

## 10 July 2024:

We got a message about DE Shaw's **SDET** internship hiring on campus, its benefits and eligibility criteria. The next day we had a meeting with our seniors regarding company specific preparation and important areas to focus on.

Eligibility:

B. Tech :

CSE, IT - CPI 7.0 & above

ECE, EEE - CPI 8.0 & above

MCA - CPI 8.0 above

Benefits:

1. Stipend - INR 1,50,000 per month
2. Company paid accommodation for the entire duration.
3. Insurance Coverage
4. Breakfast/Lunch/Snacks
5. Training
6. To and fro domestic air fare (upto INR 15000 on actuals)

## 17 July 2024:

**ROUND 1: Online Assessment: Coding and aptitude questions:**

There were 3 sections in total:

Section 1:

2 coding questions:

**Question 1:**

**20 mins to solve**

**You are given a general keypad phone photo which contains buttons with number and alphabets written on it. You are given two strings. One contains alphabets (string a) and the other contains numbers (string b). You want to check whether they are good or not. They are good if they have the same length and for each  $0 \leq i < a.length()$   $a[i]$  and  $b[i]$  are on the same button.  $1 \leq a.length() \leq 10^5$**

Approach:

I read the question and the Grammar was very ambiguous. Then I saw the examples and try to match it with the explanation.

For each character c from a – o, the number written on the button is  $(c - 'a')/3 + 2$ . For the rest I used switch case. Then I just checked in a brute force way. It took nearly 10 mins (due to poor question explanation).

Verdict: all the test cases passed.

**Question 2: 30 mins (1600 rated)**

**You are given an  $n \times m$  matrix and an array called thr (threshold) of size m. You need to find the number of ways**

to select two arrays **a** and **b** from the matrix such that for each  $0 \leq i < m$  either  $a[i] \geq \text{thr}[i]$  or  $b[i] \geq \text{thr}[i]$ .

$1 \leq n \leq 10^5$

$1 \leq m \leq 8$ .

You need to count them as ordered pairs which means if **(a, b)** is a solution then **(b, a)** is also a solution. Also note that **a** may be equal to **b**. For example, if **a = thr** itself.

Approach:

If you see any variable **x** such that  $x \leq 20$  in the question then it's a bit-masking question. I did it using masking and tries. But here's a much simpler way:

Convert each array in the matrix into a mask and store it in a map as mask -> frequency.

Mask construction:

Mask = 0

For each **i** from 0 to **m-1**

If  $a[i] \geq \text{thr}[i]$  mask  $\mid= 1 \ll i$ ;

Now for each array **a** in the matrix, you can select an array **b** only if  $\text{mask-a} \mid \text{mask-b} == (2^m) - 1$ ;

Iterate from  $i = 0$  to  $2^m - 1$  and check for each array **a** in matrix if  $i \mid \text{mask-a} == (2^m) - 1$ . If yes then add **mp[i]** to **ans**.

Since I did it using tries it took 26 mins. Then I got wa for few test cases. There was minor mistake and I corrected it. Finally, all tc passed.

TC:  $n * (2^m)$

## **Section 2:**

Cs fundamentals, data structure implementations like heap, pseudo code outputs, finding which line contains the mistake type of questions. Since I got both questions correct, I thought to attempt only those questions for which I am 100% sure. I didn't know the data structure implementation questions like heap and some c++ pointer questions. I left nearly 4 questions in this section.

## **Section 3:**

Aptitude questions. The question setter might have forgot that we are not chartered accountants. We didn't even have a calculator. The questions were very lengthy and while preparing I thought they won't go that far asking very tough questions. But they did go much farther. There were nearly 10 - 12 questions of which I managed to solve 5 – 6. I prepared apti from indiabix from 13<sup>th</sup> to 16<sup>th</sup> July. Thought it was just a waste of time to prepare for, in the crucial time. (But to only found out it wasn't)

## **Post OA discussions:**

Few didn't understand the first question. Many did the 2<sup>nd</sup> question in  $O(n^2)$ . Apti was tough for most people.

Evaluations started and before completing the whole process they called people who performed well in OA for interviews within just an hour to save time.

## **Round 2: DSA Round:**

3 people were called at first

There were 2 panels with 2 interviewers in each panel.

First, they both were sent for the interviews and it has gone for 50-60 minutes or more.

Next, I was called to panel 1: 7 pm

First, they just asked I had dinner or not (I hadn't but I don't know why I said yes). They didn't ask my name/resume details or anything.

Question 1: Burn Tree from striver sheet:

They asked if I have solved the question for which my answer was obvious no (even though I have solved it). I just needed to act a little bit.

Question 2: Puzzle

Just a childhood puzzle where there are 2 islands and you along with 3 priest and 3 demons and one boat are on one island. You need to take all of them to the other island. The boat can carry only 2 people of which one must be you. On any island number of priest  $\geq$  number of demons. Min

number of usage of the boat should be found. I have heard the puzzle many times but unfortunately, I made it a little bit messy due to anxiety.

Question 3:

You are given an array and you need to find the median for every prefix sub-array. Median of an array is the middle element when you sort the array. If the length is even you take the left.

I said a  $O(n^2)$  approach and obviously he wanted an optimised one. Then he gave me a hint of heap.

Take 2 priority queues (one is min heap and the other is max heap). Traverse through each element. First add the element to min heap. If  $\text{minheap.length} > \text{maxheap.length}$  then pop the first element of min heap and add it to max heap. First element in the maxheap will always be the answer.

Question 4:

You are given an n array tree (he drew a really scary diagram with too many branches for each. At least for me back then it was scary.) It represents the manager-employee structure of a company. Parent is manager and child node are employee. There is only one root node which is the ceo. I am given only 1 function. If you give the id of a node to that function it gives the id of immediate parent. For ceo it returns null.

I should implement a function such that given 2 ids I need to find the id of their least common manager's node.

Its basically anLCA question but its an n-ary tree and you can't traverse any node or such.

I have been given 5 minute to solve this. I just gave a brute force approach like take all the mangers of both in a list and then traverse through list.... He said in a company of billions of employees (lol) you can't do that. He asked me to do it without any extra space.

Approach (binary search): Count the number of managers for each node until CEO. Say 5 for a and 7 for b. obviously 6<sup>th</sup> or 7<sup>th</sup> manager of b cannot be the manager for a. If 5<sup>th</sup> manager is same for both then a is manager of b. I would check if mid manager (say 3<sup>rd</sup>) is same for both. If yes check for 4<sup>th</sup>, 5<sup>th</sup> mangers else check for 1<sup>st</sup>, 2<sup>nd</sup> managers (1<sup>st</sup> being the ceo always).

I took like 3-5 minutes to solve this.

One guy said round is over and I asked for feedback and some company related questions and he clarified those. After which he said I can leave.

But wait, the other guy stopped me and asked my approach for the 2<sup>nd</sup> question of the OA. Then I said I used tries and masking. He said it can be solved without tries and asked for the explanation. I explained him and he was quite impressed with the unique approach.

Mine was the longest of all (1hr 50 minutes).

## **DAY 2:**

I was called for round 3 at around 10:30 am. Still round 2 was going and a total of 12 candidates were shortlisted for round 1 from which only 4 were qualified in total.

### **Round 3: HR round**

HR said this is not a normal boring hr round and proceeded to ask same old boring hr questions. Questions include like tell the craziest thing you did in the college (We pranked our friend with fake insta account), a situation where your friends didn't agree with you and what you did, what 3 companies other than de shaw would you join and why. Which one do you prefer: SDET or SDE. I said I like SDET because testing the software is like finding edge case to in question and I get a satisfaction when I see the green after solving question by which he got impressed.

### **Round 4: CS fundamentals and DSA Round:**

There were formal introductions and he asked how is your interview going and so on. They also discussed about my projects, why I did them, how I did them and some other details about the projects.

Then he asked what's my favourite subject. I said OS. Then he asked why it is. I said I like concepts like virtual memory, fragmentation and many others. They asked some good questions in depth like what do you do to make games smoother on low end devices (just some talk on virtual



memory). I said I would use both pagination and segmentation and some fancy names like multi-threading.

Then they gave me a question to solve:

Given an array of strings. You should form a string such that every string in the array appears in the same order as a substring in the final string and length of the final string should be minimal.

Eg: [a, aa]. Answer: aa

I formed some other good test cases and asked some doubts for clarification by which he got impressed.

I gave 1-2 traversals through each string in the array solution.

After round 1 only 4 people were selected then after all rounds 3 were selected.

Then they said, for us 3 there will be another round at 1'o clock in the night and make sure you have good internet connections and so-on. Then they said it was just a prank and all 3 were selected (to just see our emotions may be).

### **Few known but important reminders:**

- Companies want you to be good in every domain (CP, Projects, Cs fundamentals, Communications skills, CPI). They don't want a master in any few of the above.
- Try to complete CS fundamentals during your semesters itself. They save you much time during the interview season to focus on projects and cp. CS fundamentals include OOPS, OS, DBMS, CN. Learn 1 properly.

- Never fall behind rating. Your goal should be in becoming a competitive programmer and a consistent learner but not being X rated.
- Your CPI matters. Ties between candidates are frequent and are broken using your cpi. Maintain a minimum of 8.5.
- Females have very good opportunities than males. A bare-minimum effort can land you in a very good job.
- I was an android dev. Many people don't choose it. So, I had a great insecurity about my projects and I would've been very grateful if someone said this to me: The type of your project doesn't matter. Only the uniqueness and the size of it matters (at least for big-tech).
- Communication skills are the cherry on top. You may see many undeserved getting the opportunity but its only because they have good communication skills.