**SWE Intern Interview Round-1 & 2 2021**

**Commonly asked topics : Graphs, Trees, Searching, Sorting, N-ary trees, Tries, Strings, Bit Manipulation**

**1] Consider a mountain as an isosceles right angled triangle with hypotenuse on the x-axis. Given coordinates (x,y) of the peaks of mountains, find the number of visible mountains.**

Approach: The question was pretty vague and eventually it boiled down to finding the extent of each mountain i.e. interval covered by each mountain and finding the number of non overlapping intervals.

**2] Given a 2D binary matrix, return a distance matrix that contains the distance for each cell from the nearest 0.**

Approach: based on multisource bfs

**3] If you are given an array of numbers and frequency is defined as the count of maximum repeated elements in that array. You are given k turns where in each turn you can increase any element by 1, what is the best possible maximum frequency that you can get.** *Ex: [1,2,4], K=5, then answer =3*

Approach: I only gave a brute force solution since I had less than 10 minutes left.

**4] Given an input string X and key(variables), value(values) pairs of strings. construct string Y by replacing the substrings(variable) wrapped in % symbols in X with its value. example:**

**X= “/home/%USER%/test”,(key, value) pairs [“USER”=”user1”] then Y = “/home/user1/test”**

Approach: Iterate over X and add the current char to Y if it’s not ‘%’ otherwise iterate till next ‘%’ and then replace the substring(variable) with it’s value. Here to store (key, value) pairs use unordered\_map for optimization.

**5] This is the follow up question of question 4. Here variables are dependent on other variables i.e a variable can have other variables in the value. (dfs should be used and if cycles found report an error) example input: X= “/%HOME%/%USER%/test”, (key, value) pairs [“HOME” = “/system/%USER%”, “USER”=”/tests”]**

Approach: This is a graph question. A particular variable is connected to the variables which are present in its value. Here we do dfs for finding absolute values of the variables. Maintain a boolean unordered\_map(key: string, value: boolean) which keeps track of the current path. Cycle is detected when we visit a variable which is already in the path. After finding the absolute values of the variables follow Q1 approach.

**6] Given an array of N strings which are paths. print in the format given below.**

**arr = [“/home/user1/test”, “/home/user2/test”, “system/tests”]**

**expected output:**

**home:**

**user1:**

**test**

**user2:**

**test**

**system:**

**tests**

Approach: This is an N-ary tree question. the class for the tree would have the directory name(string) and unordered\_map for child node pointers (<string, node\*>, using string cause two folders/files cannot have the same name). Now we have to iterate over each string and create a new node whenever the current file/folder is not present in the parent directory (can be checked using unordered\_map of the parent node using the current file/folder name). Now for printing in the given format we have to iterate over the unordered\_map of the root directory and do dfs for each node.

**7] Given a complete tree and an index, return true if a node exists at that index otherwise return false. (expected time complexity is O(logn)).**

**Complete tree: The nodes are indexed in bfs order and in each level the indexing is done from left to right (the empty places are also indexed).**

Approach: convert the index into binary number and remove the left most significant digit. Now iterate over the binary number from left to right. If the current digit is 1 then go right otherwise left. If at any point the current node is empty then just return false. After iterating the whole binary number(after removing the first digit) return true.

**8] Find the word prefix.**

Approach: Trie Based question, can be done using trees as well.

**9] Suppose you have one array, where you can have duplicates.**

**And you're given one number.**

**You have to return one array which contains the indices where that number occurs in the sorted input array.**

*Ex: [22, 33, 44, 33, 11] and 22*

*The sorted array would be*

*11 22 22 33 44.*

*So the final ans is [1, 2].*

**10] Follow up question on 9] Return the most frequent element indices in case the given element is not present in the array.**

**11] Follow up question on 10] If there is no unique most frequent element, then return the result for the element, which occurs first in the input array.**

**12] Follow up question on 11] Lastly, for all the elements. Return the indices in the sorted array.**

**FTE Interview Round-1 & 2 2020 [DSA]**

**1] There is a rectangle with left bottom as (0, 0) and right up as (x, y). There are N circles such that their centers are inside the rectangle.**

**Radius of each circle is R. Now we need to find out if it is possible that we can move from (0, 0) to (x, y) without touching any circle.**

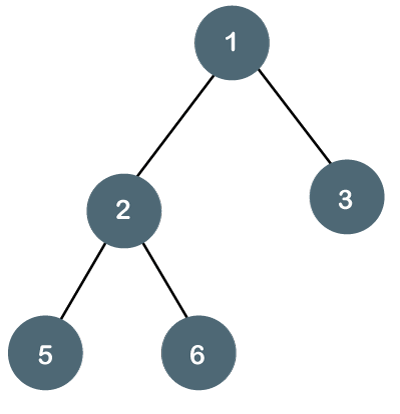
**Note : We can move from any cell to any of its 8 adjacent neighbours and we cannot move outside the boundary of the rectangle at any point of time.**

**r is radius**

**n no of circle.**

**2] Print the right side view of a binary tree.**

**Example input:**



**Example output:** 1 3 6

**3]** [**https://leetcode.com/discuss/interview-question/979117/googlecoding-interviewredistribute-spaces-in-a-fixed-sized-array-of-characters**](https://leetcode.com/discuss/interview-question/979117/googlecoding-interviewredistribute-spaces-in-a-fixed-sized-array-of-characters)

**4] Given a matrix of 0’s and 1’s, where 0’s denote the path available for movement and 1’s denote obstacles. Find the shortest path from (0,0) to (m,n). If no path is possible, return -1.**

**Eg:**

**0 0 0 0**

**1 1 1 0**

**0 0 0 0**

**0 1 0 1**

**0 0 1 1**

**1 0 0 0**

**Ans: 15**

**5] Given a matrix of 0’s and 1’s, where 0’s denote the path available for movement and 1’s denote obstacles. Find the shortest path from (0,0) to (m,n). If no path is possible, return -1.**

**Eg:**

**0 0 0 0**

**1 1 1 0**

**0 0 0 0**

**0 1 0 1**

**0 0 1 1**

**1 0 0 0**

**Ans: 15**

**6] In the above question, if ‘k’ flips are allowed for converting 1s to 0s, what will be the shortest path length in this case?**

**Eg:**

**K = 2**

**0 0 0 0**

**1 1 1 0**

**0 0 0 0**

**0 1 0 1**

**0 0 1 1**

**1 0 0 0**

**Ans: 9**

**7] Given a matrix of 0’s and 1’s, calculate the shortest distance of every cell from its nearest 0 value.**

**Eg:**

**0 0 0**

**0 1 0**

**1 1 1**

**Ans:  
0 0 0  
0 1 0**

**1 2 1**

**8] Given a matrix consisting of values ‘L’ and ‘W’ where L denotes land and W denotes water, find out the size of the largest landlocked area.**

**Eg:**

**L L W**

**L W W**

**W L L**

**Ans:**

**3**

**Eg2:**

**L L L L L**

**L W W W L**

**L W L W L**

**L W W W L**

**L L L L L**

**Ans: 25**

**9] Consider the game of blackJack. There is an infinite stream of cards and the card numbers range from 1 to 10. There is a 10% probability of picking each card irrespective of the previous picks. After some number of picks, if the sum is -**

1. **Less than 17, then continue picking more cards.**
2. **Greater than or equal to 17 but not more than 21, then it's a win.**
3. **More than 21, oops! You are busted!**

**Find the probability of ending up busted.**

**10] Given ‘n’ objects, obj1, obj2, obj3 ….. Objn and ‘Q’ queries denoting the relative ordering of these n objects. Arrange these objects in an n x n matrix such that all the queries are followed and return any one possible solution. In case a solution is not possible, return -1.**

**Eg:**

**n = 3**

**Obj1 is to the left of Obj2**

**Obj3 is to the right of Obj2**

**Obj2 is to the top of Obj1**

**Obj 3 is to the bottom of Obj2**

**Obj1 is to the top of Obj3**

**Obj 2 is to the left of Obj3**

**Ans:**

**\_, 2, \_**

**1, \_, \_**

**\_, \_, 3**

**FTE Interview Round-1 & 2 2020 [HR]**

**1] Consider a situation where you have worked on a project in a team and in the final project presentation, only one person is allowed to present the project. Due to this, the evaluators have formed an opinion that only the presenter has done all the work in the project, but this is actually not the case and everyone has contributed equally. What would you do to correct such a situation?**

**2] Given a hypothetical situation that you have organized an event and have put in the best possible efforts to organize it, but no one turns up on the final event day. What can be done in such a situation?**

**3] What will you do in a situation where you need to do a team project but one of the members simply refuses to contribute or doesn’t seem interested in doing so?**

**AE Intern Interview Round-1 2020**

**1] Given a dictionary that contains mapping of employee and his manager as a number of (employee, manager) pairs like below.**

**{ "A", "C" },**

**{ "B", "C" },**

**{ “A”, ”D” },**

**{ "C", "E" },**

**{ "E", "F" },**

**{ "F", "F" } ,**

**{ "D", "E" },**

**In this example C is manager of A,**

**C is also manager of B, F is manager**

**of C and so on.**

**Write a function to get no of employees under each manager in the hierarchy, not just their direct reports. ~~It may be assumed that an employee directly reports to only one manager~~. In the above dictionary the root node/ceo is listed as reporting to himself.**

**Output should be a Dictionary that contains the following.**

**A - 0**

**B - 0**

**C - 2**

**D - 0**

**E - 1**

**F - 6**

**2] Follow up question 1] Write a function to get no of employees under each manager in the hierarchy, not just their direct reports. In the above dictionary the root node/ceo is listed as reporting to himself.**