Microsoft Interview | Set 33 (On-Campus for Internship)

- Difficulty Level :\nHard
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Recently Microsoft IDC had visited our Campus for Internship. There were 6 rounds in total for me.

Objective Round :-
The objective round was taken in Cocubes.com, there were 15 questions (1 question was repeated in my set). There was a question about \xe2\x80\x9cRectangular Collisions in an array\xe2\x80\x9d which I had no idea about.

Coding Round :-
There were two coding questions :-
1) Find an element in a sorted array which has been rotated circularly at only one location in O(logn) time.
(Refer https://www.geeksforgeeks.org/search-an-element-in-a-sorted-and-pivoted-array/)

2) Find the inorder successor of a node in a Binary Search Tree.
(Parent pointers were present in the BST). (Refer Method 1 of https://www.geeksforgeeks.org/inorder-successor-in-binary-search-tree/)

Group Interview Round :-
First 10 minutes, he asked about what we expect to be the next big thing in technology. Then he gave two questions :-
1) Given a string, you have to check if it is a valid number or not.(The number can be signed, floating point/integer). If it is a number return true else return false.
The constraints were :-
i) No decision statements allowed (No if-else,no switch-case).
ii) No ternary conditional operators allowed (? : not allowed).
iii) No looping statements allowed (No for/while/do-while).

(My solution was a recursive implementation returning a bool having only one return statement using relational operators and two global variables, one for checking if it is the first occurrence of a \xe2\x80\x98.\xe2\x80\x99 and other for checking if the sign \xe2\x80\x98+\xe2\x80\x99/\xe2\x80\x99-\xe2\x80\x98 occurs in 1st location or not).

2) Bing wants to improve the experience of users by giving reward points to users. Devise an algorithm to assign reward points to different users.

Personal Interview Round I :-
1) You are given a string containing only \xe2\x80\x98(\xe2\x80\x98 and \xe2\x80\x98)\xe2\x80\x99, check if the string is well formed,i.e. check if the parenthesis is well matched.
(Either have a count of \xe2\x80\x98(\xe2\x80\x98 or use a stack for pushing \xe2\x80\x98(\xe2\x80\x98 and popping when \xe2\x80\x98)\xe2\x80\x99 is encountered).

2) There is a Bot Class with the following prototype :-

```
class Bot {\r\n// private data members\r\npublic :\r\n bool moveleft(); // The bot moves one block left and returns tru
```

You are given a bot and the dimension of a maze having walls and some blocks having gold, check if the bot can reach a block containing gold.

(Use dfs graph traversal using the recursive implementation and return true if the current position has gold and return false only if you cannot move any further).

Personal Interview Round II :-
1) You are given the roots of two binary trees, check if the trees are isomorphic or not.(Initially he framed the question for a tree (not a binary tree) and gave me two random nodes instead of the roots).

(Refer https://www.geeksforgeeks.org/tree-isomorphism-problem/)

2) You are given an array of n X m dimension. You start from (0,0)th location. You can move from (i,j) to any of (i + 1,j),(i,j + 1),(i + 1,j + 1)th locations. Find the total number of paths starting from (0,0)th to (i,j)th position.

(For all i and j,dp[i][0] = dp[0][j] = 1, dp[i][j] = dp[i \xe2\x80\x93 1][j \xe2\x80\x93 1] + dp[i][j \xe2\x80\x93 1] + dp[i \xe2\x80\x93 1][j]).

Personal Interview Round III :-
1) Given a dictionary, group the anagrams together.
(Sort each string in dictionary, as anagrams will have same representation after sorting, use a hash map to store the groups of anagrams).
2) He asked questions related to my project.

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All Practice Problems for Microsoft !

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