

Himanshu Kumar (MCA 2021-24)

Ciena Interview Experience (C/C++ Profile)

The company came for 2 profiles : C and Java

Online Assessment

There were 2 sets for C profile. I was allotted the set with 45 MCQ (The other set was 3 coding questions of easy/medium level)

Subject of the questions and their rough count

- Aptitude (around 10-12)
- C (20)
- CN (5 to 10)
- OS (5 to 10)

I did around 43 out of 45

Interviews

3 Interviews : 2 Technical + 1 HR

Tech. Interview 1

I went in there were 2 interviewer in the room. (2 students were giving the interview in the same room)

I went to my interviewer. We greeted each other. Then she asked me : "Himanshu, tell me about your hobbies ?" (She didn't ask for introduction or anything)

I told her. I love sports. She stopped me in between and asked “there are many sports. Which one do you play”. I told her “I usually play volleyball, cricket and sometimes I do arm wrestling for fun” (She laughed slightly when I said arm wrestling).

Then I told her : I’m interested in slow down aging (It was even in my resume 😊)

She asked me what I mean by it. I told her “to literally slow down our age physically so we can live longer”

She was interested in it and then we had a 5-10 min conversation on how sleep can improve our life span and how fasting does a phenomenon known as “autophagy” and what is the current research going on it, how sugar is bad (It was a fun conversation. Both of us laughed in between several times. I had a smile throughout because this was supposed to be a tech interview)

Then she told me “Tum to work ki jagah sleep pe hi dhyan dete reh jaoge”. I told her “No mam, actually sleep will improve my work quality. I may be able to do quality work in the same time frame and I do understand that sometimes I’ll have to work extra and depending on how critical the project I’m ready to do that”

****Now the actual tech interview starts:****

She asked me to rate myself in C and C++

My ratings were : C – 7.5 and C++ - 6.5

She asked “what is this idea behind .5 in my ratings ?”

I replied : “Mam, People will usually rate themselves 7 because it is a sweet spot when they are not sure where to put themselves. That’s why I used extra .5 because I know where to put myself”

She asked me “why less in C++ than C ?”

I answered : “Because C++ has too many advanced concepts : Shared pointers, Weak Pointers while C is a simpler language”

1. She asked me tell me all the pointers you know of ?

Answer : Void Pointers, Null pointer, Dangling Pointers, Wild Pointers. Then I told her about the Smart pointers like : Shared ptr, Smart pointers and Weak Pointers

2. Her : “What about a virtual pointers”

Me: “No idea mam” (I had no idea where this pointer came from 🙄)

3. DS Question:

You’re given an array of n elements you’ll have to find a subarray of k elements with the max sum. (She asked me to write the code directly on the paper instead of explaining verbally)

- I wrote a DP solution using include-exclude method because I didn’t listen to the question carefully (I thought we can choose any k elements)

Then she told me “You did for any k elements”. I said “yes mam”. Then she corrected me that the k elements that we’ve to choose are contiguous

Then I gave her the right solution using “Sliding window of k size”

I wrote the code for this in 2 loops.

She asked me why 2 loops. I explained that the first loop is to get for first k elements then the second loop is for the sliding the window one by one. Then she asked will 2 loops increase the time complexity. I told her “No, it will still be $O(n)$ ”

***Learning:** Listen to your question carefully. In my case it didn’t cause any bad impression but in your case it might

4. Write a program to find a cycle in a linked list

Before writing the code : I told her that it is a standard question and we can use fast and slow pointers.

Since I said this is a standard question. Now she doesn't want the fast and slow pointers approach (😞). She asked me to do it some other way

- I did it using a set

> I realised that I could have taken more time in this question by first giving her the brute force approach then giving the optimal solution

Learning: Don't go to optimal solution first. (Spend more time in things you know, so that "jo nhi aata uska puchne ka time hi na bache")

5. She asked me to design a module in python that filters the number of requests coming out

I didn't understand what she wanted. So I asked her "mam. How will be input and output be"

She inquired whether I've done question like this before. I said no. She said "Ok no problem, let's move on to the next question"

6. Have you studied design patterns in C++ ?

- I said "no"

- She was surprised and asked me "Tumne apne university C++ course me ye kesa ni padha, ye to usually hota hai".

- I told her that we didn't have C++ in the university course. We had python and Java. I actually studied C++ on my own from youtube

7. Given a Tree. Write a program that will check whether the following is a Binary Search Tree.

I wrote the solution where I did in-order traversal and then checked whether the inorder traversal is sorted. If it is sorted then it is a BST

Then I explained my code. She was satisfied with the answer. But then she asked me can I optimize it.

I tried all the other traversal but nothing came to my mind.

Then she gave me hint "Can you think of a range" . Then I gave her the solution where we can see if the elements lies in a range. For ex: for root node the range will be : [INT_MIN, value of the root node]. Then we can do that for each of the node

Then she told me "You can go. Nice to meet you".

She didn't ask me "do I've any questions for her". So I didn't ask anything

Tech Interview 2

I had my tech interview in the same room where my previous interview was. This time the other person took my interview

This time there was no chit-chat (direct tech interview)

1. What did mam (previous interviewer) asked you ?

I told him about all the questions

Then he asked me whether I find something difficult. I told him about the python requests design question

2. Him : "You've python in your resume. What is the difference between lists and arrays in python?"

I told him : "There is no builtin arrays in python. We only have list which can use like arrays. We also have tuples"

He was not satisfied with my answer. So added "We can use numpy to use arrays but it's an extra module. We have to import".

Then he told me “I want to know about the type of elements you can put in both of them. Then I told him same type of elements is allowed in arrays and different types are allowed in lists”

3. Then he looked in my resume and asked me about my projects. I told him about all the projects. He was interested in my C++ Music Player but my best project was my python web app which I’ve already deployed on pythonanywhere.com. So I told him “sir. I’ve a project which is already online. You can take a look at it, if you want to see my C++ project then I’ll have to bring my laptop from the classroom

> Always try to show your best project. Usually interviewers will have time to see only 1 project

He explored many features of the application and then asked me about the tech stack. The tech stack was : “Django”

4. Then he asked me “have I not made any projects during my university course because a lot of people are coming with their university projects”

I told him “I’ve made them as well. But they are simpler projects that doesn’t solve any real world problem and in my resume I’ve only included the projects that are slightly complex and does something useful”. I even suggested him “If he wants I can show him my university projects as well”

He said “No, that’s fine. You already have good projects in your resume”

> Note: I won’t be answering all the questions because these are standard questions and are available on the internet. In my interview I tried to explain everything that I know about that topic until the interviewer is happy

5. What is runtime polymorphism. Give an example ?

6. What is compile time polymorphism. Explain with example

7. What is virtual function ?

8. How will you dynamically allocate memory in C ?

malloc()

calloc()

9. What is the difference b/w malloc and calloc ?

Calloc : Initialization 0

Malloc: No initialization

- I told him how calloc is like blocks of memory while malloc is like a single chunk
(we actually discussed on it, because he wasn't sure what I was trying to say)

10. What is the memory layout of a program ?

Text

Data

Stack

Heap

Then he asked me to give an example : for a program what is stored where

11. What is the difference between :

```
char arr[] = "Himanshu";
```

```
char *arr = "Himanshu";
```

I told him that we can change the character in the first arr. But we can't do that in the second one.

But we can point the second one to another string literal while that is not possible in the first one

12. What is the use of the extern keyword ?

13. What are storage classes in C ?

Types of storage classes:

1. Automatic Variables
2. External Variables
3. Static Variables
4. Register Variables

14. What happens if there is a static variable in a function ?

I told him that even though it's scope is limited to that function only but its value will remain throughout the program and if we changed it one time and tried to access it the other time. We'll have the changed value

15. What is the output of the following program

```
#include <stdio.h>

int main ()
{
    static int x = 5;
    printf("%d\n", x--);
    if (x != 0) {
        main();
    }
}
```

Ans :

5
4
3
2
1

16. Explain inheritance in C++

First I gave the answer for inheritance, then I told him about the types of inheritance.

Then, I explained him what happens to private, protected, public variable under the various access specifier private, protected, public

I explained this using this table :

Base Class Members	Visibility Mode		
	<i>Public</i>	<i>Protected</i>	<i>Private</i>
Private	Note Inherited	Not Inherited	Not Inherited
Protected	Protected	Protected	Private
Public	Public	Protected	Private

> This is the question where he praised me saying : “You explain things in a very good manner”. As the questions were proceeding I was getting more and more confident

16. Then he asked me to give him example where C++ made things better than c

I gave him this example :

Problem with printf

`'printf()'` is not **type-safe**

```
```c
#include <stdio.h>
int main ()
{
 int x = 10;
 printf("%s\n",x); // %s: string
 return 0;
}
```
```

This **won't give compilation error** but will give segmentation fault when running the program

Solution in C++ :

> Using `'std::cout'` instead of `'printf()'`. Because cout doesn't require format specifier

17. What are some other things in C++ that are not in C ?

- | Range-based for loop
- | `'bool'` datatype
- | Exceptions Handling
- | Type Safety
- | Constructor in Structures
- | Object Oriented Programming
- | Templates

18. What is the difference between

```
char * const ptr = "Himanshu";  
const char *ptr2 = "Himanshu";
```

In the first the ptr is constant (I.e we can't change the pointer to somewhere else) while in the second the thing we can change the pointer

Then he asked me what if we don't have a const in the second statement. I told him that there won't be any difference because both the statements:

1. char *ptr2 = "Himanshu";
2. const char *ptr2 = "Himanshu"

are same. Then I explained him that C++ doesn't allow us to write char *ptr2 = "Himanshu" while C allows this even though both of them are actually constant. The problem with (1) is that if we tried to change the value like this :

```
int main ()  
{  
    char *ptr2 = "Himanshu";  
    ptr2[2] = 'b';  
    printf("%s\n", ptr2);  
}
```

then it won't give compile time error. But will give segmentation fault . Hence C++ force us to write const in front of it, so that we can get the error in compile time if we tried to do something like this. In C we write const then we will also get compile time error in C but C doesn't force it. (Another benefit of C++)

19. After this he asked me about sizeof structure/union and simple pointers related questions (3-4 questions)

Total 20-25 were asked and I answered *all* the questions properly

20. Then at last he asked me “Chalo last question hai, bubble sort to padha hoga”

I said “yes sir”

Him: “Uska code likh do” (Sense of excitement filled me)

I got so excited that I forgot what is bubble sort 😊

My mind went blank. He gave me 1 minute to think. But however hard I tried I couldn't remember it. I can recall all the sorting algoirhms (even advanced sorting algorithm like : Bucket Sort) but bubble sort aaya hi ni mind me

he gave another minute by giving me a hint but somehow the pressure starts to build up on me “Itna aasan cheej kese bhul gya mai”

Suddenly the first interviewer looked at me. She laughed and said “Seriously, bubble sort” (She was like tree ka solution de diya and ye nhi aata). I told her “Mam, suddenly mind blank ho gya”

Then second interviewer told me “hum lunch karne ja re hai, tum tab kar ke de dena bubble sort or cheat mat karna”.

But my first interviewer intervened and said “you can go himanshu, sir to tumhe ese hi preshan karte rhenge, we'll ask you to write bubble sort in ciena, if you get selected”

I got selected for the the HR round

> Conclusion : You don't have to answer everything but whatever you do answer should be well explained

HR Round

1. We already know your technical skills tell me about other than your tech skills and what you like to do

- I told about sports, dogs and my helpful nature

2. You must've seen in our presentation about woman in Ciena. What is your opinion in women in ciena and pride in ciena (But maine to presentation li hi ni thi 😊)

- I still said I do align with woman in ciena and I think we should promote better work culture for woman

3. Do you've any questions from me (Finally kisi ne to pucha ye question)

I asked about

- work culture
- your expectations from a fresher like me
- how is your experience at ciena
- Do people play sports at ciena

Selection (14)

I was selected in the team of the my second interviewer

11 were selected for C++ profile

3 were selected for Java Profile

Tips

1. Focus primarily on : C/C++, DS, OS

2. Listen them well & Speak clearly. Don't try to answer them before they complete their question
3. If you think you need time. You should ask "Mam/Sir, I need a minute to think for the problem"
4. If the problem is better explained on paper, use the paper (I would say use the paper in every question until it is one word answer) and remember to look at them for their expression like nodding or confusion. If they seem confused ask them "sir, is something not clear ?"
4. Suppose you're solving a DSA problem speak some words like "if we use map then then this will happen, if we use binary search then this will happen". The interviewer should be clear on the thing that you can actually think in real time

You luck will determine a lot. Some candidates answered all the questions but still aren't selected