Amazon Interview | Set 90

1. Phone Interview
a. Given sorted array in decreasing order. Find first occurrence of given key.
b. Find diameter of a binary tree.
2. Face to face 1 (Programing skill)
a. http://www.geeksforgeeks.org/dynamic-programming-set-31-optimal-strategy-for-a-game/
b. Merge N sorted lists to a single sorted list but comparisons should be minimum
3. Face to face 2 (DS round)
a. 1 represent A, 2 rep B etc and 26 rep Z. Given a number, find number of possible decoding for this number. No need to consider number starts with zero. Eg: input – 1234, output – 3(ABCD, AWD, LCD)
b. How to find a loop in linked list. How to remove this loop.
c. How to design LRU cache(looking for the DS's used and their interaction)
4. Face to face 3(Design)
a. A device need to upgrade and downgrade its software. Eg: mobile phone need to upgrade its OS. Design high level and low level. (follow-up – 1. form version X to Y is not possible but z can. 2. from current version to latest version not possible but we can upgrade to an intermediate version and then to latest version. What
DS will be effective here)
b. Design a semaphore.
5. Face to face 4(curtain raiser)
a. HR questions including prev projects, best work etc
b. Given a linked list where each node contains an extra arbitrary pointer which points to any node in the list. Write code to clone the list.
b. Print vertical sum of a binary tree.
c. Print a binary tree in vertical zig-zag order.
6. Manager round
a. manager round HR questions. Team fit questions etc.
b. Given a mathematical expression. How to design this expression evaluator using OOPs concept.
Each round consists of 1 to 1.30 Hrs.
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Amazon Interview | Set 89

Online round:
1) Program to check if two rectangles overlap.
2) Program to find if a given string, say S, contains another given string, say P.
3) Write a program to check if the coins can be summed up to a given number, if yes print the coins that sums upto the given sum.
Telephonic round:
1) Given a singly linked list, modify the value of first half nodes such that 1st node's new value is equal to the last node's value minus first node's current value, 2nd node's new value is equal to the second last node's value minus 2nd node's current value, likewise for first half nodes.

```
Ex:

1) 1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7

Modified list:
```

```
6(7-1) -> 4(6-2) -> 2(5-3) ->0(4-4) -> 5 -> 6 -> 7

2) 1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8

Modified List:

7 -> 5 -> 3 -> 1 -> 5 -> 6 -> 7 -> 8
```

2) Reverse the alternate level nodes of the binary tree.

```
Ex: Given tree:

               a

            /     \

           b       c

         /  \     /  \

        d    e    f    g

       / \  / \  / \  / \

       h  i j  k l  m  n  o


Modified tree:

               a

            /     \

           c       b

         /  \     /  \

        d    e    f    g

       / \  / \  / \  / \

      o  n m  l k  j  i  h
```

Face to Face Rounds:
Round 1:
â€¢ Thorough discussion about one project that I considered as the most interesting or challenging.
â€¢ Suppose we need a service to perform certain task every day at some specified time. How do we ensure that everyday at the specified time the service will do that task?
â€¢ Design a stack that supports push, pop, and retrieving the minimum element in constant time.
â€¢ Program to get the maximum distance between two nodes in the binary tree. The interviewer further generalized this problem for n-ary tree. Then he asked how to get the longest path in a graph.
Round 2:
â€¢ What happens when we enter the url in the browser?
â€¢ Difference between inner join and outer join.
â€¢ How does the garbage collector works in java?
â€¢ Questions on stacks and heaps(memory management).
â€¢ We have n gold coins. We need to amalgamate all the n coins to create one single coin, we can merge two coins at once. The cost of merging two coins is equal to the value of those coins. How do we ensure that the cost of merging n coins in minimum.

Ex: 5 ,8 , 4, 3, 9, 6
We will merge 3 and 4, cost=7 {Remaining coins: 5,8,9, 6,7}
Then we merge 5 and 6, cost=11 { Remaining coins: 11,8,9,7}
Then we merge 7 and 8, cost=15 { Remaining coins: 11,15,9}
Then we merge 9 and 11, cost=20 { Remaining coins: 20,15}
Then we merge 20 and 15, cost=35 { Remaining coins: 35}
Total cost: 7+11+15+20+35 = 88
If we had merged the coin array {5, 8, 4, 3, 9, 6} in different fashion:
Merging 5 and 8, cost=13 {Remaining coins: 13, 4, 3, 9, 6}
Merging 13 and 4, cost=17 {Remaining coins: 17, 3, 9, 6}
Merging 17 and 3, cost=20 {Remaining coins: 20, 9, 6}
Merging 20 and 9, cost=29 {Remaining coins: 29, 6}
Merging 29 and 6, cost=35 {Remaining coins: 35}
Total cost: 114
As we can see that the cost is less in the first case. Program to get the minimum cost of merging all the n coins.
â€¢ Replace BST nodes with the sum of nodes greater than or equal to the node.
Round 3 (Hiring Manager):
â€¢ Detailed discussion of my work in the current company.
â€¢ Some behavioural questions like how do you handle certain situations etc.
â€¢ Design a restaurant reservation system. I was also asked to write some sql queries in this regard.
Round 4 (Bar Raiser):
â€¢ Given a linked list, write a function to reverse every k nodes (where k is an input to the function).
â€¢ Given a sorted array which may contain duplicates, write a method to find the starting and the ending index of the given number if present.
Suppose we are give array: 1,2,2,2,5,6,6,9,10,10,10
If the number given is 9 then starting index and the ending index will be 7.
If the number given is 2 then the starting index will be 1 and the ending index will be 3.
If the number given is 7 the the starting and the ending index will be -1 as the number is not present in the array.
â€¢ Write a method to compress a given string “aabbbccc” to “a2b3c3″ . It should be an inplace compression, no extra space to be used.
â€¢ Discussion about my current project.
â€¢ Describe a scenario when you failed, when you helped our collegue etc etc.
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Amazon Interview | Set 88

Online Test:

1. Rectangle overlap problem
2. String searching problem
3. Coin change problem

1st Telephonic interview:
Questions regarding processes in OS(how it is represented in memory like code segment, data segment, stack , heap), garbage collection , stack and heap , what happens when a URL is entered in browser and then proceeded to 2 programming questions

1. Given a BST, transform it into sum tree where each node contains sum of all nodes greater than that node.
2. Shuffle an array

(All arrangements were done by Amazon including travel, stay)

Onsite F2F 1:
Started with general introduction , asked about my work , know any design patterns and where you applied them in your project etc.
He asked a single question to design a single stack with push , pop and pop mid operations , followed by working code.

F2F2:
Again started with general introduction , work i do , then he gave a question about finding count of each occurrence of words in a document.
I gave hashing based solution (with working code), it lead to a great discussion on hashing , then he led me to give a solution with tries . As much time is not left he asked me to tell the approach only.

F2F3 (With Bar raiser):
Bar raiser will be from a different team.
He asked me a question to connect siblings at each levels of a binary tree , as i knew this question already. He wanted working code. After i gave the code he found a bug and i found one myself.After resolving the code he moved on to different question.
Next question is optimal implementation of 3 or more stacks in a single array.I gave some approached based on heuristics and with extra memory.He dint seem satisfied and then asked many questions about work i do and grilled me on many aspects.

F2F4(With Hiring Manager):
Asked me to design Automated Air traffic controller system . Gave me few requirements , made me identify classes and its members , and some high level code for identifying probable aircraft collisions.
He asked me about situations where i missed the deadlines and learnings from it , How do you build trust with Customer .
Then i asked him few questions like What specific qualities you look for in a potential candidate , How an SDE can contribute to Amazons claim to be most customer centric company and any concerns about my employment background (as i am working in manufacturing industry currently).
Interviews were held on friday , i got a call from HR lady on Tuesday following week.

Some tips:

1. Practice lot of pen and paper code.
2. Folks at amazon do not want pseudo code , they want working code with minimal syntactical errors.
3. Online plus telephonic rounds are for screening only.Also , Don't pass the time in telephonic rounds, they want to give at least two questions (easy though)
4. McDowell's book and recent 40 sets of amazon interview experiences will make you good to go.

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Amazon Interview | Set 87 (For SDE)

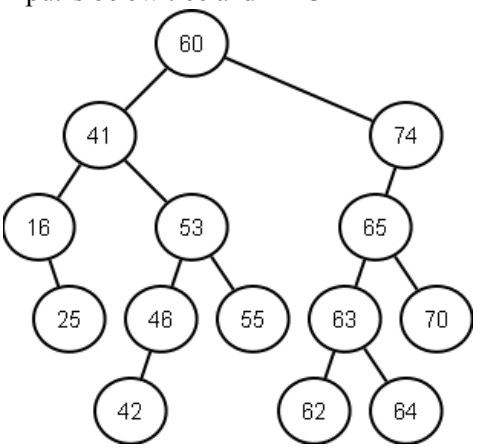
I recently cleared the Amazon SDE position. Through out my prepration GeeksforGeeks played great role, this is the only site which i referred/followed more than 90% of the time during preparation phase.
Please find my experience with amazon below.
1 Written test
1) Given a array of number find the next greater no in the right of each element

```
Example-    Input     12 15 22 09 07 02 18 23 27

            Output    15 22 27 18 18 18 23 27 -1
```

2) Given a link list and input int K, reverse the link list in K size slots

```
Example Input 12--> 13--> 3--> 20--> 55--> 87--> 20--> 77--> 90 Lets k =3

Output 3--> 13->12--> 87--> 55--> 20--> 90--> 77--> 20
```

3) Given tree and input int K, Print the nodes that are k distance way from leaf.
Input is below tree and k = 3



Output- 41, 53, 65, 74

2. First F2F round (DS and Algo)

Two interviewer was there in panel, Only one was asking question other was only observing, He was noting down all the conversation happening between us and noticing approach and solution provided by me. This was common in all the interview rounds.

1) Given a infinite string of O's and 1′s respectively. You need to find the transition point from 0 to 1.

I gave the native solution in O(n). He told to optimize more. Direct binary search can't be applied on it because string was infinite and length of string was not given.

I told that i will divide the string in 10 size slots it will reduce complexity. Still he told to optimize more. I told i will increase the slot size in power of 2 like 2,4,8,16,32. he was satisfied with that.

He again complicate it by adding that now my string contain 0, 1, 2 in sorted order. You need to find transition point from 0 to 1 and 1 to 2. i provided the approach.

After that told this time i want to make it generic. String can contain 0 to n(input) number find all the transition point. I solved it, he was satisfy with approach and told me write code for it.

2) Find common elements out of two sorted array

3. Second F2F(DS and Algo)

1) It was bit difficult for me to crack, She stated asking from java cloning, which was my weak area. Given a class which contain string Name and reference to person friend, clearly shown below.

```
Class A {

   A(String str, Person P { //Constructor

       this. name = str;

       this.friend= P ;

   }

   // override

   Clone() {

       // code for this function was expected from me

       // which can produce the deep copy
```

```
    }

}
```

Suppose A–>B–>C–>D means A is friend of B, who is friend of C and so on..
Calling once the Clone method will clone the whole friend list like
A'–>B'–>C'–>D' (there A' is the clone of A).
Cracking this was really tough for me, because i was not familiar with these question.
2) How to find the last nth element from singly link list, its was very easy for me.
Solved in 2 min and wrote the code quickly.
3) Given a sorted array of number , value K and value X, find the K nearest number to the value
Example: Input 12 16 22 30 35 39 42 45 48 50 53 55 56 K = 4 X = 35
Output 22 30 39 42
Interviewer was running out of time because 1st question took huge time. So she told to tell only the approach, code was not expected.

4. Third F2F (Bar raiser)

Interviewer was of friendly nature. He was very senior and very cool guy. Started with my project question and then some behavioral question and in last one technical question

1. What is your current project, What value you added in your project till now.
2. What challenges you faced while working in project and how did you overcome.
3. What was the important learning for you in last project.
4. If you have the option to go 3 year back in life, then what would you like to change in life, means which skills and steps/decision you want to gain or change.
5. What you did in past on which you feel proud.. blaa blaa….
6. Given a tree, how will you find the vertical sum of nodes
   refer this link to understand more about question
   http://www.geeksforgeeks.org/vertical-sum-in-a-given-binary-tree/
   I gave the solution using Hash map, but he was not satisfy with answer. He told to gave other solution because Hash map will increase the space complexity. I used array solution which was increase time complexity, then i used circular link list and finally solve it using doubly link list. He was satisfy with solution. Told me to code for it.

5. Forth f2f round(OOPS, design pattern and OS fundamental)

1. Started with my project details, my project was in android mobile, so he told me to design a "Contact application". Class diagram and their relationship was expected from me. What all design pattern you can use in that.
2. Explain inheritance and Base class is given you need to stop exposing the base class methods without touching the base class at all. It was really tricky. Â Â question i liked it.
3. What is deadlock and How to detect deadlock in system.
4. Concept of Database normalization and various types of it.
5. He also started asking some networking question. Like TCP/IP, socket connection.
6. How the chat between 2 user work internally, internally how the packets flows between layer. And suppose user A send "Hi" message to user B and user B just shutdown the system. What will happen in that case.

6. Fifth f2f (Hiring manager)

1. Why you want to join Amazon.
2. What did you know about Amazon.
3. Current project explanation.
4. What new code you implemented and how much impact it put on other.
5. Given a tree, write the In-order traversal. I wrote in 2 min using recursion.

Next addition was, can you write it using iteration tried and wrote some buggy code.
He started checking and told the bug and told me to correct it. Even-through i solved the same question at my home, Still it was not clicking my mind. I started correcting it but failed. After that interviewer gave one hint. I used the hint and solved the whole code again. He was running out of time so took the code sheet and told i will check it later in free time.
Refer this link for actual solution and proper understanding of last question
http://www.geeksforgeeks.org/inorder-tree-traversal-without-recursion/

Message for all :-
Amazon expect accurate and precise code with less complexity. So discuss first with your interviewer the approach. Don't jump into code.
Even if you don't know the right answer, keep on discussing various possibilities to solve the question and try crack that problem with different angle. Practice more and more verity of questions.
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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Amazon Interview | Set 86

This is an account of my recent interview experience with Amazon. My process started off at one their hiring drives. It was a tiresome process that comprised a written round followed by six rounds of interview, spanning around 37 days.
Following is an account of my experience:
Round 1 (Written round):
1. Given two linked lists each of which represent a number, write a function that returns a linked list that represents the sum.
2. Given a sorted array of numbers. Construct a balanced binary tree with the numbers in the Array as keys.
3. Given a sorted Array of numbers that has been rotated by a few positions, write a function to search an element in the Array.
Round 2 (F2F):
1. Given a binary tree in which the node structure has an additional field called â€œnextâ€ which of pointer to tree node type, fill up this field of each node to point to the next node at the same level (NULL if last node).
2. Sort an almost sorted Array. An almost sorted Array being an Array in which a number is at the most k positions away from its position in the sorted Array.
3. You are given a 2D grid in which each cell is either empty, contains an entry â€œDâ€ which stands for Door, or an entry â€œWâ€ which stands for wall (Obstacle). You can move in any of the four directions from each empty position in the grid. Of course you cannot move into a cell that has â€œWâ€ in it. You need to fill each empty cell with a number that represents the distance of the closest door to that cell. (They asked me only for the Algo as there wasnâ€™t much time).
Round 3 (F2F):
1. Given a 2D (Rectangular) grid of points. You need to find the shortest path from a given source point to a destination point. You can only move up or right. Now among these points, there a few special points from which you can directly jump to the diagonally opposite point (Top-Right diagonal). You are granted a function which when invoked on the point returns 1 if it is a special point and 0 if it is not.
2. You are given a sequence of black and white horses, and a set of k stables numbered 1 to k. You have to accommodate the horses into the stables in such a way that the following conditions are satisfied:
a. You fill the horses into the stables preserving the order of horses. For instance, you cannot put for horse 1 into stable 2 and horse 2 into stable 1. You have to preserve the ordering of horses.
b. No stable should be empty and No horse should be left unaccommodated.
c. Take the product (number of white horses * number of black horses) for each stable and take the sum of all these products. This value should be the minimum among all possible accommodation arrangements.
Round 4 (F2F with Hiring Manager):
1. Discussion on my current work, difficulties and challenges faced at work, difficult people I have had to work with, instances when I went out of my way to propose creative solutions to existing problems at work etc.
2. Given a parentheses string, determine if it is a valid / legitimate parentheses string. For strings consisting of single parentheses type

and those consisting of multiple types.

Round 5 (F2F â€“ Bar Raiser):

1. Discussion on my current work, difficulties and challenges faced at work etc:-
2. Given a floor of dimensions 2 x W and tiles of dimensions 2 x 1, write code to find the number of ways the floor can be tiled.
3. Given a graph, if we were to print all nodes within k hops of a given node, which algorithm would we use, the answer to this was obviously a Breadth first search. He followed it up asking, if one were to use Depth first search instead to code this problem instead, one would encounter bloated running times for Graphs with certain attributes (Perhaps Dense graphs or some such). Describe what types of graphs would a DFS algorithm falter with and why.

Round 6 (Telephonic Interview):

1. Given that you want to maintain a backend for a bookstore Application that would store names of Authors and books, such that the application can return all the books written by a specific Author and all the Authors of a specific book which is specified in a query. The query can be such that only a substring of the Authorname or the bookname is specified and all the matches should be returned. I proposed a trie based solution, and was asked to code the solution on a collabedit shared document.
2. Describe multithreading.
3. Describe all the processes that happen between you typing in a URL and the webpage appearing on your screen.
4. What is a singleton set What is the data storage model (Data structures) used to store records in a relational Database.
5. Given an Array containing numbers between 1 to n, out of which 1 number is missing, find the missing number.
6. Given a sorted Array and a number, print all pairs of numbers in the sorted Array that sum to the given number.

I got the confirmation call the same evening that I had the telephonic interview. ***GeeksForGeeks is a godsend for interview aspirants aiming at top companies. Keep up the outstanding work guys, your website has shaped careers and lives. J***

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Amazon Interview | Set 85

1st Telephonic round

After few project and introduction related question.

1. Write a program to find an element in sorted and rotated array.
2. Write a program to print all path whose sum is equal to a given number path must start from the root node and it may or may not end at the leaf.

2nd Telephonic round

After 3-4 days

Some c/c++ question what is malloc how does it work and memory layout and allocation related questions

1. Write a program to find longest repeating substring In a given string running code were required covering all base cases.
2. U have given 10 files and you have given a string suggest data structure which ll facilitate efficient search of string in the file if string appears more than ones in that case u have to print line number and file in which they appear.

After 15 days I got cal that I have cleared the telephonic round and my F-2-F interview is going to take place in Hyderabad

F-2-F round 1

After introduction and project related questions

1. Write a program to print a tree in vertical order asked more than one approach to do this problem and modified problem many times.
2. Write a program to convert a tree to doubly link list in post-order fashion only change of pointer are allowed that is left pointer can work as previous and right pointer s as next.

This interview went well J

F-2-F round 2(Bar raiser)
Few question related to OS what is deadlock, Race-condition, Semaphore and many more, few question Related to DBMS what is Normalization define all normal forms(I directly told him I donâ€™t remember I read it in 5th semester)

1. Why amazon??
2. Why do u want to leave company XYZ.
3. Your biggest challenge till the date.
4. Many project related question.

Data structure

1. U have given 10 files each having 1 million integer in sorted order, physical memory have size of 3 million suggest method to extract 1 million integer in sorted form efficiently.
2. Write a program to convert a decimal number into binary your code should work on both big endian and small endian machine. U have given a variable which tell u whether machine is big endian or small endian

DBMS and few bar raiser question made this round average L
F-2-F round 3

1. You have given an n-ary tree write a program to check whether this tree is sum tree or not.
2. Given an array write a program to find kth smallest element in the array. He was hardly interested in the solution he just want to know how many ways u can solve it solved using 5-6 method at the end he was satisfied with the answers.

F-2-F round 4
Longest oneâ€¦.this interview went on for 1 hour and 30 minutes but was interesting one(interviewer looked lyk a frustrated guyâ€¦some tyms I felt that he is going to punch me :P)

1. You have given M array each of size n all array are sorted separately write a program to make a big sorted array of size m*n . during discussion he told me to prove many lemma like height of tree is log(n)(for n elements) sum of n natural number is (n*n+1)/2 and many more. He modified problem many times donâ€™t use extra space do it in space etc. discussion went on for almost 1 hour but at the end he was happy with the solutions(I suggested 2 method and further optimization in them.
2. U have given an binary matrix which is sorted row wise and column wise write a program to search a row in the matrix having maximum number of zeroes.

Finally this interview also went well he was happy with my performance
After 2-3 days I got mail from the HR that I m rejected LL reason was bar raiser â€¦ 1 advise to all donâ€™t take BR round lightly it does not matter how well u performed in other round if u didnâ€™t do well in BR round then there is no way u can make it. An average round tech interview is fine but average BR round means rejected.

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Amazon Interview | Set 84

I attended a hiring event for Amazon in world trade center in bangalore.
First round was coding test (Written round) :
1. Given a string of parenthesis, write a function if it is balanced.

2. Convert BST to a Doubly linked list.
3. Find the number of occurrences of words in a paragraph.

First Round :

1. Asked Why Amazon?
2. Asked some questions on resume.

After some friendly talk, jumped on technical but easy questions :

1. Implement BFS.
2. Difference between Dijkstra and BFS.
3. Given a linked list, find out if the list is circular, also find the point from where the cycle start.
4. Given an array, find the max sum over a sub array.
5. If you have two eggs, how many max steps you need to find the floor, from which the eggs break.

And some more easy questions.
It was already 5, so they decided to have further rounds later.
10 days later I had attended interviews :

First Round :

1. Asked about heaps, given an array, tell if it is min heap, if not, apply operation min-heapify.
2. Is a heap a complete binary tree?
3. Asked What is hashmap.

a. What happens when two numbers map to same key?
b. how does chaining work?
c. What to do when you have a bad hashing function, and only we can modify the structure of hashmap not hashing function?
d. What do to when you your hashmap is filled completely (as in all the linked list are filled up to their capacity)

4. What is quicksort? Implement for a linked list and tell complexity.

Second Round :

1. What is quicksort?

a. What is complexity when all elements are sorted and how can you improve it? (Randomization)
b. Will randomization work when elements are same?
c. What algorithms sort equal elements in O(n) time ?
d. using the information, how can you improve quick-sort? Think about it, its good. Don't want to spoil it for you by writing answer here.
e. implement this modification.

2. Given two river banks (visualization : two parallel lines), one bank has numbers written (1….n) in sorted order. On the other bank the numbers (1…n) are arranged randomly. A bridge can be formed from the ith point from bank 1 to ith point in bank 2. Find the max number of non-intersecting bridges you can form?
3. Given 1…n , and given some statements like i hates j, then find some arrangement of n numbers such that if i hates j then in the arrangement i comes before j. Say 1 hates 2, then 123456789 is acceptable but 213456789 is not.
4. Asked about internet. What happens when you type a URL on your browser?

Third Round (Hiring Manager):

1. Why do you want to leave current company?
2. Why do you think amazon is the right place for you?
3. Implement a calculator which takes a maths expression and evaluates it and prints the result.
4. Given statements like A is connected to B. D is connected to E. And transitive connections are allowed. Write a code which takes input such connected statements and and two numbers i and j and returns true if i and j are connected (can be transitively), and false if not connected.

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Amazon Interview | Set 83

Written (50 Minutes)

- 20 aptitude and general cs objective questions
- Code : Find minimum # elements to be removed from int array so that max element is <= 2x of min element
- Code : For given array a of size n we create a set of a[i] , a[a[i]] , a[a[a[i]]] ….. i varies from 0 to n-1 , find the max size of such set.

Face to Face 1Â

- Design MP3 player which would play only unique songs in random order from given list of songs
- Code : Print left and right most elements at all levels of a binary tree.
- Max elements in sliding window of size k over int array of size n.Â

Face to Face 2

- Code : Find min element at given level in binary tree
- How would you combine lots of big sorted files residing on disk (file size >>> memory)Â
- What happens when you enter URL in browser.
- Design multiple stacks in a Single one big int array as efficient as possible (real world example multiple process function stacks creation and deletion in memory of linux os)

Face to Face 3Â

- Discussion on challenging work projects.
- Design in-memory file system.

Last round Telephonic

- Toughest work projectÂ experience.
- A robot standing at top left corner of a grid, it can only move in right or bottom direction , determine total number of possible paths are their to reach bottom right corner.
- Code : Prune binary tree so that only nodes which are part of K-Heavy path remains, K-Heavy path means total of all elements in a path from root to leaf is > K.

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Amazon Interview | Set 82 (For SDE-2)

Round 1 (F2F):
1) Find the merge point between two lists.
2) Given a sorted array find the number of BSTs you can form.
Round 2 (F2F):
1) Discussion projects i have worked on.
2) Given millions of files process them sequentially in multiple stages and make sure it has good scalabilty, error handling, elegantly handles changes to the system. etc.
Round 3 (F2F):
1) Given a matrix with each cell containing each number of candies, and a constraint that you can move only right or down, from the top left corner to the bottom right corner, find the path that gets you maximum candies.
2) Convert a Binary tree to its mirror in-place.
Round 4 (Telephonic + online coding):
Given a continuous stream of strings, maintain strings such that duplicate are eliminated on the fly. The interviewer wanted working code. So coded the solution during the interview and emailed it to him 10 mins after.
So if you get “Ted”, “John”, “Mark”, “Ted”, “David”, at the moment in

time, the list should contain John, Mark, David.
Round 5 (Hiring manager in US, telephonic + online coding):
1) Discussion on current projects.
2) Why Amazon
3) BFS vs DFS
4) Given a function to getFriends that gets a list of profiles of friends of a particular friend, implement a function to get the shortest path between two given profiles.
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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Amazon Interview | Set 81 (For SDE-I)

Hello Geeks, I had interview in amazon few days before. I'm sharing you my experience. It was for SDE-I Profile for Hyderabad(India) location.
Round 1: Online Coding(Interviewstreet)
Q1. Print the nth largest node of the given BST. In this question you will have to write a function.
Q2. Convert the BST into sorted doubly linked list. In this question also you will have to write a function.
Q3 & Q4 was simple algorithm based.
Round 2: Telephonic Interview-I
Q1. Given Matrix, and co-ordinates of sub-matrix of given matrix find sum.

```
Eg            1  2  3

              4  5  6

              7  8  9


   Coordinates for submatrix 1,1 and 2,2

   Sum= 28
```

Q2. Given a linked list reverse every n chunks.
EG: 1 -> 2 -> 3 -> 4 -> 5 -> 6…n = 3
Output: 3 -> 2 -> 1 -> 6 -> 5 -> 4…
later they extended this Question…If there is only one node and give many conditions.
Round 3: Telephonic Round-II
Q1. Design a data structure for insertion, deletion & get minimum element in O(1)time complexity? Implement the same.
Q2. Given a Binary Search Tree and two nodes find parent node which is parent of both nodes in a given binary search tree. Later the they extended it to simple binary tree.
Round 4: F2F-I
Q1. Is given n-ary tree is Sum tree or not? implement function…
Q2. find Nth largest element in an array
Round 5: F2F-II
Q1. Vertical traversal Order of tree(implement it).
Q2. Lots of discussion on project.
Round 6: F2F-III
Q1. Given a circular array and a pointer find the given element in the array.
Q2. Lots of discussion on current company & company's work.
Round 7: F2F-IV

Explain:
1. Customer Producer problem,
2. Semaphore
3. Deadlock how to solve it.
Q: Favorite Sorting Algorithm.why,where to use it? and various question on the sorting algorithm which I answered.
Every time they ask for time complexity for code. Ask to optimize my solution.

++

Amazon Interview | Set 80

Online Written
1. Cant remember the question exactly, but it was bit easy and was easily solvable using the substring function for the string.
2. Need to find whether two rectangles overlap or not
3. Need to find the matching percentage , if we are given two paragraphs
Telephonic
1. Need to find the least common ancestor for given two nodes
2. Implement Min stack problem with other optimizations
Fully functional code and covering all boundary conditions was required
Face to face 1 (Hiring manager)
1. Top K words from the file containing millions of words. Proper code for the scenario.
2. Why do you want to change the company
3. What is your manager review for you in your current company
4. What all projects you worked on and detail
5. Some other non tec questions
Face to face 2
1. Given a number n where n means 0,1,2,3….n-1. Compute the no of BST which can be formed using this range as input in any order
2. Given a string input : aaabbccdeeabb output should be : a3b2c2de2ab2
Challenge here is that we need to do it in place, without any other string or data structure
For both the problems full code with all the boundary conditions was required
Face to face 3
1. Rotate a 2D matrix by 90 degree, but here the matrix is stored in 1D form
2. Given a linked list which contains representation of any number, like for 1234, the representation will be 1->2->3->4. Now we need to add 1 to the number, so that the output is 1->2->3->5
3. Then he asked me 1-2 questions for which I immediately responded the solution, through that he got the idea that I already know the solution
4. Moved to the white board, he draw a matrix, each contains only 0 ad 1 but in sorted manner. I need to return the row which is having the max no of zeros. Then he asked me optimized solution for finding the first â€˜1â€™ in the array
5. Then he explained me a production line problem, Many factors were involved in that, robotic arm need to draw some lines with various colors on some wall. We need to minimize the cost of drawing those lines, Code was not required in that situation, as the problem set was very big, but we discussed the complexity plus solving procedure for each of the factors of the problem. Every minute detail of how will I solve the problem.
Basically problem itself was composed of many different types of sub problems, keeping mind open at that time is very important.
Then after few days, I mailed the HR regarding the result, she told me one round is still pending, will update soon and after 1-2 week, they sent the mail for halting the process, didnâ€™t get any solid reason, as it was totally unexpected, all my rounds went well.

++

Amazon Interview | Set 79 (For SDE-1)

I have 8 months of experience and I recently appeared for interview of Amazon for role of SDE-I.
Written Round:
Q1: Convert a binary tree to DLL.
Q2: Given a random node address in Singly linked list. Delete that node.
You need to write full code in language of any choice with all the edge cases covered.
Interview 1:
Q1 : Given a sorted array and a number and element K. find K nearest elements to the number in sorted array.
Q2: MsExcel columns has a pattern like
A B C … Z
AA AB AC…. AZ BA BB … ZZ
AAA AAB
A has code 1
Z has code 26
AA has code 27
AAA has code 626
given a number return a column name as string
Interview 2:
Q1: Given 4 youtube servers which are processing user requests.
i> At any given time If someone requests for currently running videos, then return the number of videos running at a time.
ii> Which server will actually get the request ?
iii> How the servers will communicate with each other ?
iv> Other methods to do this task to reduce overhead on servers?
v> How many videos running given a time constraint ?
Q2: Given a binary tree and each node has an extra next pointer apart from left and right. Connect all the nodes using next pointer in Zig-Zag Manner.
Interview 3:
Q1: Discussion about project in current company.
Q2: Given a shared memory between multiple threads, how will you ensure safe access to memory in different scenarios like reading and writing? If at thr point of wrtitng there are mutiple read requests from threads how pending requests can be managed.
Q3: Given an array that has positive numbers and negative numbers and zero in it. You need to seperate the negative numbers and positive numbers in such a way that negative numbers lies to left of zero and positive numbers to the right and the original order of elements should be maintained
Interview 4:
Q1: Discussion about current project in company.
Q2: Why you want to leave your current company ?
Q3: Why Amazon ?
Q4: Which phone you have
Q5: Which one will you buy next
Q6: given a function with signature
bool isFactorialDivisible(int x, int y)
Return true if x! is divisible by y
else return false
After 3 days I got the confirmation call.

++

Amazon Interview | Set 78

The first round was an online test hosted on Interviewstreet.com. Around 350 students appeared in the online test. The duration was 90 minutes. It consisted of 20 MCQs based primarily on Predicting The Output, OS, CN and Data Structures.
These questions were pretty basic and easily solvable.
Apart from that, there were 2 coding questions.
1. Given a string, find the first element which is non -repetitive i.e that element must not be present anywhere else in the string.

```
Eg : Input : teeterson

     Output : r, as it is the first element which

              is non repetitive.
```

2. Given a string of digits,find the next smallest number using the same digits.If its not possible to get such a number print -1;

```
Eg : Input : "123"  Output : "132"

     Input : "12453" Output : "123534"

     Input : "987"     Output :  "-1"
```

After a week, the results came out and 25 students were shortlisted.
Personal Interviews:
Technical Interview 1 :
1. Given an array of 1s followed by 0s,find the number of 0s.

```
Eg : Input : 111100    Output =2

     Input : 1         Output =0
```

I solved it by using Binary Search to find the first and last occurrence of 0 in the array and subtracting the results.
2. Given an array of positive and negative numbers, find the pair of elements whose sum is closest to 0.

```
Eg : Input :  3 5 -9 -4 17 11

     Output  3 , -4
```

The brute force solution would be O(n^2) by comparing each pair of elements.As expected, he asked me to optimize my solution.
So I sorted the array using merge sort. (I know its not in-place but it did not strike me at the time)
Then used two indexes at the beginning and end of the the array and incremented/decremented the indexes as needed.
3. Given a Binary Tree , print all the root to leaf paths.
I started by telling him my approach and the logic behind the recursive solution that I had in mind. Then he asked me to write test cases for the function that I had written.
6 students were selected after this round.
Technical Interview 2
1. Given a binary tree convert it to a double linked list.
2. Given an array of integers , replace each element with the product of the remaining elements.

```
Eg : Input - 1 2 3 4

     Output : 24 12 8 6
```

First, i gave the obvious solution. I computed the product of the whole array and then divided it by each element to get the resultant array.
But he asked me to do it without using the division operation. After some cross questioning I gave the following solution.
Store the product of the left side elements for each integer in an array L[].

```
For eg : Here , L[]= {1 , 1 , 2 , 6 }


Do the same for the right side elements.


Here R[] = { 24 , 12 , 4 , 1}


The multiply R[i] and L[i]  to get the resultant array.

Complexity : O(n)
```

Finally 2 people were selected.
Result: Selected for a 6 month long internship as SDE-T (Testing)
GeeksForGeeks has been instrumental in my preparation for the interviews and I am really glad that I discovered this website at the right time.
PS : Could you guys tell me if the SDE-T position is inferior to the SDE-1 position or are they of the same level?
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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Amazon Interview | Set 77 (Off-Campus For SDE-1)

Amazon SDE1 Off campus (1.5yrs experienced)
Written Round
1. Given an array in which elements are first increasing and then decreasing. find the maximum element in the array.
2. Given an array of unsorted elements, find the minimum difference between any 2 elements in the array.
1st f2f
Discussion about my projects (nearly 20 mins)
1. Given an array of positive numbers, find the maximum sum of a subsequence with the constraint that no 2 numbers in the sequence should be adjacent in the array. (extended to negative numbers)
2.Write a function to print the level order traversal of a binary tree in spiral form.
2nd f2f
Small discussion about my projects
1.Write a function to find the next smallest palindrome number of the given number. for example: if given number is 12345, then the next smallest palindrome is 12421.
2.Given 2 strings str1 and str2. What is the efficient way to navigate from str1 to str2? The constraints are i) a string can be changed to another string by changing only one character. ii) all the intermediate strings must be present in dictionary. If not possible, return “not possible to navigate from str1 to str2″. (pre-processing is allowed and enough memory is available). for example: str1 = feel and str2 = pelt, then the navigation is feel -> fell -> felt -> pelt (Hint: Graph)
3rd f2f

Discussion about my projects (nearly 20 mins)
1. Given two numbers represented by two linked lists, write a function that returns sum list. The sum list is linked list representation of addition of two input numbers. It is not allowed to modify the lists. Also, not allowed to use explicit extra space.
2. Given a matrix of characters and a string, find whether the string can be obtained from the matrix. From each character in the matrix, we can move up/down/right/left. for example, if the matrix[3][4] is

```
o f a s


l l q w


z o w k
```

and the string is follow, then the function should return true.
4th f2f Hiring Manager
Deep discussion about my current project (nearly 45 mins)
(application architecture, challenges faced and a lot of technical discussion)
1. Write a program to check whether the given binary tree is BST.
5th f2f Bar Raiser
Deep discussion about my current project (challenges faced, etc) nearly 20 mins
Deep discussion on REST api authentications (Hash key vs Encryption & Decryption) nearly 20 mins
1. Given an input string, write a function that returns the compressed string for the input string in INPLACE. (no extra memory) (length of compressed string < = length of input string)
For example, if the input string is â€œaaabcdeeeeâ€, then the function should return â€œa3b1c1d1e4?.
GeeksforGeeks helped me a lot in improving my skills in DS and Algorithms.
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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Amazon Interview | Set 69 (For SDE-1)

Online Coding Round:

1. Find if a given string contains duplicates
2. Given a BST, find the maximum N elements of the tree
3. Given a BST, convert it into Doubly Linked List
4. Rotate a 2-D Matrix by 90 degrees

Telephonic Interview 1:

1. Sliding Window Problem: Given a larger integer buffer/array (say size, x), now given a window size (say, n) and a number (say, k). Windows starts from the 1st element and keeps shifting right by one element. The objective is to find the minimum k numbers present in each window.
2. Given a binary tree, each node having an integer data, the objective is to create a new Doubly Linked List using this binary such that each node in DLL has vertical sum of nodes in binary tree. The order of nodes in DLL shall be left to right as that of binary treeâ€™s vertical nodes i.e., leftmost vertical sum shall be 1st node in DLL and the rightmost vertical sum shall be the last node in DLL.

Telephonic Interview 2:

1. Given the root of the binary tree and a pointer to any random node in that tree, the objective is to print all the nodes at â€˜kâ €™ distance from the given random node.

Face to Face:
***Note*:** Time and space complexity were discussed in each of the following questions. And for each question I was asked to optimize the algorithm and later write the working code for it.Also in each round the current project was discussed.
Round 1:

1. Given a matrix (m*n), source (0, 0) & destination (m-1, n-1) (i.e. last cell), Find out total number of ways to reach the destination from the source.
2. Given a binary tree, defining a term â€œcomplete path sumâ€ as, sum of values of nodes lying in a path from root to the leaf; Now given a value â€˜kâ€™, we have to find the k-heavy path and prune the binary tree i.e. prune/delete nodes for which complete path sum is smaller than k.

Round 2 (Managerâ€™s Round):
A thorough discussion on an issue: If I am an owner of company which is selling some product. So, how shall I store my data in Database such that when any analyst comes and asks for any information then I could provide him most precise values. It mainly consisted which data should be stored and how it should be stored.

1. Given two sorted arrays, create a final sorted array. Later, the problem was extended saying that, now we have â€˜mâ€™ number of sorted arrays each of size â€˜nâ€™, now efficiently create a final array. A lot of discussion was done on complexity of the approach (both time and space).

Round 3:

1. Given a binary tree, where cost of travelling to the left child is â€˜1â€™ and same for the right child is â€˜2â€™. Now, given the root of the tree and a value â€˜kâ€™, find the total number of nodes that are at a distance/cost of â€˜kâ€™ from the root.
2. Given an unsorted integer (positive values only) array of size â€˜nâ€™, we can form a group of two or three, the group should be such that the sum of all elements in that group is a multiple of 3. Find the maximum number of groups that can be generated in this way.
3. Given an integer array, find minimum number of jumps to reach the end of the array.
http://www.geeksforgeeks.org/minimum-number-of-jumps-to-reach-end-of-a-given-array/

Round 4:

1. Given a BST, convert it into a Doubly Linked List in place. *NOTE*: We donâ€™t have to create a new data structure i.e. we have to modify the links/pointers in given BST.
2. Question was framed this way: Given street of houses (a row of houses), each house having some amount of money kept inside; now there is a thief who is going to steal this money but he has a constraint/rule that he cannot steal/rob two adjacent houses. Find the maximum money he can rob.

NOTE: I didnâ€™t face any HR round, all though in each rounds I was asked about the reason for the change.
In all it was a great experience, and interviewers were really cool and gave a plenty of time to think and code, sometimes suggested/hinted if I got stuck.
GeeksforGeeks has been extremely helpful for me in preparing.
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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Amazon Interview | Set 68 (For SDE-1)

I went through the Amazon interview process for SDE-1, I didn't make it past the 3rd F2F round.
Online Round:
1. Find if a given string contains duplicates
2. Given a BST, find the maximum N elements of the tree
3. Given a BST, convert it into Doubly Linked List
4. Rotate a 2-D Matrix by 90 degrees
Telephonic Interview:
1. Given an array of integers (+ve and -ve), give a contiguous set of numbers that add to 1
Eg. 4 3 5 -3 -1 2 -3 10 2
Ans: 5 -3 -1 2 -3
2. Check if a given tree is a BST or not
3. In a 2-D Matrix with the following properties:
i. Contains only 1s and 0s
ii. Every Row is sorted
Find the row with maximum zeroes.
F2F:
Round 1:
1. Print all the cycles in a directed graph
2. Given an unsorted array, assign every element to its immediate larger number after the current number, assign to -1 if no such number exists
Eg. 3 1 2 5 9 4 8 should be converted to
5 2 5 9 -1 8 -1
Round 2:
1. In a 2 D array where every row and column are sorted, give the nth smallest element
2. In a Binary tree, every element must contain the sum of its sub-trees
Follow up question: how would you solve this if you can ONLY increment the value of a node
Eg. If a node's value is 20 and its sub-tree sum is 10, the node's value can't be set to 10 because you can only increment
3. Given n, find the smallest number for which product of the digits is n, if no such number exists, print -1
Note: Digits can only be split as single digits, i.e., 132 can't considered as 1 * 32 or 13 * 2, it would only be 1 * 3 * 2
Eg. Answer for 36 would be 49
Round 3:
1. Convert a Binary tree into another binary tree whose in-order traversal gives a sorted list
This has to be done in-place
Eg.

```
        1

    2       3

 4   5   6     7


should be converted into


        4

    2       6
```

```
1   3   5     7
```

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Amazon Interview | Set 67 (For SDE-1)

1) Round 1 telephone interview – implement division without using division operator in log(n) time.
solution: use bitwise shifting
2) Round 2 telephone interview – write a program to buy and sell stocks to maximize profit, can only do 1 action per day i.e. buy or sell.
solution: I used 2 pointers to keep track of best buy and sell rates. I implemented it in O(n) time. He was happy with the solution.
After a few days I got a call from the recruiter saying the team was very happy with my interviews and wanted to meet with me in person.
I had to actually reschedule my on-site interview as I couldn't locate the office since it was not locatable on Google maps!!
I got in the office in Toronto. I was given a visitor pass and escorted to a meeting area where the interviews took place.
3) F2F(HR round)
This was easy, the interviewer asked basic questions about my background and what made me choose computer science. I talked about my favorite project and she answered some my questions.
4) F2F(Director) he wanted me to do BFS search. Given a level, child index return the child node for a binary tree. I gave him a inorder search instead, he was okay with the solution.
5) F2F(SDE) this is when things started to get tough. He wanted me to design a library reservation system. He wanted me to explain him a design and draw some diagrams and then implement the classes.
We didn't have enough time to do all of it. He wanted to know what data structure I would use to perform searches for books. I choose LinkedHashMap because it allows O(1) lookup and O(1) insertion.
6) F2F(SDE) He wanted me to build a boggle game. This is where I got a little mixed up with some java and C# syntax and he was not too impressed. I tried to write the algorithm using 2 for loops and he gave me some hints as to how to implement it.
7) F2F(SDE) Given a list of words, find anagrams. This was easy enough to implement. He asked runtime in the end.
The interviewers communicated with you all the time, its not like you go in an exam and quietly write what you have memorized. There is lots of pressure and lots of explaining to do as you write the code.
All in all it was a great experience. The guys were cool and fun to interview with.
Geeksforgeeks was a tremendous help towards the interview.
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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Amazon Interview | Set 66 (For SDE)

A F2F
1. Min stack problem (algo+code)
2. filling next pointer in tree but in zig-zag order (algo+code)
B Hiring manager
1. A big file (some TBâ€™s) containing custid, page and time stamp, find out the repreating customer(the one who visits after 24 hrs)(algo)
2. In a paragraphs tell the frequency of the words(algo)
3. A sequence of array, print the kth largest number(algo+code)
C F2F
1. Left view of a tree (algo+code)

2. Swap two node pointers in a singly linked list(algo+code)

D F2F

1. Given some sets of people who fight against each other. They are represented as graph. if a link exists between A and B, the it means that A and B are fighting against each other. Likewise there are some more links. The question was to divide the nodes into groups such that no person in a group fight with another member in that group. (More of bipartite graph) find the groups (algo)
2. A singly linked list, find the kth element from the last. The question was further modified to not to process a node more than once. (algo)

E Bar raiser

1. Questions on projects, what is it, what did you do (deep diving)
2. Situation that has to miss deadline
3. Any situation encountered with performance issues
4. Any situation where you need to convince your team mates
5. Any situation where you can see there are some improvements required and proposed
6. There is a large file(1TB) containing braces. Question is to check for their balance. I said will use a counter, will increment on an open brace and decrement on an close brace. If counter goes negative or counter is non zero at the end of the file, braces are not balanced. Otherwise balanced. Followup question was to make this process parallel (meaning to see if this problem can be solved through parallelism, like dividing the the problem into sub problemâ€¦) Remember the file is very large.

++

Amazon Interview | Set 65 (Off-Campus for SDE-2)

My experience for Amazon's Software Development Engineer-2

1st Round (Face-to-Face)

1. Design ATM

2. Design Car Service center

—- Deep dive into design and focus on specific modue called 'Service'

—- Supervisor should be able to allot a Best Engineer to Service customer request, How do you code to get best engineer to fix the car service request.

2nd Round (Face-to-Face)

1. Write a program to get all list of nodes without siblings in Binary tree

2. How do you implement 'Car service center' application to achieve Reliability, Scalable and Consistent in distributed environment.

3rd Round (Face-to-Face)

1. Some behavioural Questions

2. Core java Q: Why do we need equals method ? Can we check equality using hashcode method. Difference b/w them ?.

3. Get all nodes K distance away from leaf nodes. I could able to tell him my idea, but I couldn't able to come up with program with in given time.

4th Round (Face-to-Face)

1. Specific questions on current working project.

2. Implement my own Connection pooling

3. Given a linked list, write a function to reverse every k nodes. Initially I told him solution with help of Stack , then he asked without using extra space, With his clue, I could able to tell him using recursive logic to solve it.

Inputs: 1->2->3->4->5->6->7->8->NULL and k = 3

Output: 3->2->1->6->5->4->8->7->NULL.

5th Round (Face-to-Face)

1. Given a string, find the longest substring which is palindrome. For example, if the given string is â€œforgeeksskeegforâ€, the output should be â€œgeeksskeegâ€. I have seen this question , but never thought about solution.

Same question i got in interview, I was very happy to get solution, interview asked me optimize further. I could fix 1 improvement and he suggested 1 improvement.

2. Identify all possble entities/domain objects in Cricket. Went little deep.

3. Given Channel, Program and TRP ratings, How do you consume those at server side,

and what do you do to retrieve specific data like 1Get all programs in given channel where TRP is > 10′.
4. Some behavioral Questions
Overall it was great experience, Myself satisfied with my performance in all rounds expect 3rd round :(.
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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Amazon Interview | Set 64 (Off-Campus for SDE)

I am sharing my off campus SDE interview experience with Amazon.
Online round: (1hr)

1. Given coin array and a sum K, find min. number of required coin to make sum K.
2. Two rectangles are given in two D space. Find if these are overlapping or not
3. KMP for pattern searching

After two days I got the call to come Amazon office for F2F interviews:
1st Round:

1. Program to construct binary tree from its inorder and preorder traversal. (algo+code)
2. Reverse every k-element in a linked list(algo+code)

2nd Round:

1. Tell me about one of your best project in detail.
2. Design Restaurant reservation system.

3rd Round:

1. Given a binary search tree of n nodes, find all the pair ofÂ nodes whose sum is equal to a given number k in O(n) time and constant space.(algo+code)
2. Given a function â€œfâ€ in which 0 occurs with probability 0.4 and 1 occurs with probability 0.6. Using function â€œfâ€ deduce a new function â€œf1â€ such that both 0 and 1 occurs with probability 0.5
3. Given a matrtix, find the maximum sum subarray in it.(algo+code)

After one week I got the call from HR for my BR round.
4th Round (BR Round):

1. Â Tell me about yourself.
2. Â Why are you looking for change?
3. Â How will you handle conflict with your manager?
4. What is the most challenging work done by you Â in your current company?
5. Lots of discussion happened about current companyâ€™s project.
6. Given a number N, find the smallest 3 digits numberÂ such that product of its digits is equal to N. (algo+ optimal code)

In all the rounds, the most optimal production quality working code was required and if you get stuck, then they will give you HINTS but donâ€™t consider this in your favor!

++

Amazon Interview | Set 63 (For SDE-1)

I have a total experience of two years. I am sharing my interview experience with Amazon. This is for SDE1 Amazon.
A very big thanks to whole team of geeks for geeks. It is because of them only that I was able to make Amazon and get a job in my dream company. Otherwise it was impossible for me.
Online round: (1hr, working code required)

- Given coin array and a sum K, find min. number of required coin to make sum K. (DP Question)
- Two rectangles are given in two D space. Find if these are overlapping or not
- KMP for pattern searching

After two days I got the call to come Amazon Bangalore ofc to attend next rounds:
1st Round:

- First occurrence of duplicate char Â in a char array.
- Merge two sorted array of n and n+m size
- Zig-zag traversal of tree

2nd Round (Hiring Manager, full explanation in white board):

- Tell me about one of your best project, deep drive J
- Count the words in a file (simple one)
- Design parking system.

3rd Round: (one or two DS ques I forgot)

- Reverse every k-element inÂ a linked list
- Check if two tree are mirror tree
- Find longest palindrome in a string
- Find sum K from an unsorted array which have both â€“ive & +ive numbers.
- Full explanation about tries (search, insert, traversal, delet)
- Full browser working
- Lock variable and their implementation (OS)
- What is hashing, if any hash function mapping tow inputs to one output then how to handle that scenario at the time of retrieval, you canâ€™t change hash function.

After one week I got the call from HR for my BR round.
4th Round (BR Round, full on white board):

- Cultural fit questions: tell me about yourself, why you are looking for change, what innovative you did in last two year (I had already preparation for all these type of questions) J
- Lots of discussion happened about my current project.
- Given two string remove the characters of one string from another string
  oÂ Â Another variation he asked: Given two string remove the characters of one string(**having duplicate characters**) from another string

oÂ Â One more variation he asked: Given two string remove the characters of one string(**having duplicate characters**) from another string **from right to left.**

- Given one string, print all the anagrams of this string from a given file which contains lots of strings.
  oÂ Â Another variation of this he asked: Given **group of string,** print all the anagrams of all given string from the file of strings.

- After that he asked one more culture fit question

He was very happy after seeing my explanationsJ J
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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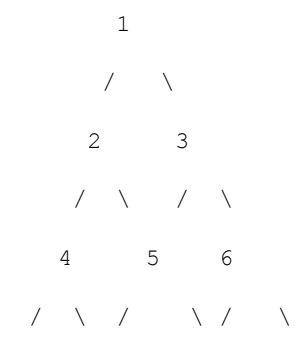
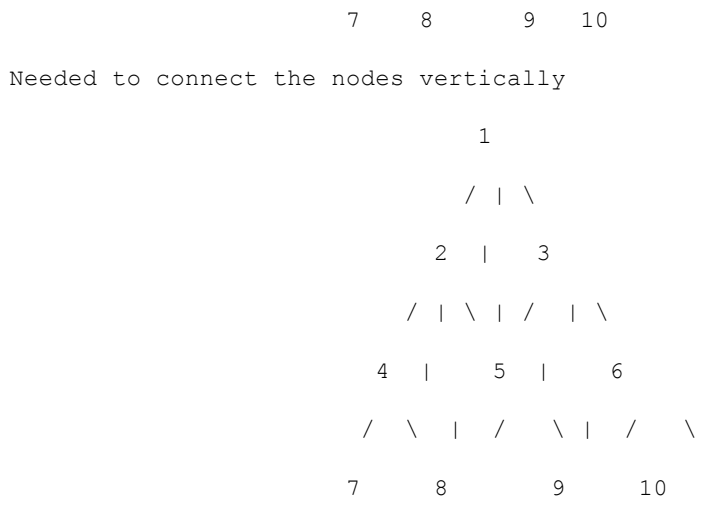
Amazon Interview | Set 76 (For SDE-1)

Hello Guys, I was recently interviewed by Amazon for SDE-1 position. Following is my interview experience.
Round-1 (Written on InterviewStreet)
1. Rotate a N*M matrix 90 degrees clockwise
2. Given a string find the repeated characters and print them in lexicographical order. e.g i/p string- “ABCCAD” o/p-”AC”
3. Given a binary tree, find the k-th largest element
4. Convert Binary tree to DLL
Round 2 (Telephonic)
1. Given an MxN array, in which the rows are sorted. Need to sort the complete array
Round 3 (F2F)
1. Spiral Level order traversal of Binary tree
2. Given a huge file 100 million integers. He further divided the file
to 100 files with 1 million integers each. Each file is sorted. Find the efficient way to find smallest ‘m’ integers. Note ‘m’ is very less in comparison to a million
3. Given sorted & rotated array find the index of given integer
Round 4 (F2F)
1. Given a Binary Tree and a sum k.Print all the paths with sum = k. Path can or cannot start with root
2. Reverse k elements of linked list
3. Given a 2D array find the maximum sum rectangle
4. Given a list of n mp3 songs. Play them randomly. No song should repeat until all the others are played.
Round 5 (F2F with Development Manager)
1. Tell me about yourself and the projects done in previous company. A discussion on those projects followed.
2. Why do you want to leave your previous company
3. Given a binary tree





Assume each tree node has an additional pointer

(struct node* vertical)

Round 6 (F2F)
1. Given stock price of Amazon for some consecutive days. Need to find the maximum span of each day's stock price. Span is the amount of days before the given day where the stock price is less than that of given day

E.g i/p = {2,4,6,9,5,1}

o/p= { -1,1,2,3,2,-1}

2. Given a Binary tree each node should contain the sum of left and right subtrees. Leaf nodes will become 0 in the resulting tree.
Round 7 (F2F with Project Development Manager)
1. Tell me something about yourself
2. Tell me about your previous company and projects
3. Why do you want to leave the previous company in such a small time.
Finally got the offer after few days
Tips:- Be clear to the interviewer, the are quite helpful. Try to discuss the various approaches that come up in your mind if you are struck somewhere.
All the best.!!
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Amazon Interview | Set 75 (For SDE-1)

I am currently in my 8th semester . I recently attended the off campus drive for SDE1 at Amazon. Here's my journey.
Round 1:- (Written)
This was a written round . It was hosted on interview street.
It was a 90 minutes test with 20 mcq and 2 codes
1> Return the longest palindromic substring in a string
2> Count the number of 2′s in all number from 0 to n .
Mcq's were based on ds algo,operating system and maths.
After two days I got a call from the hr that I have cleared the written and a phonescreen is to be scheduled.
Round 2:- (Phone screen 1)
This was supposed to be a 1 hour round. The interviewer shared a collabedit link.

1> Divide an array into 2 subarrays such that the absolute difference of their sum is minimum. It was then extended to divide into two subsequences .
2> Convert a sorted array to a balanced binary search tree.
3> Convert a linkedlist with positive and negative integers into a list with first all negative integers, then positive. order amongst negative and positive numbers to be maintained .
Generally if first phonescreen is convincing the next step is direct face to face interview , else one has to go through another phonescreen . I had one phonescreen only . After a month i was called for inhouse interviews . All arrangements were made by them .

Round 3 :- (Face to Face 1)
1> Define a BST. Now check if a binary tree is a BST
2> Given an array of size n, and an integer k. find minimum number in every subarray of size k
3> Given n non-negative integers representing an elevation map where the width of each bar is 1, compute how much water it is able to trap after raining
4> Given an array find all triplets whose sum is equal to a given number k

Round 4 :- (Face to Face 2)
1> Find the diameter of a tree.
2> Print the diameter of a binary tree . (U have only left and right pointers)
3> Assembly scheduling problem (Dynamic Programming paradigm)

Round 5 :- (Face to Face 3)
1> How to check if two sets are disjoint ?
2> How to implement hashing for a set .
3> Given n sets , give the minimal number of sets which must be removed so that the remaining sets are all disjoint (Variation of set packing problem)
The interviewer was interested in some greedy heuristic as he knew its an np complete problem and no solution can be better than exponential
4> You are given a matrix of 1′s and 0′s . The property is that
every row of matrix is sorted in descending order . Return row with maximum number of 0′s

Round 6 :- (With senior manager)
Interview started with detailed discussion of projects.
1> Implement lastindexofastring(String s1,String s2) . If s2 is present multiple times return the last index of s2 in s1 , else return -1.
2> Given a paragraph of text, write a program to find the first shortest sub-segment that contains each of the given k words at least once. A segment is said to be shorter than other if it contains less number of words.
The interviewer then asked me if i had done something on multithreading . As i was not very confident so i said no and he dint go further .
He then asked me what is my biggest regret in my student life in college .
Amazon hr's were extremely helpful. After 3 days I got a confirmation call that I was hired. Geeksforgeeks has been instrumental in helping a lot of people to land up in good companies. Keep up the good work 🙂
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Amazon Interview | Set 74

Phone Interview:
1) Given a 2D matrix where every row is sorted, give the index of row which has maximum number of oneâ€™s
2) Given a Binary tree, print its every level in a new line.

Face to Face Interview (Round 1):
1) you have an array which has a set of positive and negative numbers, print all the subset sum which is equal to 0.

```
eg 2, 1, -1, 0, 2, -1, -1

o/p: 1, -1
```

```
1, -1, 0

0

2, -1, -1
```

2) How do you check whether a binary tree is a binary search tree.
Face to Face Interview (Round 2):
1) you have a billion numbers how do get kth top elements
2) given a number n, print all pairs of valid parenthesis

```
eg: n=2 -> (()), ()()

       n=3 -> ()()(), (())(),()(()), ((()))
```

I did not clear after this round, I hope this helps others.
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Amazon Interview | Set 73 (For SDE-1)

I have been interviewed for SDE1 by amazon. Here are the questions.
1st Round – Online Coding
1. Contiguous elements in an array whose sum is k.
2. Convert sorted array to binary search tree.
2nd Round – Telephonic
1. Implement stack with Push, Pop, GetMin and GetMax in constant time. Algo + Code
2. Given a matrix, sorted both horizontally and vertically, algo and code for finding an element in it. Algo
3. Given a stream of characters, convert it to a sentence with valid words. Assume you have a function IsWord which returns true if the passed string is a word. He asked me to write code and mail him. Algo + Code
Ex: Iamgoodboy – I am good boy
3rd Round – Telephonic
1. Given an array of characters, find the longest continuous non-repeating sequence of characters. Algo + Code
Ex: aabcdefdghiajk – efdghiajk
I have given a hash based solution, so he asked me to write a custom hashfunction and how to handle collisions.
2. Find the next largest palindrome number of the given number. Algo + Code
Ex: 120 -121, 123 – 131
4th Round – InHouse technical round
1. Find the mirror image of a binary tree. Algo + Code
2. Given a string, find the largest repetitive sequence. Algo + Code
Ex: abcdefbcd – bcd, banana – ana
5th Round – InHouse technical round
1. Given a string, remove ‘a’, ‘bc’ from the string and print the result. Algo + Code
Ex: asdbc – sd
2. You will be receiving an infinite sequence of numbers continuously and at any particular moment find the 10 largest ten numbers received till now. Algo
6th Round – Bar raiser round
1. Given a graph, find the nodes which are at less than k distance

from the given node.
Continuation: find all the nodes which are less than k distance from m
nodes. Algo + Code
2. Implement a queue using an array. All base conditions. Code
3. Given a very big array of millions of integers, find sum of all the elements.
Parallel processing and threads is the answer. Threads concept,
synchronisation and so many of it.
4. OS concepts – virtual memory, paging, process states, paging algos.
5. In detailed explanation of projects done till date.

7th Round – Manager Round

Asked dilemma situation. Any process development work, work experience and all.
geeksforgeeks helped me to refresh all kinds of topics. Thank you.
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Amazon Interview | Set 72 (Off campus for SDE-1)

Amazon Interview (Off campus for SDE-1)
Experience: 8 months
Interview Process – 2 (telephonic) + 3 (f2f – Bangalore) + 1 bar raiser (telephonic)

Telephonic 1 (25 minutes only)

Q1. Two strings s1 and s2 are given; find a minimal length substring in s1 which does not contain s2 as a substring. (Do include all edge cases)
Q2. Swap all nodes of a linked list with their next nodes.

Telephonic 2 (65 -70 minutes)

Q1. An integer array of size n is A[] given, find the three numbers s.t. A[i] > A[j] > A[k] and I < j < k.(algo only)
Q2. An array of integers is given, trim the array such that 2*min > max. min and max are the minimum and maximum elements of the array. You can remove elements either from start or from end of the array if above condition does not meet. No of removals should be minimum. (algo + code)
For example a, b, c, d, e f are the elements of array, c is the min num and e is max no
condition 2*c > e is true then we are done but if false then remove either from start i.e. a,b,c or from end i.e. e, f such that new min or max would satisfy the condition and removals should be minimum.
Q3. A sorted array of integers and a number K is given, find the closet number to K. (algo only)

F2F 1 (60 minutes)

Brief introduction about my self and my work experience in current company
Q1. Equilibrium Point in an integer array (sum of left side elements should be equal to sum of right hand side elements)
Q2. Extend above for multiplication (multiplication of left side elements equal to multiplication of right side elements)
(special case of Zero and some discussion on arithmetic exception and range bound errors)

F2F 2 (60 – 65 minutes)

Some general introductory questions; why are looking for a change and work experience.
Q1. For a given number K, print all pairs of valid parenthesis combination and return the total count of such combinations.
Q2. There are n balls kept on a table and connected in random fashion but there is no cycle (no back edge). Write the code to select a ball such that after lifting the whole structure from that ball height will be minimum. (algo+code+ mathematical proof of correctness)
Q3. Difference b/w http and https.
Q4. Suppose you are handling Amazon website and you have 10 MB size home page. Optimize the homepage for a customer who has 100 kbps internet connection.
Further he asked for the customer who has 100 mbps internet connection.

F2F 3 (with Hiring manager, 80-90 minutes)

Lots of discussion about current project. He will ask you everything from bottom level to your contribution.
Q1. Implement memcpy (*src,*target) function.

Q2. Reverse contents of a linked list.
Q3. I code in java so lots of question on oops and java like swing and awt difference , vector and array list difference , interface and abstract classes.
Q4. Client and server code in chat window, background process in server and network, networking layers.
Q5. Process and threads and code for thread safe situation (take an example and explain)
Bar raiser (Telephonic one hr)
Hr Question like biggest challenge so far, projects, why are you looking for a change, why amazon, biggest mistake.
Q1. Given flat files (for an entire year, 1 per day) of train schedules (arrival and departure times at a given station) find Min platforms required to accommodate the trains in that station.(algo only)
Q2. I want to write a ransom note. But I don't want to write it by hand, I'm going to cut letters out of a magazine. How can I tell if the magazine has enough of the right words to spell out the note I want to write? Let's assume we have a way to digitize the text of the magazine. (algo only)
I asked him about Amazon kindle and Amazon instant video. Show him that you know lot about amazon.
Advice for Amazon: except from all data structure, read Trie data structure very well and how to process big data.
Next day I got call from HR tht I am Hired
Thanks a lot to geeksforgeeks team.
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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Amazon Interview | Set 71 (For SDE-2)

Recruitment Drive – Delhi (22 March 2014)
Position SDE-2
1st Round – Coding and Algo (50 Minutes)
1. Find In order predecessor in BST.
2. Find Nodes which are at "K" distance from given node.
Interview asked to explain logic and write full code with all boundary conditions.
2nd Round – Design Round (50 Mins)
1. Asked about abstract classes and abstract class there uses and where they have to used.
Asked me to design online cab booking system for amazon. Then asked me to design High Level diagram for it.
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3rd Round – Coding and Algo Round (1 Hour)
1. Asked to explain how to check Binary tree is BST? then asked me to write whole code of it.
2. Then asked me about assembly line problem. http://www.geeksforgeeks.org/dynamic-programming-set-34-assembly-line-scheduling/
3. Then asked me to solve Knapsack Problem http://www.geeksforgeeks.org/dynamic-programming-set-10-0-1-knapsack-problem/
4th Round – Manager Round (45 Min)
Asked me about my experience with current company and details of my project
Then asked about singleton pattern.
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Amazon Interview | Set 70 (On-Campus For Internship)

Online Round Coding Question:
Q1. Given a float number 7.64, convert it into the string WITHOUT using any inbuilt function/library.

for eg:
input
float no.: 7.64
output
string: 7.64
Q2. Given the inorder and preorder traversals of a Binary Tree, output the postorder traversal of it.
for eg:
input:
Inorder: 7, 8, 4, 1, 6, 2, 5
Preorder: 1, 4, 7, 8, 2, 6, 4
output:
Postorder: 8, 7, 4, 6, 5, 2, 1

Round 1 written:

Q1. Given a string find the length of longest substring which has none of its character repeated?
for eg:
i/p string:
abcabcbb
length of longest substring with no repeating charcters: 3 (abc)
Q2. Given a link list with right pointers and each element of the list has a down link contains another link list with down pointers as:

```
 5 -> 7 -> 9 -> 18

 |    |    |    |

10    6    14   20

 |    |    |    |

11    8    19   22

 |    |         |

12    13        24

 |

15
```

each right and down list are sorted.
Write a function flatten() which flattens this link list to a single link list with all the elements in sorted order as:
5->6->7->8->9->10->11->12->13->14->15->18->19->20->22->24

PI Round 1:

The interview started with discussions and questioning about the internship project and other projects mentioned in my Resume.
After the discussions about projects interviewer asked a question on string the question was:
Q1. A string of length n and an integer m was given, give an algo. to rotate the string counter clockwise by m. I was asked to give all the check conditions for input m.
Then the interviewer asked me to write a code for the same with a strict guideline that there should not be any mistake in the code ;).
Q2. After this he asked me about heap, min and max heap, insertion and deletion in a heap. He asked me to prove that the time complexity of inserting n elements in a heap.
At-least he asked about the uses of heap data structure and other data structure which are implemented using heap.

PI Round 2:

Q1) What is the difference b/w abstract and interface class?
Q2) Write a program to create single thread and print “Hello World”, stating all the arguments of createThread function?
Q3) What is a deadlock and what are the condition necessary for the deadlock to occur?

Q4) What is a cache memory and how it is implemented?
Q5) Explain LRU, FIFO and other page replacement algorithms?
Q6) Write a code to implement LRU cache and then implement full cache memory?

++

Amazon Interview | Set 62 (For SDE-1)

I recently went through the Amazon interview process for the post of SDE-1.
Round 1 (Written)
1. Given an array, output an array where every index conains nearest greatest element to that element on right side.
2. Program to convert sorted array to Binary Search Tree
3. Find first non-repeating character in String
ex: geeksforgeeks: f
geeksforgeeksFirst:o
Round 2 (F2F)
1. Given linked list as a-x-b-y-c-z
output it as a-b-c-z-y-x
that is reverse alternate element and append to end of list
2. Output nearest number greater than given number such that output is palindrome
ex: 121:131
900:909
99:101
Round 3 (F2F)
1. Vertical Sum in Tree(I told him I know the solution, he proceeded further)
2. Given stream of Strings find top 5 words with maximum frequency or count
3. Given 2 nodes in Binary Tree find distance between them
Round 4 (F2F with hiring manager)
1. Projects done so far, HR questions
2. Design Linkedin and find till 2nd level connections and path between 2 connection
for ex: if A is friend of B which is friend of C
print between A and C A-B-C
3. Programming language: Java
About synchronisation, serialization, transient and volatile keyword, Singleton Class
Round 5 (Bar Raiser)
1. Count Inversion in array that is if i a[j]
Told the solution nlogn of divide and conquer. He asked another solution, then told by inserting in BST and whenever node goes to left side then adding 1 and number of children on right side . We have to keep track of count of right subtree in every node
Round 6 (F2F)
1. HR questions (Why leaving company, projects, SWOT)
2. Program to check for mirror tree
3. Data Structure so that push, pop, getmin, getmax O(1) (using 3 stacks)
4. Data Structure so that push, pop, pop min, pop max
Told Solution till O(logn) by using min heap, max heap with pointers to doubly linked list nodes

++

Amazon Interview | Set 61 (For Internship)

Hello geeks, Last month I appeared for the **Internship Interview of Amazon**.
What my personal experience says is that never try to jump to the right solution straight-away, instead take your time and **think progressively** about the possible solution to the given problem.
Check for boundary test-cases carefully and also don't remain completely blank during your conversation with interviewer but keep on telling him about the **tentative solutions** that are coming to your mind.
My entire process consists of **3 rounds:**
1. Online Round.
2. 1st Telephonic Interview
3. 2nd Telephonic Interview

Round 1:
It was an online round consisting of 20 Multiple Choice Questions (from C language, Operating Systems, Data Structures and Algorithms and Software Development Concepts) and 2 Coding Questions:
1. Given 2 linked lists constructed another linked list containing the sum of those 2 linked lists. e.g Given :Â 1 -> 2 -> 3 and 4 -> 5 -> 6 Ans: 5 -> 7 -> 9
2. Find the Vertical sum of the given Binary Tree.

Round 2 (Telephonic):
The duration of telephonic Conversation was about 60 minutes and the Interviewer asked me 2 coding questions:
1. Given an array of +ve as well as -ve numbers, find out whether it is possible or not to convert it to 0 by adding/subtracting operations on all the elements.
e.g arr[]={1,2,3}
YES (1+2-3)
arr[]={3,6,2}
3+6-2 != 0
3-6-2 !=0
-3-6-2 !=0
-3-6+2 !=0
-3+6-2 !=0
-3+6+2 !=0
3-6+2 !=0
3+6+2 !=0
Hence ans= NO
2. Given a binary Tree where the structure of each node contains an extra "next" pointer (initially all NULL), modify the binary tree such that all the nodes at the same level gets connected by utilizing these given extra pointers.
The interviewer also asked me to write the code for the same.

Round 2 (Telephonic):
The duration of telephonic Conversation was about 90 minutes and the Interviewer asked me 2 coding questions:
1. Write a code to find the **Diameter** of the given a binary tree
Firstly I gave the solution which has complexity O(n^2) then he asked me to optimize it so finally I did it in O(n).
2. Given a number design the algorithm to find the next greater number which contains exactly same digits. e.g. n= 123 next greater with same digits = 132
The number can be very large so its better to consider it as a sequence of characters.
I was also asked to write the code for the same.
I had a very great time preparing for the interview and got to learn a lot of new concepts.
I am really very thankful to **GeeksForGeeks** for being the primary source of my preparation and believe me guys this website is just **awesome**.
And ya forgot to mention I finally got the confirmed offer for Internship at Amazon 
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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Amazon Interview | Set 60 (For Internship)

Believe me or not before I faced an Amazon interview round I was never sure whether all those gratitude that people usually present to GeeksforGeeks were actually worth. But it is always easier to connect the dots looking backwards and now I can say with assurance that this website really deserves all the applause.
I was recently interviewed for an internship position at Amazon and had to go through a total of 3 rounds i.e. one online followed by two telephonic rounds.

Online Round

As usual the online round had two coding questions and 20 MCQs. This was a pretty easy round and it's duration was 90 minutes. The round consisted of questions from various domains like Algorithm, Data Structure, Operating System and Aptitude.
A few days after appearing in this round, I was informed that I have been qualified for the next round.

First Telephonic RoundÂ Â

I had just three days to prepare for this round and truly speaking, it was my first experience of appearing in any such interview. This round lasted for almost 60 minutes. It began with my general introduction followed by a brief discussion on my projects. After this, the interviewer asked me four questions.

Question 1:

Given an array of numbers find all such triplets that satisfy the given condition.
Condition:Â a[i] < a[j] < a[k] where I < j < k.
At first go I thought that it was a pretty easy question but slowly the mist started to clear and I realized how tough it was. The interviewer wanted me to solve it in linear time i.e. O(N)

Question 2:

Given two trees check if they are mirror images of each other or not.
This was a straight forward question and it took me less than 10 minutes to code it.
Now the interviewer wanted to test my understanding of operating systems and asked two fairly direct questions, to which I gave my answer based on my understanding (not bookish definition as I did not remember any of those).

Question 3 & 4:

What is semaphore and what do you mean by a deadlock.
After two days I got a call from the HR informing me I have been selected for the next round. Now it was the time for the last and the decisive round.

Second Telephonic RoundÂ Â

For this round I had slightly more time than the last, due to the fact that the weekend fell in between.The interviewer was very very cool and helping this time, something which I kept at the last in my list of probable things that can happen during an interview.
Duration of this round was around 90 minutes.
This time I had to face three technical questions and one general question on Amazon.

Question 1:

Given a BST, replace each node with the sum of the values of all the nodes that are greater than that node. Only constraint being that I was not allowed to use any global or static variable.
Although I panicked a bit and made few mistakes, I got through.

Question 2:

Given an array of numbers find the maximum count of duplets and triplets such that there sum is a multiple of three. Number that has appeared once canâ€™t be included anywhere else.
I solved this question using a property of modulus.

Question 3:Â Â

Given the stock prices of 10 days find the best possible buy sell pair.
For this question I started with a $O(N^2)$ solution but then finally managed to reduce it to O(N) solution with constant space complexity.
I was also asked few questions on Amazon like what are domains in which Amazon deals.
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Amazon Interview | Set 59 (Off-campus for SDE-1)

I recently went through the Amazon interview process for the post of SDE-1. It was an amazing experience for me.

Online Round (2 hours):

Q1- Program to rotate a matrix by 90 degree clockwise.

Q2- Program to convert a binary search tree into doubly linked list.

Q3- Program to find a node which is just greater than a given node in a tree.

Q4 â€“Given a sentence. Find all the characters which are repeated more than 1 time and print them in lexicographical order.

F2F interview 1(45 minutes):

Q- Given a MXN matrix. To find the number of ways to reach the mth row and nth column cell from 0,0 cell. Find the same if some of the cells are marked as not reachable.

First implemented using recursion then through dynamic programming.

Q- Given a linked list like a1-a2-a3-a4-b1-b2-b3-b4. Convert it into a1-b1-a2-b2-a3-b3-a4-b4.

F2F Interview 2(50 minutes):

Q- Given a sorted array of 0 and 1. Find the first occurrence of 1. Production working code was required. I provided him O(logn) solution. He asked me how it is O(logn). Then I explained him and generated the formula for same. He was convinced finally.

Q- Implement the cache using LRU technique. Production working code was required.

F2F Interview 3(1.5 hours):

Discussion on my current project. He asked every minute details of my project and made me feel like he knows better than me about my project

Then he asked me to implement a data structure for showing the currently visited items by a customer on any website. You will find the same on Amazon website at bottom left side.

Program to sort m sorted arrays. I told him that I knew this. So we moved ahead.

Data structure to push, pop and find min element in O(1) time.

F2F Interview 4(45 minutes):

Q- To delete all the nodes from a binary tree that lie on a path whose sum from root to leaf is less than a given value K. Twist was that the node values can be any integer. It may be a negative number.

He asked me to find the time complexity and space complexity.

I did it using recursion with O(n) time complexity and O(1) space complexity. He said that there is some space being used by my program that I am not taking into consideration. I got his point. Since I was doing it using recursion, So some internal stack space was being used and that would be O(logn)i.e height of tree. That was bit tricky.

Q- Given two sorted arrays. Find the median of the combined array.

One thing that you need to keep in mind is that you need to provide them the optimized solution with respect to time and space and donâ€™t forget to consider the corner cases.

After 4 days I got a confirmation call from Amazon

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Amazon Interview | Set 58 (On-campus for Software Development Engineer)

I’m in E&CE and I’m sharing my interview experience with Amazon on IIT campus to help you prepare for your interviews. There was online test for 300 students. 25 were selected for interviews. There were 4 back-to-back rounds on the same day. My interview process lasted for around 5 hours and finally I got hired.

Round 1:

1. Given 1 billion integers. Find 100 maximum integers. Memory available is insufficient to store 1 billion integers.

2. Given array of N integers ranging from 0 to N-1. Output maximum repeating integer. Use only O(1) memory.

Round 2:

1. An array of integers is given such that it is first ascending and then descending. Find index of some given integer in that array. Ex. 2,4,6,8,7,5,4,3. Input: 4. Output: 2, 7. Write code on paper.

2. Two sorted arrays are given. Find median when both arrays are merged and sorted. Write pseudo code on paper. Take care of boundary conditions.

Round 3:

Basic OS, DB concepts.
1. You are given some integers. Propose a data structure to implement “add”, “delete”, “fetch” and “fetch any” operations. All four operations must complete in constant time.
2. There is a B-tree with two type of nodes A and B. Return nth A or nth B while doing inorder traversal in O(1) time. And write pseudo code on paper.
Round 4 with manager:
There is very huge text file consisting several rows and columns of integers. Memory available is not sufficient to store whole text file. One column can be stored in memory. Sort whole file corresponding to given column keeping all rows unchanged. You cannot make new text file. Write neat code on paper.
Solution:
Round 1:
1. Make min heap of first 100 elements. For each remaining elements, if it is greater than root (min) node then remove root node, add that element then heapify. Time = 1 billion * log(100)
2. Simple. For i = 0 to N-1, A[A[i]%N] += N. Return i with max A[i]. O(n) time.
Round 2:
1. Find pivot point. O(log n) Binary search in both left and right arrays. O(log n)
2. Compare median of both arrays. Accordingly select right half or left half array. Repeat. O(log n)
Round 3:
1. Make a hash table and a linked list. When you add an element add it in both hash table and linked list. But in hash table along value caralso store pointer to the same value in linked list. To delete an element find it in hash table, use stored pointer to delete the same element from linked list also. For fetch any operation return head node of linked list. Memory = 2*N
2. Preprocess in O(n) time: Make two vectors for A and B. Traverse in-order. When you get A add its pointer in vector of A. Same for B.
Round 4:
Read whole column. Heap sort (saves memory). Now you know old indices and new indices. Shift entire rows from old index to new index. Keep one row in temp storage to avoid overwriting.
Some tips that may help you:
1. Always be confident for whatever you are saying.
2. Listen carefully. Ask doubts until the question is perfectly clear to you.
3. Think out loud. Start with obvious approach and then improve upon it.
4. They will test your way of approach, thinking process. Don’t give up. Interviewer may give you hint if you are stuck.
5. Direct them to ask you about your strong topics.
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Amazon Interview | Set 57 (Off-Campus for SDE-1)

Hi geeks, I recently hired for amazon. I just want to share my Interview experience with You all.
Totally 1 Written + 5 F2F
Written round:
Q1: Convert a sorted integer Array to balanced binary search tree. This is very simple one and I could do it in O(n) time and O(1)extra space.
Q2: Write a Program to reverse every k nodes of singly linked list without using extra space. Constraint: k>=2
F2F round 1:
Q1: Find the largest element in the sorted rotated integer array in o(log n) time.
Q2: Find Height of a Binary Tree. This is very easy question, so I did quickly.then he move on to next one.
Q3: Find your own method to balance an unbalanced binary tree.(you must not use existing methods like AVL, red black or b trees).
Hint: There is no restriction on placing nodes. You can remove any node from any place and put it in any place.
I devised an algorithm which will make use of two lists.Â One list contains nodes far away from the root and this is sorted in

decreasing order of levels and left to right if nodes are in same level.Â Other list contains nodes which are not fully filled. This is sorted increasing order of levels and left to right if nodes are in same level .
Remove the first node (listed in list1) and insert as a child of first node in list2.add this node also in list 2.Â Do this operation until the height of the tree becomes log(n).Â Interviewer was impressed with this and finished the interview.
F2F round 2:
Q1: There is a file which contains N words. There may be M anagrams in that file, K words on each anagrams. K>=1, M>=1, N>=1. You need to write an algorithm which will create one list for each anagram with k words and group all M lists with one data structure (This is the main area.we need to think a data structure which will minimize the space and time complexity of word Finding appropriate List and Inserting word).
I could do the insertion in O(1) time by keeping track of tail pointer in each list.Â But finding the appropriate list needsÂ o(n) in case of linked list, o(log(n)) in case of binary search tree. Using hash table, you can do this in o(1), but writing a hash function is difficult and inefficient in terms of time. Then I suggested Trie data structure.with this, we can reduce the time complexity well. But space complexity will be more.Â I told all the ideas to interviewer. They were much satisfied with this. And moved to next question(without writing code J)
Q2: Find min and max element of an unsorted integer array.
Very simple question you can do two pass on the array and find it, but number of comparisons will be o(2n). He asked me to reduce it.
I gave an algorithm which will do the same in O((n/2)*3) which is fairly less than o(2n). They were impressed on my solution and asked weather I have any question .
F2F round 3: (CS fundamentals and system programming)
Questions were in C++ patterns, Network Programming, Linux, since I did project on networking, Linux I could perform well in this round.
F2F round 4: (Hiring manager round):
Interviewer was keen on testing cultural fit. Nearly 10 to 15 questions on my previous project,
Why amazon?
Why you want to leave previous company?
What initiative you took in prevous company?
How will you manage conflict with your manager?
How will you demonstrate ur product to customer?
F2F round 5: (bar raiser)
This also had cultural fit questions and then a data structure question.
Qn: Find the distance between two nodes in a binary tree, no parent pointers are given. I could solve this in post order traversal in o(n) time complexity. He asked me to code in home and send it via mail.
Geeks for geeks is my Wikipedia for interview preparations. Thanks to geeks for geeks.
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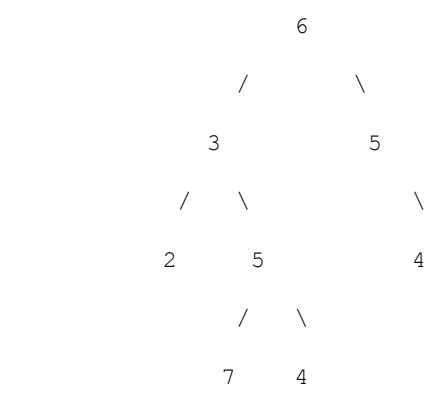
Amazon Interview | Set 56 (Off-Campus)

The most important thing about Amazon interviews is that you need to produce Flawless, Most Optimal solution in the First try itself. Take your time to think, but when you code make sure you Cover every edge case before handing your solution to the interviewer.
Online Round (90 mins)
20 MCQ questions spanning Aptitude, basic C/C++ skills
2 Coding Questions
-> Vertical Sum in binary tree
-> Add 2 link lists
Phone Screen (PS1) (45 mins)
Basic questions about OS. Virtual memory, multi-threading, etc.
-> Next Greater number for every element. (Algo + Code)
-> Reverse link list (Algo)
-> LCA in Binary Tree (Algo + Code)

F2F Interview 1: (45 mins)
-> LCA of K given nodes in a n-ary tree .(Algo + Code)
-> Sliding window minimum . (Algo + Code)
Discussion about Internship project .
F2F Interview 2: (60 mins)
Discussion about Internship project .High level Design was to be produced
-> Given a boolean 2-D matrix, find the number of unique rows in it.(Algo + Code)
I gave 3 diffrent solutions.One of them used Hashing .The interviewer then went into GREAT details of hashing .
After a lot of discussion about various Types of hash implementation,pros/cons,uses , he gave me a Scenario for which i needed to build a good hash function.
F2F Interview 3(Stess Interview) (60 mins)
Discussion about Internship project .
-> Given a Binary tree and a arbirary node of that tree , find all the nodes at a Distance of K from that Node .Nodes DON'T have parent pointers.(Algo + Code)
-> Implement 2 stacks in an array .(Algo + Code) .
Follow up question ->What do we do if we want to change the size of array dynamically.
-> Implement 3 stacks in an array .(Algo)
-> Implement K stacks in an array .(Algo)
F2F Interview 4 (60 mins)
-> Lot of OS questions . Mutex,semaphore,Deadlock ,Virtual memory , Scheduling algos .
Then he gave me a Code, and asked to make it Thread Safe .
I had used SQL in my intership project, so was asked basic DBMS questions and SQL queries.
SQL query to find maximum in a column, without using aggregate MAX function .
-> Given a binary tree, where every node value is a Digit from 1-9 .Find the sum of all the numbers which are formed from root to leaf paths . (Algo + Code)




```
There are 4 leafs, hence 4 root to leaf paths:

 Path                    Number

6->3->2                  632

6->3->5->7               6357

6->3->5->4               6354

6->5>4                   654

Answer = 632 + 6375 + 6354 + 654 = 13997
```

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Amazon Interview | Set 55 (On-Campus)

Online Test on InterviewStreet:
18 MCQs (Normal C loop questions, networking, dbms, os, analytical)
2 Coding questions
1. Check if an undirected graph is a tree or not.
2. Given an array of integers, print the 2 elements with least absolute difference.
Interview Rounds:-
Round 1:
Tell me about yourself.
1. Given a matrix(not necessarily square) in which the elements in a row, as well in a column are sorted. Find a given integer in the matrix.
Tell the approach. And then code.
2. Given a position where a knight is placed on an nXn chessboard. Find the maximum number of knights that can be placed on the board, so that no 2 knights attack each other.
Remember that you need to just give the number of knights, not all their positions. I first could arrange ceil(n*n/3) knights. Then he asked me find a better solution. Finally I got to ceil(n*n/2). Then he asked me to code it. Then he asked me to remove the ceil condition(check for even and odd separately).
He asked me if I had some question for him. I asked – Amazon strives to be the most costumer centric company on earth. What, as a programmer/developer, do you do to achieve this, because generally, the customer's problems are an issue for high level managers and planners.
Round 2:
Started with some questions from my Intern project.
1. Given a Binary Tree, replace the data of each node by the sum of data of all its descendent nodes.(Leaf nodes will have 0)
2. Given a sorted array of positive integers, find the least missing positive integer. First I gave an O(n) solution. Then he asked me to optimize it. Finally I gave an O(log n) solution.
3. Given a stream of numbers, find k random numbers from them. I explained him Reservoir Sampling approach. He asked why this approach works. What is the probability of each number being selected? What is the probability of any number being selected if stream has less than k numbers(its 1).
He asked me if I had some question. I said I had one, but I already asked it to previos interviewer. He asked me if I got a satisfactory answer to it. I said the answer was very much satisfactory.
Round 3 (CS Round):
He asked me if I am comfortable with writing SQL queries. I prefered not to.
1. What is an interface? Why it is used? Give an example. What is an abstract class? Why it is used? Give example. Why 2 different concepts of interface and abstract class?
2. Do you know about singleton class? What is it? Implement a simple singleton class. I made some mistakes in making attributes static etc. He guided me and finally I corrected all bugs.
3. Given a binary tree, where each node has an extra next pointer. Fill the next pointers so that each node's next pointer points to its next sibling node. First I gave a solution where I would require a map, where each map key will be a level number, and value will be pointer to the last currently accessed node of that level. Then he asked me to do it without space. Finally I gave him a solution without space. I gave a non-recursive approach, and he asked me to code it.
Round 4(Senior SDE 3 from Seattle Office):
He told me about himself, his team, his work and his team's work.
1. Tell me about one of your challenging project/internship/class assignment.
2. Give a situation from your life where you were given a negative feedback, and how did you tackle the situation.
3. Explained me a cache situation, where, keys will be in cache, and each key will point to a string. It was LRU cache condition, and I had to implement the LRU cache. Then write a function to retrieve a string, given its key, from this cache. Retrievel should be O(1) (if you give O(n) retrival, he will ask you to make it O(1)).
Finally got an offer !! 😀😀
While you are answering a question, clarify any doubts that come to you mind. Dont take any assumptions by yourself at all.
Keep on speaking your approach as you think. Keep speaking, if possible, even when you write code. They want to test if you really know the approach, and not just copying code. All rounds were technical and elimination. The last round has the highest

weightage in their procedure. Write clean code, ask for some time if you want.
Thanks a lot to the GeeksForGeeks team for helping with interview preparations!
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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Amazon Interview | Set 54 (On Campus for SDE)

Hi All, I got the following question for the On-Campus placement process. Hopefully it'll help you too.
Screening Test
Q1. Left View of a tree
Q2. Add three numbers represented as linked lists
example
n1: 1->2->3
n2: 4->5
n3: 6->7->8->9
sum: 6->9->5->7
Round 1 (F2F Interview)
Connect same level nodes without level order traversal. (Code)
Given an array where all numbers but one occurs in pairs, suggest all ways to find the unique number. What if the array was sorted? (Code)
Round 2 (F2F Interview)
Print cousins of a given node (Not sibling)
Given a 20 GB file and 2GB RAM, how to parse it and detect where to break it, concepts of memory management
Implement 3 stacks in array, all approaches and code
Deepest left leaf of a binary tree
Round 3 (F2F Interview)
Longest path in a tree with just one bend. May or may not start with from the root. (Complete code)
Code for deadlock and how to resolve.
OOPS concepts, polymorphism
Round 4 (Telephonic Interview)
Check if a tree is a subtree of another. (Code)
Convert a given number to Roman numbers.
Thanks a lot to the GeeksforGeeks team again. Appreciate the hard work you guys have put. Also a big thanks to all the contributors.

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Amazon Interview | Set 54 (For Internship)

Hi All. Here is my interview experience for internship at Amazon.
Position: 2-Month Intern
No. of Rounds: 1 Online + 2 PI (2 F2F)
Round 1: (90 minutes)
20 MCQs and 2 coding questions
There were 20 MCQs based on C output, probability, basic maths, OOPS, algorithm analysis and Operating Systems.
Question 1: Given a linked list, write a function to reverse every k nodes (where k is an input to the function).

Example:
Inputs: 1->2->3->4->5->6->7->8->NULL and k = 3
Output: 3->2->1->6->5->4->8->7->NULL.
Inputs: 1->2->3->4->5->6->7->8->NULL and k = 5
Output: 5->4->3->2->1->8->7->6->NULL.

Question 2: Given a string containing words separated by arbitrary number of spaces. Write a function that returns a string consisting of the first letter of each word. (Note: there may be any number of spaces at the starting of the given string, at the end of the given string or in between words of the string.)
Example:
Input: ” this is a test case ”
Output: tiatc
(Function prototypes and main was given for both the questions. Although many solutions passed the initial test cases, they were rejected later as they did not satisfy boundary cases.)

Round 2: (face to face) (1 hour 20 min)

Question 1: Given two numbers represented by two linked lists, write a function that returns sum list. The sum list is linked list representation of addition of two input numbers.
Example

```
Input:

 First List: 5->6->3  // represents number 563

 Second List: 8->4->2 //  represents number 842

Output

 Resultant list: 1->4->0->5  // represents number 1405
```

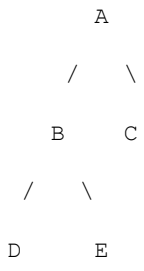
I reversed the linked lists and simply added the corresponding nodes along with the carry. Then he asked me to solve the question without reversing the list. Then I solved the question iteratively without reversing the lists.
The interviewer then asked me to write a recursive code for the same problem.
After that he asked me to modify the code so that the carry at each place is passed by value instead of using pointers(which I had used in my code).

Question 2: iterative and recursive code to reverse a linked list(Take Care of corner cases: when list has no nodes or contains a single node)

Question 3: Write a function to check whether a binary tree is a sub-tree of another binary tree (Check for all corner cases).
I solved it in O(n^2) time complexity. He did not ask me to optimize my code.

Question 4: Which data structure would you use to keep records of stock market?
I asked him to clarify the problem statement.
He then asked me : Suppose you have to maintain the stock values of various companies during various periods and return minimum stock value of a particular company over a given period of time.
I answered segment tree (Probably the correct answer was queue data structure).
However the interviewer proceeded with questions on segment tree.
He asked me to write a code for
a) Creating a segment tree
b) Performing range minimum query in a segment tree
c) Updating the segment tree
He asked me to analyze the time complexity for building the segment tree and performing the range minimum query in the segment tree.
He then asked me: If you are to maintain the stock value of a company for the past 6 months..then you have to update the segment tree every day by deleting a stock value and inserting a new stock value. How would you do that?
Here I got stuck and could not perform the updation in better than O(n) time.(However using queue it can be performed in O(1) time) .
He finally asked me if I had any questions.

Round 3: (face to face) (20 min)
Only one technical question was asked to me in this round.
a) He asked me to speak something about myself and my technical achievements..
b) How to store a binary tree in a file & then read back.(It is not necessarily a BST)
First I answered that I would store level-order traversal of the tree.
He then asked me how I would maintain the nodes at various levels (which I was unable to answer). So, I changed my approach and told that: I would store in-order and pre-order traversals of the tree from which the original tree can be easily retrieved.
But then he told me to optimize my approach (As this approach would require twice the original space to store the data in the nodes). I could not further optimize my approach (However the better approach was to use parenthesization.



If this is the binary tree then it can be stored as (A(B(D),(E)),(C)) in the file.)
c) Then there was a 10 min discussion my project , the problems I encountered and how I solved them.
d) Finally he asked me if I had any questions.
I asked about the intern projects at Amazon and the use of DBMS and NETWORKING in it.
He started elaborating the entire work-process at Amazon and his work-experienceâ€¦â€¦..most of which I could hardly understand.
He also told me to have a good knowledge of JAVA as it will be required at some stage during the projects.
Finally I got selected.
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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Amazon Interview | Set 53 (For SDE-1)

In each round they ask me why I want to join amazon, why I am leaving my previous company with such a short span(around 2.5 months) and project stuff.
Interviewers were quite friendly. They would explain you till the point you fully don't understand. And even while discussing approach and solving, they would clear your doubts if any.
Online Test on InterviewStreet
1. Given 2 string , find whether 2nd is sub-string of 1st or not. (it would be great if you solve with KMP)
2. Given 2 rectangles , find whether they are overlapping or not.
3. Given list of coins with various values (unlimited coins of each type) , find how many ways you can make a given value. (DP was expected.) Since it was not guaranteed that coin of value 1 would be present , we have to return -1 if the given value is not possible.
All rounds on same day.
1st f2f:
First I was ask to introduce myself and give a brief over my projects. Latter he ask me to explain any one of my project and the hardest task I have done.
We have used infix to post ix and postfix evaluation for our generic search expression's evaluation. Here we had a lot of discussion on why conversation from infix to post-fix was needed and all.
1. Given a String s and int r , first fill each character row wise and print column wise.
for e.g. String s = "abcdefgh" and r = 3

so filling column wise would give :
a d g
b e h
c f
and final ans would be adgbehcf.
he just wanted the exact output. Internally how we handle string was not concern.
2. given a string or say number .. for e.g. 134 now with each number , as per mobile's keypad , some letters would be associated. here 1 – > abc , 3->ghi, 4 ->jkl . So we should print all the permutation such that we take 1 character from each of the number. input number can be of any arbitrary length.
lets say each digit has m numbers associated , then for the input of length n , we need to generate n^m possible strings.
Took a map of which would return all the letters for the number. solved it using recursion. its quite similar to permutation of string. . Interviewer seemed quite impressed here.

2nd f2f

1. Find integer part of sqrt of given number. Initially I gave o(root(n)) solution. Later solved with binary search(O(logn)).
2. Given an array of integers. replace each number with next higher number on its right side , which is nearer.(if not present than keep it as it is.)
for e.g. input – > 3 4 6 1
output->4 6 6 1
I suggested we can traverse from right side , we will take extra array (o(n) space complexity here) and in that array , we would store index of next higher nearer number.
so it would be like

```
if (a[i] < a[i+1]

  then store i+1;

else

   traverse using index stored in auxiliary array
```

Since we needed extra space to store indexes, he asked that the input is array of a structure which has number and higher Index, 2 fields. So that we don't need extra space and extra traversal.

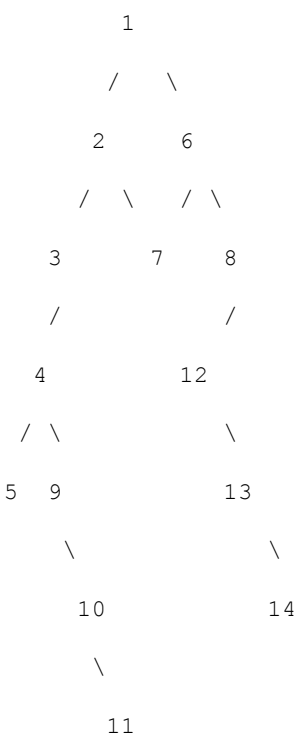
```
class Node {

   int val;

   int higher;

}
```

He was very interested to see how i keep track of indexes and how i traverse between them. It is o(n) with o(1) space complexity. (when we have a[i]>a[i+1] we don't do linear search , but we jump using the indexes, so its not o(n^2)) It was hard to convince him on complexity.
3. given a binary tree. connect all the node at the same level. each node would have left,right and nextSibling pointers. we need to fill nextSibling.
solved with level order traversal . Similar to BFS on tree with queue. Only approach was needed, no code for this one.

3rd f2f (Hiring Manager)

1. It was a design question. You have to design a game. it has different types of monsters and different weapons. hero would shoot monster. each monster would have some initial health. Each weapon would do some predefined damage to monster. when its health gets 0, monster would die/disappear. and there would be multiple levels. based on level, monster and their behavior would change.
2. Given a read only linked list with next and random pointer , clone the list. I told him that i know the solution and explained him the approach. It was with the use of hashmap and takes o(N) extra space. Then he ask me whether I know a o(1) space solution, since I didn't knew, i was told to solve this. With this , he told that I can modify link list.

Initially I struggled, but with his help, in the end came up with working code. He was looking fine with implementation.
Here I ask about the work culture and the process being followed at amazon.I ask lot of questions regarding tools and technology they use. Since I had work on scrum model , it was quite interesting. He seemed to be impressed here.
4th f2f(Dev Manager)
1. Given 2 sorted linked list , merge them into single sorted list. Change the pointers, don't copy data. (same as merge part of mergesort on SLL)
2. Given binary tree, connect all the nodes which are in same column. 1 caveat was that same 1 node can have 2 parents. Here as in example, node 7 is being pointed by 2 and 6.
Solved it using level order traversal. Used a Map : columNo, Node. it would store the last visited node of that column. So whenever we visit a node, first we check if its corresponding column is present in hashmap. if not , it means its the first node of column, put into map. if the column present , then we will get the node stored in map and current node would be its nextVerticleSibling. and we update the map.
He deed the dry run with example and code and he was OK with final approach.



Finally after two days, I got call from HR that I am selected

Many Many congratulations to the Priyank. 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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Amazon Interview | Set 52 (For Internship)

Hi All, Here is my interview experience with Amazon for internship. Hope it helps:
Round 1:
Online round with 20 objective questions on (Questions related to data structures, analysis of algorithms, C Language and some puzzles.) and 2 coding questions in 90 minutes
Write a program to reverse k alternate nodes of a linked list
Ex: 1->2->3->4->5->6->7->8->9

If k is 3 Output should be: 3->2->1->6->5->4->9->8->7
Given a string. Write a program to form a string with first character of all words.
Ex: The bucket is full of water
Output: Tbifow
Check all edge and corner cases.
Round 2: Face to face round
Given a binary tree. Modify it in such a way that after modification you can have a preorder traversal of it using only right pointers. During modification you can use right as well as left pointers. Write complete code and dry run it for some test cases.
Given 2 linked lists. Find out if they intersect or not. If yes, find intersection point .Write complete code for it.
I could not remember the simple way: find the length of the lists and simply move forward the shorter list by difference of the lengths and find the intersection point. Instead, I joined the end of first list at the end of the 2nd list and then went for cycle finding by Floyd Cycle finding Algorithm. Although both are O (n), but he was impressed as it was a new approach.
Round 3: Face to face round
Given a sorted array of 0â€™s and 1â€™s. Find out the no. of 0â€™s in it. Write recursive, iterative versions of the code and check for all test cases.
Spiral level order traversal without using extra variable for detecting level (using one stack and one queue) and few other implementations as well.

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Amazon Interview | Set 51 (On-campus for SDET)

Hello Everyone!! Recently, I have been through the interview experience of Amazon India and I would like to share my experience with everyone.
Position : SDET
No. of Interviews : 1 Written + 4 PI (3 F2F and 1 telephonic)
Suggestions : Your code should be optimal, have proper variable naming, consider all corner cases and should not be lengthy.
Round 1: (90 minutes)
20 MCQs and 2 coding questions
Coding questions :
1. A string consists of parenthesis and letters. Write a program to validate all the parenthesis. Ignore the letters.
eg. ((alf)ls) â€“ valid
)(dkk)() â€“ invalid
2. You are involved in a betting game whose rules are as follows :
a) if you win a round, the bet amount will be added to your sum and next bet amount will be $1;
b) if you lose a round, the bet amount will be reduced from your total sum and next bet will be twice the previous.
c) game ends when all the rounds are complete or you dont have sufficient sum.
Initially, you are given with a string of the form â€œWLWWLâ€ where W indicates a win and L indicates a loss and initial sum. Initial bet amount will be $1.
You need to find the amount at the end of the game.
Function prototypes and main was given for both questions
Round 2: (face to face) (1 hour 15 min)
1. Given a 2d matrix in which rows are sorted in ascending order and columns are also sorted in ascending order .I need to find an element in optimal time complexity
2. In the same (M X N) matrix I have to print the matrix in increasing order of elements .write code for it(I used heap for that purpose and used concept of merging k sorted array).
3. Given an array , each element is one more or one less than its preceding element .find an element in it.(better than O(n) approach)
4. Given two strings STR1 and STR2 .we need to find longest substring in STR1 whose all characters are taken from string STR2(was asked to write code for it in optimal time)

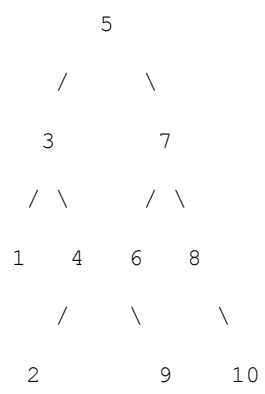
```
STR1-abcdefacbccbagfacbacer

    STR2-abc

    ans : length : 7

              acbccba  (from position 7 to 13)
```

5. Given a binary tree. I need to print the nodes in vertical line zigzag manner. For example: 1st vertical line from top to bottom, 2nd vertical line from bottom to top,3rd vertical line from top to bottom and so on



Answer would be –
1
2 3
5 4 6
9 7
8
10

Round 3: (face to face) (50-60 minutes)
I was asked about my project in details. He asked me project related questions for first 20 minutes.
Next he asked to convert a binary tree in a doubly link list.
I told him various approaches like by using space complexity and in-place conversion.
I was asked to code all those approaches.
Then he gave a hint about one more approach and asked to code it.

Round 4: (face to face) (60-70 minutes)
Again, I was asked about my project in details and he was questioning me on every part of it. Next he asked me to name the subjects that I have studied so far . He asked many theoretical questions on database management systems, SQL, operating systems, OOPs concepts and their real life examples and also two coding questions.
1. Code for dfs of a tree(tree can be any general tree)
2. Print pascal triangle and your output should be same as pascal triangular form (have to consider the space separation) .I told him two approaches and wrote the code.

Round 5: (telephonic) (1 hour 30 min)
For first 40 minutes he asked me about my achievements, about amazon company, my project in details and what problems I faced in project and how I resolved them. next he asked one coding question.
1. Find the square root of any number (square root can be a real number) without using any library function .
I told him an approach using Newton-Raphson method. It was faster but he asked simple and optimal method so then i suggested binary search method (O(log n)) and I was asked to code it and dictate and he ran the code on his system also.
Finally, I was hired with three of my friends. :
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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Amazon Interview | Set 50 (On-campus for SDE)

Recently, I have been through the interview experience of Amazon India and I would like to share my experience with everyone.
Number of interviews: 1 online exam (will be completely evaluated by the compiler itself, then code of those who will clear the cut-off will be analysed by the hiring team) + 3 Face to face technical + 1 Telephonic (Technical again)
Online exam:
20 MCQ: Aptitude questions, if you are good in logical reasoning then donâ€™t worry about it (basic permutation and combination), C output questions, and most of them were pretty simple.
2 Online coding questions: 1. Print the first non-repeated character in a string.
2. Print the left view of a binary tree.
1st Face to face:
A skeleton of a binary tree with nodes having garbage values is given and an array is given. Had to fill up the binary tree skeleton with the values in array such that the resulting tree is a BST.
Solution: sort the array, enter the values in an in-order fashion (A long discussion on which sorting algorithm is the best and why? We ended up discussing how merge sort can be optimized, just â€œoptimizedâ€, not like reducing the order of time or space complexity). Then told me to write the merge-sort function for the discussed solution for merge-sort such that say I am a developer, I canâ€™t test on a machine, and this class will be used by a million number of users.
2nd Face to face:
Was asked 4 questions: Print all string permutation (String might have repeated characters).
Least distance between two values in a very big binary tree (Binary tree may contain same value in many nodes).

```
                    5

          1                   7

     4         3           8    2

  1
```

{Least distance is 3 between 1 and 2 (not 5). }
Vertically print the value in a binary tree. Like in the previous example:
4, 7
1
5, 3, 8
7
2
Next, I was asked to design an efficient data structure for two lifts in a building of n floors.
Round 3 Face to face:
Had to find maximum profit in an array of stocks prices for consecutive days in two cases, one I can sell and buy any number of times I want, second, I can only buy and sell one time.
Another question was to define a function â€œinorder_it(Node A, Node root)â€ which will return the next node in a binary tree to a particular node A. Was asked to write code for both of them.
Round 4: telephonic:
Kind of HR + Technical, asked a lot about my internship project and other academic projects. Then we discussed the problem of sorting rows of a file based on a particular column. Like as in Excel file, you can sort file based on roll_no, first name, last name, any column you want.
File is very large, so you canâ€™t just store the whole file into memory.
Solution: sort it out yourselves.
All the best everyone.
And yes, I got through along with 5 other mates from my college.

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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Amazon Interview | Set 49 (On-campus for SDE-1)

Recently, I have been through the interview experience of Amazon India and I would like to share my experience with everyone.
Position: SDE- 1
No. of Interviews: 1 Written + 4 PI (3 F2F and 1 telephonic)
Before telling you the questions and interview procedure, I would like to offer some suggestions. There are always instances when your interview is not off with a great start. You need not panic and keep your calm. Secondly, to compensate all the shortcomings in the technical part, interact with the interviewer as much as you can. Show him that you are really interested in the company. They are looking for future managers not just coders, so you have to have people skills.
Okay, so here we go:
Day 1:
Round 1 : (Written on Interview Street)
20 MCQ questions consisting of Data Structure, Algorithms, Operating Systems, Probability, Combinatorics and Quatitative Analysis.
Suggestion: Always code your solution on the editor provided on the website. It takes screenshots of the page so if you copy a large chunk of data even from your notepad that's considered as cheating.
Coding Problems :
1. A string consists of parentheses and letters. Write a program to validate all the parentheses. Ignore the letters.
eg. ((alf)ls) â€“ valid
)(dkk)() â€“ invalid
2. You are involved in a betting game whose rules are as follows :
a) if you win a round, the bet amount will be added to your sum and next bet amount will be $1;
b) if you lose a round, the bet amount will be reduced from your total sum and next bet will be twice the previous.
c) game ends when all the rounds are complete or you dont have sufficient sum.
Initially, you are given with a string of the form â€œWLWWLâ€ where W indicates a win and L indicates a loss and initial sum.
Initial bet amount will be $1.
Function prototypes and main was given for both questions.
Round 2 : (Face to Face)
The interview started off with a light discussion about myself, achievements. Then he asked me about my project and the difficulties faced. Then we moved on to coding problems.
Q1: You are given an array in which you've to find a contiguous subarray such that the sum of elements in it is equal to zero. (I coded using hashtable in java)
Q2: Given a binary tree. Find out if it is a binary search tree or not.
Round 3: (Face to Face)
Q1: You are given a generic tree. Design a structure for it. Now for every node of the tree make the leftmost child of the node as a duplicate of the node itself and return the root of the tree.
Q2: He: Tell me the time complexity of 8-queen problem.
Me: (I did not exactly remember the complexity so I coded)
Round 4: (Face to Face)
He asked me variety of theory questions, I was stumped as I did not know many things. He asked me about ACID properties, oops concepts, SQL etc. out of which I could answer only a few.
Then we switched over to coding.
Q1: He: You are given various time intervals and you have to merge the overlapping ones.
Me: I had already coded it in the Code Ninja questions on the amazon's website, so he just asked me the approach to the question.
Q2: You are given a binary tree. Tell me if it is height balanced or not.
Round 5: (Telephonic)

The interview started with if I had any questions, and then proceeded with the projects I've done.
Q1: You are given a file with many words. You are given a word as an input and you have to find every anagram of that word in the file.
Q2: Given two words, tell if they are anagrams or not. Extend your solution for unicode as well.
Finally after a long wait of almost 8 hours the result came and I was hired!!
I would like to thank geeksforgeeks for all the pain they take in compiling every article so that people may understand every concept clearly.

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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Amazon Interview | Set 48 (On-campus for SDE-1)

Recently, I have been through the interview experience of Amazon India and I would like to share my experience with everyone.
Position: SDE- 1
No. of Interviews: 1 Written + 4 PI
Day 1:
Round 1 : (Written)
20 MCQ questions consisting of Data Structure, Algorithms, Operating Systems, Probability, Combinatorics and Quatitative Analysis.
Coding Problems :
1. A string consists of parentheses and letters. Write a program to validate all the parentheses. Ignore the letters.
eg. ((alf)ls) – valid
)(dkk)() – invalid
2. You are involved in a betting game whose rules are as follows :
a) if you win a round, the bet amount will be added to your sum and next bet amount will be $1;
b) if you lose a round, the bet amount will be reduced from your total sum and next bet will be twice the previous.
c) game ends when all the rounds are complete or you dont have sufficient sum.
Initially, you are given with a string of the form "WLWWL" where W indicates a win and L indicates a loss and initial sum. Initial bet amount will be $1.
Function prototypes and main was given for both questions.
Round 2 : (Face to Face)
Some discussion on my projects, and then a couple of questions.
1. An array of integers is given, find all the ranges present in the array.
eg. 1 6 4 2 3 — ranges will be {1-4} and {6}.
I used sorting to solve this problem, so some follow up questions about which sorting technique i would prefer here.
What is the difference between merge sort and quick sort and when quick sort is preferred over merge sort, etc.
2. Two strings are given. One of them is the initial string and other string contains characters as per their priority. Sort the initial string as per the given second string. characters in initial string may or may not be present in the second string. If not present, sort them in lexicographical order at the end of output.
eg. String1 – ddloyc, String2 – odl
Output – oddlcy
Again, some discussion over various approaches to solve this problem.
Round 3 : (Face to Face)
Discussions over my projects.
1. (Reservoir sampling problem) http://www.geeksforgeeks.org/reservoir-sampling/
2. Generate all valid permutations of n pair of parenthesis. http://www.geeksforgeeks.org/print-all-combinations-of-balanced-parentheses/
3. Given a bst, update the value of every node with sum of value of all nodes greater than and equal to the value of current node.

Counter Question : I had used global variable for this purpose, so he asked me to solve it without any global or static variable.
4. Inorder Successor of a node in bst.
5. Given a list and a number k, invert first k elements and leave next k elements. Repeat this throughout the list.

Round 4 : (Face to Face)

1. N number of jars are kept in a linear fashion. Each jar contains a color whose value ranges from 0-99. Now you can mix any two adjacent jars having colors 'a' and 'b' (both integers), and it will produce a new color of the value (a+b) mod 100 and will also produce smoke with value (a*b). Mix all the jars in a way such that in the end only one jar remains and total smoke produced is minimum.

Day 2 :

Round 4 : (Telephonic with someone very senior)

He said that i must have been through many coding questions already, so he will start with the basics.
1. What is the difference between C and C++ ?
2. Which one will you prefer, when and why?
3. What is the difference between C++ and JAVA.
4. Which is better, C++ or JAVA. Support your answer.
5. Give one use case where C/C++ can use pointers to solve it, but it can't be done in Java.
6. Again, some discussion over my projects. Which project i liked most and why? What problems did i face during that project and how i handled them.
7. Given a stream of 0′s and 1′s in which 0′s come first and then 1′s, find the first occurrence of 1.
8. Design a data structure for phone-book of mobile phones. Implement it and discuss about its benefits and limitations.

In the evening they announced the result and i was hired!!! 😀😀

Suggestions :- Write a neat code with indentations. It's a good idea to mention all the test cases(in case of an algorithmic problem) and all the use cases(if needed to design a data structure) beforehand. And, don't just respond to the questions of the interviewer, try to interact with them.

This article is compiled by Kumar Vivek Ranjan. 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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Amazon Interview | Set 47 (Off-campus for SDE-1)

Round 1: Written

20 MCQs and 2 coding questions
(1) Mirror a tree.
(2) Find if an array has pair of elements with sum k.

Round 2: Telephonic Interview

(1) Given a number, find the next minimal greater number with same number of set bits(Approach+code)
(2) Given a linked list with next and arbit pointer. Clone the list(Approach + code)
(3) AVL Tree(Approach)

Round 3: Telephonic Interview

(1) Given a number which denotes number of pair of parenthesis(only one type of parenthesis). Print all the valid permutation of those parenthesis(Approach + code).
(2) Connecting all nodes at the same in Binary Tree(Approach + code)

Round 4: F2F(manager)

Discussion on all projects I have done.
(1) Convert BT to DLL(Approach + code)
(2) How to find if nodes in LL are odd or even(Approach)
(3) How to detect loop in LL(Approach)
(4) Segment Tree(Approach + code)

Round 5: F2F(Two interviewers)

This one was bar raiser I guess
(1) Convert a BST in such a way that every node contain sum of it and every greater element than it (Approach + code)

(2) Garbage collector(Approach)
(3) Finding median in array(Approach)
(4) Finding k closest elements to an element in an array(Approach)
(5) Deleting a node from LL provided the tail nodes points to mid element. After deletion property should be maintained(Approach)

Round 6: F2F(Senior guy)

A long discussion on projects.
(1) Circular Buffer array problem(Approach + code)
(2)BT is BST or not(Approach + code)

Round 7: F2F (Two interviewers)

(1) Given coins of 1,2 and 5 and given a number N. Find in how many ways you can make the change(Approach + code)
(2) Swapping alternate nodes in LL(Approach + code)
(3) Swapping k nodes in LL(Approach)

Round 8: F2F(Again with manager)

Discussion on projects. Every positive , negative point he discussed on each projects
Now All HR type questions
(1) How will you handle conflict with teammate.
(2) How will you handle conflict with manager.
(3) Your teammate is not sharing required information with you. What will you do?
(4) If you are given 10 requirements and you don't have to fulfill each and every requirement what will you do?
(5) Given some languages which one you prefer and why?
(6) Given some tasks with one you prefer?
(7) If you are about to meet deadline and one of your teammates need some help.Would you cross deadline to help him?

++

Amazon Interview | Set 46 (On-campus for Internship)

Written:

20 MCQ on basics of C, OS, Networking + 2 Coding.
1) Left view of Binary Tree.
2) Rotate a matrix by 90 degree.

Interview (Round-1)

1. You have to find p,q of matrix p*q such that it fill n elements(n given) Such that
a) matrix should be nearest to a square matrix and
b) 0<=((p*q)-n)<=2
2. Zig-zag traversal of tree
3. You are given an array of length k and it have numbers from 0 to n (where k>>>n) in O(n) time and no extra space find occurrences of each element in O(n) time only

Round-2

1. You are given row and column wise sorted matrix you have to find and delete an element such that it is still sorted in O(n) time.
2. Find if sum of any 2 elements in an array equal to k in O(n) time using extra space.
3. In a BST to every element add sum of elements greater than it.

Result –> Got Selected from Campus Internship Interviews.

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Amazon Interview | Set 45 (For Internship)

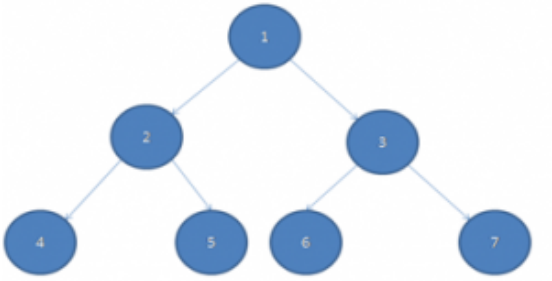
Hello everyone! Recently I sat for an on-campus internship recruiting process of Amazon. The process consisted of a written round followed by two face to face interviews.

Written Round:

This round consisted of 20 MCQs and two coding questions. We had to complete the test in 90 minutes. The MCQs mainly focused on C and general aptitude. They were easy to solve. The students having faster question solving skills were in advantage!

The two coding questions were:

1. We were given the edges of the graph and we had to find if a cycle exist in the graph or not.
2. Given a binary tree, we had to print all the nodes in the Zigzag order.



For the given tree, we should print: 1324567

A total of 18 students were selected for the next round from around 150+ students.

Face to Face Interview:

The interviewer started with the question about what projects I have done. I explained the two recent projects which I did. Then he started asking technical questions. He asked about:

1. Given a sorted array which has been rotated, we have to find the point of rotation.

I did it in O(n). Then he asked me to write a more optimized code. I then did it in O(log n) using modified binary search.

2. About heaps, maps.
3. About Job Scheduling.
4. Scaling of websites as one of project was an online portal.

Then he asked me if I have any questions. I asked about how to improve. He said that I should blue practice the problems more and more. I should work more on algorithms rather than solving the problems relating to the limitations of any language. He even emphasized on the fact that companies like Amazon are looking for the students having good knowledge of algorithms. He even mentioned that GeeksforGeeks is a perfect site for preparing for companies like Amazon.

I was not lucky enough to be selected in the 2nd round of the interview but it was a motivating experience.

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Amazon Interview | Set 44 (For Internship)

The written round was relatively easy. It contained 20 multiple choice questions on basic c, algorithms and finite automata. Some questions from OS and networking were there too but were easy. Coding questions were:

1. Find the nodes of the tree as seen from the left view of the binary tree.
2. Rotate the given matrix by 90 degrees i.e. the first row becomes the last column and second row becomes the second last column and so on.

Interview round 1:

Two questions were asked. One puzzle and the other coding question.

1. Given n coins for two players playing a game. Each player picks coins from the given n coins in such a way that he can pick 1 to 5 coins in one turn and the game continues for both the players. The player who picks the last coin looses the game. You have to tell that for given n coins who looses the game?
2. Given a number n, find the number just greater than n using same digits as that of n.

Interview round 2:

1. Given in facebook find an efficient way to find the mutual friends between you and one of your given friends.

Hint: hashing, dictionary data structure implementation

2. For two very long numbers given, find the product of these numbers in an efficient way.
Hint: using binary multiplication effectively.
Finally I got internship offer from them.…:)
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Amazon Interview | Set 43 (On-Campus)

Questions asked in Amazon Interview.
Round 2: Written
1. Find the SQRT of a number.
2. Simulate Reversed level order traversal.
Three F2Fs.
F2F 1:
1. Given a binary tree, no two adjacent nodes have same color, but all leaves should be in same color. You can fill only with two colors. Write a function to find whether a given tree can be colored using above scenario.
2. Given a binary tree, change the right pointer of every leaf node to the next leaf node (right to it but may be on different level).
3. Given a class with n people,where each people plays a game with all other people. Results are with you. You have to arrange them in a queue with a condition that, a[i] should have won a[i-1], for all I, you donâ€™t need to care about a[i-2] . (a[i] may win or lose a[i-2]).
F2F 2:
1. Write prime numbers from 1 to 100000.
2. Another simple question from tree. can't remember
3. Question from probability. Given c containers, r red balls, g green balls. Give a condition that if a guy randomly pick a ball from any of the containers, it should be red.(more probable)
F2F 3:
1. Reverse a linked list iteratively, recursively.(Ice breaking question :P)
2. Given a matrix with 1s and 0s, u have to construct a matrix such that a[i][j]=1, if only every element in ith row and jth column is 1, otherwise 0. You have to use constant space and O(mn) time complexity.
3. Maze solve problem. Given a matrix with 1s and 0s, 0 represents free path, 1 represents blocked area, and you can move in any of the 8 directions. Find the path from source to destination and print it. Then he told me that he can change destination at run time. And asked me to do for that.
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Amazon Interview | Set 42 (On-Campus)

Following questions were asked during interview.
1. Given an array, find the longest increasing subsequence of size 3 with max product, all numbers are positive.
2. Given 3 linked lists representing 3 numbers, add them and return the result as another list (take care that your method handles overflows).
3. Find the lenght of longest path in a binary tree(diameter). I gave a O (nlogn) solution. He wanted O (n) solution. did that
4. You are standing at 0 0 and you have to get to i, j. Find the number of ways. Did that with recursion then with DP. Then he extended the question saying some edges are not traversible. Then edges have weights, find min weight path.
5. Delete all leaf nodes in a tree.
6. Find the peak in an array, array is first increasing then decreasing. Peak is the max element.
7. Given a binary tree. A complete path is defined as any path from root to leaf. A k heavy path is a complete path with sum of node

values on that path > k node values can be -ve too. Delete all nodes in a tree which do not lie on any k heavy path.
8. Given a rotated sorted array, find the minimum element.
9. Infinite stream of bits is coming, after every bit comes, you have to determine whether the number formed with bits till now is divisible by 3 or not, you cannot form the number as it will overflow at some stage.
10. Imagine a binary tree lying on the floor with nodes as balls and edges as threads, you are given a pointer to a node. When you pick the tree from that node up what will be the structure of the tree. You have gravity changing the structure of the tree.
11. An array is given representing the colors of n jars, colors have values 0-99. When two jars are mixed the resulting volume is same as volume of one jar. Smoke is color1*color2… and resulting color is (color1+color2)% 100. Keep on mixing colors such that you end up with just one jar with minimum smoke.
12. A question on paging, processes also.
Selected … thanks to geeksforgeeks team.

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Amazon Interview | Set 41 (Onâ€“campus)

The first round had 20 multiple choice questions covering C programming, Data structures, Algorithms, Maths and puzzles, and a question from Networking and Operating systems. The duration of the test was of 90 minutes and marking scheme was +1, -0.25
It also had 2 coding questions.
i) Given an array of numbers, find the minimum value of the absolute difference that can be obtained from any pair of numbers from the array.
ii) Find the first non-repeated character in a string. If there are no such chars then return -1.
There were 4 rounds of technical interview, no HR round. Following are the major questions asked to me in the tech rounds. I had to first suggest the logic, discuss that with the interviewer and then he asked me to code it up.
Round 1 â€“
1) Check if a given tree is a Binary Search Tree or not. Simple enough question.
2) You are given an array whose each element represents the height of the tower. The width of every tower is 1. It starts raining. How much water is collected between the towers?
Eg. [1,5,3,7,2] â€“ then answer is 2 units between towers 5 and 7.
Looks easy, but if you donâ€™t observe well, then you might end up with the wrong logic like I did at first. Also there are lots of possible corner cases. Luckily I could identify them all.
3) Given an array and a fixed window size X, you have to find out the minimum value from every window. De-queue was not allowed. So I had to do it using 2 stacks.
Round 2 â€“
1) Some DBMS questions like how is database stored in memory,how an image stored in database and a few more questions from it.
2) What is a height balanced tree. Give an O(n) solution to balance it. Then he changed the definition of a balanced tree as- a tree is balanced if every node in a particular level should have the same number of descendants (and not only direct children). And every node can have any number of children. I had to design the class and then write the code for it.
3) Given an array of integers, find an index such that if you split the array into two parts the absolute value of the difference between the sum of elements in both parts had to be minimum. After giving him the logic, he changed it to split it into 3 parts such that sum of elements in all of them are equal. I had to code this one.
Round 3 â€“
1) There is a sentence that your friend knows, but while giving it to you, he lost all the spaces. You have to dictionary with you. How would you reconstruct the original sentence using it.
2) How to delete a particular node from a circular Linked list.
3) You are given an encrypted file. You donâ€™t know the key used to encrypt it. Like A might be mapped to B, B to some D and D to some other F. But you donâ€™t know this encryption scheme. You have the dictionary with you. How will you decrypt the file? I suggested lots of solution like exhaustive searching, then using some variants to minimize the complexity. He gave me just a one word hint- histogram. So I gave him a logic that counting the frequency of every letter used in the dictionary. Then replace the

most used letter in the file with the most used in the dictionary. And then compare words with the dictionary. In case of a mismatch back â€“track and use the second largest and so on. I also discussed with him that it could also have high complexity in worst case, but he moved on.
4) What is indexing in DBMS. How will you implement an index.
Round 4 -
1) A complete path in a tree is from a root to a leaf. A k-heavy path is a complete path whose sum of elements is greater than k. Write a code to delete all nodes which are not in any of the k-heavy paths.
2) You have an array whose elements firstly strictly increase and then strictly decrease. You have to find the point of change.
All the questions in all the rounds required the minimum possible complexity possible (both time and space). And I had to write the code of my final solution as well. Finally the results came and I was selected by them.
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Amazon Interview | Set 40 (On-Campus Round 1)

20 Objective type questions (Technical: OS, Java, Networking) and 2 programs. Time given was 90 minutes.
1) Longest Remaining Rime Scheduling
2) Threads
3) subnetmask â€“ classB â€“ 64 departments
4) Match the following
SMTP
BGP
TCP
PPP
5) On recursion, value of f(513,2)

```
if(n<0)
  return 0;
else
  return ( n%10 + f(n/10, 2) )
```

6) Complexity?

```
f(i) = 2*f(i+1) + 3*f(i+2)
For (int i=0; i < n; i++)
   F[i] = 2*f[i+1]
```

7) Frog steps either 1, 2 or 3 steps to go to top. In how many ways it reaches the top?
Based on recursion, options
a) f(i) = f(i+1)+f(i+2)+f(i+3)+1
b) f(i) = f(i-1)+f(i-2)+f(i-3)+1
c) f(i) = f(i+1)+f(i+2)+f(i+3)
d) f(i) = f(i-1)+f(i-2)+f(i-3)
8) Based on java 2 questions, one from Exceptions
9) Preorder is given, we had to find out the postorder
10) Memory management, pa=32bit, la=36bit , frame size=2^12, first page entry, second page entry

11) This question is from GATE CS previous question papers

```
for (int i=0; i < n; i++)

     Fork();

No of child process?
```

Programs:
1) Print left view of binary tree
2) Sum of 3 linked list

```
Digit..   123------1->2->3------------linkedlist1

          234----2->3->4--------------linkedlist2

          34567----3->4->5->6->7---linkedlist3

Output: 34924-------3->4->9->2->4
```

Sum(linkedlist1, linkedlist2, linkedlist3)
We had to print the linkedlist form of the digit.
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[TopTalent.in] Interview with Pradeep Verma from NIT Trichy who talks about his internship at Amazon

 Pradeep Verma calls himself just one of those Indian kids but Amazon usually doesn't recruit every other kid out there. Pradeep did his internship at Amazon last summer and not surprisingly got a full time offer from the e-commerce giant thanks to his excellent performance. In an interview withÂ TopTalent.inÂ he talks about his internship experience and how it benefited him.
You can also download hisÂ resumeÂ to see his credentials and understand what made him standout.
1. Can you briefly describe your background?
I hail from Visakhapatnam, a city in Andhra Pradesh. I ended up with an AIR 6025 in IIT and an AIR 1745 in AIEEE. Now, I am pursuing my B Tech final year in Computer Science and Engineering at NIT Trichy. My dad works for the Government and my mom is a homemaker. Prior to engineering, I was not any different from other Indian kids. As I entered NIT, I quickly grabbed some interest into Computers and worked my way through to get into a Computer Club at college (called DELTA). Apart from this, I am into many other teams at college conducting and organizing events/fests. I am the Marketing Chairman for NIT Trichyâ€™s International Cultural Festival, Festember. I pursued research on â€œParallel Algorithms â€“ Task Assignmentâ€ for some time and I am expecting to publish a paper on this topic very soon.
2. Can you describe the complete hiring process? Did your internship help you grab this offer?
Amazon came to our campus to hire interns. The Selection Process consisted of a written test, programming test followed by two interviews. We were tested on Data Structures, Algorithms and OOP Concepts during the interviews. I did an intern at Amazon in

the summer of 2013 post which I have been offered a Pre-Placement Offer from them.

3. What project did you work on during your internship?

Amazon, as all of us know is a giant in e-commerce. Something very astonishing about Amazon is the scale at which they function. At some points the servers at Amazon need to handle something close to 10,000 orders per minute. So in this company, speed and complexity handling is a great challenge considering the scale at which they function.

My project was along the same lines â€“ I had to bring down the running time of a â€œprocessâ€ [confidential and cannot be disclosed] from 2 to 4 hours to something close to 15 minutes. I used AWS and Java Technologies to achieve the same.

4. What were the tricky questions you encountered? How did you tackle them?

I was questioned on Data Structures, Algorithms, OOPs and other basic concepts. I still remember one question in which they asked me to choose a favorite game and give an OOP model for the same. This is something real and application of what we read in books. This involved a lot of thinking and I liked the way they asked it. Apart during the intern I required concepts from Operating System, Threads, Basic Algos and DBMS to complete my project.

5. How much preparation did you put in to get this opportunity?

I should say I dint put any focused preparation for the above. I went with the flow, grabbed all opportunities to learn and innovate. I feel what companies look for is an overall well developed person. So I guess my involvement into a lot of clubs and activities, decent tech knowledge and my projects got me this opportunity.

6. What is your advice to other aspirants looking for similar opportunity?

Technically, get to know all basics of Algos, DS, OS, DBMS, Networks etc. I would recommend interview designed books like â€œCracking the Coding Interviewâ€ by Gayle Lakmann and â€œDataStructures and Algorithmsâ€ by Narasimha Karumanchi.Â Apart one great opinion I have is, it is just not enough to be a good coder, develop in all aspects â€“ Have a decent pointer, grab all opportunities (you have a lot of them in IITs and NITs), get social, learn some tech, do some cool projects and any company would be more than happy to have you with them.

7. What should one keep in mind while preparing a resume?

A resume is one page reflection of YOU. It is important to customize a resume for companies. For eg Research projects would interest Microsoft R&D profile and Coding projects would attract Facebook or Google. Â And one thing I find in most resumes is people put a lot of unnecessary stuff. No one out there really bothers if you had won some Bronze medal in a quiz when you were in 6th Class at School Level. Â Get to real stuff. Put yourself into a shoe of a recruiter and think what you would look for in a resume. Â And it is very important to proof read your resume. Having spelling mistakes on a resume could be a blunder.

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Amazon Interview | Set 39 (SDE)

I recently attended the walk-in process for Amazon Off campus recruitment drive. This was for SDE position at Chennai. I would like to share my interview experience with Geeks for Geeks.

Written Round :

a) Given a linked list and 2 integers M and N.. Keep M nodes and delete N nodes repetitively till the end of linkedlist.

b) Given a BST , replace a node value with the sum of all the elements larger than the current node.

I could solve it with Reverse Inorder traversal and an int pointer to keep track of the sum.

c) Given a BST and a value , check if the path sum from root to leaf equals the given value.

1st F2F round:

a) Multiply two linked lists represented by numbers. Only one linked list must be used to do all additions and store the result i.e., intermediate additions should not be done with extra linked lists and finally computing the result.

b) Given a BT check if there is a BST in it. If it exists print the largest BST in the BT.

c)Given a large file with huge number of words group the anagrams of a word

hai how are you. iahohw done woh.

o/p:

hai ->iah

how ->woh ->ohw
done
are

2nd F2F round:

a) Given a linked list , print the nth last node. He asked me to give the optimised solution for it.
solved using slow pointer.
b) Find the LCA in Binary Tree
He asked me to optimise the code with bottom up approach and gave lots of boundary conditions
c) Given a zigzag traversal construct a tree from it. Full working code was asked.

```
eg. 1 3 2 4 5 6 7 9 8

                1

              2   3

            4   5  6   7

          8  9
```

Solved it with double ended queue.

3rd F2F round :

a) Given a chess board of finite length , start postion of a knight , an end position.
->find whether the end position is reachable by the knight.
-> Number of minimum hops required to reach that position.
I came up with a BFS solution instantly . He posed several conditions in the same question as I have seen the question already.
b) He changed the question to infinite length chess board and if given two knights in a chess board .find minimum hops required for them meet.
->gave a lot of space and time constraints.
->asked me to write the complete code without STL.
c) if we encode A-1 , B-2 , C-3 , I send a word CAMP encoded as 311316. It can be decoded as 3 11 3 16 (CKCP), 3 1 1 3 16(CAACP) , 3 1 1 3 1 6 , (CAACAF) . given a input encoded string find the no. ways it can be decoded. (ACODE prob. in Spoj)
311316 – 4
->Could nâ€™t come up with DP solution at first so gave a solution with recursion tree. He asked me to optimise to avoid unnecessary computations.. Finally Solved it using DP.

4th F2F round (Bar Raiser Round):

The Round started with the projects I have done so far. Few basic questions in cloud computing. I have used Amazon Web Service (AWS) in one of my projects.
a) Lots of questions on AWS . Why we used it when there are so many alternatives.
b) When i convinced him with scalability issues, he posed questions on how AWS handle load Balancing and scalability issues .
c) Obviously questions on Elastic Map Reduce and Elastic Block Storage. Questions piled up until I could explain every nook and corner in that project.
d) Strengths and Weakness.
e) Why Amazon and why do I leave my previous company within 2 months.
f) Given a linked list with random pointers , clone the linked list.
Gave few solutions and he asked me to clone without manipulating the original linked list but with extra space. Came up with little tweaks using HashMap
Map< node * , node *> key is the node and value is the random ptr node.
g) Find the ceil and floor of a value in a given BST without extra space.
if a BST contains 1 3 6 7 9 12
->if the given value is 8 floor is 7 and ceil is 9.
->if the given value is 9 both floor and ceil is 9.
P.S. Be cautious in explaining your projects.

5th F2F round: (Hiring Manager Round):
Few questions on projects and advantages of AWS.
a) Asked me about the different inter process communication methods.
b) Which method is faster and why. Then he asked me to explain about shared memory
c) Asked to write the code to implement LRU cache.
d) Then code for malloc implementation given an array.
e) He asked me to write a thread safe code for the given scenario.
given two writer threads and two reader threads . give a mechanism to handle the writer and reader threads. The writer thread writes a value 1 2 3 4 in a queue or array and reader thread reads it and print the output as 1 , 2 ,3 ,4 â€¦..In the same order as given and only onceâ€¦
->i handled it with a binary semaphore and a single queue for both reader and writer..
f) conditions for a deadlock and he asked me to associate with the real life scenario.
mutual exclusion and all the cases.
g) Different types of scheduling and what type of scheduler does linux have and why.
h) doeslinux have preemptive scheduling and few questions on virtual memory.
He just analysed my approach towards the problem and checked my basic understanding in OS concepts.
Finally got offer from Amazon after two days. I owe a great thanks to GeeksForGeeks. It helped me a lot to improve my data structure and problem solving skills. Hope this will help you. All the Best .
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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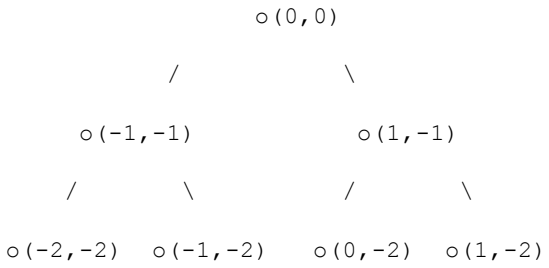
Amazon Interview | Set 38 (SDE-I)

1) (Telephonic round 1)
a. Print a matrix in spiral order (Code)
Soln: Solved it using recursion. Each recursive call was suppose to print boundary elements. On every recursive call, shifted the origin point and passed new size of matrix.
b. Given a pair of brace {}. Validate it. (Code)
Soln: using two variables (i.e open_count and close_count) and proceed further.
c. What if we have multiple types of braces? (Approach)
Soln: Using stack.
2) (Telephonic round 2)
a. Given list of songs. How would you shuffle it? (Code)
Soln: Gave various approaches from naive to optimal. The optimal one was similar to shuffling of array of ints.
b. Give list of words. Print all anagrams together. (Code)
Soln: Used Hashmap with key as â€œsort(str[i])â€ and value as List which is anagrams.
3) 3: In-house 1
There are various varieties of clothes (say shirt). Varieties are based on parameters like pattern, size, colour, etc.
a. What will be your input format so that it can store all values of all parameters?
List<List<String>>. Each List<String> denotes values for a particular parameter
b. Design a class for a shirt for the same requirement.
c. You have to return all different types of shirts that can be formed based on various combinations of input parameters. (Code)
d. Assuming you have all types of shirts available. Now there are various queries like:
i. Show all types of shirt having colour “red”,
ii. Show all types of shirt having size “small” and pattern “check” etc. etc.
So how will you store I/P so that this requirement can be fulfilled efficiently?
4) In-house 2
a. Given a Binary Tree. Assuming each node denotes some x,y coordinate. root node denotes (0,0). Write a code to display coordinate of all nodes.
case (i): Tree is complete and no node’s x-coordinate is overlapping. (i.e all nodes will expand along x-axis so that no node overlaps). (Code)



Here we can see that many nodes are overlapping over x-cordinate.
case (ii): Tree is incomplete and no node's x-coordinate is overlapping. (Approach)
case (iii): Tree is incomplete and node's x-coordinate can overlap. (Approach)
b. Design a DS to perform
Insert
Search
Delete
get Random
All in O(1).
Soln: Focus on Delete and get_Random. On further analysis, only get_Random was required to me modified. Only a bit of tweak will serve the purpose.

5) In-house 3

a. Given array of ints. Assuming total no. of elements is even. Need to tell whether this array can be grouped in sets of pairs such that sum of each pair is divisible by K.
eg: 0,2,4,8,12,20,18,4 and k=4
so (0,8), (2,18), (4,20), (4,12) is one such set in which sum of each pair is divisible by k. (Code)
b. There is a vertical rod. Discs of various radiuses are inserted in it. When we will try to take out any disc then 1st all the discs above it has to be taken out. Taking out a disc and putting it back is counted as one step.
Considering this, what will be the minimum no of steps in which these discs of various radius can be stored in sorted order in the rod.
Only minimum no of steps was required. "How to sort" was not required. (Approach)
c. Given array of ints. find ar[i],ar[j] such that j>i and ar[j]-ar[i] is maximum. Famous problem. (Code)

6) (Semi Technical- Hiring Manager)

a. Normal HR questions. Why Amazon over your previous company, some areas where you want to improve, define dream job and similar other questions as per the discussions.
As per feedback: my answer for "Why Amazon over prev company" was not clear here.
b. Given two arrays of ints of size m and m+n in sorted order. merge it inplace. Famous problem. (Code)
c. Given string.
Qusn: Find the char occuring max no of times.
Soln: Simple one. Take auxillary array of size 256 and maintain frequency of each char. Scan auxillary array and get the required char. O(k+n) where k=256 here.
Counter Qusn: Why O(k+n)? Why canâ€™t it be O(n) only?
Soln: At the time of maintaining freq of each, compare to get max freq char also. No need to travel aux array again. O(n)
Counter Qusn: What if memory size is only 100 bytes?
Soln: Detailed one.
Counter Qusn: Assuming updating freq of each char takes 1sec, so it will take N secs roughly. How can we improve it?
Soln: Use multi threading for parallel programming.
Counter qusn: Will there be any issue?
Soln: In case one aquires lock, other one that needs lock will go in waiting. This adds extra time and so can take more than N secs.
Counter Qusn: How to improve this?
Soln: Detailed one.
And many more such counter questions.

7) (Amazon Seattle. Semi HR. Analysis of thought process- BAR RAISER)

a. Again same question. Why Amazon over previous company?

This time I was prepared
b. One +ve point and one -ve point from amazon india site.
c. Was prepared for this and already did some pre analysis on the site.
Many more such HR questions.
d. Analysis of thought process:
Assuming a new building is going to be constructed for IT official purpose. 75 floors. You are builder. This building will be on lease for diff companies.
i. How many lifts you will add in that building?
ii. At which floor each lift will stop?
Note: At each step, I had to identify the required data after analysis and then only data for the same was provided.
Soln (i): (As it is totally based on thought process, so counter question from your side is good point)
1. No of Lifts are determined by many factors. Major factors are height of lift and no of persons working in that building.
2. I was knowing height of building. To calculate no of persons, I asked size of each floor. It was 100 sq m each floor.
3. Each floor will have cubicles and other rooms and passages. Assuming 70% of total area is used by cubicles.
4. Each cubicle will have 4 persons. After calculation it came to be 40 employees per floor. So 3000 employee in whole building.
5. Next analysis was: In most of the IT company, the in/out timing is flexible. Generally in time is b/w 9:00-11:00 and out is b/w 5:00-7:00.
6. We have 2hrs of window in which all employee will use the lift. So no of lifts will depend on this factor also.
7. After calculation, it came out to be approx 9 lifts (which was a good no according to him).
Soln (ii): Now the qusn is at which floor each lift will stop.
8. AS we don't know how many companies will be there in this building at any time, so it is advisable to provide equal chance for employees on the basis of floor no. rather than on the basis of company.
9. Best way would be to minimise the no. of stops of each lift.
10. This can be done by giving each lift equal no of floors on which it will stop.
11. It can simply be calculated as 75/9= 9 (round off).
12. So 1st lift will have floor buttons b/w 1-9, 2nd will have b/w 10-18 and so on.
13. This approach was best (according to him) for current scenario.
14. Remember that each floor should get equal chance and we don't know how many companies will be there.
Tips: Geeksforgeeks, Careercup, Cracking the code Interview (Book) +++++.
Finally got offer in few days. Very satisfied.
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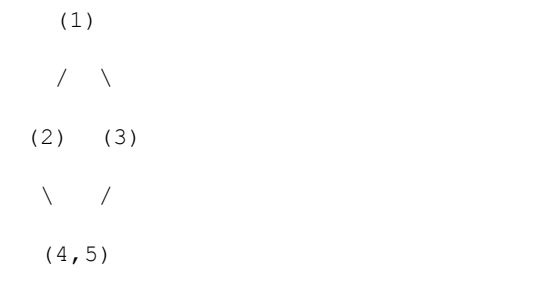
Amazon Interview | Set 37

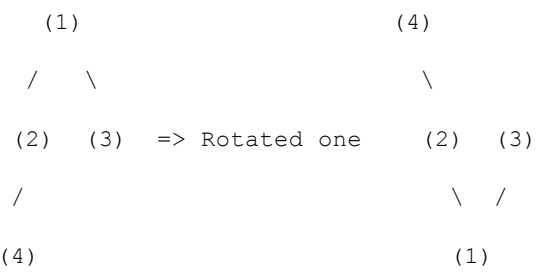
Interview Experience for placements at AMAZON.
It consists of 1 online round (20 MCQ + 2 coding question) and 4 F2F interviews.
Online Round 1:
20 MCQ 1 question each from OS, pigeon hole principle, probability, DBMS, networks, NP problem and other questions from C/C++ input output and logical question
22 from batch out of 300 students were selected for F2F interviews
Interview Round 1:
As they were short in time as it was 9 at night so they asked me single coding question.
Que 1: Given an array of n numbers with repetition of numbers. You need to find the max length of continuous sub array with at max 3 unique elements.
For eg
array: 1 2 3 1 4 3 4 1 2
ans: 6 (3 1 4 3 4 1)
Solution: Time complexity O(n)
Extra Space O(1)
Interview Round 2:

They asked me 3 questions but I am not remembering the 2nd one. Sorry for that
Que 1: You are given two binary trees. You need to tell that if one tree is rotated 90 degree and placed at bottom of that tree and each leaf nodes at max depth of two trees will meet each other or not.
for eg:
lets assume () as a node
Tree 1



node 4 and 5 are overlapping

Tree 2



So it returns true as node 4, 5 of tree 1 is overlapping with node 4 of tree 2
Firstly I was asked to give algorithm then when i gave he asked me to code it
Solution: Time Complexity O(n+m) (where n and m are nodes in tree 1 and tree 2 respectively). Space Complexity O(n+m)
Que 3:
Suppose u given normal deck of cards 4 suites and 13 cards of each suite in which one card is missing
you are picking a card one at a time and sees that card and putting it aside
Find the suite and number of missing card.
Then he said change the number of suites to K (very very large you cant add till k)
and N numbers (again very large numbers)
Interview Round 3:
It was an easy round for me atleast but not for others
Que 1: Find the palindrome of a given number without using extra space
Que 2: 100 floors and 2 egg problem changed to 50 floors and 2 eggs
Que 3: You are given array of numbers which increasing first then decreasing. Find the greates number.
eg: 1 2 3 4 5 4 3
answer: 5
Solution : Time Complexity O(logn)
Space Complexity O(1)
Interview Round 4:
He asked me about my myself apart from coding and as I said “Hacking” so we discussed about hacking a lot.
He also aksed me about my projects
Then he gave me a puzzle:
Assuming I have a chessboard (8X8)
a knight is placed at (x,y) and he moves N hops

Find the probabilty that he will be inside after N hops.
On a condition that if a knight moves outside then he will remain outside he cant come inside.
For eg. (x,y)=(0,0)
n=2
probabilty=(12/64)
4th round was type of HR as he wants to know about myself and how I do different things.
If I stuck in a position what will I do.
If your boss says that you have to do X and you are not satisfied with this then what will you do and how will you approach.
After that I waited for 3 hours and I got selected with 4 of my friends
Hope this will help, I try the possible way to support you.
All the best for your placements

This article is compiled by anomaly404. Many Many congratulations to him. 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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Amazon Interview | Set 36

1 round (20 MCQ + 2 coding question)
3 face to face round, 1 telephonic interview.
1st coding question
_____
Find the diameter of the tree.
2nd coding question
_____
check the validity of sudoku.
1st face to face Round
_____-
Qs-1) In a binary tree, a complete path is defined as a path from root to a leaf. The sum of all nodes on that path is defined as the sum of that path. Given a number K, we have to remove (prune the tree) nodes from the tree which lie on a path having sum less than K. A node can be part of multiple paths. So we have to delete it only in case when all paths from it have sum less than K.
I was able to solve the problem with bottom up approach, and able to write a working code of it.
Q-2) Given an array of positive numbers, find the maximum sum of a subsequence with the constraint that no 2 numbers in the sequence should be adjacent in the array. So 3 2 7 10 should return 13 (sum of 3 and 10) or 3 2 5 10 7 should return 15 (sum of 3, 5 and 7).
I was able to give him a DP solution with a Parent array which stores thee index of the parent of every element,i hd put -1 for the first element,at the end I backtrack the array to find the all the elements.
2nd face to face Round
_____-
After some personal questions, the interviewer asked 1 coding question
Q-1)
n1 pairs of "{} " brackets
n2 pairs of "[] " brackets
n3 pairs of "() " brackets
I have to find the all valid combinations of all the pairs. I have to write the working code of it.
I gave him the solution with recursion and stack.
3rd face to face round
_____-
Interviewer asked some basics Questions on Design patterns, OOPS and OS,after the big Discussions of all the Questions he asked 1 coding questions.

1st Question
————

There is a string, in which all the spaces are removed, we have to find the original string with the help of a machine which takes input a word checks that it is valid or not.

Telephonic Interview
————————————-

The Interviewer asked to give a brief idea about my project.
After some questions on my Project, the interviewer asked 2 coding question
Q-1) tree to doubly link list. O(n) and in-place solution is required.
Q-2) A array of N elements, we have to replace all the elements with nearest greater which is present on the right side of that elements. O(n) is required.
After 2 days, they inform me that I am selected for the job.

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Amazon Interview | Set 35

On-campus, 1 MCQ round, 2 coding rounds, 4 face-to-face rounds.

MCQ round(45 min)

- 5 questions on mathematics, one was from probability, all easy 15 questions technical, from each-demand paging, dining-philosopher, humming codes, 3-4 C programs output, etc

1st Coding round–2 questions(45 min)

1. Given an array,find minimum distance between two given integers in the arrays. Note that the two given integers may be same.
2. Given three linked lists, each representing an integer, add them
eg
3-7-0-8
2-1
5-4-2
ans– 4-2-7-1
explanation- 3708+21+542=4271

2nd coding round(45 min)

1. Given an array containing both positive and negative elements, arrange in such a manner — 1 positive number, then 1 negative,then 1 positive and so on. If number of negative numbers are more,extra numbers should be kept in end and vice versa. Note the order of negative and positive elements should be same in the modified array and you are not allowed to use any extra space
2. Given a binary tree, replace each node value by sum of its children value.

Face to Face rounds–

Round 1

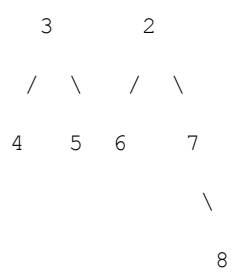
1. Level order traversal and then level order traversal in spiral form. Only algo, no code
2. Given a dl representing the spiral level order traversal of a binary tree,convert it to a binary tree inplace. In Last level, nodes will be either to the right or left only. complete code in C

```
eg 1-2-3-4-5-6-7-8

o/p--

                1

              /   \
```



3. Glass pyramid problem.Measure amount of water in j'th glass of i'th row.(algo+code)
Round 2-
very few technical questions
1. Given an array which is first increasing and then decreasing,how will you search an element?(only algo)
2. Convert a n-byte integer from little endian to big endian.(code was required)
3. Find k max elements from a large file.(only algos)
Round 3
no technical questions at all
Round 4
After some personal questions, the interviewer asked some technical questions as well
1. Suppose we receive requests for a page, but we want to ensure that max no of request per sec is 'x'. If there are more than x requests,what will you do?
We want a continuous flow. How will you do that?
2. Suppose in a system, some processes are already running. Now when an user will give new task(or process), he will give a list of processes his process is dependent upon. Some of those may be running, some may not be running right now. You have to ensure that there is no contention, i.e., If a process, Pj is dependent on process Pi,
Pj should not execute along with Pi. How will you ensure that? Complete algorithm with code was required. The interviewer went on complicating the problem.
At last I used graph and 3 hashmaps to solve the problem. He was ok with it.
That's it. My last round completed and I was selected.

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Amazon Interview | Set 34

First of all, a very very big thanks to whole team of geeks for geeks. It is because of them only that I was able to crack the interview process of amazon and get a job in my dream company.
No of Rounds: 1 MCQ round + 2 online test round + 4 PI
Type of Interviews: Campus Interview for freshers
MCQ round(Time) : 45 minutes 20 Objective Questions:
5 question on maths which included 3 on probability
Some c output questions easily available on geeks quiz
Questions on heap, hashing, time complexity of recursive functions
One sql query, one question on fcfs and round robin scheduling, page fault in demand paging, dining-philosopher problem,one on propositional logic, one based on Huffman code.
Online test 1 (Time): 45 Minutes
2 Questions:
1. Given three linked lists,where each linked list represents a number, add the three lists and return the resultant list.
5->1->2->NULL

9->1->NULL
7->2->2->NULL
Output :: 1->3->2->5->NULL
2. Given an array and two numbers x and y, find minimum distance between two numbers x and y. assume that x and y always exist in array and it may be that x and y are same alsoâ€¦

Online test 2 (Time): 45 Minutes
1. Convert a given binary tree to sum tree.
2. Given an array consisting of both positive and negative numbers, 0 is considered as positive, rearrange the elements such that positive and negative numbers are placed alternatively, constraints are that it should be in-place and order of elements should not change.

Interview Round 1(75 Minutes):
Technical Interview
Asked to give a brief idea about my project.
Question 1: Given a linked list,reverse every k nodes of the linked list.
Question 2: given a matrix of size m * n, place k students in such a way so that cheating in an exam could be minimizedâ€¦. Was asked to just explain the approach, no code required.
Question 3: suppose a online chat between customer and serviceman, serviceman wants to reply to customer as soon as possibleâ €¦suppose text which is to be sent as reply takes 10 sec for being typed. How can he make typing faster ?
My answer was using autoprediction feature, by which he will need to type less number of characters, so typing will become faster..
Then question was extended to how to store the words for being used in predictionâ€¦
I answered a trie data structure which allows prefix matching..
Then question was further extended to write a code to traverse all the words stored in dictionary in lexicographic order..

Interview Round 2(50-60 Minutes):
Technical Interview
First of all was asked to tell something about myself.
Then a detailed discussion about the project, conversation continued nearly for 20 minutes, he wanted me to explain him everything from the scratch.. I used genetic algorithm in my project..so he wanted to explain him the concept of genetic algorithm..
Then a coding question:: stable stock problem.
You are given prices of stock of a company at consecutive days in an array..write a code to find the maximum profit one can make by keeping a stock value for as long as possible..that value of a stock is called a stable stock value.
Example::
6 5 9 8 3
So maximum profit is 15, because stock of value 5 would be hold for 3 days. So max profit is 15.
The problem basically was a variation of finding index of next smaller element.
I solved it using the concept of largest rectangular area in a histogram where need to keep track of previous smaller will not be required.

Interview Round 3(60-75 Minutes): (Bar Raiser Round)
Technical Interview
Interviewer was very cool.. he first asked about me, did some casual talk to do away with my nervousness.
Infact, he told me that it looks like that you all have studied geeks for geeks very thoroughly so I am going to ask you a question that is not present in geeks for geeks. He challenged me it will be a question you have not heard of before. At the end of round, he showed me it was a question from top coder, but I had never heard of anything called top coder before.
Question 1: Given a string, find the longest sinusoidal sequence in it. If there are multiple such sequences of same maximum length, return the one which comes first in lexicographic order in a dictionary..
Sinusoidal means increasing then decreasing then increasing and so on.
Example ::
a r u n ::
a u n , a r n , r u n are three such sequences of length 3â€¦. But, a r n is output since it comes first in lexicographic order.
Interviewer gave me hints that if I had to found the sequence in which all elements were increasing, then I answered LIS will give me

the solution , this was the hint. So, basically, it was a variation of LIS. I answered it in O(n2) and 2n spaceâ€¦.
Then was asked to do it in (n) space and o(n).
Question 2: Suppose a student needs to implement a bst structure to solve a problem, but instead he used a linked listâ€¦. Then give an example of input sequence, in which his implementation worksâ€¦ new value will always be added at beginning of a linked list.. so. Basically at each step after insertion , root of bst and head of link list should point to same node. I was asked to provide the sequence.

Interview Round 4(35 Minutes)
This round started of with some nontechnical questions.. what will I do in different situations?
They seemed to have found out every detail of terms involved in my project..so, there was a detailed discussion on projectâ€¦ my project involved concepts of statistics, so he asked me questions regarding statsâ€¦. This discussion went nearly for half an hourâ€¦.
In the end, he told me lets see whether your project could bring you to amazonâ€¦.
After the 4th round, I nearly have to wait for 4 hours before the result were announced. Finally, the interviewer said they were highly impressed by me and I was hired.
In total 7 students were selected among us.
Once again a big thanks to whole geeksforgeeks team.
This article is compiled by Arun Jain. Many Many congratulations to Arun. 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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Amazon Interview | Set 33

I recently attended a walk-in for Software development Engineer (SDE- 1) at Amazon, Bangalore.
Here is my experience of Amazon interview.
As I was from the same city, there was no phone interview. I have listed down all questions that I remember.
Round 1: Data Structures, Algorithms and coding (1 hour)
Interviewer just started off with questions without introduction and stuff.
1) Given a singly linked list, swap every 2 nodes, for odd number of input; retain the last node as it is.
Eg: Input: 5 13 15 18 20 11 6 7
Output: 13 5 18 15 11 20 7 6
I was asked to write the code straight-away.
Wrote the same, verified boundary cases and discussed.
2) Given a binary tree, find the number of pairs where sum of 2 nodesâ€™ values equal to k
Eg:

```
 1

2 3

4 5 7
```

Say k=7, output =2 (2+5, 3+4)
Suggested an approach where Iâ€™d use inorder traversal of this,
Then interviewer asked me to solve the simplified problem, find k in sorted array instead of tree.
Got solution for this one, to have 2 pointers at each end, and traverse accordingly.
I was asked the approach for extending same to BST.
Then, I implemented the same for BST using stack.
Round 2: Data Structures, Algorithms and coding (1 hour)
1) Given input as k sorted arrays, generate a single sorted list as output.
Eg:
Array1: 1 5 8 9 11 â€¦.

Array2: 2 12 24 44 â€¦..

.

.

Arrayk: 3 15 79 115 â€¦.

Output: Array1: 1 2 3 5 8 9 11 12 15 â€¦.

Discussed the approach, and complexity, then wrote the code for the same.

2) Given a function isGreater, compare user defined objects and then return the object that is greater than all other objects.

Twist: obj1 > obj2 and obj2 > obj3 does not mean obj1>obj3

I asked for the use case for the same, as I was not convinced with the problem.

He gave an example of games/ 1 team winning another.

Discussed the approach and then wrote the code.

3) Given an input sentence, output the non repeated words in the sentence.

4) How are maps implemented?

Interviewer then clarified my questions about Amazon.

Both first and second rounds were at similar difficulty level.

If the interview feedback was bad for any of these, the candidate was eliminated. If at least 1 of these went well and other â€œnot sureâ€, then too candidate is called for next rounds.

Round 3: Hiring Manager round (1 hour 40 minutes)

Discussed on my current roles and responsibilities

why do you want to join to Amazon?

What are your accomplishments in your role so far?

What are the things that youâ€™re not good at and need to improve?

Serialization of Binary tree. Given 1 traversal is it possible to re-construct the binary tree.

Write code to reconstruct the tree given any 2 traversals.

I took in-order and post-order traversal, discussed the approach and wrote recursive solution.

Was then asked the approach for iterative.

Round 4: Culture Fit Round

This surprisingly had a data structure question first.

1) Given a n (large number) lists of customers who visited n webpages on n (large number) days, design a data structure to get customers who have visited the website on exactly “k” days and should have visited at least “m” distinct pages altogether.

Was then asked to improvise the solution as much as possible

2) Details on my previous project and job profile

3) Challenging situation faced

4) Why should we hire you?

Then, he answered some of my questions.

Round 5: Coding, Algorithm and data structures (Technical round with a senior developer)

Started with questions straight away

1) Least common ancestor of a binary tree (Solution and Code)

2) Given a 2 dimensional array sorted vertically and horizontally, search for an element and return true if the element is present. (Algorithm, Code and Complexity)

Example

```
1    5    13   29

11   16   25   38

45   49   52   57

51   54   59   66
```

3) Something on count sort.
4) Print binary tree in zig-zag order..
5) Gold box problem (Approach)
There are â€˜nâ€™ gold boxes placed in a row, each having different number of gold coins.
2 players play a game, where the motive is to collect the maximum number of gold coins. Each player can see how many coins are present in each box, but can get a box from either end only, on his turn.
Design a strategy such that Player1 wins (Assuming both players play smartly)
I got the hiring call after couple of days, after my last round of interview. They said feedback was very positive and theyâ€™re happy to hire me.
Was so happy Thank you..

++

Amazon Interview | Set 32

I would like to contribute for GeeksForGeeks by sharing my experience of Amazon Interview process. This was for a SDE position in Hyderabad. I have almost 2 years of work experience in Samsung.
1st Round: Written
Test was on Interview Street Platform.
Qs-1) A function printMostFrequentWords, which takes in an array of strings, was given. It is required to print a list of all the letters that occurred with the highest frequency in each line of the array, followed by the frequency.
The list of letters should be an alphabetical list of upper case letters followed by an alphabetical list of lower case letters.
Sample Test Cases:
Input #00:
When riding your bicycle backwards down a one-way street, if the wheel falls of a canoe, how many ball bearings does it take to fill up a water buffalo?
Hello Howard.
Output #00:
e 6
al 7
a 3
Hlo 2
Qs-2) http://www.geeksforgeeks.org/construct-a-special-tree-from-given-preorder-traversal/ –Variation of this one
Qs-3) http://www.careercup.com/question?id=12998667
Third case was a bit tricky.
Qs-4) Rotate an M*N matrix by 90 degrees. There was no function given in this case. Everything should be assumed by you only.
Qs-5) Delete the Kth Node from a linked list.
I solved 4 questions with all test cases while for another 1 only 10/15 test cases passed.
2nd Round: Telephonic
Qs-1) Spiral level order traversal of a tree. (Use two stacks)
Qs-2) A person can jump 1 or 2 steps. No of ways of reaching the top of n stairs. (Try for O(1) space.)
Qs-3) Find the longest substring in a string with exactly 2 unique characters. The substring should not contain more than two different chars.
So, aaaaabbaaa is a valid substring
Also, ccaccccaccaca is a valid substring.
Need to write code for the 3rd qs.
Expected = O(n)

I answered all the 3 questions and was confident of receiving the call for onsite which I did.

F2F ROUND 1:

Qs-1) The question was to print a tree vertically. Please note it was not asked to get the sum at each vertical level. We have to print nodes at various vertical levels starting from the leftmost vertical level to the rightmost vertical level.

I suggested array of vector then a hashing. Finally I gave a solution based on DLL.

Code was written using DLL only.

Qs-2) Only approach was asked on how will you save a binary tree in a file(Not a BST)

There are no assumptions on Binary tree.

This round went well for me.

F2F ROUND 2:

Qs-1) First I was asked to design a Data structure with O(1) insertion and O(1) search. I told about hashing. Then he told me to get a random number from the current list of numbers which have been inserted into my Ds. So I maintained an array storing pointers to the hash table.(Assume no Collision, he told so).Then he said O(1) deletion also. I was stuck on this I was not able to make both deletion and getRandom in O(1).After Some Discussion he moved on.

Qs-2) He told there is a range, defined by a min val and a max val. In a given array I had to find all elements within the range. I told him its only possible in O(n).We have to look at each element. Then he told me to assume array as sorted. Then I used Binary search for finding indexes of ceil of min and floor of max to find the elements in the range.

This round went ok for me.2nd question i wrote proper code with all edge cases, but in first I got stuck a bit.

F2F ROUND 3:

Qs-1) In a binary tree, a complete path is defined as a path from root to a leaf. The sum of all nodes on that path is defined as the sum of that path. Given a number K, we have to remove (prune the tree) nodes from the tree which lie on a path having sum less than K.

Note: A node can be part of multiple paths. So we have to delete it only in case when all paths from it have sum less than K.

I was able to solve the problem and write correct working code for this.

(Hint : Think of a bottom up approach.)

Note: Values in tree can be -ve also.

Qs-2) A robot problem: No. of ways to reach from 0,0 to m,n in a m*n grid. I had to tell recursive function only. No code required.

This round went very good for me. The first question was a bit tricky but solving it raised my confidence.

F2F Round 4 with Hiring Manager:

Qs-1) This was mostly a HR Based round. A lot of questions about my previous work, my initiatives, challenges I faced and many other questions.

A simple question on matrix was also there. Fill rows and cols with ones if a 1 is present in that row or a col. Code also required.

Question based on shipment and orders etc. Eg: What all things to take care in b/w of order placed and item shipped. What all factors and things you will consider.

I was being interviewed for transportation team. So questions based on it.

Overall, the round went well

I returned to Bangalore that night.

Few days later, I got a call from HR saying I am very close and I need to appear for another round in Bangalore office.

F2f Round 5:

About half an hour Hr based discussion.

Then two Technical questions with code:

Qs-1) In a binary tree, return true if all leaves are at same level and return false if all leaves are not at the same level.

Qs-2) An array is given which is first increasing and then decreasing. Find the pivot element. Need to take care of all the edge cases.

This round went well for me. Mostly this round was on soft skills. I did well in coding questions and wrote proper code for both.

In the evening I got a call from HR that I was selected. 

I would like to thank GeeksForGeeks Team for being a great help for me.

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Amazon Interview | Set 31

Recently I attended the Amazon walk-in and got selected for the position of SDE I.
Written test:
1. Write a code to convert tree to DDL(assume tree node contains pre, next pointers and set as null intially.)
2. WAP to encode and decode string.
aabbbbcccd <->a2b4c3d1
3. Find the sum of elements in after nth iteration for below operation on array.

```
original array  4 6 8 3 6    sum = 27

iteration1      -2 -2 5 -3    sum = -2   (a1= a2-a1)


iteration2:     0  -7  8     sum= 1


iteration3:       7  -15     sum =-8
```

Hiring Manager:
1. Find the nearest leaf node from given node in binary tree..
use post order traversal.. like LCA in binary tree
2. Find the first k largest numbers from large file size. Explain solution for
1. When we have space to store K elements in RAM
2. When we didn't have space to store K elements in RAM
Tech:
1. Design N-ary tree, to make sure that lock and unlock operations can be done with minimum complexity (height of tree)
a node can be locked when its ancestors or successor are not locked.
we can a unlock a node a any time.
2. a[] = {a,b,c,d,e} b[]={f,g,h} result should be = af+bg+ch+df+eg
Tech:
1. Find maximum product of subarray in given array of integers
2. Design T9 dictionary
Bar Riser:
1. Design a tree, in which a root can have unlimited children and write a code to print each level in separate level
2. Print the anagrams present in a huge file (each line in file contains one word and you didn't have any constraints like limited memory etc..) for a give string
use trie or hashmap
Like all Amazon interviews in GFG, here interviewer more concerned about edge cases and perf perf perf perfect code.
Thanks a lot GEEKS FOR GEEKS and my dear friends Ramesh, Purush, Jhadey for helping me in preparation.

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Amazon Interview | Set 30

I have attended the interview for Software Development Engineer position and got the offer from Amazon.
I spent a lot of time in GeeksforGeeks going through the precise and simple explanations of complex problems, which helped me to sharpen my mind. Really, its a great work by the geeks and I am happy that I am a part of it.
The following were the questions.
Round 1 : Write a program to solve the below problems. (Time 1.30 hrs)(Written Test)
1. Given a string in the form of a Linked List, check whether the string is palindrome or not. Donâ€™t use extra memory. Give the time complexity. The node structure is

```
Class Node {

          Char data;

          Node next;

}
```

2. Given a Binary Search tree along with the parent pointer, find the next largest node for the given node. Give the time and space complexity. The node Structure is

```
class Node {

     Int data;

     Node left;

     Node right;

     Node parent;

}
```

3. Given a sorted array which is rotated n number of times. Find out how many times the array is rotated. Time complexity should be less than O(n).
Round 2 : With Team Member
1. Tell me about yourself.
2. Explain your project.
3. Given a Binary tree, find the vertical sum.
….a. I gave a solution using hashmap. There were discussion about the problems (time and space complexity) in using hash map. Then due to its cons, he told me to use some other DS to solve the problem.
….b. Then I gave a solution using Array. There were discussion about how it can be used, time and space complexity and its pros and cons.
….c. Code using Array.
4. Given a matrix mxn, where all the rows were sorted, print the elements in the matrix in a sorted order.
….a. I gave a solution with O(mxmxn) time complexity.
….b. He wanted a solution in O(mnlog(m)) time complexity and gave a hint to use heap.
….c. Code for the same.
Round 3: With 3rd Level Manager (culture Fit)
1. Tell me about yourself.
2. Explain Your accomplishments.
3. What you are proud of yourself?
4. How you will handle the conflict with the team member?
5. Lot of behavior oriented questions.
6. Given a String, remove the duplicates in the string.
….a. Lot of variations from the same problem.

….b. Asked for a solution in different time and space complexities and the complications involved.
….c. I guess the communication skill might have been tested here.
7. Given a floating point number, write a program to convert it into a string. The number of digits after decimal point can be more than 1000.
Round 4 : With Manager
1. Can you tell me about yourself?
2. Explain the projects you worked on?
3. Given a Binary tree, connect all the leaf nodes in the form of a doubly linked list. Donâ€™t use extra space.
4. A scenario was given about two robots and its functionality. Write a program which will be running in both the robots which will perform the specified functionality.
5. Given an integer, find the next largest integer using the same digits as in the given integer. For example, if 12345 was given, the program should return 12354.
Round 5 :
1. Tell me about yourself.
2. Explain what you have done in your previous company.
3. As I have worked on a product and they told to explain the product
4. What are the developments you have done and what impact it will be having?
5. What will happen to your development, if the product Is migrated?
6. Questions on threading.
7. What is a thread safe code? Explain.
8. What is a process and thread? Differences?
9. Given a binary tree print the elements in a zig zag order.
Thanks a lot for Geeks team.

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Amazon Interview | Set 29

I am very much excited for sharing my experience for Amazon, i went through 6 rounds and really enjoyed a lot for facing all of them and i feels like in each round that GEEKSFORGEEKS is the one the best site which gave me lot of ideas for solving the problems, This is THE BEST site for coding for getting good questions and also for improving our skills and creating our base SOLID.
1st round >> ONLINE test
1) Convert a BST to Double Linked List
2) Count the number words words + spaces + special chars in a given string
3) Print kth Lasgest node of the given tree.
4) Write the complete code for rotating the given matrix.
Solved three successfully with all cases but for one some cases was missing because of network issue i was facing time problem.
2nd round >> Telephonic
1) Level order traversal (Both approach recursion && Queue)
2) In O(1) â€“ getMin, getMax, getTop,push,pop
3) Find the least positive missing number in an array.
4) Print all permutations of the given string
For all i need to write the code, and i was feeling like i was doing fast and being on expectations of the interviewer, he was so happy with me.
3rd Round >> FACE TO FACE (It was nice, it went thru 1hr)
1) Write a code for inverting the values of BST and return the new treeâ€™s root

(In place i have to do this, first i have given solu. with O(n) space with O(n) complexity)
2) Finding the element in O(m+n), in a sorted matrix which is sorted in row as well as in column.
(I said i know this, so i just told the approach and we skip that !!)
3) Project questions, infact in all rounds it was there!!
4) Rope Puzzle :: 2 ropes are there and u need to find the 45 mins(Very generic Google Puzzle)
4th Round >> FACE TO FACE (It was Amazing, it went thru 1hr 30 mins)
1) Find a median in running stream of numbers.
2) Find a k best or max values in the running stream of numbers.
3) Project Questions !! i Love that !!
4) State machine questions !! Gaming Questions (Bcoz m a game developer)
Questions on garbage Collection, Virtual machine (Bcoz i did project on it)
Anyway i love all those part.
5) One very nice question, i need to calculate the area for rain drop which will be holded for bar graph(Its basically a very real world problem, i love to do that, even i did mistakes but they guys are really awesome they helped me out to get rid of my problems)
5th Round >> FACE TO FACE (It was Damm Amazing, it went thru 1hr 15 mins)
1) I need to write recursion function for a robot which has to move from one location to other location in a grid.
In recursion i took time to write the base cases, but finally with some hints i was able to make it.
2) I need to code for k-heavy path approach and also need to write its recursion.
There also i was continue taking to the interviewer and clearing my doubts and using the hints given by him. Finally i was able to code it and do the recursion also.
Every time i need to write the recursion in mathematical form and calculate the Complexity also like we have to do normally for detecting the complexity.
I love the mathematical part and coding, its in my blood !!
3) Project Question !! Scalable problems !! Dealing with N dimension study and mathematical problems, even covering my whole resume.
Finally he was very happy and said to me that you need to think proper then code or design, rest is awesome !!
6th Round >> FACE TO FACE (It was with the Hiring Manager,i guess, it went thru 45mins)
1) He asked me about my whole projects and lots of about my resume and my challenges faced till now, it was good to explain all those.
2) He asked me to design an approach which will search all the valid combinations of a given string.
I have given some approaches like implementing TRIE, and explained the pros and cons for it and also the complexity of it.
Then i modified it and explained the Other approach which is better than the above by using HASH MAP and INDEXING with buckets if valid words.
We had lots of discussion on it. and Finally he said we are looking for guys like you.
Finally i have the offer Letter From Amazon and He asked me for Coffee Or Cold Drink. I Have taken Coffee.
NICE EXPERIENCE !! I LOVED ALL THE INTERVIEWS AND ENJOYED A LOT !!
Finally a Gold Medalist 2yr Exp. guy who is doing a very nominal job, got a Right place to work which is AMAZON !!
Heartly Thanks To GeeksForGeeks Community And Their Coding Stuff Which is available in Site !!

This article is compiled by Pushpendra Mishra. Many Many congratulations to Pushpendra. 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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Amazon Interview | Set 28

Hi, I was recently interviewed for SDE1 position for Amazon, Hyderabad but was not able to make it through. Although I wasn't selected but it was a good experience and GeeksforGeeks has been very helpful.
Following were interview questions-

I had one written round and one telephonic round before 4 in-face interviews in Hyderabad.

Round 1 (Written):

There were four questions which had to be submitted in a time span of two hours. Questions were:

1. Given a character string, display the characters that appear more than once in that string.
2. Rotate a matrix 90 degrees to right
3. Convert a BST to DLL.
4. Find kth largest element in a given BST.

Round 2 (Telephonic):

1. First question was to get two numbers fro a BST whose sum was equal to k. I answered it using a preorder traversal to get a sorted array and than starting two index from both ends to find if two elements with sum as k exist or not. He than asked if it can be solved without using an array or extra space. I tried solving it by traversing from two ends of the tree in preoder and reverse preorder fashion and it took some time to code. Dry run of the code seemed to be right but I wasnt sure. Anyways the best way of not using extra space can be to convert tree to DLL (in space) and use the same technique as used on array.
2. For second question I was asked if I had heard the question before or not. Question was that a a matrix is given with its rows and columns sorted and an element is to be searched in that matrix. I had heard the question before but had not solved it and told the same to the interviewer. After thinking for a while I could get an algo by starting at the rightmost element of the first row. If element if bigger we move down or else we move right. The solution was fine but he doubted that I had solved it earlier.
3. He asked to write a program of finding the square root of a number without using library functions. I had done it before and told him the same. I used Newton-rapson method to get the solution but he wanted it through something on the lines of binary search. I almost got the solution but may be I was running out of time so he dropped the question there only and asked me to dictate the solution of 2nd problem.

Two days later I got a call that I have cleared my telephonic round and have to be present in Hyderabad for further rounds(four). Arrangements done my Amazon and I appeared for the further rounds on 27/4/2013 in their Hyderabad office.

Onsite:

Round 1 (Technical):

1. First question was to find the vertical sum of a binary tree. I told him the solution using and array/hash. Whenever we move left we decremented the index while moving right we increment the index. The solution looked fine to him but he wasn't very comfortable with negative indexing. So he asked for another solution using doubly linked list. Initially I wasn't getting it but when he gave some hint I was bale to solve it but it took some time to cover edge cases. With the final solution he looked convinced.
2. Next question was to have Stack operations of Push, Pop, and FindMax in O(1) time. I started doing this using only one index of max variable but than I realised I needed max index at all levels so gave him a solution using two stacks. One having the element and the other having the corresponding max index. He looked convinced with the solution.

Round 2 (Technical):

1. In second round there were two interviewers and coincidentally one of them was the same guy who took my telephonic interview. First question was related on how to chose the 'related' items list whenever a product is displayed on Amazon website. the problem was to find the least related product for a given product. Initially I answered using n-ary tree but told him that we would have duplicate entries. He asked for optimized solution so I suggested using adjancy-list nut finally realized that it can be solved using graphs. They were convinced and asked to code. I solved it using a Queue so while traversing a matrix we pushed in the elements in the queue with their level of relation. They were convinced with the solution.
2. Second question was to delete an element from doubly linked list. I solved it but missed out on and edge case where the element to be deleted is not present in the list. I added that check later.
3. Third was that for a given BST invert the signs of the elements and finally have a new BST. It clicked my mind that after sign inversion it will be a mirror tree and gave the solution for the same.

Till this time feedback looked fine.

Round 3 (Technical-Managerial):

1. The next interviewer was senior guy and asked me about my work. Explained him in detail.
2. Later he asked me that for a given binary tree having three address fields i.e. left, right and bfs successor, left and right fields are filled and the successor field is to be filled. I solved it using level order traversal with a queue but he wanted solution without using extra space. I was taking time to solve it when he gave hint about keeping track of the parent. After this hint I was able to solve it with few conditions missing but with his intervention I was able to give a working code (as looked to him and me).

Round 4 (Technical-Managerial):

1. There were two interviewers. First question was tell me about yourself and your work.
2. Given a m*n matrix, we need to find the number of ways by which a bot can reach the (m-1,n-1) block if bot can move only right

and down while starting from (0,0). I gave him a solution using DP. Build the recursion tree showing the final solution. He didn't ask to code but asked to finds the recurrence relation. I got stuck I don't know why. I guess this was the start of decline. he gave some hints and I was finally able to write it, still.
3. For a given binary tree and a key, prune the tree with all the paths (root to leaf) that have sum less than or equal to k. I was able to solve it with some hint. The solution looked convincing.
Four days later I got a mail stating that "*Unfortunately, we are unable to take your candidature further, at the moment. However, your credentials are extremely impressive and we wish to retain your details on our active database. We shall get back to you as soon as another similar opportunity opens up*."

This article is compiled by Rohit. 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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Amazon Interview | Set 27

Hi, I was recently interviewed for SDE1 position for Amazon and got selected. I have 1.5 year experience in java. Geeksforgeeks helped me lot. I am very thankful to Geeksforgeeks team. Following were interview questions-
Two telephonic rounds followed by 5 F2F interviews.
Round 1 (Telephonic):
1. There is a dictionary already implemented. Write a method, which takes input String without space, to prints all subsets of the input string which is present in dictionary.
Example: Dictionary â€“ a*
…….Input- aaabaa
…….Output- a,a,a,aa,aa,aaa,a,a,aa
2. There is a dictionary already implemented. Write a method , which takes input String without space, to replace the characters from the strings which are not present in dictionary with -
Example: Dictionary â€“ a*
…….Input- aaabaa
…….Output- aaa_aa
Interviewer was cool. Did not code properly (lots of bugs were in code), but gave good approach for first question. For second question solution sent in a mail.
Round 2 (Telephonic):
1. Write a program to remove duplicates from array of prime numbers.
2. Write a program to return nearest elements from a binary search tree for input element.
This round was very good. Interviewer was very happy with my approach for both questions. Code did not have big bug.
Round 1 (F2F- Problem Solving and coding):
1. Tell me about yourself.
2. Write a program to find top 10 elements on an array of integers.
Donâ€™t remember much. Questions were easy. This round was very good. Interviewer was happy with solution.
3. Write a program to calculate a^b and store it in floating point representation.
Round 2 (F2F- Computer Fundamental):
1. Tell me about experience in past job.
2. OOPS concepts- Polymorphism, Inheritance, Encapsulation, Abstraction.
3. Aggregation and Composition.
4. Design patterns which you have implemented.
5. Write code to implement Singleton design pattern.
6. Design a system to implement options in Pack of cards.
7. Difference between Windows and Unix.
8. Threads, Synchronization, Deadlock.
9. Other subjects which you studied in your academics.

10. Most challenging work you ever faced.
11. Discussed about current project, role.
This round was fair enough. I was not able to discuss questions on subjects which I studied in academics.
Round 3 (F2F- Data Structures and Algorithms):
1. Tell me about yourself.
2. There is a 2d array. Write code to find the path with maximum sum. You can only traverse i+1 or j+1.if i is row number and j is column number.
I solved it using dynamic programming
3. In a binary tree find the least common ancestor for two nodes. (Write code)
4. Similar to 3rd question. Write a program to find least common ancestor in binary search tree.
This round was very good. Finished it only 40 mins.
Round 4 (F2F- Managerial round):
1. Tell me about yourself.
2. Copy Linked list with orbit pointer.
3. Write a code to find top hundred elements in a data set which cannot be loaded in RAM.
4. Typical parenthesis checking problem.
5. Most challenging work you ever faced.
6. What will do if you get task which is ambiguous.
7. At what extend you will be frustrated if you always get ambiguous problems.
8. How many members in your team in current organization. Whatâ€™s your role? Questions on current project.
Interviewer was very cool and friendly.
Round 5 (F2F- Bar raiser round):
1. Tell me about yourself.
2. Discussed about current project.
3. Write a program to find number of inversions in an array.
Example- Array 2, 5, 3, 1,10
Inversions (2,1) , (5,1), (3,1), (5,3)
Answer will be – 4
Gave solution of complexity o(nlogn) . Interviewer gave me hint for that.
Hint- Divide and conquer approach.
He asked me to write code which doesn't have any bug.
This article is compiled by **Neha Gupta**. Many Many congratulations to Neha. 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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Amazon Interview | Set 26

Hi, I am Mayur Kale,I was recently interviewed for SDE1 position for Amazon in our campus and got selected. Geeksforgeeks helped me lot. I prepared only from Geeksforgeeks.org. I am very thankful to Geeksforgeeks team.
Onw online coding test followed by 4 rounds of F2F interviews.
Online Coding Test (2 Problems,20 MCQs, 1:30 hours) From Interviewstreet
All problems had multiple test cases for which the code was validated against.
1. from input string we have to print character which occurs maximum number of times.
Face to face: Round 1(Technical, 1 hour):
1. Given a boolean matrix mat[M][N] of size M X N, modify it such that if a matrix cell mat[i][j] is 1 (or true) then make all the cells of ith row and jth column as 1 (time complexity expected was O(M*N) and space O(1))
Solution: http://www.geeksforgeeks.org/a-boolean-matrix-question/
2. Given binary tree, if we draw a line from root then we have to print all nodes on that line.
Code for both questions was required and some other discussion happened..
Face to face: Round 2(Technical, 1 hour):
1. Given string we have insert %20 on each space and input string has enough memory to contain output string.

(time complexity expected was O(n) and space was O(1).
2.merge point of linked list.
(I told I know this question so he moved ahead..)
3.Given binary search tree in array form and we have to check whether it is fully binary tree or not..
(I gave O(n^2) solution but He was expecting O(n) solution after some discussion I managed to give answer in O(n) complexity…)
4. Given that integers are read from a data stream. We have to find k maximum elements from that stream…
(I gave solution of insertion sort,then come to heap)
code for all questions required and nice discussion was there…
He was very impressed with my answers…
Face to face: Round 3(Technical, 1 hour 20 minutes):
-He asked me to choose topic on which questions should ask..
I chose OS…
-some questions on paging and virtual memory.
-If we use 8 GB RAM for 32 bit machine what will happen?
It was nice question..
He was very impressed with answer.
-Some discussion on Networking(DHCP and DNS).
-Some discussion on Linker and Loader.
-Some discussion on JAVA.
-Some discussion on DBMS.
-one puzzle
A champagne pyramid is a pyramid made of champagne glasses , each of equal capacity say , n. The pyramid begins with one glass at the top level , two glasses at the second level , then three below that and so on up to infinite levels. A level x of the pyramid thus has x no. of champagne glasses.
A steady stream of champagne is poured down from the top level,which trickles down to the lower levels. What is the distribution of champagne in the glasses at a given level i.
(I told I know this puzzle then he moved ahead..)
-Give a Building with n floor. A person can take 1 step or 2 step to climb. Find the number of ways to reach nth floor. Code was required
Interviewer was very happy after that.
Face to face: Round 4(Technical, 1 hour 20 minutes):
It was like semi HR round.
1. Why Computer science?
2. Given an array of integers which is initially increasing and then decreasing, find the maximum value in the array.
http://www.geeksforgeeks.org/find-the-maximum-element-in-an-array-which-is-first-increasing-and-then-decreasing/
3. Modified k heavy path in binary tree problem.
In evening they told me result and I got selected in amazon. It was very nice experience for me.

This article is compiled by **Mayur Kale**. Many Many congratulations to him. 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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Amazon Interview | Set 25

Hi, This is Pandu. About 1 month back I had attended Amazon Interview In hyderabad, it was total of 8 rounds which includes 2 telephonic and 6 face to face and the whole process was lasted about 25 days because of unavailability of all the interviewers. The whole was very painful for me as before and after attending interviews on each interviewing day, I had to spend with some tension & anxiety. I was interviewed for SDE 2 position
The following are the questions:(For all the algorithmic questions , working code is required, they would take those papers and

discuss in their internal meeting after all the rounds)

Telephonic Round 1(with Lead developer):

Q1)Given a snake and ladder game, write a function that returns the minimum number of jumps to take top or destination position. You can assume the die you throws results in always favor of you.

Telephonic Round 2(with SDE 1): (after 5 days of 1st telephonic)

Q1)Given an integer array and an integer value X, return two elements in that array such that sum of them equals to X.

– Here he asked about different ways to solve it and pros and cons of each solution.

(For Hash map solution , He was looking for getting solution in only one pass)

Q2)discussion about my project details and challenging task

Q3) suddenly you web application has become very slow on clicking particular URL. How would you debug it and solve the problem

Face to Face round 1(with SDE 1): (after 4 days of 2nd telephonic. 3 faces to face rounds were taken on same day and lasted about 5 hours)

Q1) Given a sorted array and a number write a method that returns the number of occurances of given number

Q2) You have given a dictionary of an alien language in which letters are same as English letters but their order is different. Your task is sort the letters or give relationship b/w letters using that disctionary. note: the dictions may conatain 1 to n words.

Face to Face Round 2(with SDE 2):

Q1) In our project we are using Java Spring framework. He asked to implement spring container.

Q2) Implement LRU caching. After that asked me two different cases (1) required element is already in chase , 2) required element in not in cache and cache is full)

Had to explain those two cases by walking through your code.

Q3) You are given a faulty binary serach tree in which only 2 nodes are misplaced(swapped their positions with each other). write a method

that takes root of that BST and return the root of the corrected binary tree.

Face to Face Round 3 (With Lead Developer) : (Design question)

Q1) Given an URL you need to analyze all the images(they may be in 1000′s of number) and return the cumulative quality of images present in that url.

lets say: you can configure image quality as very good,good, average, poor..etc, so you have to return one value among them. The given URL may conatain several othe URLs and they also conatain lot of images . you need to consider all of them. lot of questions like how to avoid visiting same url again,

how would you determine the quality of an image if you encounter an url that contains only an image..etc.

Q2) Design Elevator system. And then write an algorithm for that Design such that, the user request should be completed in logN time in a N story building with M elevators,

This round was lasted more than 2 hours.

Face to Face Round 4 (With Hiring Manager): (after 5 days of last 3 f2f rounds)

Q1)Discussion about my project details

Q2) Design Question: Design Clustered caching system for an web site like Amazon.com.

In which millions of web servers deployed over the globe and only one inventory Database system

Q3) Design question: Design only Train search functionality of IRCTC

Face to Face Round 5 (With Bar Raiser): (same day following Hiring manager interview)

Q1) Discussion about my project and Challenging task

Q2) Design Question: In an online teaching system,there are n number of teachers and each one teaches only one subject to any number of students.

And a student can join to any number of teachers to learn those subjects.

And each student can give one preference throuch which he can get updates about the subject or class timings etc.

Those preferences can be through SMS or twitter/facebook or email..etc.

Design above system and draw the diagram for above.

Q3) coding and algorithm: There is a N-ary tree in the 3d Space. and you are standing on right side of that tree . Print the only those nodes when you looked at that tree.

(which is like printing rightmost node in each level of that tree. He would not tell this, you have to conclude this by drawing a tree like that).

After writing the code for above one, he was asked me to print them in an order in which 1st one followed be last one followed by 2nd first one followed by snd last one..etc.)

Face to Face Round 6(some one who is in very high level, guess director to a technology):
(After 1 week of last interview)
Q1) Lots of discussion on my current project. Different behavioral questions were asked during the discussion.(about half n hour discussion)
Q2) Given a cube of size N. which was constructed by N^3 number of 1 unit smaller white cubes. Now you dipped that cube in a black color paint and taken out.
after that how many cubes are still in white color. Prove your answer(by writing mathematical equations)
Q3) There are N bolts each of which different size and N nuts, they are also with different sizes. and each bolt fits with exactly 1 nut. Give an algorithm that combines those N bolts and nuts into N pairs of Matched bolt and nut.
HR told me on last interview day that I would be notified by the result within two working days as already the whole process was delayed for so many days. I had waited for almost 1 week and send them mails & called them about my candidature but did not get any response. I was almost lost hope. But, Finally after 8 days of last interview, got a call that I was offered SDE1..(I guess, They were not completely satisfied by in design part but I did better in algos, problem solving and coding part and as a result I was offered SDE 1). In the end I rejected to join at Amazon as I got another competitive offer.

This article is compiled by Pandu. 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] Google, Facebook, Amazon, Walmart & PocketGems, All Fighting For Prasoon Mishra

 Meet Prasoon, he was just your average guy who studied at IIIT-Hyderabad but today Prasoon Mishra is one of the most well know names across engineering colleges across India. Last week we got a request from one of our readers that he and his friends want us to Interview Prasoon and today here we areÂ fulfillingÂ their wish.
This really tells us how much people are waiting in anticipation for his interview. So, we went a step ahead, we not only would like to present his interview but we also have his resume for you to download.
SoÂ click hereÂ to download his resume by logging in. Here is the much awaited interview of Prasoon Misra as he shares his thoughts about his interview experience.
TopTalent: Firstly, how do you feel when so many world class companies are trying to woo you?
Prasoon:Â I am greatly overwhelmed! I never imagined such a scenario, so I am delighted that so many companies considered me worthy of an offer.Â It feels good to know that I did things right. And, itâ€™s always a treat to see your hard work rewarded.
All these companies are highly reputable and they are very selective in their hiring, but a lot of engineers get hired from across the world. So, its important to keep things in perspective and not get carried away. I can join just one company, so all these offers are equivalent to just one good offer. And hence, at the end of the day, I see it as a good job opportunity.
TopTalent:Â Which company are you planning to join and how did you make that decision?
Prasoon:Â Yes, that was a very tough call. It was extremely confusing. They are all top tech companies, and each had a lot to offer in terms of the role, work and responsibility. Google, given their array of products â€“ itâ€™s a crime for an engineer to decline their offer. Walmart & PocketGems have quality work and good growth opportunities. Amazon also offered a very good profile.
But, I chose Facebook because I feel that it is a better cultural fit for me at this stage. Even after their IPO, they are trying to preserve their startup culture, and continues to offer a lot of opportunities . That just nicked it in the end!

TopTalent:Â Can you give us a brief account of what you felt was the toughest interview?
Prasoon:Â Its hard to pin-point a single tough interview. Each company had its own style. Facebook & Pocketgems had very intense and focused rounds, revolving around coding/algo and system-design. They were looking for speed and accuracy. At Google, as can be expected, some really tough algo questions came up. I am unsure about the complete correctness of one of my solutions, even now. In another round, I was able to convince the interviewer that his solution had the same flaws as my solution. So, that was a confidence booster. Walmart though, was a bit unexpected. In a design round, my initial solution was built around a string algorithm. But, the interviewer pointed out some counter-cases. So, by relying on his hints and the counter-cases, some probabilistic techniques got incorporated into the system. At the end, the interviewer informed me that my final solution was a model in machine-learning. So, I feel that mathematical aptitude helps in more ways than just algorithm design.
TopTalent:Â What kind of skill-set companies are looking for in candidates?
Prasoon:Â Well, a strong understanding of data structures and algorithms, along with fast-and-accurate coding skills are the primary requirement. And companies pay particular attention to the quality of code -> neat, short & easy to understand. Moreover, a good aptitude in Computer Science is also desired. The fundamentals of OS, DBMS, distributed systems, design patterns, etc, often get applied indirectly in the design rounds. In this regard, I feel that a basic understanding of common systems like search-engines, spell checkers, trends, etc, helps one greatly.
And, companies inherently dig for creativity. The above mentioned skills are just tools to come up with smart solutions.
TopTalent:Â Whats your advice to students who are aiming for similar placement offers as yours?
Prasoon:Â Do not get burdened by the hype surrounding these jobs. And after that, I think its extremely important to enjoy the subject and the process of preparation. In my opinion, there is an element of luck involved with interviews, and candidates must acknowledge it. Hence, they must not over-pressurize themselves.Â And, all wise proverbs about success strictly apply.
TopTalent:Â What should one keep in mind while preparing a resume?
Prasoon:Â One must understand that the resume is ones first impression. So, itâ€™s important to be precise and accurate in terms of what one wants to convey. A lot of tips are available on the internet, and one can pay heed to them. In terms of the content, I chose to write projects that had good depth, and discard the lighter ones. I feel that this enhances the strength of the resume. Other than these, one must prepare oneself to have a detailed discussion on everything that is mentioned in the resume.
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Amazon Interview | Set 24

Hello Guys, I had 6 rounds(written + telephonic+ 4f2f interviews) in hyderabad centre of Amazon.
I was 90% sure that I would clear the interview but I got rejected. The only reason I felt I was rejected was that the interview process was immature. The interviewer interviewing was a guy with 1yr of work ex expecting solution in the manner he wanted, which was pretty unexpected from a technology giant like amazon.
Every round of Amazon would have basic question like what you do etc. But all that is just formality, it doesn't count since one interviewer stopped me in between and said we have less time lets talk about problem solving(Which was again not expected from technology giant)
Also, for those writing written this month, the written round would have the same questions as I have listed below. So please solve this, before going for written
Anyways, these were my questions:
Written(Interview street) â€“ 3 Questions:
a) General code for coin denomination problem where the input was an array containing the coin denomination and the sum we want.
b) Rectangle overlap problem(Can be found in geeksforgeeks)
c) String Matching Problem(Wrote KMP)
Telephonic Interview:
a) Convert BST in place into doubly linked list
b) Given a Binary Tree is it a BST

If you miss one edge case, you are out of the interview. This is what they check and nothing else. They don't check your logic, they only see if you write proper code. So always start with brute force and write proper code.

F2f interview(1st round) â€“ Very easy

a) Given a number is it divisible by 3 and 5

- Only catch here were the edge cases and nothing else

b) angle between hour hand and minute hand

c) Revere bits in a binary

d) Get the kth node from end of linked list

F2f inteview(round2)

a) It was basically on writing multi-threading code(Write multi-threaded code for Enqueue of Queue using linked list)

b) Asked about basic complexities in Queue, hash and tree

c) Window Problem(In an array, find the minimum of the set in a given window). There are many solutions using hash, brute force. But the dequeue answer is what he was expecting.

I gave the deque answer

Any other answer to this problem was a reject

F2F Interview(Round -3)

a) Given a doubly linked linked, delete the occurrences of duplicate element from it. (One miss of edge case and out again)

(for eg) If you write, temp->prev->next = temp->next without actually adding the condition, if(temp->prev) then temp->prev->next = temp->next

b) Given a matrix with ordered rows and columns(Rows are sorted 0′s followed by 1′s). Find the row with maximum 0?s(linear time)

I answered it

c) DataStructure with Insert O(1), Deletion O(1) Search O(1) and ReturnAnyElement O(1)

Again answered this using augment of hash and doubly linked list

d) Given a tree with negative and positive numbers, return the root with maximum sum in its sub-tree

F2f interview(round-4)

a) It was basically a design interview where I was told to some OOPS design

b) Given a stream of 0′s and 1′s(You Tube). Find the first occurrence of 1 in it. Then the question was changed to a string instead of a stream.

Finally, after giving 100% it was reject. So according to my experience, if you dont give 100% you are out or else it is ur luck that you get through amazonâ€™s process.

Moreover, currently they have started exploring candidates by sending two interviewers which actually means that the one is new to interviewing and other is experienced. Hence, basically they are playing with interviewers.

If you want the answers for questions, please comment I will post it.

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Amazon Interview | Set 23

I was recently interviewed for SDE1 position in Amazon Bangalore. 1 online coding test followed by 5 rounds of F2F onsite interviews.

Online Coding Test (4 Problems, 2 hours)Â From Interviewstreet

All below problems had multiple test cases for which the code was validated against.

1.Â Code for converting floating point decimal number to binary numbers. If the number cannot be converted, state so.

2.Â Given an integer array A of size n. Given an integer k < n. Construct an array B, such that

B[i] = min{A[i], A[i+1], A[i+2], A[i+3], â€¦., A[i+k]}

Solve in time complexity better than O(nk).

Hint: use min Heaps

3.Â A singly liked list. Can have a loop. Detect it and find the size of list.

4.Â A singly link list and a number â€˜Kâ€™, swap the Kth node from the start with the Kth node from the last. Check all the edge cases.
Sample Input: 1->2->3->4->5->6->7->8 and K = 3
Sample Output : 1->2->6->4->5->3->7->8
Sample Input: 1->2->3->4->5->6->7->8 and K = 10
Sample Output: print error â€œLIST IS OF LESSER SIZEâ€.

Face to face: Round 1(Technical, 1 hour):

1.Â Given a K sorted array. Sort it with minimum time complexity.
O(nlogk) solution was expected. Code was required.
2.Â Given a file with many product name of an company. You have to find out unique name in the file.Â SupposeÂ mobile,laptop,notepad,desktop,pen,mobile,pen .. etc is given we have to print laptop,notepad,desktop. Pen and mobile should be remove due toÂ duplicity.Â
Code was required.I gave o(n) time complexity solution for it using 1 hash table and Doubly Link List.Â

Face to face: Round 2(Technical, 1 hour):

1.Â Given a Sorted array with oneÂ missingÂ number. I have to find firstÂ missingÂ number.Code was required.Â I gave solution with o(logn) time complexity.
2.Â Give a Building with n floor. A person can take 1 step or 2 step to climb. Find the number of ways to reach nth floor.Â Code was required

Face to face: Round 3(Technical, 1 hour 20 minutes):

1.Â Given an Sorted Array with duplicates I have to find first index of any duplicates. Suppose 12222333355578999 first Index of 2 in 1. Code was required.I gave O(logn) Solution.
2. Given an binary tree. Traverse it in zig-zag manner. Code was required.Solved using a 2 stack.
3. In a snake ladder game without snake and ladder :). If some one is playing then we have to findÂ probability to win the game of any player. Condition of winning is if you are on 96 and 5 comes in dice then you loose the game and If you are at 96 and 4 comes then only you will win the game. But you cant use dice more than Y time.
I gave o(XY) Solution through DP. Where X is sum.
Interviewer was very happy after that.

Face to face: Round 4(Manager, 1 hour 20 minutes):

1.Â Tell me about yourself.
2.Â Why do you wish to move out of current job?
3.Â Explain in detail the current project. Intention was to understand whether I had good depth of knowledge of the project and team I was working in.
4.Â How big is the team & what is your role?
5.Â Proudest project that I have worked in my current company. Details.
6.Â Any instances where you are not satisfied with what you did?
7.Â Any instances that you felt the need for improvement in some areas, which could have helped you technically and professionally. Any negative feedbacks.
9.Â Write the code to store Binary Search Tree in Doubly Link list. Code was required.
10.Â Petrol and distance problem given in Geeks for Geeks.Â http://www.geeksforgeeks.org/find-a-tour-that-visits-all-stations/

Face to face: Round 5(Manager, 1 hour 10 minutes):

1.Â Tell me about yourself. It starts with a basic intro round, where your communication skills are judged.
2.Â Why changing the job?
3.Â Explain in detail the current project. In depth information.
4.Â What will you do if your module is dependent on some one else and you are stuck due to him. I told him to that I

will create stub (Template of desire data using edge case conditions)Â
5.Â Write the full code of finding a Name and phone in simple phone(In which abc all come on 1 using pressing speed and time duration) using sub string of name. I gave 2 solution 1 using suffix tree and 2 using hash table and KMP Algorithm. He told me to write full code of Â this problem using hash table and KMP Algorithm. I wrote the full and Manager wasÂ satisfied with my answer.Â
Three days later I was informed that I was not selected. With below mail :-
Thanks for your interest in Amazon. We appreciate you sparing time towards discussions with us.Â After the detailed discussions with you and internal discussions thereafter, we regret that we do not have a suitable opening at present that does justice to your aspirations and capabilities. Hence we would not be able to take it forward at this juncture.
With your permission, we will retain your details in our database and would get in touch with you, should there be a suitable opening in future.
Wish you all the best in your endeavors.
I am still not able to find the correct reason behind it. And Now I am frustrated.
This article is compiled by anonymous user. 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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Amazon Interview | Set 22

I was recently interviewed for SDE1 position in Amazon Bangalore. 1 online coding test followed by 5 rounds of F2F onsite interviews.
Online Coding Test (4 Problems, 2 hours) From Interviewstreet
All below problems had multiple test cases for which the code was validated against.
1. Code for converting floating point decimal number to binary numbers. If the number cannot be converted, state so.
2. Given an integer array A of size n. Given an integer k < n. Construct an array B, such that
B[i] = min{A[i], A[i+1], A[i+2], A[i+3], â€¦â€¦., A[i+k]}
Solve in time complexity better than O(nk).
Hint: use min Heaps
3. A singly liked list. Can have a loop. Detect it and find the size of list.
4. A singly link list and a number ‘K’, swap the Kth node from the start with the Kth node from the last. Check all the edge cases.
Sample Input: 1->2->3->4->5->6->7->8 and K = 3
Sample Output : 1->2->6->4->5->3->7->8
Sample Input: 1->2->3->4->5->6->7->8 and K = 10
Sample Output: print error “LIST IS OF LESSER SIZE”.

Face to face: Round 1(Technical, 1 hour):
1. Given a binary search tree. Find two numbers in the tree whose sum is k. If there are no such elements, state so. Assume that the tree is balanced.
O(n) solution with O(logn) space was expected. Solved using two stacks. Code was required.
2. Copy a linked list with next and random pointer. Not allowed to modify the given list at any time. Only read privilege on the given list.

Face to face: Round 2(Technical, 1 hour):
1. Given a matrix mxn containing integers. Find a kxk submatrix which has the largest sum.
Solved using prefix sum matrix.
2. Given an n-ary tree. Traverse it in zig-zag manner. Code was required.
Solved using a Queue and a dummy node for level info.

Face to face: Round 3(Technical, 1 hour 20 minutes):

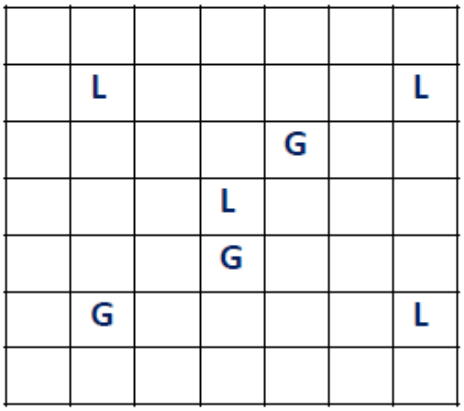
1. Given N buckets each of capacity 1L numbered from 1 to N. Buckets are arranged in a form of a 2D Pyramid shown below.

```
                    1

                2       3

            4       5       6

        7       8       9       10
```

No each bucket is resting on 2 buckets. I will add water in the top bucket(number 1), after filling the bucket completely access of water will spill to the left and right bucket. Need to write a function which will return water in nth bucket after I will add x L of water in bucket number 1.

float getWaterInBucket(float x, int n);

2. Given an mxn matrix. Each entry is a room. Rooms containing â€œLâ€ are locked. No one can enter a locked room. Rooms with â€œGâ€ are guarded rooms. Distance of a room from a Guard is defined as the minimum number of rooms that are encountered for the Guard to reach that room (Guard can move in all allowed 4 directions at max). Find the room that is farthest from all guards. Expected time was O(mn). (Hint: BFS)



Face to face: Round 4(Manager, 1 hour 20 minutes):

1. Tell me about yourself.

2. Why do you wish to move out of current job?

3. Explain in detail the current project. Intention was to understand whether I had good depth of knowledge of the project and team I was working in.(Nearly 30-40 minutes of discussion)

4. How big is the team & what is your role?

5. Proudest project that I have worked in my current company. Details.

6. Any instances where you are not satisfied with what you did?

7. Any instances that you felt the need for improvement in some areas, which could have helped you technically and professionally. Any negative feedbacks.

8. What happens when you type in a URL on browser?

9. Given a binary tree with parent pointer only. Given pointers to two nodes in the tree, find the LCS(Least Common Ancestor). Quality Code was required with proper handling of boundary cases.

10. Object oriented design of â€˜Snake and Ladder Gameâ€™. Was asked to propose classes, inheritance and reasoning behind it.

Face to face: Round 5(Manager, 1 hour 10 minutes):

1. Tell me about yourself. It starts with a basic intro round, where your communication skills are judged.

2. Why changing the job?

3. Explain in detail the current project. In depth information.
4. Given a binary tree. Tell if all the leaves are at the same level. Code was required with proper handling of boundary cases.
5. Discussed how the stock market works. Reached to:
Design a data structure for storing the stock prices of various stocks. Make design such that update (new entry addition) of prices can be done efficiently. Also, it should be efficient to answer the queries like, â€œMaximum/minimum of stock prices of stocks s1, s2, s3 in the month of November 2012 etc.â€
Four days later I was informed that I was selected
Following materials I used for preparation.
1. GeeksforGeeks
2. Careercup
3. Introduction to Algorithms(Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein)
4. Algorithm Design [Jon Kleinberg, Ã‰va Tardos]
This article is compiled by **Shredder Woods**. Many Many congratulations to Shredder 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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Amazon Interview | Set 21

Recently I have gone through 10 rounds of interviews of my dream company Amazon for SDE1 and I got selected. My only resource and library for preparation was GeeksforGeeks, which is the best website for tech preparation, if you aim for big shots like Amazon, Microsoft, etc. I was not too confident to attend interviews. The interview experiences blog gave me courage and coding experience to crack all rounds. Please do follow this site for every update, and suggest your friends to follow if they try for job change and if they aim for big companies.
I am sharing my interview experience, which will help others.
Total rounds : 10
1 online written test + 4 telephonic + 5 F2F screening rounds.
In F2F rounds, for every problem complete executable code + algorithm will be expected.
In all rounds , best solution will be expected (with less complexity)
Online Written Test:
1. Find maximum frequent numbers in an array. If there are more numbers with maximum frequency, they display all numbers in ascending order. Ascending order is important.
2. Two numbers represented as linked lists. (Bigger than integers). Return a linked list which is the product of the given two linked lists.
1->2->3->Null (123)
2->3-Null (23)
O/P: 2->8->2->9->Null

1st Phone Screening (45min):
1. Find a linked list has circle in it, If it has loop, find origin of the loop.
2. In Linked list, Node has two pointers, one points to next node, other points to arbitrary node in the linked list. Write a function to return a new list which is clone of the given linked list.
3. An array is sorted and rotated by k times. Find an element in an array. (efficient and logarithmic time solution is expected)

2nd Phone Screening(45min):
1. Two strings s1,s2 are given as input. Remove characters present in s1 which are there in s2.
2. How to find number of subsets in a set.
3. Searching an element in 2D matrix which is sorted in row wise and column wise.
1 2 3 4
2 3 4 5

3 4 5 6
4 5 6 7
5 6 7 8 Find an element in it.
4. Difference between merge sort and quick sort. How do you improve quicksort (think about in selecting pivot element).
5. Give a scenario for quick sort in worst case.
6. How to store a set in memory, what ADTs do we use and what are tradeoffs for each ADT.

3rd Phone Screening(35min):
1. N-Petrol bunk problem: There are n petrol bunks located in a circle. We have a truck which runs 1 km per 1 liter (mileage 1kmpl). Two arrays are given. The distances between petrol bunks are given in one array. Other array contains the no of liters available at each petrol bunk. We have to find the starting point such that if we start at that point , you we would able to visit entire circle without running out of fuel. Initially truck has no fuel.
2. Reverse linked list in groups of size k.
I/P: 1->2->3->4->5->6->7->8->Null k = 3
O/P: 3->2->1->6->5->4->8->7->Null

4th Round(35min):
1. Algorithm to construct a tree given Pre and In order traversals.
2. Inorder successor of a tree.
3. Threaded binary tree(inorder without recursion)

F2F Round 1 (with Hiring manager 60+ min):
1. Tell me about yourself and Projects you worked.
2. About the most critical situation in the project you went through. How you did it. (he needs complete explanation of the scenario)
3. If he gives the same scenario as an interview question, how will you improve code quality and its complexity.
4. About SDLC you followed. Which one do you like and why.
5. Do you have any questions to ask (very important one- ask something about projects they work, etc. Good sign)

F2F Round 2 (with Developer 60 min):
1. Tell me about yourself.
2. Zigzag traversal of binary tree. (more optimal solution is expected from you).Complete code should be written and they will check later.
3. A robot is there in 2D space, which can move to its left direction. You are given with an array which are moves of robot, which starts from origin(0,0). Find the rectangle covered by it.
I/P: { 2,3,4,5,6,1,3,5,5} starts at (0,0)
O/P: rectangle points: (-4,4) to (4,-2)
4. Casual discussion about hiring process.

F2F Round 3 (with Developer 50min):
1. Data structure which does insertion, deleting latest item, find min, find max in O(1) time. (Gave hash, 2-D, linked list, many .. He impressed lot here)
2. Vertical sum of a tree. (Column wise sum â€“ can find same one in geeksforgeeks)
3. Find n-th digit in the continues sorted stream of data.
I/P: {1,2,3,4,5,6,7,8,9,1,0,1,1,1,2,1,3,1,4,1,5,1,6,1,7,1,8â€¦â€¦ infinite} n =28
O/P: 28th digit
Complexity analysis of all the above.

F2F Round 4 (with Developer 45 min):
1. Print matrix spirally.
1 2 3 4 5
6 7 8 9 10
11 12 13 14 15
16 17 18 19 20
21 22 23 24 25
O/P: 1 2 3 4 5 10 15 20 25 24 23 22 21 16 11 6 6 8 9 14 19 18 17 12 13 18
2. Write a function to check syntax of opening and closing braces whether they are proper or not.
3. Same question if you have k types of braces(â€˜(â€˜ â€˜[â€˜ â€˜{â€˜ ,â€¦. K types) All are of same priority.
4. Same question if you have k types of braces(â€˜(â€˜ â€˜[â€˜ â€˜{â€˜ ,â€¦. K types) All are of diff priority.
5. Print all valid combinations of k number of pairs of braces.
6. Return count of above combinations without using algorithm for printing them.
7. Memoziation â€“do you know about it. Explain me.

F2F Round5 (Bar Raiser round) 60min:
1. Leader ship principles followed by Amazon
2. About project.
3. Why you are leaving prev company, What will stop you there.
4. Set of strings are given in a dictionary order. The problem here is order is not as our alphabetical. It may be different. C may come before a,b, x may come before d,c. etc. You will have to find the order of characters by using given input. (topological sort â€“ complete code is required to write)
5. Binary search tree into Sorted doubly linked list (Expected Inplace algorithm)

Things to keep in mind:
1.For every problem, give one simple solution first (may have more time complexity) and think for optimal solution.
2.Write a code in clear manner. It should be understandable without your explanation.
3.In a position to tell complexity for code you are going to write.
4.First tell the algorithm or approach and proceed with writing code.
5.Do not hesitate to ask for clarification. They will impress.
Thatâ€™s all from my side. Best of luck.
Thanks again for GeeksforGeeks, a lovable website for techies.
This article is compiled by **Ranganath**. Many Many congratulations to Ranganath 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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Amazon Interview | Set 20

Recently got interviewed with amazon Hyderabad for SDE1.
Written
1) Given a BST, along with left and right pointer for a node, it has forward and backward pointers, convert the tree into Doubly linked list using these extra pointers.
2) A = {5, 3, 8, 9, 16}
After one iteration A = {3-5,8-3,9-8,16-9}={-2,5,1,7}
After second iteration A = {5-(-2),1-5,7-1} sum =7+(-4)+6=9
Given an array, return sum after n iterations
3) Write a function which compress string AAACCCBBD to A3C3B2D
and other function to generate from the compressed.

First f2f)
1) Check given BT is BST
2) The cost of a stock on each day is given in an array, find the max profit that you can make by buying and selling in those days
3) In matrix A[m][n] each row is sorted and each column is sorted, write a function which checks whether a number exists in this matrix or not.
4) Given a string, find the longest sub sequence which contains only unique characters.

Second -f2f)
1) Convert a BT into SUM BT(each node values = sum of left and right node)
2) "I get thousands of emails daily", find all anagrams in each email and print the count of all anagrams in each email.
My solution was using a trie and a hash function to increase the counter at each node in the trie.
Hash function will return the given word in a sorted manner, he asked me to code which was tedious but gave a rough draft.
Initial set up cost would be big but the same trie can be used for any email by making all counters to zero.

Third f2f)
1) He talked almost for 45 min regarding my project and asked how we implement it. I was also working on web services in my current company, so they were more interested in asking questions there and want to know how well I implemented there.
2) A design question of chess int board[8][8] each value in the matrix represents a character. 1-9 number represents all whites and 11-19 represents all blacks.
Given a pawn at (x,y) print all possible moves. Assume whites are index 0 and blacks are at index 7.

Fourth f2f)
1) There is ternary tree in two dimension space(one plane). Print all elements that are visible from right side of the plane(If you see along y axis plane)
eg) In the following answer would be (1) (5) (8)
——————————(1)——————————————
——————————-(2)–(3)–(4)–(5)————————————
————-(6)–(7)–(8)——————————————
2) Print these elements in a zig zag order, first level1 and then level n, level 2 and level n-1 and so on.
In simpler words print rightmost ending element in each level of a ternary tree.
My approach was take two queues, enqueue root in Q1 and while dequeueing enqueue its childeren in Q2, while shuffling elements from one queue to another store the last element in doubly linked list.
While printing, use this double linked list, remove from head and then tail, till it becomes empty.

Fifth f2f)
1) Find jth element in ith row of a pascal triangle
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1… and son on. pascal(4,2) should return 6.

```
pascal(int i , int j){

  if(i<0||j<0) return 0;

  if(i==0 &&j==0) return 1;

  if(i==0 && j!=0) return 0;
```

```
  return pascal(i-1,j-1)+pascal(i-1,j);

}
```

complexity is bad and I am not grouping the solution once calculated of sub problems
2) Implement your own hash function with keys as strings and values is of type Object
initially I told BST with insertion deletion of order log(n), then he told me to think and answer then I told self balancing BST and he asked me to implement,
3) Evaluate a mathematical expression 2*3+(5-6/2), something like this, with operator priority.
Each f2f interview will be of 50-60 min. In each f2f round they will ask reason for change, and about your current project. You should answer perfectly regarding your current project and don't blabber something and all, they will ask good questions in the current project as well.
These questions might take up more than 15-20 min and in the rest of the time you have to answer 2 question in DS for minimum and code them as well.
If you answer you will get one more question which is an advantage
First he will explain the question and gives you sometime.
You need to explain the solution first, if he likes it, then he will asks you to write production code and takes the paper.
Each interview is not like a level in amazon, they won't share feedback neither with you nor with other interviewers.
After the interview process is done all those who took your interview will sit and judge (That's what HR told me)
All the interviewers were friendly, finally I got a call from HR saying that I was selected
Thanks to Geek4Geeks
This article is compiled by **Bharath jhadey**. Many Many congratulations to Bharath 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 Sujeet Gholap, placed in Microsoft, Google, Samsung, Goldman Sachs & Tower Research

Itâ€™s 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 atÂ TopTalent.inÂ had 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, donâ€™t forget toÂ ***downloadÂ*** *his resume by logging in.*
Team TopTalent: Can you tell us a bit about your background before joining IIT Madras?
Sujeet:Â 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:Â 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:Â It felt nice and gave an ego boost when people referred to me as â€œthe guy with six offersâ€. 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 dayâ€™s 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?Â

Sujeet:Â I 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 companyâ€™s 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 wasnâ €™t 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.

(Wasnâ€™tÂ really a surprise for us. Google seems to be theÂ first choiceÂ for 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:Â I 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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Amazon Interview | Set 19

I recently had a set of interviews with Amazon.com and listing below the questions. The day had around 15-20 of us at their office and the whole process took close to 12 hrs.

Hope, people can reap benefit from it. 😃

1st Round:Â Online Written round.

a. Determine if a matrix is a cross-matrix.

Â Â A cross-matrix is a one in which all theÂ diagonalÂ elements are same and not repeated anywhere else.

b. Print the level-order in reverse order, i.e. from Bottom to top.

c. One more easy question, which IÂ don'tÂ remember now.

2nd Round:Â F2F- Developer

a. Kadane's Algo.

However, it was hidden behind a good problem set.

Interviewer wanted to identify whether I can recognize the same.

I did not remember it instantly but was able to prove it by solving.
b. Linked-list intersection point.
Again, had to decipher the above from a different problem set.
[A tree with only parent pointer, how to find LCA?]
Was able to easily identify the same and we quickly moved onto other things.

3rd Round :Â Hiring Manager
a. Design a stack which can perform findMax in O(1).
Had read the answer once in some book and duly told him have heard it.
He verified and we moved on.
b. Set of stocks for each day have been given. Need to find the days on which I buy and sell share to earn max profit, alongwith finding the max profit.
Had to write the code, which I was able to do well.
He was impressed and I felt I had a good chance.

4th RoundÂ : Developer
a. Find top k searched elements from aÂ continuousÂ stream of data.
I remember we needed to use Min Heap but his constraint was using a continuousÂ stream.
Finally was able to do it with his help.
b. Some design question based upon his team's problems.
Had to use a queue and a hashmap to solve it.
He was very muchÂ interestedÂ in whether I could identify the complexities correctly.

5th RoundÂ : Manager – Different Team
a. Given a linked-list and 2 integers k & m. Reverse the linked-list till k elements and then traverse till m elements and repeat.
Write production quality code.
I am not sure what happened and why I fell off on such an easy question, but you just can do something like that in the last round.
b. An array of elements have been given. Find for each element, first max element to its right.
Was able to do it well, however lost it on complexity analysis.
c. Boundary traversal of a tree. Write the code.
Wrote the code, however he was not able to check the same as took a lot of time.

Before this round, I had good hope of getting selected, butÂ no oneÂ can give such a bad last interview and get selected and hence after 2 weeks got a rejection mail.

This article is compiled by **Mohit**. 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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Amazon Interview | Set 18

Amazon visited our campus on 16,17 and 18 Dec.
WRITTEN ROUND(1.5 hrs)
20 MCQ + 2 CODE
MCQ- mainly Aptitude, C-output questions, OS- unix related and DBMS
CODE-
…1) Binary complement of a number.

…2) Easy question related to bets
42 out of around 200 students were shortlisted after this round..
ROUND 1:
Around 15 min discussion on my image processing project
Finding an element in rotated sorted array..
12 students were shortlisted after this round
ROUND 2:
1) Convert postfix to infix in which the result must be having minimum number of braces i.e apply braces whenever necessary.
2) Given a binary tree print the sum of elements on same axis (for all axis).
Elements on same axis are for e.g.: root, root->right->left, root->left->right
3) Design hash table with following operations you are given with a good hashing function..:
insert() â€“O(1)
find()-O(1)
delete()-O(1)
traverse()-O(n)..(where n is the number of elements in hash not the size of hash)
4) Given an array find a sub-array with sum=0
5)

```
for(i=0;i<n;i++)

 for(j=0;j<n;j++)

   cout<<a[i][j];



for(i=0;i<n;i++)

  for(j=0;j<n;j++)

   cout<<a[i][j];
```

out of these 2 which one will be better
I was asked to write the complete code for all the questions.
6 students were shortlisted after this round
ROUND 3:
1) Given memory in the form of chunks if one process is reading any chunk, then any other process is not allowed to write but it can read, if write lock is on, then any other process is not allowed to read or write, now process can have lock on any number of chunks (continues) and other process requesting read or write can even request for memory that does not have the same starting address as the process who has locked the continues chunk memory.
Now we have to design a DS for representing memory and then design isRead() and isWrite()which will return Boolean values true-if read/write can be performed vice versa.
2) Permutation of a string with and without repetition of characters.
3) Given an array of numbers if we start deleting numbers from end of array, then we have to tell the maximum element of the array after deletion in O(1).
I was asked to code all the questions.
4 students were shortlisted after this round.
ROUND 4:
1) Around half hour discussion on my intern project which was with an e-commerce company.
2) Given a linked list with one extra arbit pointer we I was asked to make copy of linked list..
http://www.geeksforgeeks.org/a-linked-list-with-next-and-arbit-pointer/
he asked me to write the full code for method 1 in the above link.
In the end 3 students were hired and I was one of them..
I am very thankful to geeksforgeeks It really helped me a lot for my preparation. Keep up the good work guys

This article is compiled by **Sahil**. Many Many congratulations to Sahil 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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Amazon Interview | Set 17

Online Written round :
5 programming questions. You have to answer within 2 hours.
1. Swap two nodes in a linked list
2. Find kth smallest element in a binary search tree
3. Longest increasing subsequence in an array
4. One DP program

Face to face interviews:
1st round :
1. Find whether given tree is BST or not
2. Boundary traversal of a tree
3. Print the border nodes of the tree

2nd round:
1. There are n number of points in a two dimensional plane. Find two nearest points
2. There are n number of points in a two dimensional plane . Given a point find k nearest points to it.

3rd round:
1. Given a matrix with random numbers in it , If a location has 1, make all the elements of that row and column as 1
2. Given a matrix, find whether you can form the given number in

4th round:
1. Write a program to list all the possible words from the given set of data in the same order. (eg : given word : nokiamobile O/P : nokia mobile : given word : samsung O/P : 1. SAMSUNG 2.SAM SUNG(considering sam as a word))
2. Given two trees , find whether they are from same set of dataset or not.
3. Thread pool implementation.

This article is compiled by **Yogesh**. Many Many congratulations to Yogesh 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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Convert a BST to a Binary Tree such that sum of all greater keys is added to every key

Given a Binary Search Tree (BST), convert it to a Binary Tree such that every key of the original BST is changed to key plus sum of all greater keys in BST.
Examples:

```
Input: Root of following BST

              5

            /   \

           2     13


Output: The given BST is converted to following Binary Tree
```

```
              18
            /   \
          20     13
```

Source: Convert a BST
Solution: Do reverse Inoorder traversal. Keep track of the sum of nodes visited so far. Let this sum be *sum*. For every node currently being visited, first add the key of this node to *sum*, i.e. *sum = sum + node->key*. Then change the key of current node to *sum*, i.e., *node->key = sum*.
When a BST is being traversed in reverse Inorder, for every key currently being visited, all keys that are already visited are all greater keys.

```
// Program to change a BST to Binary Tree such that key of a node becomes
// original key plus sum of all greater keys in BST
#include <stdio.h>
#include <stdlib.h>

/* A BST node has key, left child and right child */
struct node
{
    int key;
    struct node* left;
    struct node* right;
};

/* Helper function that allocates a new node with the given key and
   NULL left and right  pointers.*/
struct node* newNode(int key)
{
    struct node* node = (struct node*)malloc(sizeof(struct node));
    node->key = key;
    node->left = NULL;
    node->right = NULL;
    return (node);
}
```

```
// A recursive function that traverses the given BST in reverse inorder and
// for every key, adds all greater keys to it
void addGreaterUtil(struct node *root, int *sum_ptr)
{
    // Base Case
    if (root == NULL)
        return;

    // Recur for right subtree first so that sum of all greater
    // nodes is stored at sum_ptr
    addGreaterUtil(root->right, sum_ptr);

    // Update the value at sum_ptr
    *sum_ptr = *sum_ptr + root->key;

    // Update key of this node
    root->key = *sum_ptr;

    // Recur for left subtree so that the updated sum is added
    // to smaller nodes
    addGreaterUtil(root->left, sum_ptr);
}

// A wrapper over addGreaterUtil().  It initializes sum and calls
// addGreaterUtil() to recursivel upodate and use value of sum
void addGreater(struct node *root)
{
    int sum = 0;
    addGreaterUtil(root, &sum);
}

// A utility function to print inorder traversal of Binary Tree
void printInorder(struct node* node)
```

```
{
    if (node == NULL)
        return;
    printInorder(node->left);
    printf("%d ", node->key);
    printInorder(node->right);
}

// Driver program to test above function
int main()
{
    /* Create following BST
              5
            /   \
           2     13  */
    node *root = newNode(5);
    root->left = newNode(2);
    root->right = newNode(13);

    printf(" Inorder traversal of the given tree\n");
    printInorder(root);

    addGreater(root);

    printf("\n Inorder traversal of the modified tree\n");
    printInorder(root);

    return 0;
}
```

Output:

```
 Inorder traversal of the given tree
2 5 13
```

```
Inorder traversal of the modified tree

20 18 13
```

Time Complexity: O(n) where n is the number of nodes in given Binary Search Tree.
Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above
++

Amazon Interview | Set 16

I recently appeared for amazon which came to our campus. Here is my experience.
Shortlisting Round.
There were 20 MCQ and 2 programming questions. Each correct answer carried 1 mark and -0.25 for a wrong answer.
Programming questions were:
a. Given a number with the number of digits in the range of 10-50, find the next higher permutation of the number. If such a number doesn't exist, return -1.
b. Given an array of strings, you need to find the longest running sequence of a character among all possible permutations of the strings in the array.
INPUT:
ab
ba
aac
OUTPUT:
a,3
Then there were 4 rounds of interview.
T1
a. Given link list segregate odd elements first and even elements afterwards.
b. Given a BST of memory sizes. Find best fit for a memory block of size M.
T2.
a. Given 2 sorted arrays of size m and n+m(with n elements) , merge
them into the latter..
b. Given a character array find the first element that repeats itself.
T3.
a. Given a binary tree connect all nodes in a level through link list.
b. Some question related to share market which boiled down to find maximum difference between two elements such that second element appears after the first one.
c. What is thrashing ?
d. Real world application of heaps?
e. Minimum spanning tree and topological sort .
T4.
Around half an hour HR then
Given a function node* inplacemergesort(node* n1, node* n2) which takes 2 linked lists as input and performs in-place merge sort and returns the final list. How will you test it and make sure it does what it claims.
I was hired .
The interviewers were very friendly, patient and looked for optimal solution to each question .
I am very thankful to geeksforgeeks for such a great site and the way its maintained.It really helped me a lot for my preparation.
Keep up the good work guys
Thanks.

This article is compiled by **Ayush**. Many Many congratulations to Ayush for his selection in Amazon. 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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Amazon Interview | Set 15

For the position SDE I.
I had an online test through interviewstreet and following were the questions:
http://www.geeksforgeeks.org/archives/9999
http://www.geeksforgeeks.org/archives/8615
http://geeksforgeeks.org/forum/topic/microsoft-interview-question-for-software-engineerdeveloper-about-arrays-10
http://www.geeksforgeeks.org/archives/1155
F2F Interview :
1. Generate all valid permutations using '(' and ')'. Valid permutation is the general definition of valid sequence of the opening and closing brackets.
I told him a solution where we would generate a combination using a recursive solution and prune the cases where a valid combination is no longer possible. The solution was fine and not that difficult. But the interviewer was very interested in knowing if I can calculate the complexity of the solution. He gave me some hints but it was just not striking me. I told him my approximate answer. We moved on.
2. Create an ancestor matrix for a tree.
The solution would seem simple. But since the matrix is N*N, the interviewer wanted some tricks to reduce the complexity of the write operation on the matrix.
I told him a solution where you can initialize the matrix with all zeros and only write 1 for the ancestor cell using a modifies recursive solution and linkedlist.
He was fine with the solution
F2F 2:
1. Find the maximum weight node in a tree if each node is the sum of the weights all the nodes under it. Obviously tree nodes can have negative weights.
2. Kadane's algo
F2F 3:
1. Find the diameter of a tree.
2. Link every node of a level to the the next node at the same level

```
eg:

Tree is:

                      1

                   2     3

                4    5  6    7

would become:

                      1

                    2-->3

               4--->5--->6--->7
```

3. Find the first subarray which has a zero sum in an array
F2F 4:
Detailed discussion on projects I did in college and about my interests.

This article is compiled by **girlforce**. 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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Amazon Interview | Set 14

TeamÂ : Transportation
LocationÂ :Hyderabad
Round 1 (Online Test)
Q1. Find the kth largest value in a BST
Q2. Swap the alternate nodes in a singly linked list(not the data);
Q3. Minimum no of coins required to get the given sum. Coins are given in a sorted array.
Q4. A file contains data as follows(Student name, marks in 3 subjects)
Shrikanth 20 50 60
Kiran 30 80 90
Find the student who hasÂ maximumÂ average score
Q5. Find out given two trees are isomorphic or not
Round 2 (Telephonic Round)
Q1.Â Â Print the level order of binary tree such that each level should print in a different line
Q2. Push() and Pop() methods of stack are given. Write a function to get the minimum of stack in O(1) time
Project related questions
Round 3 (F2F with Dev Manager)
Q1. Connect nodes at same level in a binary tree(may not be a complete binary tree) without using recursion
Q2. Sort the linked list which contains only 1,2,3 numbers in a single pass
Round 4 (F2F with developers)
Q1.Â Design a snake and ladder game
Q2. Given a linked list contains even and odd numbers.Â separateÂ the list into two lists contains odd/even numbers.
Q3. Given a 2D matrix which contains 0′s and 1′s. Given two points of matrix whose value is 1. Find the path(with only 1′s) between the given points
Round 5 (F2F with Senior Manager)
Project related questions
Challenging tasks done so far
Q1. Given a large file which contains m rows and n columns. Given a column no, sort the column in such a way that corresponding rows also sorted
Round 6 (F2F with Developers)
Q1. Print all pairs(sets) of prime numbers (p,q) such that p*q <= n, where n is given number
Q2. Given a binary tree, if parent is 0, then left child is 0 and right child is 1. if parent is 1, then left child is 1 and right child is 0. Root of the tree is 0. Find the kth node value which is present at Nth level
Q3. Longest monotonically increasing sequence in O(NlogN)
I couldn’t make it. Hope it helps someone else.

This article is compiled by **Shrikanth**. 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.
++

Amazon Interview | Set 13

Round 1 (Telephonic)
Q1. For a given number, find the next greatest number which is just greater than previous one and made up of same digits.
Q2. Find immediate ancestor of a given Node
Q3. Clone the linked list having an extra random pointer in nodes which is pointing random node in the list.

Round 2 (F2F)
Q1 In a binary tree, a random pointer is given in each node. If this pointer pointing other than any successor of the node then set it as NULL. Otherwise let it remain untouched. Write code.
Q2. You will be given the number of pairs of parenthesis. Find out the total possible valid unique combinations and there should not be any duplicity. Write code

Round 3 (F2F)
Project and some questions related to it.
Q1 Given an in-order traversal of a special binary tree having property that the node is always greater than its left and right child. Construct the tree and write code.
Q2 Find top 10 trending words inserted by users in sites like twitter. Only algorithm.
Q3 write an efficient code to find the first occurrence of 1 in a sorted binary array. (2 minutes only)

Round 4 (Telephonic)
Q1. Remove duplicated from a string in O(n) without using hash.
Q2. Find the first occurrence of 1 in a sorted infinite binary tree.

Round 5 (F2F)
Amazon has many visitors to its site. And it tracks what pages the customers visited, etc and other stuff.
Make an efficient data structure for storing 3 days of information of all those customers who have visited site exactly two different days and searched more than 3 unique pages of the site in those 2 days.
So whoever visited site exactly two days out of these three days and visited more then 3 unique pages should be in the contact list.
After final round got a regret mail after 3 days that I was Not selected.

This article is compiled by **Ramendra**. 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.
++

Amazon Interview | Set 12

I am very thankful to geeksforgeeks team for such a great site. I got offer from Amazon.
Written Test
It was online test on interviewstreet.
20 MCQs- basics of C & C++, OS and some aptitude question

There were 4 technical rounds each for 40-60 minutes, no HR round.
1st Round
Given two numbers and a binary tree, all elements in binary tree are distinct, write code to determine the shortest distance between

the two nodes. (unit distance between two adjacent nodes). Nodes donâ€™t have parent pointer.

2nd Round
1. http://www.geeksforgeeks.org/archives/3758
2. There are some glasses with equal volume 1 litre. The glasses kept as follows

You can put water to only top glass. If you put more than 1 litre water to 1st glass, water overflow and fill equally both 2nd and 3rd glass. Glass 5 will get water from both 2nd glass and 3rd glass and so on..
If you have X litre of water and you put that water in top glass, so tell me how much water contained by jth glass in ith row.
Example. If you will put 2 litre on top.
1st – 1 litre
2nd – 1/2 litre
3rd -Â 1/2 litre

3rd Round
1. http://www.geeksforgeeks.org/archives/3042
2. Liked list is given as below (with elements as 1, 2 and 3), sort this in one pass.
3->2->2->1->2->3->1

4th Round
1. An expression is given.
[] can enclosed [], {} and ()
{} can enclosed {}, ()
() can enclosed only ()
Check that brackets in the expression are valid or not according to enclosing condition and opening closing condition.
Follow UP:
Two arrays are given.
One array contains symbols and second one contains expressions. Symbol array contains opening symbol at even index and closing symbols at odd index just after opening symbol. Index is starting from 0. Opening symbol at index i can only contain symbols from i to 2n-1, If there n pairs of symbols.
Now check that expression in the expression array is valid or not.
2. There are m sorted arrays of each size n. You have another array B of size m*n. Fill the array B from the m arrays in sorted order.Give the optimal solution.
I liked the way interviewers were interacting. They were very supportive and friendly as well.

This article is compiled by **Viswas**. Many Many congratulations to Viswas. 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.
++

Amazon Interview | Set 11

I would like to thank geeksforgeeks team for the excellent website. I got placed in amazon because of your website. I would like to share my experience and the interview questions.

1 round was online written technical test
There were 20 MCQ and 2 programming questions. Each correct answer carried 1 mark and -0.25 for a wrong answer.
Programming questions were:
—Write a program to find the difference between the sum of nodes at odd height and the sum of nodes at even height
—Given an array of integers representing coin values and the sum required. find the number of coins required to get the sum

4 technical rounds
Various programming questions related to data structures were asked. Each round was an elimination round. Questions asked were
—Write a program to traverse the tree in spiral form in O(n) time.(Hint:use two stacks)
—Program to implement atoi function
—Program to swap the kth node from end and kth node from front
—Program to find loops in linked list
—Find the maximum length palindrome in a string
—Difference between process and thread
—Advantages and disadvantages of thread and process
—Test cases for checking binary tree
—Test case for atoi function
—Test cases for finding loops in the single linked list
Each technical round was for 60-90 minute duration. There was no HR round

This article is compiled by **Supreeth**. Many Many congratulations to Supreeth. 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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Amazon Interview | Set 10

Recently I got interviewed at Amazon Hyderabad. I just wanted to share my experience. Hope someone gets little help from this.

1. Telephonic
a. In Binary Tree node, extra pointer ->next is given in the structure of node. Make linked list at each level.
Â Â I did it with using Queue made of doubly linked list. Time complexity O(n), space O(n). I was asked to write code as well on collabedit site.
b. Equilibrium point in array, equiPoint = ith index where Sum(Left array) = Sum(right Array).
Â Â Did it O(n) time complextity and O(1) space. I was asked to code it as well.

2. Telephoinc
a. Find each pair in BST, which adds up to given number k.
Â Â Explained different methods for it and he asked me to code for one.
Â Â I did it as follow.
Â Â void findPairs(node *start, int k)
Â Â {

```
Â Â Â Â Â Â if(start == NULL)
Â Â Â Â Â Â Â Â return;
Â Â Â Â Â Â findPair(start->left, k);
Â Â Â Â Â Â if(k – start->data > start->data)
Â Â Â Â Â Â {
Â Â Â Â Â Â Â Â if(search(start->right, k – start->data)) // this search is normal BST search.
Â Â Â Â Â Â Â Â Â Â printf("(%d, %d), ", start->data, k – start->data);
Â Â Â Â Â Â Â Â findpair(start->right, k);
Â Â Â Â Â Â }
Â Â Â }
```

b. There were few other simple questions. I don't remember know.

1. Onsite: with Hiring Manager.

a. About Project, cross questioning, etc.

b. Two files containing large number, one in each. You have only fopen(), int read(fp), fclose(), fwrite(). Add these two numbers and write in third file with the help of given functions only.

Â Â Explained him the logic and he was okay with it.

c. Write sql query for getting direct and indirect reportees of a given employee. Lets say Employee table(empId, ManagerId).

Â Â wrote it and he verified it and it was okay. Recursive query, CTE.

d. Oops concepts, asked to explain Static keyword with all possible example.

Â Â Explained, variable, methods, classes one by one with Static keyword.

2. Onsite: with Developer.

a. Print encoding for an Array.

Â Â Rules: consider BST made from given array. Let say number x is present in the BST and to reach x, If you go right print 1, if left then 0.

Â Â Now you are given an index i in the array A (so x = A[i]) and print the encoding without constructing BST to reach x

Â Â and without space with least time complexity.

Â Â I was not able to do it on the spot but after this interview, I got some free time and solved it and handed over papers to the interviewers. I liked this problem. It was little interesting.

b. Find triplets in array so that a+b+c = k, k is given number along with array.

c. Then moved to finding all possible pair set in an array. Mind the term SET. Take care of duplicates as well.

Â Â Reduce time complexity as much as you can.

3. Onsite: with Developer.

a. Given array, find all possible sets of elements which add up to a given integer K.

Â Â I coded it with just 4-5 lines in just couple of secs. It took little time to make him understand the solution.

Â Â I was given an input of 6 numbers in an array and asked to run my solution till the end. It was recursive and he asked me to keep on writing, writing, writing, till he got that okay, it will work fine.

b. I was asked couple of questions which I already knew and I told him and we moved on to next questions. I don't remember what he asked.

c. If tree is BST or not. Coded it.

4. Onsite: with One Manager and Senior SE.

a. Discussion on my current Project. Quite a good discussion. It took quite a good time.

Â Â They asked me what more enhancements I can think of for features, I made in my project.

Â Â I explained few different things that I could think on the spot and they liked it.

b. Linked list with a "mad" pointer along with "next" pointer in it, mad can point any where(can be null as well). Return clone of

given such linked list.
Â Â I already knew the best approach for this. Then he asked me to think something else. I mentioned Hash. He was okay with it and we moved on.
c. Replace the elements in an array with the next following greater number of it from right side of the element.
Â Â I told him I already know this and I asked if he wants me to explain the algo. He said so and I explained. Then we moved on.
d. Reverse each K nodes in linked list.
Â Â e.g. 1->2->3->4->5->6->7-_ given
Â Â output 3->2->1->6->5->4->7-_
e. Two strings S and S1. Remove all chars from S which are present in S1.
Â Â Explained them all possible methods for this what I could think of(with space, without space). Finally, they were looking for BitMap solution. I explained that as well before one mentioned it.
f. Design a Chess game.
Â Â Gave different classes and their relations, some procedures, then cross questioning and I was able to give all answers which he mentioned quite reasonable.
Â Â They were okay with the design.

In the whole interview process I was asked like 8-10 questions which I already knew and I mentioned the interviewers same. I was told why you read so much.
Overall, it was quite a good experience for me. I liked the way interviewers were interacting. They were very supportive and friendly as well.
Unfortunately, I was not selected. I have no idea what they were looking for.

Thanks to **Vinay** for sharing Amazon Interview experience. 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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Amazon Interview | Set 9 (Answers)

This post is about answers to the questions asked in Amazon Interview | Set 9. It contains links to some of the solutions available on the geeksforgeeks. I have also written my answers which I replied in the interview. I hope it would help the readers.
Online Programming Round: (5 methods, 2 hours)
3) Â Â Â Â http://www.geeksforgeeks.org/archives/10379
5)Â Â Â Â http://www.geeksforgeeks.org/archives/12832

Telephonic Interview 1:
1)Â Â Â Â http://www.geeksforgeeks.org/archives/24272Â
2)Â Â Â Â http://www.geeksforgeeks.org/archives/18752
3)Â Â Â Â http://www.geeksforgeeks.org/archives/2398Â

Telephonic Interview 2:
3)Â Â Â Â Find the distance of every other point from P. Then use of max-heap of size K.
http://www.geeksforgeeks.org/archives/2392

Face-to-face Interview 1: (Hyderabad, Date: November 08, 2012)
2)Â Â Â Â I gave the following solution (with the help of the interviewer):
1. For every set, find out the number of sets it has intersection with. Also maintain those set indices.
2. Remove the set which has maximum number of intersection. And update the remaining numbers.
3. Repeat step 2 till we have any set which has intersection with any other set. At the end, we will have the solution. (Still not sure about optimality).

We can relate the solution with graphs: Remove some nodes so that remaining all the nodes are isolated nodes.
Searching: To make searching efficient, we can build trie data structure using bits for every set. So that we can find the intersections fasters.

Face-to-face Interview 2 (with a manager):
1)Â Â I tried for some time. Then the interviewer gave me the formula. The number is 1+ceil((N-W)/S) in all the cases.
For second part of question, simple solution is to find min in every window. But we can optimize so that we can utilize previous results/previous min.
Bit optimal: I created a min-heap of W elements. But the heap contained indices of the array elements, not the values inside the array itself. The indices were stored in heap as per their values in the array. Then for a new window, search the heap linearly (heap was in form of array), replace the old indices (which are no longer in the new window) with the new indices, and adjust that index in the heap. After adjusting all the new indices, we will have new min for the new window at the root. (Not sure whether the complexity brought in to the solution is worth!)
Â
Face-to-face Interview 3:
2)Â Â Â Â I gave a solution based on trie data structure using characters of the string. But he suggested to build trie based on the string itself. However, I was not able to think in that way.
3)Â Â Â Â Linear search. Binary search.

Face-to-face Interview 4 (with the manager of the unit of opening):
2)Â Â Â Â I said, we can organize an online coding competition. People would register and we will have the details. He replied, itâ €™s too expensive. Then I said, we can postpone the competition!

All the Best!

Thanks to **Hitesh** for sharing his answers. 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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Amazon Interview | Set 9

How did it start?
I completed and submitted the 4 programs at the link: https://amazon.interviewstreet.com/challenges/dashboard/#problems
Later on I came to know that the recruitment through this link is over. So I contacted a few of HR persons at Amazon, and I got a new link for online programming test.

Online Programming Round: (5 methods, 2 hours)
1)Â Â Â Â A sentence is given which contains lowercase English letters and spaces. It may contain multiple spaces. Get first letter of every word and return the result as a string. The result should not contain any space. Complete the following method:
static String getFirstLetterWord(String text) {Â }
2)Â Â Â Â Given an array. Iterate it for the given number of times. And then return the summation of the resultant elements.
Ex: Array is { 1,2,5,6}, N=2
After 1st iteration: {2-1, 5-2, 6-5}={1,3,1}
After 2nd : {3-1, 1-3}={2,-2}
Sum is 2Â + (-2) = 0
If only one element remains in the array, the element remains the same after applying the iteration. Complete the method.
static int iterateSequence(Vector<Integer> a, int N) { }
3)Â Â Â Â Find Nth largest element in the BST. Complete the method.
staticintnLargeBST(Node root, int N) {}
Given that

```
class Node

{

    Node left, right;

    int data;

    Node(intnewData)

    {

        left = right = null;

        data = newData;

    }

}
```

4)Â Â Â Â Swap adjacent nodes in the linked list. Change the links, not the data. Complete the method.
Ex:1, 2, 3, 4
o/P: 2, 1, 4, 3
ex: 1,2,3,4,5
op: 2, 1, 4, 3, 5

```
class Node {

  Node next;

  int val;

}


static Node swapAdjacentNodes(Node head) {}
```

5)Â Â Â Â Find length of the Longest-Increasing-Subsequence.
e.g.1.
i/p: 1, 2, 3
o/p: 3
explanation: the sequence is increasing
e.g.2
i/p: 4,5,6,7,8,1,2,1,2,3,5,4,6,7,8,9,0,6,7
o/p: 8
xp: 1,2,3,4,6,7,8,9
e.g.3
i/p: 1,2,9,4,5,10,7,8
o/p: 6
xp: 1,2,4,5,7,8
e.g.4
i/p: 20, 3,22, 5,50, 34, 49, 91,110
o/p:6
xp: 20,22,34,49,91,110
OR
3,5,34,49,91,110

Complete the method.
static int lengthLIS(Vector<Integer> sequence) {}

Telephonic Interview 1:
1)Â Â Â Â A M x N matrix, filled with 0s and followed by 1s. Find the row which contains minimum number of 0s. E.g.
0 0000 1
0 0 1 111
0 00 1 11
The answer is 2nd row. (Row index: 1)
2)Â Â Â Â Find whether given two strings are anagrams of each other.
3)Â Â Â Â Given an array of size N, move the first d elements to its last.
e.g. {1, 2, 3, 4, 5}, d=2

- output: {3, 4, 5, 1, 2}

Telephonic Interview 2:
1)Â Â Â Â Given a BST, find the node which contains the value which is equal to (or lowest greater than) the input value.
2)Â Â Â Â Kadaneâ€™s algorithm for 1 dimensional array.
3)Â Â Â Â Given a point P and other N points in two dimensional space, find K points out of the N points which are nearer to P.

Face-to-face Interview 1: (Hyderabad, Date: November 08, 2012)
1)Â Â Â Â Given a Singly Linked List which contains integers, bring odd values in the beginning and even values at the end. The relative order of odd values, and that of even values should be maintained as it is.
e.g. 34, 45, 78, 10, 33, 5

- o/p: 45, 33, 5, 34, 78, 10

2)Â Â Â Â Given N sets of integers, remove some sets so that the remaining all sets are disjoint with one another. Find the optimal solution so that the number of sets remaining at the end is maximum.

Face-to-face Interview 2 (with a manager):
1)Â Â Â Â Given an array of size N, a window of size W slides over it by increment of slide S. If the window reaches to the end, we should stop there. Find a formula in form of N, S, W so that we can find the number of valid windows. Write a program to find minimum in every window and print it. Optimize it.
e.g. {1,2,3,4,5}, W=2, S=1
first window: {1,2} min=1
second window(increment by S=1): {2,3}, min=2
â€¦
last window: {4,5}, min=4
The array might not be sorted. I have taken sorted array for simplicity.

Face-to-face Interview 3:
1)Â Â Â Â Trim the Given BST by given min and max values. It means remove the nodes which have values less than min or greater than max. Write iterative and recursive – both the solutions.
2)Â Â Â Â Given an array of strings, find the string which is made up of maximum number of other strings contained in the same array.

e.g. â€œratâ€, â€catâ€, â€œabcâ€, â€œxyzâ€, â€œabcxyzâ€, â€œratcatabcâ€, â€œxyzcatratabcâ€
Answer: â€œxyzcatratabcâ€
â€œabcxyzâ€ contains 2 other strings,
â€œratcatabcâ€ contains 3 other strings,
â€œxyzcatratabcâ€ contains 4 other strings
3)Â Â Â Â Find integer value of sqrt(N). Do not use any library functions or any mathematical solution.

Face-to-face Interview 4 (with the manager of the unit of opening):
1)Â Â Â Â Given a 2-dimensional array of integers, find the value 1 in the array, and set all those rows, and columns to 1, which contains one of the values as 1.
2)Â Â Â Â Suppose you are working in companies like naukri.com. You need to collect email Ids and contact numbers of all the Software Engineers aged between 25 to 40, in India. How will you do that?
3)Â Â Â Â Suppose a person of the age of your grandfather works on computer. He knows little about the computer. And he complains that it was working fine, but for last 2 days, it has become very slow. How will you solve it? What could be the reasons?
4)Â Â Â Â Design an IVR system for a Restaurant in which customers can book their tables for lunch and/or dinner. Advance booking for 2 or 7 days/as you wish. After the request from user, respond to him that you will confirm the request within 5 minutes. Check availability and send SMS confirming the same. If the SMS is delivered then assume that the customer is genuine. If the SMS is not delivered properly, discard the user request, as it is not genuine.
i)Â Â Â Â Â Â How can you take names and email Ids of the customers during the process?
ii)Â Â Â Â What can you do for repeat customers? How will you identify the repeat customers?
iii)Â Â If there is request for a team size greater than the table size, what will you do? E.g. request for 10 persons when table sizes are 6, 4 and 2.

All the Best!

Thanks to **Hitesh** for sharing Amazon Interview experience. 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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Amazon Interview | Set 8

I recently interviewed with amazon for the position of SDE1 in their TRMS team. The interview procedure was unimaginable rigorous.
Here are the details
Round 0: Written Round
Interviewstreet Test – 2 questions to be done in 2 hours
Q1: Calculate the expression (2+3)*5 .. The question just said this .. I guess we had to make our own assumptions to solve the problem
Q2: Two trees can be called isomorphic if they have similar structure and the only difference amongst them can be is, that their child nodes may or may not be swaped..
for example
——4
—-2—6
–1–3–5–7
and
——4
—-6—2
–1–3–7–5
are isomorphic .. the trees are similar and a few nodes have their left and right child swapped…
Given two trees determine if they are isomorphic…
The interviewstreet people marked the solution to my first question wrong even when it worked fine.. When I told the HR about the

situation, she got it checked with some of the amazon guys and they were ok with it.
I cleared the written test.
Telephonic Interview 1
Q1: Find the Kth largest integer in a Binary Search Tree. When I told her the solution like the one given on geeks for geeks, she asked me to do it using recursion.
Q2: Given an array of positive integers, find the max no that can be formed by any permutation of the arrangement. I told her a logic. She then asked me to write just the comparison function to choose one number to put before the other.
When I gave the interviewer straight answers, she twisted the question more.. Probably they wanted to see how i think and approach a problem.
Telephonic Interview 2
Q1: A binary search tree is given with its two nodes interchanged. I had to find both the nodes.
Q2: Identify all the pythagorian triplets in the given array.
I cleared this round. The HR told me I had to come over to Bangalore for in-person interviews. (all the travel arrangements were made by amazon itself)
Personal Interview 1
Q1: Find the sum of continuous subarray within a one-dimensional array of numbers which has the largest sum .. I didnt know a solution (kadane's algorithm), but somehow I was able to work it out in the interviews ..the interviewer liked my way of approaching and did help a little
Q2: How can you best implement queues using stacks. What would be the time complexity?
was able to do this one quickly.
Personal Interview 2
Q1: Find non-unique characters in a given string. I told her one O(n^2) [brute force], one O(n logn) [sort and then compare adjacent elements], and one O(n) [store the character count in an array] approach. She then asked me to do it in O(n) without using array.
Clueless, she finally told me she wanted me to use BIT Vector. I wasnt well converse with Bit Vectors and I told her so.. She still asked me think more. Finally she told me a solution using the same which was impossible to think in the interview alone, especially when one didnt know what BIT Vectors were. She agreed when I stated the point and accepted my previous O(n) solution and we proceeded to the next question.
Q2: Given an array of integers, populate another array with the product of theÂ elements of the first array except for the current index element.
Here when I gave her a O(n) solution [find product and divide it with current element to get the number for this index position], she asked me to do it without the divide operator. Gave her a O(n^2) solution. But I couldnâ€™t think better. Finally just when she began to tell me an O(n) approach, I remembered the geeksforgeeks solution to the problemÂ and gave it to her. Probably she didnâ€™t consider it. (donâ€™t know for sure)
Personal Interview 3
This interview was with the hiring manager at Amazon. He first asked me a couple of HR questions like Why Amazon? Why should we hire you? Projects, internships etc ..? How would you handle a disagreement with your team mates? Etcetc â€¦
Then he asked me a programming question.
Q: He drew a circle on the board and marked a few points on it. Named them X1, X2, X3 ..
Then he said these are gas stations, and you have to find the correct gas station from where a car should begin to loop in the circle such that it never runs out of gas before completing a round. He then sat on the table.
(Sorry, but I will have to describe it in detail to tell you how it was put out to me.. and off-course to bring in more clarity to the question itself..)
Unclear about what I had to do exactly and what information was available, I asked him back a few questions.
Why will car run out of gas after fuelling from lets say the first gas station?
He said each gas station has limited amount of gas (lets say X1) and after fueling from this station it can run out of gas even before reaching the next station (anything could happen, it may be able to cross the next gas station but run out later before completing the round..).Â Â So I have to find a gas station the car should start the loop from such that it never runs out of gas before completing the loop.
So can the car refuel at the next available gas station, if its able to make up to it?
Yes
Do we have the information about the amount of gas required to reach from one petrol pump to another?
Yes

I made an assumption that the car tank was huge enough to fill as much gas as possible.
And then I drew two arrays, one holding the amount of gas each station had, and other the amount of gas needed to go from this station to the next station..
Fuel Available: X1, X2, X3, X4, X5
Fuel Required to reach next station: Y1, Y2, Y3, Y4, Y5
He said ok, and asked me to go ahead.
I then took the difference (Y1-X1), (Y2-X2) ..and stored it in an array.. and then suddenlyÂ it hit me that this became a simple problem of finding the maximum sum of a continuous subarray within an array (circular). He liked my approach and asked me to program it. Did it and showed him a dry run of the code I had written.Â He was ok with it.
(I felt good after the interview because in there I didnâ€™t stumble at all ..)
Personal Interview 4
Q1: We have a huge file with braces â€˜()â€™ [just one type..] Find if they are balanced ..Â (stacks wouldnâ€™t work here because you will probably run out of memory storing the stack ..) When I gave him another solution, he asked me to do it using parallel processes. I told him to elaborate more.. (to be honest I wasnâ€™t familiar with parallel processes) .. Finally I told him so ..and he asked me to think about it still ..
We discussed it for about 20 minutes. Not reaching anywhere he moved on to ask me the next question.
Q2: Find the smallest substring which contains all the characters of the main string. Again I dint have a solution to this. I gave him a O(n^2) approach. He asked me to think further because the way I was approaching it was the way to go about it and I can make use of the last sub-solution obtained to improve my complexity. Couldnâ€™t think of anything, we finally moved on to the third question.
Q3: given the numerator and denominator of a fraction, find the quotient and the remainder without using divide and mod (â€˜/â€™, â€™%â€™)operators. This was simple. I did it. He then asked to write the invariant of my solution which was denominator*quotient + remainder = numerator.
He then asked me to think about the cases when either or both of numerator and denominator were negative. We were almost out of time so he didnâ€™t give me time to think and concluded the interview. He wanted me write an invariant that was true regardless of the input. Now that I think of it, I should have said |denominator|*quotient + remainder = |numerator|
Flew back home in the night.
2 Days later the HR informed me that I didnâ€™t make it in. 😕
This was probably the most difficult of all the interviews I have ever had.
Hope it helps some of you ..
Thanks to **ganglu** for sharing Amazon Interview experience. 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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Amazon Interview | Set 6

Following are my interview details for senior software engineer in 2010. Thought of sharing it, if it helps anybody
Telephonic Interview 1
1) Write your own power function in C/C++. Time complexity of your code, optimizations.
2) Given two strings, write a function to remove all characters in one string which are present in other string
Telephonic Interview 2
1) Construct a tree from ancestor matrix. The main thing he wanted to check was use of binary search.
2) Find the k maximum selling items at amazon site at the end of day. Given a file which has count all sold items. Use of min heap was expected.
Face to Face 1
1) Given a Binary Search Tree, in-place convert it to DLL.
2) Find the next greater element for every element in array.
Face to Face 2
1) Median of two sorted arrays.
2) Given an XML file, how will you store it in memory. Use of tree was expected.
There were some more questions that I don’t remember.

Face to Face 3
1) Given a Binary Tree, check if every node is sum of all of its children.
2) Given any Binary Tree, convert it to a tree where every node is sum of all of its children.
3) Given an array, find three numbers a, b and c such that a^2 + b^2 = c^2
That is all I remember now.

Thanks to **Vivek** for sharing Amazon 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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Amazon Interview | Set 5

I've attended the Amazon interview in Hyderabad, This was kindle team, I got rejected but I'd like to share the experience, thought of giving back something to geeksforgeeks, which was a great reference for me.
Written test
Very straight forward
1. Given a linked list, sort without extra space.
I wrote merge sort
2. Methods to serialize & deserialize a tree ,must complete the below 2 monthods. File serialize (node *root) & node * deserialize(File f)
Cleared the written test, I was told this after 1:30 Hrs.
First round
1. Find diameter of a tree, I've seen the question here, But i didn't recollect.. So solved my self..in some primitive way which made me write code with difficulty.
2. Find a lowest common Ancestor, The variation was the tree was just a Binary Tree, Not BST, It was interesting to solve as i know only BST variation.
Second round
1. Given an array randomize it,
2. Write all possible permutations of a array of size z.
3. Given a 2-D array of 0s and 1s, find islands in it. An Island is 1s together. E.g (below there is U shaped island)
0100001
0100001
0100001
0100001
0111111
4. Write a method to check if a tree is BST or not. I wrote some stupid mistake in this code, probably that gave away my interview.
Third round
1. So many HR like questions. Why Amazon, Why u want to leave, Why u dont want to stay, what did you do to stay back, biggest challenge, worst mistake, etc etc.. blabbered something.
2. Write a method that will test a function which merges 2 sorted linked lists.
3. Design a system, which can convert books from one format to another
Fourth Round
Only one design question: Design a email client.
After 4 days and lot of anticipation, I got a mail saying I got rejected, Was wondering what they exactly look for.
Source: Amazon Chennai Interview in Hyderabad
Thanks to muzicisgod for sharing Amazon 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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Amazon Interview | Set 4

Please find the details of my Amazon interviews below.
Date of Interviews: 1 Sept 2012
No of Rounds: 4
Type of Interviews: Walk-in for 1 yr experienced

Round 1:
Question 1:- Given a 2D array containing only 0/1′s and each row is in sorted order. Find the row which contains maximum number of 1s.
I was asked to code. Algo which I told was I will search position of first 1 in 1st row using binary search. And mark it. Now note that position check in 2nd row. If there is 1 for that position already found in 1st row, then binary search from 0 to that position else move to row number 3. Similarly continue further.

Round 2:-
Question 1:- Given a Binary tree and two nodes. Need to find the minimum ancestor, no parent nodes given.
Each time when I told answer, they modified question little bit or removed some extra storage which I was taking.
Question 2:- Given a Binary tree and two nodes. Need to find smallest path between them

Round 3:-
Question 1:- Given an array of infinite size containing 0/1 only and in sorted order, find position of first one.
My answer: first check whether 1 is present at 100th position or not if there, do binary search between 0 and 100 else check 1 is there at 200th position, and similarly continue further.
Question 2:- Given life time of different elephants find period when maximum number of elephants lived. ex [5, 10], [6, 15], [2, 7] etc. year in which max no elephants exists.
Other questions were regarding Operating system like virtual memory etc.

Round 4:-
It was HR round. Questions related to project. Questions like why I should Hire you etc were asked.
Result is still on wait.
This article is compiled by **Naveen Kumar Singh**. 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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Amazon Interview | Set 3

Please find the details of my Amazon interviews below.
Date of Interviews: 26th July 2012
No of Rounds: 1 online exam + 4 PI
Type of Interviews: Campus Interview for freshers

Online test(Time): 90 Minutes
20 Objective Questions: Aptitude and basic C objective problems.
2 Subjective Questions:

I. Â Â Â Â Given a linked list containing character in each node, segregate its nodes in such a way that all nodes containing a vowel are moved to the end of the linked list. We will have to maintain the order.
II. Â Â Â Parenthesis checker.

Interview Round 1(50 mins)
Question 1: You are given two linked lists whose nodes contain a digit as data member. Both lists represent a number. You have to add them and return the resultant list.
Input: 9->9->3->4->5 and 8->9->1 (represent 99345 and 891)
Output: 1->0->0->2->3->6
My Solution: Reverse the linked lists. Create the new sum list which is reversed. Finally reverse the resultant list.
Question 2: Interviewer asked to solve the above question without changing the original lists.
My Solution: Count number of nodes in both lists. If equal then simply add two lists recursively. If not then advance a temp ptr which is a pointer to head of larger list by diff of nodes and then add the list pointed by temp and list 2. Make sure to keep track of carry. Add recursively. Propagate the carry in remaining elements of larger list. Was asked to code. Coded it.

Interview Round 2(60 mins)
Question 1: Delete nth node from end of a linked list in a single scan.
Question 2: In a linked list, in addition to the next ptr, a random ptr is also present. Clone the linked list.
Did it in O(n) but by modifying the linked list and then restoring it. Was asked to do it without making any modifications in the original list. Did that in O(n^2)
Question 3: Two nodes of a BST are given. Print the path from 1st node to the 2nd node. You are also provided the parent pointers in addition to normal left and right pointers.

Interview Round 3(1 hour)
Question 1: An array of n integers is there in which the range of elements is n, i.e., the difference between maximum and minimum number is n. Find the repeating numbers.
Question 2: An extension of Question 1. Was asked to find number of times each number is repeated.
Question 3: There are n frames of m data element each. The data element in each frame is arranged in increasing order. You are provided m*n space in which you have to arrange all data in increasing order.
My 1st solution was to use merge sort. He modified the question as only O(n) space is there and you need to send data in increasing order as fast as you can.
My 2nd solution was to use min heap and construct it with the 1st element of all n frames. Min heap also contains extra field which signifies the frame number of data elements. This data structure can do the needful.

Interview Round 4(1 hour)
Question 1: Replace each element of an array with its greatest next integer in O(n).
I couldnâ€™t do it. I tried but it didn't click. Not expected when you are in your last round.
Question 2: Reverse every k nodes of a linked list.
Well did that but was not finally selectedâ€¦â€¦ 

This article is compiled by **Vinay Khetan**. We will be soon publishing Vinay's Yahoo and Microsoft interviews as separate posts. Vinay was selected in Microsoft. 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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Amazon Interview | Set 2

Please find the details of my amazon interviews below.
Date of Interviews:Â 26th July 2012
No of Rounds:Â 1 online exam + 4 PI
Type of Interviews:Â Campus Interview for freshers

Online test(Time): 90 Minutes
20 Objective Questions: Aptitude and basic C objective problems.
2 Subjective Questions:
I. Â Â Â Â Â Â Â Given a linked list containing character in each node, segregate its nodes in such a way that all nodes containing a vowel are moved to the end of the linked list. We will have to maintainÂ the order.
II. Â Â Â Â Â Â Parenthesis checker.

Interview Round 1(30-40 Minutes):
Technical Interview
Question 1:Â You are given a linked list and a parameter k. You will have to swap values in a certain fashion, swap value of node 1 with node k, then node (k+1) with node 2k and go on doing this in the similar fashion
Question 2:Â For the above question, do it without swapping the values. If you want a swap to occur between two nodes, then you will have to move the nodes itself.

Interview Round 2(50-60 Minutes):
Technical Interview
Question 1:Â You are given many slabs each with a length and a breadth. A slab i can be put on slab j if both dimensions of i are less than that of j. In this similar manner, you can keep on putting slabs on each other. Find the maximum stack possible which you can create out of the given slabs.
Question 2:Â The above question was raised to 3 dimensions.
Question 3:Â The above question was then raised to k dimensions.
Questions : Â Â Then there were many questions asked on compilers and dynamic memory allocation.

Interview Round 3(50-60 Minutes):
Technical Interview
Question 1:Â You are given pairs of numbers. In a pair the first number is smaller with respect to the second number. Suppose you have two sets (a, b) and (c, d), the second set can follow the first set if b<c.So you can form a long chain in the similar fashion. Find the longest chain which can be formed.
Question 2:Â Find the longest increasing subsequence in O(nlogn). Proof and full code was required.

Question 3:Â You are given a linked list and an integer k. Reverse every consecutive k nodes of the given linked list.
Question 4:Â You are given an array. For every element you have to replace it with the closest number on the right side which is greater than the element itself.

Interview Round 4:
The team was highly impressed so they cancelled my 4th round for others who appeared for the 4th round, it was atleast an hour long.

HIRED!!Â
This article is compiled byÂ **Jinendra Baid**. Many Many congratulations to Jinendra for his selection in Amazaon. 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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Amazon Interview | Set 1

Please find the details of my amazon interviews below.
Date of Interviews:Â 22nd August 2012
No of Rounds: 1 Written + 4 PI
Type of Interviews:Â Campus Interview for freshers

Written Test (Time): 90 Minutes
20 Objective Questions: Aptitude and basic C objective problems.
2 Subjective Questions:
I.Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â To find if there is any root to leaf path with specified sum in a binary tree.
II.Â Some question based on sorting.

Interview Round 1(60-70 Minutes):
Technical Interview
Question 1:Â Check if a character link list is palindrome or not.
Question 2:Â A sorted array has been rotated r times to the left. Find r in least possible time.
Question 3:Â Clone a singly link list whose nodes contain, apart from next pointers, an extra pointer to any random node. The random pointer of a node N could be after N, before N or the node N itself.
Â

Interview Round 2(50-60 Minutes):
Technical Interview
Question 1:Â There is a big file of words which is dynamically changing. We are continuously adding some words into it. How would you keep track of top 10 trending words at each moment?
Question 2:Â Write code for minHeapify() operation.
Question 3:Â Design a data structure for the following operations:
I.Â Enqueue
II.Â Dequeue
III.Â Delete a given number(if it is present in the queue, else do nothing)
IV.Â isNumberPresent
All these operations should take O(1) time.
Question 4:Â Write a function that returns the length of the longest leaf-to-leaf path in a binary tree.

Interview Round 3(60-70 Minutes):
Technical Interview
Question 1:Â There is a binary tree of size N. All nodes are numbered between 1-N(inclusive). There is a N*N integer matrix Arr[N][N], all elements are initialized to zero. So for all the nodes A and B, put Arr[A][B] = 1 if A is an ancestor of B (**NOT**Â just the immediate ancestor).
Question 2:Â Find an element in a sorted rotated integer array.
Question 3:Â There is a N*N integer matrix Arr[N][N]. From the row r and column c, we can go to any of the following three indices:
I.Â Arr[r+1][c-1] (valid only if c-1>=0)
II.Â Arr[r+1][c]
III.Â Arr[r+1][c+1] (valid only if c+1<=N-1)
So if we start at any column index on row 0, what is the largest sum of any of the paths till row N-1.

Interview Round 4(40-50 Minutes):
Bar Raiser Round
Interviewer asked HR Questions Initially, then a sort of puzzle.
Two robots land with their parachutes on an infinite one-dimensional number line. They both release their parachutes as soon as they land and start moving. They are allowed only to make use of the following functions.
I.Â moveLeft() // robot moves to left by 1 unit in 1 unit time
II.Â moveRight() // robot moves to right by 1 unit in 1 unit time
III.Â noOperation() // robot does not move and takes 1 unit time
IV.Â onTopOfParachute() // returns true if the robot is standing on top of either of the parachute, else false
V.Â didWeMeet() // returns true if the robot meets to the other robot, else false
Write a function in order to make the robots meet each other. Robots will be executing the same copy of this function.
HIRED!! 😀

Tips / Advice:
I.Â Each time you write a code, check for the edge cases.
II.Â Do not assume anything. Keep asking questions if there are any doubts.

This article is compiled by **Akash Nawani**. Many Many congratulations to Akash for his selection in Amazaon. 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.
++

Count total set bits in all numbers from 1 to n

Given a positive integer n, count the total number of set bits in binary representation of all numbers from 1 to n.
Examples:

```
Input: n = 3

Output:  4


Input: n = 6

Output: 9


Input: n = 7

Output: 12


Input: n = 8

Output: 13
```

Source: Amazon Interview Question

Method 1 (Simple)

A simple solution is to run a loop from 1 to n and sum the count of set bits in all numbers from 1 to n.

```
// A simple program to count set bits in all numbers from 1 to n.
#include <stdio.h>

// A utility function to count set bits in a number x
unsigned int countSetBitsUtil(unsigned int x);

// Returns count of set bits present in all numbers from 1 to n
unsigned int countSetBits(unsigned int n)
{
    int bitCount = 0; // initialize the result

    for(int i = 1; i <= n; i++)
       bitCount += countSetBitsUtil(i);

    return bitCount;
}

// A utility function to count set bits in a number x
unsigned int countSetBitsUtil(unsigned int x)
{
    if (x <= 0)
        return 0;
    return (x %2 == 0? 0: 1) + countSetBitsUtil (x/2);
}

// Driver program to test above functions
int main()
{
   int n = 4;
   printf ("Total set bit count is %d", countSetBits(n));
   return 0;
```

```
}
```

Output:

```
Total set bit count is 6
```

Time Complexity: O(nLogn)

Method 2 (Tricky)
If the input number is of the form 2^b -1 e.g., 1,3,7,15.. etc, the number of set bits is b * 2^(b-1). This is because for all the numbers 0 to (2^b)-1, if you complement and flip the list you end up with the same list (half the bits are on, half off).
If the number does not have all set bits, then some position m is the position of leftmost set bit. The number of set bits in that position is n – (1 << m) + 1. The remaining set bits are in two parts:
1) The bits in the (m-1) positions down to the point where the leftmost bit becomes 0, and
2) The 2^(m-1) numbers below that point, which is the closed form above.
An easy way to look at it is to consider the number 6:

```
0|0 0

0|0 1

0|1 0

0|1 1

-|-

1|0 0

1|0 1

1|1 0
```

The leftmost set bit is in position 2 (positions are considered starting from 0). If we mask that off what remains is 2 (the "1 0" in the right part of the last row.) So the number of bits in the 2nd position (the lower left box) is 3 (that is, 2 + 1). The set bits from 0-3 (the upper right box above) is 2*2^(2-1) = 4. The box in the lower right is the remaining bits we haven't yet counted, and is the number of set bits for all the numbers up to 2 (the value of the last entry in the lower right box) which can be figured recursively.

```
// A O(Logn) complexity program to count set bits in all numbers from 1 to n

#include <stdio.h>


/* Returns position of leftmost set bit. The rightmost

   position is considered as 0 */

unsigned int getLeftmostBit (int n)

{

   int m = 0;
```

```
    while (n  > 1)
    {
       n = n >> 1;
       m++;
    }
    return m;
}

/* Given the position of previous leftmost set bit in n (or an upper
   bound on leftmost position) returns the new position of leftmost
   set bit in n  */
unsigned int getNextLeftmostBit (int n, int m)
{
   unsigned int temp = 1 << m;
   while (n  < temp)
   {
      temp = temp >> 1;
      m--;
   }
   return m;
}

// The main recursive function used by countSetBits()
unsigned int _countSetBits(unsigned int n, int m);

// Returns count of set bits present in all numbers from 1 to n
unsigned int countSetBits(unsigned int n)
{
   // Get the position of leftmost set bit in n. This will be
   // used as an upper bound for next set bit function
   int m = getLeftmostBit (n);

   // Use the position
```

```
    return _countSetBits (n, m);
}

unsigned int _countSetBits(unsigned int n, int m)
{
    // Base Case: if n is 0, then set bit count is 0
    if (n == 0)
       return 0;

    /* get position of next leftmost set bit */
    m = getNextLeftmostBit(n, m);

    // If n is of the form 2^x-1, i.e., if n is like 1, 3, 7, 15, 31,.. etc,
    // then we are done.
    // Since positions are considered starting from 0, 1 is added to m
    if (n == ((unsigned int)1<<(m+1))-1)
        return (unsigned int)(m+1)*(1<<m);

    // update n for next recursive call
    n = n - (1<<m);
    return (n+1) + countSetBits(n) + m*(1<<(m-1));
}

// Driver program to test above functions
int main()
{
   int n = 17;
   printf ("Total set bit count is %d", countSetBits(n));
   return 0;
}

Total set bit count is 35
```

Time Complexity: O(Logn). From the first look at the implementation, time complexity looks more. But if we take a closer look,

statements inside while loop of getNextLeftmostBit() are executed for all 0 bits in n. And the number of times recursion is executed is less than or equal to set bits in n. In other words, if the control goes inside while loop of getNextLeftmostBit(), then it skips those many bits in recursion.

Thanks to agatsu and IC for suggesting this solution.

See this for another solution suggested by Piyush Kapoor.

Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above

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