National University of Computer and Emerging Sciences, Lahore Campus

Course:	Design and Analysis of Algorithms	Course Code:	
Program:	BS (Software Engineering)	Semester:	Spring 2025
Duration:	15 Minutes	Total Marks:	10
Paper Date:	13-Feb-2025	Weight	
Section:	BSE-6A	Page(s):	01
Exam:	Quiz 1 Version 2	Roll. No.	22L-7983
		Name:	Imran Ahmad
Instruction/Notes:	Honesty always gives fruit and Dishonesty is always harmful.		

Q1: Derive the recurrence of following recursive algorithms. Please mention at each step and then give final equation.

```
Mystery (N)
    If (N > 1)                                  - 1
        Then  Print "Deriving recurrence is fun"  - 1
              Mystery (2N/3)                    T (2N/3)
              for (i=1 to N)                    θ(N)
                    Print "Solving recurrence is fun"
              Mystery (N/5)                     T (N/5)
```

$$T(n) = T(2N/3) + T(N/5) + \theta(N)$$

Insertion Sort

Q2: A tournament system records player scores throughout a competition. The leaderboard needs to remain sorted at all times as new scores are added. The total number of players is relatively small, but updates occur frequently. The goal is to maintain an updated ranking efficiently.

Which sorting algorithm is the best choice explain the reason with time and space complexity?

PTO