Qnance Technologies LLP

Round 1 Coding Test

Guidelines

1. Your solution will be judged on correctness, time taken to complete, time & space complexity of your code and ease in understanding for the reviewer.
2. Mention space and time complexity of your code in comments. All the solutions are expected in best time and space complexity.
3. Handle all the possible corner cases.
4. Write test cases for your code and mention in comments the expected & actual output for these cases.
5. You need to do any 2 questions.

Question 1.

Your friend is designing a security application to protect the country's space program research. The application allows the user to pass through when provided with the correct pass-code, and blocks any malicious attacks but lacks to protect the data when accessed with a pass-code which can be converted to a palindrome by removing at-most 1 character from it. Your friend wants your help to determine such malicious pass-codes from a list of possible options so that he can block this codes from the system entirely.

Implement a function, which takes in a list of strings and return the list of malicious pass-codes present in the list.

Number of strings: N
Maximum length of a string: L
0 <= N <= 1e5
1 <= L <= 1e3

For example:

Example 1:

Input: ["aba", "abcc", "basdf", "masfg", "yzey"]

Output: ["aba", "yzey"]

Example 2:

Input: ["abcba", "abcbea", "abecbea"]

Output: ["abcba", "abcbea"]

Time: 20 mins

Question 2.

You are given a rectangular grid of m x n cells. Each cell is represented by a `*`(star) or one of the four characters, {‘S’, ‘H’, ‘C’, ‘D’}. You have to implement a function findMax() which returns two values: the maximum connected area and whose area it is.

A connected area is the one in which all cells are connected and of same type. Two cells are connected to each other is you can move from one cell to the other using a combination of any of the following moves: North, South, East West, (or up, down, left, right).

Example:

Input:

```
[H * H H * S]
[H H H * H S]
[C C C * H S]
[D D D D * S]
[S S S S S S]
```

Output:

S, 10

Explanation:

H has the two connected regions, one of size 6, other is of size 2
C has one connected region, of size 3
D has one connected region, of size 4
S has one connected region, of size 10

Function Prototype:

```
std::pair<char, int> getMaximumConnectedArea( std::vector<std::vector<char>>&
grid );
```

Time: 25 mins

Question 3:

Given a sorted floating array A of size n, return another array B of size n, such that for every index i, B[i] = number of elements in A such that every element A[i] <= x < A[i] + 1.

Example:

Input array A: [1, 1.5, 2, 2.2, 2.5, 4, 4.6, 4.9, 4.99]
Output array B: [2, 3, 3, 2, 1, 4, 3, 2, 1]

Explanation:

1st element = 1; has 2 elements in A which lie between [1, 2) i.e {1, 1.5}
2nd element = 1.5; has 3 elements in A which lie between [1.5, 2.5) i.e {1.5, 2, 2.2}
3rd element = 2; has 3 elements in A which lie between [2, 3) i.e {2, 2.2, 2.5}
4th element = 2.2; has 2 elements in A which lie between [2.2, 3.2) i.e {2.2, 2.5}
5th element = 2.5; has 1 element in A which lie between [2.5, 3.5) i.e {2.5}
6th element = 4; has 4 elements in A which lie between [4, 5) i.e {4, 4.6, 4.9, 4.99}
7th element = 4.6; has 3 elements in A which lie between [4.6, 5.6) i.e {4.6, 4.9, 4.99}
8th element = 4.9; has 2 elements in A which lie between [4.9, 5.9) i.e {4.9, 4.99}
9th element = 4.99; has 1 element in A which lie between [4.99, 5.99) i.e {4.99}

Time: 20 mins