CS345A: Design and Analysis of Algorithms

Mock Quiz

Marks = 11 **Date: 14 August 2023**

NAME: ROLL No:

Attempt any one of the following problems.

1. **Two versions of Gayle and Shapley algorithm**(6 marks)
   Provide an instance of stable matching problem on a set of 3 men and 3 women such that the output of 'man proposing' version of Gayle Shapley is totally different from the output of 'woman proposing' version.
   Note: You just need to provide only the following details in your answer.
   1. The preference lists of 3 men and 3 women.
   2. Output of the two versions of Gayle Shapley algorithm.

2. **Non-dominated points in higher dimensions** (11 marks)
You are given a set P of n points in 3-dimensions. A point $q \in P$ is non-dominated if there is no point $r \in P \backslash \{q\}$ that dominates q in each dimension. Assume without loss of generality that no two points in P have the same x-coordinates or y-coordinates or z-coordinates. Design an $O(n \log n)$ time algorithm that computes all non-dominated points in P.
Hint: Process the points in the decreasing order of their z-coordinates. Under what conditions will ith point in this order be a non-dominated point ? In order to achieve efficiency you might also like to make use of some well known data structure you learnt in ESO207 .
Note: You just need to describe the algorthm. There is no need to analyse its time complexity or prove its correctness.