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Amazon Interview | Set 38 (SDE-I)

- Difficulty Level :\nHard
- Last Updated :\n27 May, 2021

1) (Telephonic round 1)\xc2\xa0
a. Print a matrix in spiral order (Code)\xc2\xa0
Soln: Solved it using recursion. Each recursive call was supposed to print boundary elements. On every recursive call, shifted the origin point and passed the new size of the matrix.\xc2\xa0
b. Given a pair of brace {}. Validate it. (Code)\xc2\xa0
Soln: using two variables (i.e open_count and close_count) and proceed further.\xc2\xa0
c. What if we have multiple types of braces? (Approach)\xc2\xa0
Soln: Using stack.\xc2\xa0

2) (Telephonic round 2)\xc2\xa0
a. Given the list of songs. How would you shuffle it? (Code)\xc2\xa0
Soln: Gave various approaches from naive to optimal. The optimal one was similar to the shuffling of the array of ints.\xc2\xa0
b. Give list of words. Print all anagrams together. (Code)\xc2\xa0
Soln: Used Hashmap with key as \xe2\x80\x9csort(str[i])\xe2\x80\x9d and value as List which is anagrams.\xc2\xa0

3) 3: In-house 1\xc2\xa0
There are various varieties of clothes (say shirt). Varieties are based on parameters like pattern, size, color, etc.\xc2\xa0
a. What will be your input format so that it can store all values of all parameters?\xc2\xa0
List<List<String>>. Each List<String> denotes values for a particular parameter\xc2\xa0
b. Design a class for a shirt for the same requirement.\xc2\xa0
c. You have to return all different types of shirts that can be formed based on various combinations of input parameters. (Code)\xc2\xa0
d. Assuming you have all types of shirts available. Now there are various queries like:\xc2\xa0
i. Show all types of shirts having color \xe2\x80\x9cred\xe2\x80\x9d,\xc2\xa0
ii. Show all types of shirts having size \xe2\x80\x9csmall\xe2\x80\x9d and pattern \xe2\x80\x9ccheck\xe2\x80\x9d etc. etc.\xc2\xa0
So how will you store I/P so that this requirement can be fulfilled efficiently?\xc2\xa0

4) In-house 2\xc2\xa0
a. Given a Binary Tree. Assuming each node denotes some x,y coordinate. root node denotes (0,0). Write a code to display the coordinate of all nodes.\xc2\xa0
case (i): Tree is complete and no node\xe2\x80\x99s x-coordinate is overlapping. (i.e all nodes will expand along the x-axis so that no node overlaps). (Code)\xc2\xa0
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                o(0,0)\n            /           \\\n     o(-1,-1)           o(1,-1)\n    /       \\          /       \\
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Here we can see that many nodes are overlapping over x-coordinate.\xc2\xa0

case (ii): Tree is incomplete and no node\xe2\x80\x99s x-coordinate is overlapping. (Approach)\xc2\xa0
case (iii): Tree is incomplete and the node\xe2\x80\x99s x-coordinate can overlap. (Approach)\xc2\xa0

b. Design a DS to perform\xc2\xa0
Insert\xc2\xa0
Search\xc2\xa0
Delete\xc2\xa0
get Random\xc2\xa0
All in O(1).\xc2\xa0
Soln: Focus on Delete and get_Random. On further analysis, the only get_Random was required to me modified. Only a bit of tweak will serve the purpose.\xc2\xa0

5) In-house 3\xc2\xa0
a. Given the array of ints. Assuming total no. of elements is even. We need to tell whether this array can be grouped in sets of pairs such that the sum of each pair is divisible by K.\xc2\xa0
eg: 0,2,4,8,12,20,18,4 and k=4\xc2\xa0
so (0,8), (2,18), (4,20), (4,12) is one such set in which sum of each pair is divisible by k. (Code)\xc2\xa0

b. There is a vertical rod. Discs of various radiuses are inserted in it. When we will try to take out any disc then 1st all the discs above it has to be taken out. Taking out a disc and putting it back is counted as one step.\xc2\xa0
Considering this, what will be the minimum no of steps in which these discs of the various radius can be stored in sorted order in the rod.\xc2\xa0
Only a minimum no of steps was required. \xe2\x80\x9cHow to sort\xe2\x80\x9d was not required. (Approach)\xc2\xa0

c. Given array of ints. find ar[i],ar[j] such that j>i and ar[j]-ar[i] is maximum. Famous problem. (Code)\xc2\xa0

6) (Semi-Technical- Hiring Manager)\xc2\xa0
a. Normal HR questions. Why Amazon over your previous company, some areas where you want to improve, define dream job, and similar other questions as per the discussions.\xc2\xa0
As per feedback: my answer for \xe2\x80\x9cWhy Amazon over prev company\xe2\x80\x9d was not clear here.\xc2\xa0

b. Given two arrays of ints of size m and m+n in sorted order. merge it inplace. Famous problem. (Code)\xc2\xa0

c. Given string.\xc2\xa0
Qusn: Find the char occurring max no of times.\xc2\xa0
Soln: Simple one. Take an auxiliary array of size 256 and maintain the frequency of each char. Scan auxiliary array and get the required char. O(k+n) where k=256 here.\xc2\xa0
Counter Qusn: Why O(k+n)? Why can\xe2\x80\x99t it be O(n) only?\xc2\xa0
Soln: At the time of maintaining freq of each, compared to get max freq char also. No need to travel aux array again. O(n)\xc2\xa0
Counter Qusn: What if memory size is only 100 bytes?\xc2\xa0
Soln: Detailed one.\xc2\xa0
Counter Qusn: Assuming updating freq of each char takes 1sec, so it will take N secs roughly. How can we improve it?\xc2\xa0
Soln: Use multi-threading for parallel programming.\xc2\xa0
Counter qusn: Will there be any issue?\xc2\xa0
Soln: In case one acquires lock, the other one that needs lock will go in waiting. This adds extra time and so can take more than N secs.\xc2\xa0
Counter Qusn: How to improve this?\xc2\xa0

Soln: Detailed one.\xc2\xa0
And many more such counter questions.\xc2\xa0

7) (Amazon Seattle. Semi HR. Analysis of thought process- BAR RAISER)\xc2\xa0
a. Again the same question. Why Amazon over the previous company?\xc2\xa0
This time I was prepared \xf0\x9f\x99\x82\xc2\xa0
b. One +ve point and one -ve point from the amazon India site.\xc2\xa0
c. Was prepared for this and already did some pre-analysis on the site.\xc2\xa0
Many more such HR questions.\xc2\xa0
d. Analysis of thought process:\xc2\xa0
Assuming a new building is going to be constructed for IT official purpose. 75 floors. You are builder. This building will be on lease for diff companies.\xc2\xa0
i. How many lifts you will add in that building?\xc2\xa0
ii. At which floor each lift will stop?\xc2\xa0
Note: At each step, I had to identify the required data after analysis and then only data for the same was provided.\xc2\xa0
Soln (i): (As it is totally based on thought process, so counter-question from your side is good point)\xc2\xa0
1. No of Lifts are determined by many factors. Major factors are height of lift and no of persons working in that building.\xc2\xa0
2. I was knowing height of building. To calculate no of persons, I asked size of each floor. It was 100 sq m each floor.\xc2\xa0
3. Each floor will have cubicles and other rooms and passages. Assuming 70% of total area is used by cubicles.\xc2\xa0
4. Each cubicle will have 4 persons. After calculation, it came to be 40 employees per floor. So 3000 employees in whole building.\xc2\xa0
5. Next analysis was: In most of the IT companies, the in/out timing is flexible. Generally in time is b/w 9:00-11:00 and out is b/w 5:00-7:00.\xc2\xa0
6. We have 2hrs of the window in which all employees will use the lift. So no of lifts will depend on this factor also.\xc2\xa0
7. After calculation, it came out to be approx 9 lifts (which was a good no according to him).\xc2\xa0
Soln (ii): Now the qusn is at which floor each lift will stop.\xc2\xa0
8. AS we don\xe2\x80\x99t know how many companies will be there in this building at any time, so it is advisable to provide equal chance for employees on the basis of floor no. rather than on the basis of the company.\xc2\xa0
9. Best way would be to minimize the no. of stops of each lift.\xc2\xa0
10. This can be done by giving each lift equal no of floors on which it will stop.\xc2\xa0
11. It can simply be calculated as 75/9= 9 (round off).\xc2\xa0
12. So 1st lift will have floor buttons b/w 1-9, 2nd will have b/w 10-18, and so on.\xc2\xa0
13. This approach was best (according to him) for the current scenario.\xc2\xa0
14. Remember that each floor should get an equal chance and we don\xe2\x80\x99t know how many companies will be there.\xc2\xa0

Tips: Geeksforgeeks, Careercup, Cracking the coding Interview (Book) +++++.\xc2\xa0

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All Practice Problems for Amazon !\xc2\xa0

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