COL106 Lab Week 8 Questions

Priority Queues

Easy

Problem 1:

In class this week, we learned about the implementation of Priority Queue Data Structure using Heaps. Let's try and code one.

Given some integers, your task is to construct a Min Heap. You may try and submit your code here.

Problem 2:

Now let's use PQ to solve some interesting problem.

In this problem, you are given the scores for all the athletes, and you need to rank them (top scorer gets the highest rank). You should be tempted to think, and try using PQ.

You can submit your code here.

Bonus Problem: If you were able to solve the first two, congrats! You can also try this one now.

Medium

Problem 3:

Given an array, your task is to find k most frequent elements. For detailed problem statement and submission link - refer here.

One direct solution to the above problem would be to just store the frequencies along with each element in a map. What is the time complexity of such an approach? Can you do better?

Problem 4:

In this problem, you are given k (individually) sorted arrays. Merge them into one array such that the output array is also sorted.

You may try and submit here.

Hard

Problem 5:

You are given a stream of integers (i.e. the integers arrive one by one). At any point, you need to return the median of all integers seen so far. The detailed problem statement can be found here.

PS: If it excites you - this question was asked in an Amazon internship interview this year at IITD 🙂

Problem 6:

A very good use of Priority Queues is in a problem like this, You need to find a path from the top-left corner in the grid to the bottom-right that takes minimum time.

The idea behind the solution will be useful in some very famous algorithm which we shall eventually study in this course.