Amazon Campus Mentorship Series 2020 Experience

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Amazon visited campus to select female candidates for the ACMS program.

An online test was held.

1. Some MCQs (Programming based mostly C++ outputs)
2. Two programming questions
   i. Find a pair with the smallest difference.
   ii. Given a mathematical expression string (with only one operator) find the value of the unknown i.e. variable. For example,
   - Input : x + 3 = 5, then x = 2
   - Input : 42 + id = 7, then id = 35
   - Input : 30 * 4 = identifier, then identifier = 1200

Selection criteria - Top 10% scorers of the above test all around India. (IGDTUW, YMCA, DUCS, NITs, IITs, etc)

As a part of ACMS, 4 sessions were held followed by two interview rounds for the SDE intern role.

ROUND 1

My interview started with no formal introduction. He was kind of late for the interview so if gave me the coding question directly (as far as I remember).

Question : Given n inputs : lets say here n = 3
a/b = 9.4
b/c = 6.7
p/q = 9.4
.
.
and m queries: m = 2
a/c = ?
p/q = ?

So I had to find the ratios in the queries using the information provided in the input.
I had to take input on my own and parse it according to my needs. So, nothing was provided. The solution was to be given from scratch. Also, identifiers are not limited to a single alphabet. It could be any valid identifier.

Approach: I used BFS.

ROUND 2

There was one interviewer and one observer in this round. We started off with our introductions. Then he asked some questions related to one of my projects from my resume. Then we started with coding questions:

Question 1: Given a boolean 2D array(m*n), where each row is sorted. Find the row with the maximum number of 1s.
https://www.geeksforgeeks.org/find-the-row-with-maximum-number-1s/

Approach: I first gave him a brute force approach - O(m*n).
Then gave him an approach with binary search - O(mlogn).
Then gave him the gfg approach - O(m+n).

He wanted me to code the binary search approach.

Question 2: Given an array A, its
`binarian(A)` is defined as 2^A[0] + 2^A[1] + ... 2^A[n].
You have to find the size of the shortest array B whose `binarian(B)` is the same as A's.
For example, `A=[2,2]`, thus if `B=[3]`, this satisfies the requirements, and the output is 1.

Approach: So basically all I had to do was find the number of set bits. That is the answer to this question. The trick was to recognise this part.

In both of the questions he asked the time complexity of my solutions.

I cleared those rounds and was scheduled for two FTE interviews.

ROUND 3

There were two interviewers in this round. The interview started off with their introductions followed by mine. Then he asked me what all have I studied in DS/Algo. Then we had a detailed discussion on **QuickSort.** He asked me in and out of quicksort. Some of the questions that I remember are :

- Is quicksort stable?
- What do you mean by stable?
- How does partition algo impact this?
- Best case and worst case with examples

- Then they asked that if the partition was such that the array is divided into n/100 and 99n/100, what would be the complexity and why?
- What is a good partition?
- What is a bad partition?

Question: From a stream of integers retrieve top 100 products on some criteria, at any given point of time.

```
Class ProductSpecification{
        int id;
        .
        .
};
```

Approach: I told him that I'll use heap. Then he asked why not linked lists or any other data structures. We had a full fledged discussion on this with different scenarios.

Question: Given two linked lists, find the product of linked lists and return the product as linked list.

Approach: I multiplied like we normally do. The twist was : I cannot retrieve the number from linked lists and just multiply it. Also, the data was read only so I could not reverse the list.

ROUND 4 - BAR RAISER

Started off with an introduction. Discussed two of my projects with great extends. Gave some scenarios, asked how my project will behave. He asked how I implemented different things and so on.

He then asked questions related to OOPs. The ones that I remember are:

- Difference between equals function and equals sign.
- Difference between overriding and overloading.
- Gave me some examples and asked whether this is overriding or not?

Then he asked some behavioral questions. I do not remember the questions.

Question: Given a chemical formula (given as a string), return the count of each atom.
Suppose a chemical Formula is given $C_6H_2(Cl_3(OH_2)_3)_3$

Return: C-6 H-20 O-9 Cl-9

https://leetcode.com/problems/number-of-atoms/

Approach: Gave him a stack based approach.
He asked me the solutions time complexity and space complexity.

Then he asked a few questions based on my skill set mentioned in my resume.