My Interview Experience At CMI

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Well,in my opinion, the interview at CMI(Chennai Mathematical Institute) was not so official like the one at ISI(Indian Statistical Institute). It was more like an informal kind.

I reached the CMI campus on the day before the interview which was scheduled on 24th June. I was quite comfortable that day. I often get nervous when I reach an examination centre. I went there along with my father(who is an Associate Professor in Mathematics) and on reaching CMI, they told us that it was compulsory for the students to stay in their hostel and the parents will be given accommodation in their guest house. So, I had to stay in the hostel with another student who came for the interview from Hyderabad. Well, it is interesting to note that we both had become friends from the moment we saw each other. We started talking about the entrance exams we have written and found that we both had written the ISI, CMI, NEST entrance exams. He had already attended an interview at ISI on June 18th, for which I was not called for. So, I asked him about the interview experience and about the kind of questions they asked. Then we came into the discussion about which is better, 'CMI or ISI'. He said that ISI had a better campus than CMI. I told him that , it is because ISI is old and CMI is new. Then, I told him that CMI was better than ISI in academics. He started asking why is it better in academics. I told him that my father is a professor and according to him, CMI had a better syllabus and the best faculty. After that, I went out to check their library which was just amazing. The library was fully air conditioned and was open 24/7. I started reading a book on Number Theory and couldn't stop reading it. My father wanted to read some books from their library too, but he hadn't brought his spectacles from home. So, we went out to see whether we could get any spectacles for my father, but was unsuccessful because CMI was situated very far from the city(about 30 kms).

I have no idea how I spent the night!!!. The fan in the room in which I stayed was creating a problem. It was spinning either very fast or very

1

slow. I couldn't sleep well that night. I woke up after each half-an-hour. Finally, I couldn't tolerate it and I went to the guest house to my father's room. Thank god, he woke up!!!

And there it was, the interview day. I was told that the interview will begin at 10:30 am and we had to reach the 'Lecture Hall 6' by that time. So, I had my breakfast at 8:00 am and reached the lecture hall at 10:15 am. We had to wait around 10 minutes in the lecture hall. And now, I was starting to get nervous. My father tried to calm me down, but was of no good. I got even more nervous when my father told me his story. He was once called for an interview at the 'Institute of Mathematical Sciences(IMSc)' for the Phd. programme and out of 7, 6 of them got selected except him.

After this story, I remained silent for the next 5 minutes trying not to think of how I will perform in the interview. I think the judges had some rush because the interview panel split into two and 3 out of 6 students were interviewed in each panel. I was the first one to be interviewed at the second panel. I was very nervous while entering the room. I was shaking like anything. Then, when I went in front of the judges(there were only two of them), they were smiling and looking really cool which got my nerves a little bit under control.

And then, they asked me,"Where are you from, Sanjay?"

"From kerala, sir", I said. "Which would be your first option, Engineering or Maths?", they asked.

"Maths, of course, sir", I answered immediately.

"Why do you like Maths?", they asked.

Now , I started thinking. I had no idea why I liked maths so much. I said, "I like to solve problems in maths, sir".

"Ok, then tell me one problem you like?", they asked.

What kind of a question was that??? I was answer-less. I don't know why!!!. Then, I saw one of the professors looking at my answer sheet and I said, "I liked the geometry question that came in the CMI entrance exam, sir".

And, after that, they got into the problem session. They asked me to go near the blackboard and write 10 numbers.

"Any number , sir", I asked them.

"Yes", they replied. So, I went and wrote

$$2, \pi, e, \sqrt{2}, \sqrt{3}, \ldots$$

"No, no ,no, you write only rational, infact only integers", they said immediately.

So, I wrote something like

$$2, 5, 8, 20, 50, \ldots$$

"Ha, you made it easy for me, subtract 20 from 50, see that you get a multiple of 10. Now you write another ten numbers", they said.

Ok..., I actually got their question and found that it had a mistake. So, I wrote

$$1, 2, 3, 4, 5, 6, 7, 8, 9, 10$$

Now, they started looking at the numbers and said, "Write 10 integers that are not divisible by 10" Then, I wrote

$$1, 2, 3, 4, 5, 6, 7, 8, 9, 11$$

And the question(which I was awaiting) came, "Can you say that, no matter whichever 10 integers you write, there will be at least two numbers whose difference will be divisible by 10"

"Yes, sir",I replied.

"Why?",one of the professors asked.

"By pigeon hole principle, there will be at least two numbers whose remainder when divided by 10 will be the same and their difference will be a multiple of 10", I answered.

"Good", they said.

Then they asked me whether I was good in Permutations and Combinations. Even though I was weak in that topic, I told them that I was okay.

So they asked, "There are 30 pairs of different shoes with me. In how many ways can you select 25 shoes from the given set such that there are no pair of shoes with you?"

I started thinking for a while. I don't know what happened, nothing was coming to my mind. My mind was absolutely blank even though it was one of the basic questions that we come across in P&C. Looking at me thinking, they asked, "How many shoes do we have in total?".

"Since, there are 30 pairs of shoes, we have a total of 60 shoes", I said.

"So, in how many ways can you take 25 shoes such that you have no pair of shoes", they asked again.

Not being able to think, I went by the long counting method. I went to the board and said, "Since, there are 30 left hand side shoes and 30 right hand side shoes, we can take 1 left in 30 ways and the rest 24 from the 30 right in $^{30}C_{24}$ ways.Similarly, we can take 2 from the left ..."

"Stop, stop, stop. Look, let me direct you to another easier approach. Suppose you have 30 different boxes. In how many ways can you take 25 boxes

from that set.", they asked.

"$^{30}C_{25}$ ways, sir", I replied immediately.

"And if those boxes contain a pair of shoes..........", they said rather slowly

Now, my mind started working. I was thinking what had happened to me. I said, "Okay, you can select either of the two shoes from each box you selected. So, there are a total of $(^{30}C_{25} \times 2^{25})$ ways. Sorry, sir."

"Good", they said.

"Ok then, tell me a topic you like", one of the professors asked.

I told them that I like calculus even if I liked 'Number Theory' more because 'Number Theory' was not a part of the high-school syllabus and I thought they might ask some advanced problems from that topic. Also, calculus in the high-school level is not so tough and they might not be able to ask much difficult questions.

So, they asked, "What is the definition of continuity?".

Now, this was confusing. I knew they were expecting the '$\epsilon - \delta$ definition' for continuity, but that was not taught in high-school. So, I told them the most basic definition that is taught in the high-school classes.

Then, they asked me to draw the graph of the function $\frac{1}{x}$ which I drew by explaining how to draw it by taking the limits and all. After drawing the graph, they asked me to plot the area;

$$\int_{-2}^{-1} \frac{1}{x} dx$$

in the graph I drew. I plotted the area correctly. Then, they asked me to find the value of the integral. So, I said the integral is same as;

$$-\int_{1}^{2} \frac{1}{x} dx = -\ln 2$$

They asked me what I had done in the given expression to convert it into the following expression. So, I told them that I substituted 'x' by '$-t$'. They said, "Good". And that was the end of my interview. They told me that the results of the interview will be published online and asked me to call the next boy to attend the interview.

When I got outside, I realized that I was sweating like I was having a bath or something. I saw my father standing outside and went towards him when I was interrupted by another student who was waiting for the interview too. He asked me about the questions they asked and how I did in the interview. So, I told him.

And guess what?. The interview results have come and I have qualified. Thank God!!!.

4