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Microsoft Interview Experience for Internship (Via Engage)

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

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

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

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

MS Engage

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

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

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

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

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

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

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

We were given two sample projects-

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

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

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

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

1. Group Discussion
2. 1:1

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

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

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

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

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

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

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

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

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

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

other details. They have hired you to improvise their overall sales. design a system for that purpose.

7. Given two unsorted arrays and a value X, Find all pairs which sum up to X. One from first array, other from second in each pair.

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

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

Tips

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

Wishing you good luck!

My Personal Notes\n*arrow_drop_up*

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