Arcesium Experience

Online Technical Round:

In total 3 sections were there, timers for each section, 25% negative marking for each question.

1) Quantitative Aptitude (15 questions 20 minutes): I was able to solve 9-10 questions from this section. Questions were of easy-medium level.
2) Technical Aptitude (15 Questions 20 minutes): Attempted 7-8 questions in this section. It basically had output based questions with some long code written for every question.
3) Coding round (2 Questions 45 minutes):
   a) Given a sequence of N integers and a number K, you need to insert operators between all N numbers such that final output is divisible by K, operators allowed were +, -, *. The priority would be +, -, * and expression would be evaluated from left to right. N < 10
      E.g. N: 1 2 3 3
           K: 27
           ANS: 1+2*3*3
      I solved this question using BFS approach. I created a queue and enqueued operands and operators in a priority based order. The first element to match the condition would be the answer.
   b) You are given a matrix where '#' represents an island whereas '~' represents the sea, you always start from (0, 0) which is guaranteed to be an island, you can move only horizontally and vertically and change direction only when you are at some island. You need to return the maximum number of islands that you can reach.
      There wasn't enough time left for me to attempt this question. However I tried to implement the brute force approach using DFS. But only one out of the thirteen test cases passed.

After this round, 15 students were shortlisted.

Interview 1st Round:

There were 5 panelists and at a time 3 parallel interviews were going on. This round was about 45-50 minutes long.

1) Give a brief introduction about yourself. I told him that my interest lies in analytics. To that he asked me what do you mean by analytics. I told him about my internship project which was based on Elastic Stack (Elastic search, Logstash, Kibana) and how it can be used to analyze data in real time.
2) What are the components of CPU?
3) What is RAM? How much can we increase the RAM for a particular CPU? I was unable to answer this question correctly. Only mentioned the pros and cons of increasing RAM.
4) What happens when we compile and run a C program? I explained him all the stages involved. Then he asked me about linking and loading process. Which happens first? I answered it correctly.
5) What is OOPS? Different properties of OOPS.
6) Explain in detail polymorphism. I explained him overloading, overriding, compile time and runtime polymorphism. I was asked to code an example for both. I used parent references while showing runtime polymorphism. So he asked me why do we use parent references and what is the use of it.
7) How does compiler know which function to call during runtime polymorphism. How it is implemented internally. I didn't know the answer to it. So I told him that I don't know how it is actually implemented but can tell how I would implement it if given to develop. My method was somewhat similar to the actual implementation.
8) What is virtual memory?
9) Detailed discussion on paging, page table, where it is stored, benefits of virtual memory.
10) What is the limit to virtual memory? How much can we increase it? I told him about thrashing and some concepts related to it.
11) Difference between linked list and arrays. Discussion on use cases of both.
PROGRAMMING QUESTION:
12) Given a linked list. Write a program to reverse the linked list in groups of size k. At first, I explained him the algorithm. Then I was asked to code it. I told him a recursive approach.

13) He asked me to convert the recursive approach to iterative approach. I wrote the code for it too.
14) Difference between recursive approach and iterative approach. Different scenarios where each of the above approach should be used.
15) Given a binary tree. We need to print all root to leaf path sum.
16) Level order traversal of binary tree.

He asked me any questions. So I asked him how open and willing are they to switch towards newer technologies.

After this round only 6 students were selected.

Interview 2nd Round:

This round was based on SQL, Algorithms and Computer Networks.

1. Given a table consisting of the following attributes:
   Employee {emp_id, emp_name, emp_sal, manager_id}.
   Write a SQL query which displays the name of all the employees whose manager's salary is greater than 2000. Also display the manager's name alongside it.
2. Explain different types of joins. I explained him using Venn diagrams.
3. What do you mean by index in DBMS?
4. Difference between clustered and non-clustered indexing in DBMS. It was a detailed discussion on indexing which lasted for about 10 minutes.
   PROGRAMMING QUESTION:
5. Given a binary tree. Count the no of subtrees which have sum equal to k.
   I gave him three different approaches for the above problem, the last one being the most optimized one. He was satisfied with the answer.
6. Given a set of distinct elements of size n. Write a program to print all the subsets for the given set. I told him a solution using recursion. I was asked to write the pseudo code for it.
7. Given a matrix of size n*m consisting of only 0's and 1's. We need to tell the maximum size rectangle area (sub matrix) which consists of only 1's. At first I told him the brute force approach and then quickly moved on towards the optimized approach: O (N^2) time complexity. He asked me to code it. I also gave him a dry run on some examples.

8. What happens when we type www.google.com I gave him a somewhat detailed explanation of the steps involved.
9. What is GET Http request? I told him about how data is sent in GET and POST request, which should be used when.
10. What are the contents of a packet? I told him about headers, protocols, flags, data etc.

After this round 5 students got selected.

Interview 3rd Round:

The Interviewer told me that this round will be a problem solving round.

1. Given N buildings, each have their own heights. So if it rains, how much water will get trapped in between buildings? At first I told him about the brute force approach where we need to check for each building, the leftmost and rightmost top building. Then I told him that we can reduce the time complexity by doing some preprocessing and I was asked to write the pseudo code for it.
2. Given an array {A1, A2, A3,.., AN} consisting of N elements where N<=10^10 and A<=10^10.
   We need to calculate (2^0 * A1) + (2^1 * A2) +….. + (2 ^ N-1 * AN).
   Since the value of N and A is so large, the answer should be the binary representation of it.
   At first I told him the brute force approach which would work for small values of A and N. Then I gave him the solution where we would convert each element of array to its binary representation and then left shift it by the power of 2 assigned to it. Then we will binary add all the numbers. He asked me about the time and space complexity and the maximum length of the answer. He was satisfied with the answer.
3. Write a clean code for printing all the permutations of a string. I told him a recursive approach with the help of swapping. Also gave him a dry run on some examples.
4. Given N prisoners who are numbered from 1 to N. Every day starting from 1st prisoner alive every alternate prisoner was killed. Who will be the last prisoner to survive? I told him by observation answer would be the nearest power of 2 less than N. I was asked to write a code for it.

HR Round:

My HR Round was taken after the 2nd Technical Round.

1. Tell me about yourself.
2. She asked me in which company I was placed before and why do I want to leave it.
3. Why Arcesium?
4. What all places I have visited in India and the favorite place among them.
5. She asked me if I wanted to pursue any further education. I said that I don't have any plans as of now. To which she asked me why no student of NIT Raipur wants to go for higher education.
6. What is my goal in life?
7. What do I do in my leisure time?

Finally, 4 students got placed.