to the author. \xc2\xa0If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 21

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Hi, a brief documentation of my Microsoft experience is as follows:

Group Activity:

> On the evening before the interview we had a group activity round. We were given to solve one question on our own, and the other one we had to solve discussing with Microsoft mentor allotted to you.

- Insert an element in a sorted circular singly linked list. Pointer to any node of the LL will be given as input
- A matrix m*n is given. If a cell contains 0 (zero) make that row and column zero.

We had to discuss Q2 with Microsoft mentors. Discussion is important and they point out flaws and ask you to optimize algo.

Interview Round 1:

1. Asked me to solve Q2 of group activity without using extra space.
2. Given an array of digits, form two numbers from those digits such that sum of those two numbers are minimum
3. Given an array of numbers, find out the minimum distance and print all the pairs with minimum distance

Interview Round 2:

1. Two string S1 and S2 are given, check whether S1 is a shifted version of S2
2. Write KMP/ Rabin-Karp for substring matching
3. Given a pointer to a circular linked list, delete that node

Interview Round 3:

1. Given a set of rectangles of varying length and breadth, find out the maximum height stack you can form with them such that if rectangle R1 is on top of rectangle R2 then length(R1) <=length(R2) and breadth (R1)<=breadth(R2)
2. Given the number of braces(opening +closing), find out the number of valid combinations you can form with them.

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Microsoft Interview | Set 20 (On-campus for Internship)

- Difficulty Level :\nMedium
- Last Updated :\n11 Jun, 2020

Hello everyone, I recently got selected for the internship at Microsoft IDC. GeeksForGeeks helped me a lot in preparing for the coding tests as well as for interviews. The positions that they were interviewing for were SDE and SDET(Testing).

1st Round. \xe2\x80\x93 Online \xe2\x80\x93 30 mins
The first round was an online round which was hosted on cocubes.com. There were 20 MCQ questions. Questions were from a variety of topics like Algorithms, Data structures, C, C++, OOPs, Memory Management, Computer Architecture, etc.

2nd Round. \xe2\x80\x93 Online \xe2\x80\x93 1 hour
This was a coding round in which two problems were given.

1. *Problem \xe2\x80\x93 1:* Given a word and a text, return the count of the occurrences of anagrams of the word in the text.
   For eg. word is \xe2\x80\x9cfor\xe2\x80\x9d and the text is \xe2\x80\x9cforxxorfxdofr\xe2\x80\x9d, anagrams of \xe2\x80\x9cfor\xe2\x80\x9d will be \xe2\x80\x9cofr\xe2\x80\x9d, \xe2\x80\x9corf\xe2\x80\x9d,\xe2\x80\x9dfro\xe2\x80\x9d, etc. So the answer would be 3 for this particular example
2. *Problem \xe2\x80\x93 2:* Given a binary tree with parent pointers, find the right sibling of a given node(pointer to the node will be given), if it doesn\xe2\x80\x99t exist return null. Do it in O(1) space and O(n) time.

3rd Round \xe2\x80\x93 Group Test \xe2\x80\x93 Code on paper \xe2\x80\x93 45 mins
First, we had to discuss the solution with the assigned mentor and then we had to code it on paper(no pseudo code)

1. *Problem 1:* Given a BST, one of the nodes violates the BST property(left-child < parent < right child), return the pointer to that node.
2. *Problem 2:* Two no.s having equal no. of digits were given in the form of singly linklist. (For eg.- 102 will be given as 1 -> 0 -> 2). Add these no.s and return the answer in the form of a singly linkllist. Do it in O(n) time, given n digit numbers
   GeeksforGeeks Link

4th Round \xe2\x80\x93 Interview

1. I had to implement a T9 dictionary . insertWord function and populateWords were the two functions which I had to implement on paper(again no pseudo code).

   First I have to discuss the approach with the interviewer and then he asked me to code.

5th Round \xe2\x80\x93 Interview

1. He dicussed the work that I did in my last summer internship and after that he asked me to code the maximum subarray problem in one pass.

I and my friends who got internships at Adobe Research, Amazon, De-Shaw, Samsung would like to thanks GeeksForGeeks for maintaining a high-quality problem set for coding tests and interviews.

If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 19

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

I recently got interviewed for a position in Microsoft, following is my interview experience.

Round 1 (Telephonic):

Started with my introduction followed by my work in existing company.

- Given a circular doubly linked list, delete a given element. He was looking for all the corner cases GeeksforGeeks Link

Round 2

1. Given an integer array find largest sum of elements which is continuous (kadane algorithm), Later asked to make code changes to find the array also. Also asked to give test cases for the same.
   GeeksforGeeks Link
2. Given a design of an application, comment/recommend the changes to be done

Round 3:

1. Given two linked lists check if they intersect??
   GeeksforGeeks Link
2. Test cases to test an ATM

Round 4:

1. Find least common ancestors of a binary tree (I said I know this, he moved to next question)
   GeeksforGeeks Link
2. Check if one array is subset of other (discussed different methods like hashing, sorting), asked to write a sorting function also
   GeeksforGeeks Link
3. Design questions related to the team they were interviewing for.

Finally I got an offer from Microsoft, they are very pleased with my performance. All the interviewers are very friendly. Thanks a lot geeksforgeeks, with out your help this would not have been possible.

This article is compiled by Chandrakanth. Many Many congratulations to Chandrakanth for his selection. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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[TopTalent.in] Interview With Nandini from VNIT Who Bagged an Off Campus Job in Microsoft

- Last Updated :\n28 Apr, 2017

It is not just intelligence but intelligence coupled with inherent confidence is what makes a person truly remarkable. It is these truly remarkable people who go that extra mile to achieve their dreams. Nandini Yeltiwar, a student of VNIT Nagpur, bagged a job in Microsoft India, not through campus placements but through the off-campus employee referral channel. She was happy to share her experience with\xc2\xa0TopTalent\xc2\xa0and gave us some interesting insight into how she landed a dream job in one of world\xe2\x80\x99s top software companies.

So here is her interview where she talks about the Microsoft interview process and how she landed a job there. Don\xe2\x80\x99t forget to\xc2\xa0download her resume\xc2\xa0by logging in to understand what makes her special.

TopTalent: Can you describe the hiring process in detail?

Nandini:\xc2\xa0We had applied off-campus through employee referral and we were initially shortlisted based on our resumes. The first two rounds were an aptitude test followed by a coding round test in which we were required to give syntactically correct code. The coding round had short basic coding problems. After each round some applicants were eliminated. People shortlisted from coding round had a phone interview which had mostly behavioral questions. They went through our resume and asked us questions on internships. Some of us were even asked technical questions in this round. Those of us who cleared the phone interview were called to the Microsoft IDC campus in Hyderabad for the technical rounds of interviews. There were three rounds which focused on each of the different positions for freshers which are Software Development Engineer and Software Development Engineer in Test. The technical interviews mainly stressed on data structures and algorithms. One round was entirely focused on testing. For each proposed code we need design test cases and hence verify the code.

TopTalent: What skills according to you was the company looking for in candidates?

Nandini:\xc2\xa0 The company looks for candidates who are strong in algorithms and programming and have good problem solving ability. They\xe2\x80\x99ll start off with simple problems and they\xe2\x80\x99ll keep adding more conditions to the problem. They require you to be good at optimizing the answer and modify the solution after each condition that is added. You need to be good in communicating your logic to the interviewer. In case of testing, they expect you to cover all boundary and special conditions.

TopTalent: What was that x-factor which might have helped you over others?

Nandini:\xc2\xa0 My final year project was on testing a software produced by a company. I feel that this made me a good fit for the testing profile since I studied quite a lot about testing due to the project. Apart from this, I had practiced a lot of coding questions, available on Internet and through

various books, before the interview which helped me in clearing technical interviews successfully. I had given quite a few interviews at campus before appearing for Microsoft, which helped in handling interviews well.

TopTalent: How important are resumes in the whole process?

Nandini:\xc2\xa0 The initial screening was based on our resume. However, the resume is not very important once you start the interview process, though a striking resume always helps. It\xe2\x80\x99s alright if you do not have impressive internships and projects. They don\xe2\x80\x99t expect rocket science from freshers. They do ask questions on the projects and internships listed on the resume in the phone interview so be well versed with all the projects you mention. You need not have a lengthy resume mentioning every small thing you did, but a short one having the major things. Whatever you mention in the resume you need to know it well in order to answer any type of questions on it.

TopTalent: What tips you can give which might help others applying to similar jobs?

Nandini:\xc2\xa0I would recommend practice. Improve and practice coding problems, basic data structures and algorithms. During the interview there won\xe2\x80\x99t be any compiler or syntax highlighter, so be proficient in writing code on paper or a white-board. Always communicate your logic to the interviewer. Sometimes they may forgive stray syntax as long as your logic is sound. You will be asked some testing questions which you need to crack even if you aren\xe2\x80\x99t interested in the Testing profile. For such problems, develop test cases based on the requirements of the software. During interview keep telling the interviewer the ideas or the way with which you are thinking to solve the problem, this is always appreciated and they can even help you in case you get diverted from the proper way of solving.

This article is powered by\xc2\xa0**TopTalent.in\xc2\xa0**\xe2\x80\x93 A high end Job portal for students and alumni of Premier Colleges in India. Sign up now for free exclusive access to top notch jobs in India and abroad. Get in touch with\xc2\xa0them\xc2\xa0via\xc2\xa0facebook,\xc2\xa0twitter\xc2\xa0or\xc2\xa0linkedin. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | 18

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Following is my experience of MS **intern** interview (location Hyderabad).

No. of Rounds:\xc2\xa03 rounds of PI

Microsoft short-listed candidates based on their Resume and there was no written test. Complete process included 3 interview rounds

Interview Round 1:\xc2\xa0Time 1 Hr. (Bing Team)

1. Implement a stack having\xc2\xa0**findMiddle**\xc2\xa0operation as well, which returns middle element of stack on O(1) time.
   GeeksforGeeks Link
2. Given notes of different denominations (1,2,5,10) , WAP to find in how many ways can you make an amount \xe2\x80\x98x\xe2\x80\x99 ?

Interview Round 2:\xc2\xa0Time 1 Hr.. (Apex Team)

1. Given an array of size n, having numbers from 1..n , with one number missing and one occurring twice. Find the 2 numbers
2. Given a number having only one \xe2\x80\x981\xe2\x80\x99 and all other \xe2\x80\x980\xe2\x80\x99s in its binary representation, find position of bit which is \xe2\x80\x981\xe2\x80\x99.
3. Code for Iterative in-order Traversal of a tree.
4. Questions from OS (Physical Memory , Virtual Memory, Interrupts, message passing , etc.)

Interview Round\xc2\xa03:\xc2\xa0Time 15 Mins (Apex Team)

1. Code to remove alternate duplicate characters from given string.
   Similar Article : GeeksforGeeks Link
2. Some HR like questions (Why do you see yourself 5 yrs. down the line)

I was lucky, and got the intern!!

This article is compiled by Nitin Khandelwal. Many Many congratulations to Nitin for his selection. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | 17

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Recently i was interviewed for Build Team Engg. role in Microsoft hyderabad. I was selected.
I am really thankful to GeeksForGeeks site which gave me motivation and will to prepare for the company, with the help of material on the site only I got selected.

Written:-

3 D.S questions

- Rotate an array by K.
- Reverse a link list. If you are able to reverse a link list than reverse the K node\xe2\x80\x99s of link list.
- Find the pair of values in the array whose sum is equal to K.

First Round of interview \xe2\x80\x93
Was asked to come up to an optimal solution for all the above three questions in the written.

Second Round \xe2\x80\x93

Some general discussion about my projects and some curriculum subjects.

- Two numbers are stored in link list, need to add those two number.
I was also asked to write the test case which breaks the code.
- how does the telephone directory search of nokia phone works. If i give a name it should get me the contact number and vice versa.

Third round \xe2\x80\x93

Some general discussion on the projects.

- I was asked how search of windows work and asked to give a good indexing scheme for that.

Fourth Round \xe2\x80\x93

Some general HR question like 1. why this company? 2. Why leaving your old company?

- Given an array which contains a number in majority (i.e. A number occurs more than 50% times in the array) need to find it.
- Given an array which is rotated N times(N is unknown),I need to search a number in it.

In each and every question they were looking for an efficient solution and if I was getting stuck somewhere they were also giving hints.

This article is compiled by Love Gupta . Many Many congratulations to Love for his selection. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | 16

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2019

I was interviewed for Microsoft App-Ex Team. I was selected. I am really thankful to GeeksForGeeks site which provides preparation material for technical interviews organised so well at one place. I am fan of you guys \xf0\x9f\x99\x82

Round1:-

1. Implement your own atoi() function(To convert string to integer) cover all the cases including negative integer.
2. LCA for Binary Tree.Write code for it.
3. WAP to Print last n lines of a big log file.

Round2:-

1. You are given an array containing only 3 type of characters let say a,b,c write a program to sort the array having these.
   Eg abcaacbbaaaaccc sort it. I gave standard 3 flag solution then he asked you are complicating it you can use other method then I gave counting method.He asked me to compare the complexity of both methods.then discuss leads to while calculating complexity we compare number of iteration only or total calculation in the program.

   then he asked if we have let say k type of character then which method is good the count one or three flag one.

2. Implement T9 dictionary. how T9 works is : let say if I press 223 it should give all the possible valid words in suggestion Eg bad,cad,aad etc. give datastructure to store valid words etc.

Round3:-

This round was with hiring manager

- Write code for merge two sorted LinkedList Inplace.

Then He gave a problem related to his team. In weather app, you have a number of weather stations, give datastructure and all to find the nearest weather station from a city.

Then He gave the brief about what his team work and all .

Round4:-

This was with GM of App-Ex team India.

- It was a design question. You are given a list of components you have to write design for rendering those components in container.Layout can be left aligned, right aligned, center aligned. You design should be extendable means if new layout comes you should modify your code as least as possible. Use concept of OOPS.

This article is compiled by **Vishal Gupta**. Many Many congratulations to Vishal for his selection. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main

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[TopTalent.in] Interview with Sujeet Gholap, placed in Microsoft, Google, Samsung, Goldman Sachs & Tower Research

- Difficulty Level :\nMedium
- Last Updated :\n28 Apr, 2017

It\xe2\x80\x99s not every day that you come across a person who has achieved so much in life at a very young age which others can only dream of achieving in their entire lifetime. His simplicity and positive attitude speak volumes for his recent success after facing some tough times. This is the story of Sujeet Gholap, a IIT Madras grad who received record breaking 6 offers from some of the best companies in the world namely Google, Microsoft, Samsung (US), Samsung (IN), Goldman Sachs and Tower Research. We at\xc2\xa0TopTalent.in\xc2\xa0had a chance to interact with Sujeet about his success, preparation, interviews and some hardships. This interview is an excellent example of how a small town boy can achieve greatness and how you can do it too.

*Also, Sujeet has agreed to share his stellar resume with our users which can help you with your resume and preparation. So, don\xe2\x80\x99t forget to\xc2\xa0**download\xc2\xa0**his resume by logging in.*

Team TopTalent: Can you tell us a bit about your background before joining IIT Madras?

Sujeet:\xc2\xa0 Sure. I hail from a small town called Kallam from Osmanabad district of Maharashtra. I studied in a local school in Marathi medium till 10th standard. I always thought people from cities would do much better than me as I studied every subject in Marathi. My mom and dad teach at a local college there. I am currently pursuing my B.Tech in Computer Science and Engineering at IIT Madras. In IITJEE 2009, I secured an all India rank of 184

Team TopTalent: Can you give us a brief account of your interview experience for these companies?

Sujeet:\xc2\xa0 All my interviews (except a couple) were technical interviews. Almost in each one, I had to tell what I did during my internships at Yahoo! and Facebook, what projects I have worked on. Many questions followed a similar monotone : arrays of integers, do something with them, biased coins and their tosses, trees and recursive algorithms, writing code on paper and explaining it to the interviewer, solving mathematical and logical puzzles etc. Interviews varied from very easy to very challenging. Some interviewers were impressed by JEE rank and CGPA while some did not give it even a second glance. Some interviewers were interested in the projects I did and asked detailed questions about it, while some were just interested in whether I can solve the problem they have given me.

Team TopTalent: So, how did it feel when you landed six massive offers on that day?

Sujeet:\xc2\xa0 It felt nice and gave an ego boost when people referred to me as \xe2\x80\x9cthe guy with six offers\xe2\x80\x9d. People I barely knew, smiling at me and congratulating me! I was on an all-time-high. Jumping around and laughing all the time. It was such a kick that the next day, although it was a normal and fine day, as it was down compared to previous day\xe2\x80\x99s high,

I was actually a bit gloomy!

Team TopTalent: What was going through your mind when you had to choose one out of those 6 offers?\xc2\xa0

Sujeet:\xc2\xa0I was supposed to finalize on a company by afternoon and I was in the state of utter confusion. Whether to take Google, which is the dream job of most of the programmers or to take Samsung, whose software division is nascent and where my contribution and impact would be much larger, visible and maybe even play a key part in company\xe2\x80\x99s direction or to take Goldman Sachs, the challenging job which I always wanted to get a taste of or to go with Tower Research, the highest paying Indian job (twice as high as the second highest) which also involves inviting challenges and lots of programming. I was realizing that it wasn\xe2\x80\x99t really a good idea after all to go for so many options. I was wondering whether I would have been better off without a choice, as all these companies were such that I would have accepted the offer without giving it any thought at all had it been the only offer. I finally decided to go with Google.

(Wasn\xe2\x80\x99t\xc2\xa0really a surprise for us. Google seems to be the\xc2\xa0first choice\xc2\xa0for most Indian programmers)

Team TopTalent: How did you prepare for these interviews? What suggestions can you give to our users who might have similar interviews lined up?

Sujeet:\xc2\xa0I was lucky that I had discussed about similar questions before, and hence was able to make it through the interviews. I was quite attentive in class which really helped me a lot. Any questions which were not algorithm intensive questions and were more or less straight knowledge based, I could just recall the answer straight from the class when the professor taught that particular topic! Being friends with the right people and forming a peer group with a common interest is something which was critical to my success. I used to solve coding challenges with Arijit who had a very good Topcoder Rank. I would think about how I would solve those problem, if I get it, I would call him up and discuss the answer and ask for more.

In terms of suggestions, I would say be an active member of topcoder, keep solving programming problems in other places too if you want like spoj, usaco. I wish I had taken these things seriously and honed my algorithmic programming skills. Be thorough with Introduction to Algorithms by CLRS and do problems on one of the above mentioned sites.

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[TopTalent.in] Exclusive Interview with Ravi Kiran from BITS, Pilani who got placed in Google, Microsoft and Facebook

- Difficulty Level :\nMedium
- Last Updated :\n28 Apr, 2017

Even if we were to search around the world, it would be a truly difficult job to find someone like Ravi Kiran. As a Computer Science Graduate of BITS Pilani \xe2\x80\x93 Pilani Campus, he successfully bagged\xc2\xa0job offers from an astounding three companies \xe2\x80\x93 all being some of the best and most admired\xc2\xa0companies in the world \xe2\x80\x93 Google, Facebook and Microsoft.\xc2\xa0We, at\xc2\xa0TopTalent.in, managed to talk\xc2\xa0to this amazingly humble genius, who hails from Hyderabad.

And before we forget, Ravi has also agreed to share his resume with our users so as to help them with their\xc2\xa0preparation. So don\xe2\x80\x99t forget to\xc2\xa0grab a copy\xc2\xa0by logging in. Here is the exclusive interview in its\xc2\xa0original form.

Team TopTalent.in:\xc2\xa0What were the similarities and differences between Google, Microsoft and Facebook\xc2\xa0Interviews?

Ravi:\xc2\xa0 All three of them share the prestige of being some of the best tech companies in the world. As\xc2\xa0you would expect, their interviews are designed to ensure the recruitment of top talent. An\xc2\xa0obvious similarity amongst their interview processes (for undergraduates, at least) is them being\xc2\xa0vastly algorithmic in nature.

There are multiple interview rounds in each recruitment process. For Microsoft there were 4\xc2\xa0while Facebook conducted 3. For Google, I was a previous intern and, hence, faced just 2 rounds.\xc2\xa0Another noticeable thing was the presence of design questions in one of the rounds by both\xc2\xa0Microsoft & Google. However, by no means, can this be a generalization to the interview process\xc2\xa0of any of the companies. At the end of the day, this only reflects how each of them is aiming to\xc2\xa0assess a candidate\xe2\x80\x99s potential to the greatest amount in the shortest period of time.

Team TopTalent.in:\xc2\xa0How did you choose between Google, Facebook and Microsoft?

Ravi:\xc2\xa0 The more thought I put in the decision making process, the more confused I got. One of the major things I believed was that none of them was going to be a bad decision, so it was always safe to pick any one of them and not go wrong. Ultimately I chose Google, since I liked it as a company. I must confess that it was mostly a gut-feeling based decision.

Team TopTalent.in: What is the kind of skill-set that companies like these, are looking for in candidates?

Ravi:\xc2\xa0Even though I\xe2\x80\x99ll keep one of the companies in mind, that is Google, to

answer the questions\xc2\xa0further on, I can safely say that this answer of mine applies vastly to the three of them. The\xc2\xa0skill-set sought out is that a candidate must be creative, so as to come up with smarter and\xc2\xa0newer solutions to problems, which are algorithmically very strong and don\xe2\x80\x99t waste time solving\xc2\xa0already solved ones. The candidates are supposed to be, obviously, good at programming so\xc2\xa0that they can give shape to their ideas in the form of real code.

Team TopTalent.in:\xc2\xa0What should one keep in mind while creating a resume for these tech companies?

Ravi:\xc2\xa0 There are a lot of good references on \xe2\x80\x9cWhat makes a very good resume? \xe2\x80\x9d I had searched the same, and stuck to whatever made the most sense. I highly recommend a 1-page crisp resume, so that it\xe2\x80\x99s easier to make an impression when someone glances at it for about 3 seconds (I\xe2\x80\x99m guessing that the time spent by a higher-up person on a single resume is nearly that)

In addition, it\xe2\x80\x99s very important to make the resume highlight qualities and projects that provide enough reason to believe why you would make the perfect candidate for the job. Prior programming experience and other achievements would be useful to mention, to further your chances of making a good impression.

Team TopTalent.in:\xc2\xa0Your advice to all the students out there who\xe2\x80\x99re aspiring for job offers similar to yours?

Ravi:\xc2\xa0I think it\xe2\x80\x99s important to enjoy the field of work, and apply to only the companies that align with one\xe2\x80\x99s interests. In the long run, it would be hard to work in case the work doesn\xe2\x80\x99t go with your interests, even if the company is as nice as three mentioned above. I had never aimed to get into any of these companies, and it has only been a consequence of the activities that I was actively interested in (like competition programming, random problem/puzzle solving, etc) and thoroughly enjoyed.

Team TopTalent.in:\xc2\xa0What\xe2\x80\x99s the difference between the work\xc2\xa0allotted in the Indian Office and the US Office?

Ravi:\xc2\xa0I will speak about this question with respect to Google, since I have an experience in both the offices. The work isn\xe2\x80\x99t really any different across the offices. If you have a good project idea, you\xe2\x80\x99re always welcome to begin on it, and take it forward irrespective of which office you are from. I myself have had the chance to intern with a very good team back in Bangalore. Work in MTV is going really great too. That being said, the US office has more diverse project choices to\xc2\xa0offer, merely owing to its larger size.

Team TopTalent.in:\xc2\xa0How can freshers/pass outs apply to these tech giants off campus? What\xe2\x80\x99s the process involved?

Ravi:\xc2\xa0 Applying off campus is usually a simple process in these days. Most of the companies have websites for application process, wherein one can just submit his/her resume, and expect to be shortlisted. It is important to highlight the efforts of other companies that are providing interview opportunities, through performance in online programming contests.

HR personnel of almost all companies are on a constant lookout for talented programmers, and students performing well in the online programming contests have great potential. A good chunk of people also get an interview call through the employee referral route.

Team TopTalent.in:\xc2\xa0And lastly, what are you working on at Google and how has the experience been so far?

Ravi:\xc2\xa0I work in the Search Infrastructure team at Google, and the journey has been great so far. Google\xe2\x80\x99s a fun place to work for, and they ensure to provide one of the best work conditions possible for an employee. It is very surprising how they provide so many amenities \xe2\x80\x93 for having fun and indulging in non-work related activities and interests \xe2\x80\x93 but at the same time manage to provide some really challenging work.

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Microsoft Interview | Set 11

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Company \xe2\x80\x93 STB team, Microsoft IDC.
Location \xe2\x80\x93 Hyderabad.

First interview

1. A quick introduction.
2. Few questions on multi-threading like \xe2\x80\x93
   \xe2\x80\xa6**a.** What is race condition?
   \xe2\x80\xa6**b.** What is critical section?
3. Write a code to find out longest substring without any repetition of characters with O(n) complexity.

   ```
   Ex. \r\nString - abcdefghaxyzpbn\r\nOutput string - bcdefghaxyzp
   ```

4. Two linked lists are merged at one point. Find the merging node.

Second Interview

1. A quick introduction
2. Few project related questions mentioned in resume.
3. If you have huge log file, you need to print last \xe2\x80\x98n\xe2\x80\x99 lines from the log file. Write a code for it assuming regular file read operations.
   He was also expecting that the page hit is minimum.
   I had provided a solution which would read the file one by one and then will store it in a \xe2\x80\x98n\xe2\x80\x99 size circular linked list.
4. If you have a m*n floor, find out a \xe2\x80\x98k\xe2\x80\x99 size square tile which will take care of filling the complete floor without breaking of tile.
   Use GCD logic.

Third interview

1. A quick introduction and he also asked what was asked in previous interviews.
2. We have a m*n matrix, every element in row is in increasing order and every element in column is in increasing order. Find out a position of element \xe2\x80\x98k\xe2\x80\x99 from the matrix with O(m+n) complexity. Write a code for it.
3. We have a \xe2\x80\x98n\xe2\x80\x99 steps and a ball which take either 1 step at a time or 2 steps at a time. Find out the number of possible ways it covers exactly \xe2\x80\x98n\xe2\x80\x99 steps.

This article is compiled by **Girish**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 10

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Written Test
It was online test which contains 20 MCQs on C & C++.

The coding round had two questions.

1. Given some text lines in one string, each line is separated by \xe2\x80\x98\\n\xe2\x80\x99 character. Print the last ten lines. If number of lines is less than 10 then print all lines.
2. Do the level order traversal of complete binary tree.
   Given

   ```
   \r\n     1\r\n  2    3\r\n4  5  6  7 \r\n
   ```

   Print it as
   1
   2 3
   4 5 6 7

Technical Round 1

1. First he asked me to tell him about any project which I have worked on.
2. Given an array of integers. Find consecutive elements in array which has maximum sum. I know the solution to this problem so I told him quickly.
3. Next he modified the question and asked me to find consecutive elements in array that have sum equals to zero. Taking some time, I told the answer to this question also.
4. Next he modified question again and asked me to find consecutive elements in array that have sum close to zero, given that there is no sub array with sum equals to zero. Also write test cases for it.

Technical Round 2

1. Given a linked list. How will I detect whether the list has cycle? Also write test cases for it.
2. He then asked me whether I have some knowledge of graphics programming. He asked me how I will implement \xe2\x80\x98floodfill\xe2\x80\x99 for graphics application. Write code and test cases for it.

Technical Round 3

1. Given a 2D array and a key value. Search this key value in array and turn all elements in row and column of this key to zero.
2. Given a sorted array of size n. Each element in array is unique and lies from 1 to n+1. Find the missing element. Write code and test cases for the same.
3. How will I keep track of number of visitors visited my web page?

Technical/HR Round 4

1. Given a string. Find a character with most number of occurrences. Write code and test case for same.
2. Why I want to join Microsoft?
3. What\xe2\x80\x99s the most challenging task I did in my graduation life?

HIRED \xf0\x9f\x98\x80 \xf0\x9f\x98\x80

I would like to thanks geeksforgeeks team for this wonderful site which helped me a lot and without which I would not be able to crack this interview.

This article is compiled by **Akash Gupta**. Many Many congratulations to Akash Gupta. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 9

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

I am Amit Dhaka. Following is my experience of MS IDC intern interview.

Date of Written: 9th September, 2012.
Date of Interview: 15 October, 2012.
No. of Rounds: 2 online exams + 4 rounds of PI
Type of Interview: Campus Interview.

1st Online Test: Time 1/2 hour
10 MCQs on basic Mathematical and Logical problems (mostly on P&C) and 5 MCQs on C programming.

2nd Online Test: Time 1 hour
3 programs were to be written.

1. Given a no. in in form of base 4, you have to convert into base 2. The no. is given as a String. Do it in place.
2. Given a sorted circular linked list. You have to insert an element in it.
3. Two BST\xe2\x80\x99s are given. You have to print common nodes that are present in both of them.

Interview Round 1: Time 40-50 minutes.

1. Given a string, you have remove duplicates from it in O(n) time and O(1) space. String can have ASCII characters. Try to use minimum extra space.
2. Given a binary tree, check if it is balanced or not.

Interview Round 2: Time 25-30 minutes.

1. Given two sorted arrays you have to merge them into single array.
2. Given an array, find all the pairs of elements whose sum is k.
3. Given an array, find a sub-array in which all pairs have their sum greater than k.

Interview Round 3: Time 30-40 minutes.

> I was asked to tell something about myself. I spoke only a minute then he started asking problems.

- Given an array, find the maximum contiguous sub-array with the maximum sum.

My query was can the array have negative values. He said yes.

- Given two BST\xe2\x80\x99s, find the least common ancestor.
- Traverse a binary tree in a Zig-Zag order.

Interview Round 4: Time 30-40 minutes.

> First he asked me if I have any queries for him. I asked 3 questions as asking questions is a good gesture. You can ask that what kind of work will you be getting. Then he started with the problems.

- Given a sorted array and it has been rotated unknown times. You have to find minimum element of

the array. I did in O(log n).

- He asked about the test cases for spell checker of MS Word.

Then he asked questions related to my resume. My advice will be that you don\xe2\x80\x99t write anything by which you can be doubted. Be confident about what you have done. If there is one thing you are good at then it is enough.

I was lucky, and got the intern!!

Many Many congratulations to **Amit Dhaka**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks

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Microsoft Interview | Set 8

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2019

This about my experience of MS interview, which happened last day

Division: Microsoft Bing R&D
Rounds: Total 4 rounds (All face to face)
Location: Hyderabad.

Tech Round 1

1. Find the middle point of the linked list
2. Check whether loop exists or not in Linked List
3. How to calculate the size of the linked list
4. Given an unsorted array, how to divide them into two equal arrays whose difference of sum is minimum
   -> First I proposed sorting and then distributing them to two buckets. She\xe2\x80\x99s fine with that. However she doesn\xe2\x80\x99t want to sort the array and asked if i can solve in O(n) time

Tech Round 2.

1. Given an array, rotate the elements of an array within O(n) time and with 0(1) space
   -> This is the worst round for me. Made silly mistake. I felt very bad after coming out. couldn\xe2\x80\x99t get an idea of continuous swapping

Tech Round 3

1. Given a sorted array, find the pair of elements whose sum can be equal or close to given sum
2. Given an array [a1b2c3d4] convert to [abcd1234] with 0(1) space and O(n) time

Director Round 4

1. Given Linked list, write heapify and delete methods.
2. Given two sorted arrays of any length, find out the median of them if they are sorted into single array.
   \xe2\x80\x93> Lost here. I couldn\xe2\x80\x99t find good solution. I think it\xe2\x80\x99s my bad luck \xf0\x9f\x99\x81 If i could have crossed this question, I would have been in MS by now.

   Anyways, it\xe2\x80\x99s a nice experience overall. First time I entered into MS campus and first interview with them. Learned lot. Needs to improve and get into that by next time \xf0\x9f\x98\x89
   They will give little hints and try to use them and make solution out of it.

Thanks to **Nitin Gurram** for sharing Microsoft Interview Questions. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks

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Microsoft Interview | Set 7

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Recently I attended Microsoft Campus Interview and got selected. Below is my Interview Experience and I just wanna share it to GeeksforGeeks viewers.

1st Round:
Online Aptitude test:
Aptitude, logical questions and subjective Questions

2nd Round:
Online test
In this round we are asked to type the code in notepad and send (no compilers)

3rd Round:

It started wih introduce yourself and he introduced himself to me. Then he asked me about my project and it gone to some stuffs related wih memory. He asked me how a program is stored in memory

1. Write a program for beautificaion (proper indentation) of a program file in an IDE.
   ex:

   ```
   \r\nint main(){\r\nif(i10)\r\nprinf("Hi");else{};\r\n}else{}\r\nreturn 0;\r\n}
   ```

   You are provided with getToken() which returns a token
   ex: if(i>10) is a token
   int main() is a token
   {,} are tokens

   so output should be

   ```
   int main()\r\n{\r\n   if(i10)\r\n       printf("hi");\r\n       else\r\n       {\r\n       }\r\n   }\r\n   else\r\n
   ```

   void beautify(char* inputfile,char* outputfile)

   Give some testcases for the above program

2. Write a program to find the diameter of a binary tree and then he wanted to extend it for m-ary tree.

4th Round:

1. You are provided with a string which contains single byte as well as two byte characters. If a character is single byte char, it\xe2\x80\x99s MSB is 0, if it\xe2\x80\x99s a 2 byte char, it\xe2\x80\x99s MSB is 1. Write a program to check whether the given string is palindrome or not.
   Test cases for above program.
2. Write a program to print the n-nodes from tail of the linked list.
   Test cases for above program.

5th Round:

1. Write a program to Validate an IPv4 Address.
   Write test cases for above program.
2. Write a program to find all the possible paths from a starting point to dest point in a maze(2-D array).

   ```
   ex:    1 0 1 0\r\n    1 1 1 1\r\n    0 1 0 1\r\n    0 0 1 1
   ```

   If there is a block it\xe2\x80\x99s represented by 0.
   If there is a path it\xe2\x80\x99s represented by 1.

6th Round:(Final Round)

1. Write a code for printing last n lines in a file (refer man page of tail command in linux). The file size may vary, it may be 1MB or it may be 100 GB.
   Give top 10 test cases for the above program

Many Many congratulations to **Muniraj G**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 6

- Difficulty Level :\nHard
- Last Updated :\n10 Jan, 2019

I am a guy from CSE dept, IIT-BHU and currently in 4th year. \xc2\xa0I am placed in microsoft now and all the credit goes to geeksforgeeks for sharpening and improving my coding skills. Thanks a lot guys for such a wonderful site. \xc2\xa0Below is my interview experience, if its of any help to my\xc2\xa0fellow job seekers.

Written Round 1 :
50 multiple choice questions in 60 mins time. Had 2 sections \xe2\x80\x93 Aptitude and Programming Ability.

Written Round 2 : 3 coding questions in 1 hour.

1. Swap every consecutive odd and even positioned bit in a number.

   ```
   Ex:- 10101011010101 = 01010111101010
   ```

2. Given a binary search tree . Convert it into a doubly linked list in place (no extra space) such that prev points to left child and next points to right child.
3. Given a linked list that contains 0,1 and 2 . Sort this linked such that it contains 0s first, then 1s and then 2s in O(n) time.

   ```
   Ex:- 2->2->1->0->0->2->1->1->0 = 0->0->0->1->1->1-2->2->2
   ```

PI round 1 (Technical):

1. About urself, most challenging project of all you have done and about ur internship.
2. Remove from string s1, all the characters that are present in string s2.

   ```
   S1=\xe2\x80\x9dabcde\xe2\x80\x9d s2=\xe2\x80\x9dxyazbx\xe2\x80\x9d Ans. S1= \xe2\x80\x9dcde\xe2\x80\x9d
   ```

3. Reverse alternate k nodes in an linked list.

   ```
   Ex:- 1->2->3->4->5->6->7->8 if k=2; then return 2->1->3->4->6->5->7->8
   ```

   Always ask some questions to the interviewer at the end. That\xe2\x80\x99s a good gesture.

   Write test cases for the programs above and see if ur program covers all the test cases or not.

PI round 2 (Program manager)

1. Design a tic-tac-toe game for multiplayer on a smartphone.
2. Design a vending machine for blind and deaf.

PI round 3 (Technical)

1. Add numbers from 1 to n^2 into a n X n matrix spirally.

1	2	3	4	5	6
16	17	18	19		
15	24	25	20	7	
14	23	22	21	8	
13	12	11	10	9	

2. Remove duplicates from a string in place. Ex-microsoft -> microsft
3. Some question on recursive functions using memoization technique for optimization.

PI round 4 (Testing)

1. **1.** Given a func :: int *strcmp(char *s1,char *s2);
   Write test cases to check functionality and security issues and even automate the generation of test cases.
2. **2.** Given a func :: int typeOfTriangle(int side1,int side2,int side3); (func gives a number for the type of triangle)
   Write test cases to check functionality and security issues and even automate the generation of test cases.
3. **3.** WAP to reverse words in a sentence.
   I am a good boy -> boy good a am i
4. **4.** WAP to get the next higher palindrome of a given number.
   123 -> 131 1232 -> 1331

   PS \xe2\x80\x93 Functional issues are test cases that check the functionality of the program and Security issues are the ones where the program may crash.

PI round 5 (Technical)

1. WAP to check if a binary tree is a BST or not.
2. WAP to find Least Common Ancestor of two nodes in a BST.
3. Reverse every two nodes in a linked iteratively and recursively.

PS- Whenever u write a program be sure to cover all the corner cases and write it in a proper indented way. As interviewers ask to write testcases for the program u have written and then check if ur program covers all the test cases.

All the best fellas !!!

\xc2\xa0

Many Many congratulations to **Pritam Kumar Das**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 5

- Difficulty Level :\nHard
- Last Updated :\n30 Jun, 2021

Hi everyone, I would like to share my experience with MicroSoft, as i have been the lucky hire.\xc2\xa0

Date: 27th August 2012\xc2\xa0

No. of Rounds: 2 Written(online) + 4 rounds of PI(all Algo/Technical)\xc2\xa0

Type of Interview: Campus Interview for freshers\xc2\xa0

Written (online)\xc2\xa0
Objective(60 minutes) + Subjective(60 minutes)\xc2\xa0

Objective: Aptitude + Reasoning(30 questions) and technical(20 questions, C/C++ programs, flow chart, identify correct function)\xc2\xa0

Subjective: 3 coding question(No in-build compiler in Web-Browser, simply you have to write your working code as a function/functions)\xc2\xa0

1. A number is given say n, find the minimum number which is greater than n and has same no. of set bits in it.
2. Binary search tree to Doubly linked list conversion(prefer in-place conversion)
3. Find the second maximum no. in an array

Personal Interviews (4 rounds)\xc2\xa0

Round 1: (40-50 mins)\xc2\xa0

1. Details about the project that i have listed in my resume, asked various question related to those projects.
2. details about q1 and q2 which is asked in the Subjective round, how you solve the problem and ask to write the same code I have written in Test and explain it.
3. question from OS:\xc2\xa0
   \xe2\x80\xa6.**i)** You have 10 GB of RAM, and you load multiples instances of a program of size 1 GB(let\xe2\x80\x99s say more than 10 instances), then what will happen, how the OS handle this situation and up to what extends?\xc2\xa0
   \xe2\x80\xa6.**ii)** producer \xe2\x80\x93 consumer problem

Round 2: (20-30 mins)\xc2\xa0\xc2\xa0

1. You have given a number N, print all balanced parenthesis expression which can be generate using N pairs of open and close braces. For ex. for N=3, ((())),()()(),()(()),(())()\xc2\xa0
   First i gave him a brute force solution(generate all possible combination and check for valid expression),then he ask me for optimized code and I was able to do it after little mess-up.also ask for complexity of my code.
2. You have given a adjacency matrix of a graph, find the number of connected component set of the graph.

Round 3: (35-45 mins)\xc2\xa0\xc2\xa0

1. A string str and two character a and b are given to a function, find out the minimum distance between these two given characters in the str. first I gave him a brute force solution(O(n^2)) then he ask to optimize it (O(n)) and finally somehow i was able to do it.
2. You have n processes and m available resources, explain each step of OS in the execution of those process along with which data structure will be suitable at a condition, which scheduling algorithm will suit best, also in case of preemptive scheduling, waiting queue etc.. its take a long time to explain him. but finally he is satisfied with my answers.
3. Write a modified strcmp function which ignores cases and returns -1 if s1 < s2, 0 if s1 = s2, else returns 1.
4. iterative inorder traversal.

Round 4: (40-45 mins)\xc2\xa0\xc2\xa0

1. Give a schema for college student database management(tables, attributes and relationships), ask me to normalize it up to 3NF.
2. Some queries based upon schema:\xc2\xa0
   Find the maximum score of each student in his/her last semester\xe2\x80\x99s math subject.(it also be possible that some student got year back and not promoted, handle all the cases).\xc2\xa0
   I tried it hard, gave him 2-3 wrong answers, but not able to do it(as i\xe2\x80\x99m not very good in DBMS).. but he was satisfied with given schema.
3. He ask me about favorite programming language, and why I like that language..
4. You have given a range in Integer(a to b), find all the prime number between a and b.\xc2\xa0
   \xe2\x80\xa6..**i)** first i gave him the simple solution(check every no. whether it is prime or not).\xc2\xa0
   \xe2\x80\xa6..**ii)** then he asked about Sieve and to implement it, and which on is better(first approach or sieve)
5. what is most challenging moment in your B.Tech life. ?
6. Why do you want to join MicroSoft.?
7. Some question on my hobbies.
8. do you have any question for me.?\xc2\xa0
   i asked 2-3 questions related to job profile(SDE/SDET) that they are offering,current projects and areas.

Finally\xe2\x80\xa6end of PIs and After 10-15 minutes, To my great relief, this time I was hired\xe2\x80\xa6

Many Many congratulations to **Ajeet Kumar**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to review-team@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.\xc2\xa0

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Microsoft Interview | Set 4

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Hi, this is Ishita Gupta. I have been one of the lucky hires of Microsoft this year through oncampus. So wanted to share my experience as well as the questions asked for other aspirants to benefit from.

Written round was conducted online. It was a one hour test, with 30 aptitude questions and 20 technical (based on C, C++, Algorithms, flowcharts, logic, pseudocodes).
After being selected in 1st written, there was another written. It was of one hour, and there were 4 questions:

1. Replace all spaces (\xe2\x80\x9d \xe2\x80\x9c) in a string with \\0 \xe2\x80\x93 write function for this.
2. Give method for finding out if a tree is binary or not \xe2\x80\x93 I wrote algorithm for it.
3. Give a method to merge two sorted arrays A and B, provided A has enough space to accommodate B at the end.
4. The problem of late landing of aeroplane due to fog and traffic was presented. They tend to burn up their fuel while waiting for landing. So a instant solution and a long term solution to the problem was asked. This was kind of subjective writing.

Both the writtens were done on 14th Aug. Results of the 2nd written was given out on 4t Sept, when they actually came to our campus.

I had 3 rounds of interview.
1st interview:\xc2\xa0

Started asking what all subjects I know in CSE (as I am from M. Tech ECE, and this time they allowed us too). I told him C, basics of C++, socket programming, little of SQL etc.

- He asked me what is the approach of C Programming called. (Procedural).

Then asked for C++.

- Then wanted me to explain him the disadvantages of Procedural programming.
- Then went onto class, object, relations between objects, inheritance, abstraction, encapsulation.
- Asked me to give an \xc2\xa0example from the interview room to describe these concepts. (I chose fan!). Then he went to concepts of memory \xe2\x80\x93 stack, heap. Static and dynamic memory allocation, static variable and local variable memory allocation.
- Difference in memory allocation for struct & class and class & object.
- Then he \xe2\x80\x9cchanged gears\xe2\x80\x9d and asked me to write a program to reverse a string.
- Then he asked me malloc, new.

Then he shifted to DBMS or rather SQL, as I mentioned I know SQL only and do not remember basics of DBMS. He asked me the types of languages in SQL (DML, DDL) and then asked to write queries to get distinct entries from a column and then to get only the non-distinct entries from that column.

- Then he asked me to give solutions to the problem of timeout and overload on irctc server during tatkal reservation. It went on for an hour. I came out all exhausted!

2nd interview:

After getting shortlisted in 1st interview, 2nd interview started off with concepts of C and C++ as well as OOPS.

1. Was asked to write a program to find out the duplicates in a string in the most efficient way with least complexity.
2. Was asked for basic concepts of Cloud Computing.

This interview lasted for 40 mins or maybe a bit more.

3rd interview:
This was the last round, and it was HR surprisingly! Questions asked were:

1. Passion
2. Tools for success
3. Discussion of technologies that I have learnt on my own
4. As student of ECE, why MSIT and not Telecom
5. Won\xe2\x80\x99t I get bored at MSIT?!
6. Any questions for the panel

This interview also extended for around 40 mins.

Results were declared 5 hours later, with everyone\xe2\x80\x99s interview being over. And God gifted me with MSIT job! \xf0\x9f\x98\x80

Many Many congratulations to **Ishita**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 3

- Difficulty Level :\nExpert
- Last Updated :\n10 Jan, 2019

I would like to thank GEEKSFORGEEKS team that they made my confidence level high when it comes to coding. I finished my interview today, hope this could be of help to others.

Date Of Interview: 25th Aug, 3rd Sept, and 4th Sept 2012

No. of Rounds: 2 online exams + 6 rounds of PI

Type of Interview: Campus Interview for fresher\xe2\x80\x99s

25-08-2012:
Online test conducted by some PARIKSHA LITE company (outsourced)

TEST 1: There were 15 questions to be done in 30 min. 6-7 of them were basic calculations and program output easy ones.

TEST 2:

A) There were 3 questions to be coded for IDC test:

- Check whether a linked list is a palindrome or not
- Whether a given sting is a new arrangement of main string (eg COXX is XXOC but not XOC)
- Convert a given sorted dynamic linked list to balanced binary search tree.

B) There were 4 question in MSIT test:

- Write merging two arrays code or pseudo code.
- Reverse a string of characters.
- Print binary representation of a given number.
- Given a control tower for aeroplane how will you make sure it does not fail. (Basically designing question)

03-09-2012:
Round1:

1. A thread waiting at while(1) and thread waiting at wait(wrt), what is the difference?
2. Output of following C program.

```
\r\n#include \r\n#include \r\nint main()\r\n{\r\n    unsigned int a, b, c;\r\n    a = rand();\r\n    b = rand();\r\r
```

3. Write code to find Nth node from the last of a linked lists, and write test cases for the same.

Round2:

1. Write code to implement a command called \xe2\x80\x98tail -5 filename\xe2\x80\x99 in unix file using file pointers and also write test cases (HINT using fread and fseek command)
2. Write pseudo code to implement LRU in real time OS.

Round3:

1. Write code to convert given number into words (eg 1234 as input should output one thousand two hundred and thirty four)

   Write test cases for the same question mentioned above.

Round4:

1. Write anagrams code when you are given an isWord() function in the fastest possible ways and also write test cases for that. After this the HR asked me to come on next day

04-09-2012
Round5:

1. Design a database schema for college elections and how will you make sure at database end that one user can vote for one person standing for one post only.
2. Write code to detect deadlocks and prevent deadlocks and implement as two separate functions.
3. Write Singleton pattern code and state places with usage of keyword static and virtual.
4. given two processes one that updates a database in 2 min and ot

   her in 5 min. Together they take 7 min. Design a method that can reduce this to minimum possible.

5. Write code to count number of nodes of a tree, find depth of a tree, find width of the tree.

Round6:

1. Design a class diagram for students registering for a sport and competition being held based on which you can decide which guy wins or loses.

Rest were sort of HR questions like why microsoft, your strengths etc but in the end she said we will send your feedback to the campus placement cell, Thank you. \xf0\x9f\x99\x81

This article is compiled by **Ankush Choudhary**. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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Microsoft Interview | Set 2

- Difficulty Level :\nEasy
- Last Updated :\n10 Jan, 2019

Please find the details of my Microsoft Interview below.

Date Of Interview: 3rd August,2012

No. of Rounds: 2 online exams + 4 rounds of PI

Type of Interview: Campus Interview for freshers

1st Online Test: Time 1 hour
30 MCQs on basic Mathematical and Logical problems and 20 MCQs on C programming.

2nd Online Test: Time 1 hour
3 programs were to be written. They wanted full length program, not just the functions. Language: C/C++

1. Given the head pointer of a linked list, each node having data value only 0/1/2, properly sort the linked list and return the head pointer.
2. Given a picture with pixels arranged in an N*N matrix, right rotate the picture by 90 degree.
3. Two of the nodes of a BST are swapped. Correct the BST.

Interview Round 1: Time 30-40 minutes.

1. Given a Binary tree, where each node has also its parent pointer pointing to its parent, apart from two usual child pointers. Write the function for inorder successor. Discuss all possible test cases for this function and whether your function can handle all those test cases.
2. How can you check whether a binary tree is BST or not, in the most space optimised manner.

Interview Round 2: Time 30-40 minutes.

1. Given two sorted linked list, create a third list which contains only those elements of first list, which are not common with second list. Do this with O(n) time. Discuss all possible test cases for this function and whether your function can handle all those test cases.

Interview Round 3: Time 30-40 minutes.

1. If your friend writes a text editor software and gives it to you for testing, what are the tests you will perform on the software to ensure it meets the basic requirements of a naive user
2. Given two linked lists, how do you check whether the two lists intersect at some node with O(n) time? Discuss all possible test cases for this function and whether your function can handle all those test cases.

Interview Round 4: Time 30-40 minutes.

1. Given an array of unsorted integers, find all the pairs of numbers which sum to a given N. Discuss all possible test cases for this function and whether your function can handle all those test cases.
2. Given three points a, b and c, write a function to find what type of triangle they construct or

whether a triangle can be made at all. Discuss all possible test cases for this function and whether your function can handle all those test cases.

HIRED!! \xf0\x9f\x99\x82

This article is compiled by **Shreyasee Nandy**. Many Many congratulations to Shreyasee.
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Microsoft Interview | Set 1

- Difficulty Level :\nMedium
- Last Updated :\n10 Jan, 2019

Following are the details of my Microsoft interviews.

Date of Interviews: 30th July, 31st July and 3rd August, 2012

No of Rounds: 1 aptitude test, 1 coding round and 4 PIs

Type of Interviews: Campus Interview for freshers

Aptitude Test(60 mins) (30-7-12)
It was an online test. It consisted of 50 questions, of which 30 were aptitude based and 20 were technical.
30 aptitude based questions consisted of speed-time based, probability, etc.
20 technical question included C outputs, flowchart, finding correct code for prime no, Fibonacci no, etc.

Coding Round(60 mins)(31-7-12)
Three questions were there

1. You have to rotate an n*n array right by 90 degree.
2. Given a linked list containing 0s,1s or 2s. Sort it
3. Two elements of BST are swapped by mistake. You have to restore the tree without changing its structure.

   Note that you don\xe2\x80\x99t have to write a function only, as happens in Amazon. Instead you are expected to write it from scratch along with main function and all the helping functions. My advice: Screw the instruction, write the function you are expected to write for all the three questions, then go for helping functions and main function.

Personal Interview(3-8-12)

Round 1(40 mins):

1. A binary tree is given. You have to check whether left node data is greater than right node data for all nodes.
   My Query: What if either one of the left or right subtree is not present.
   Clarification: You can then assume max possible value for left data, if absent and min value for right node data.
   I was asked to dry run my code for a tree. Also test cases were asked to check my code.

Round 2(80 mins):

1. To find Inorder successor of a node in a binary tree, provided you have parent pointer.
2. To find Inorder successor of a node in a binary tree,provided you do not have parent pointer. Test cases for both of them were asked.
3. Given a linked list a random ptr also exists. Clone the original linked list. Also give the test cases.
4. Construct a data structure which can push, pop and find minimum in O(1) time. Was asked to code it. Test cases were also asked and was asked to ensure that it works for duplicate

elements also

.

Round 3(80 mins):

1. A file consists of numerous words in it. You have to print the 10 most frequent words. Data structures to be used were asked and was asked to finally code it.
2. Test cases were asked for a railway portal.
3. A function was there which accepts a number k and a linked list and deletes every kth node of that list. A function to test the correctness of the above function was expected to be coded.
4. An extension of Question 3. What if function accepted an array of numbers instead of just one number and deleted multiples of array elements.

Round 4(40 mins):

This round was easiest of all.

- **Question 1:** Write a modified strcmp function which ignores cases and returns -1 if s1 < s2, 0 if s1 = s2, else returns 1. Test cases were asked, as usual.
- **Question 2:** Write a function which checks whether the tree is height balanced or not. Give test cases also.

To my great relief, this time I was hired\xe2\x80\xa6\xe2\x80\xa6\xe2\x80\xa6.finally\xe2\x80\xa6\xe2\x80\xa6. \xf0\x9f\x98\x80
This article is compiled by **Vinay Khetan**. Many Many congratulations to Vinay for his selection. If you like GeeksforGeeks and would like to contribute, you can also write an article and mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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