

AI1103

Assignment 4

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Download Python code and LaTeX from below link :

<https://github.com/KRISHNASAI1105/demo/tree/main/Assignment4>

Problem number GATE CS 2019 Q.20

An array of 25 distinct elements is to be sorted using quicksort. Assume that the pivot element is chosen uniformly at random. The probability that the pivot element gets placed in the worst possible location in the first round of partitioning (rounded off to 2 decimal places) is —

Solution

The worst possible place, the pivot element can be placed is at extreme left or extreme right. So, there are only 2 worst possible locations.

$$Pr(X_1 \text{ is compared to } X_n) = \frac{2}{n}. \quad (0.0.1)$$

Total number of pivot elements = 25.

Number of worst possible location of pivot element gets placed after first round of partitioning = 2.

Probability of placing pivot element in worst

possible locations = $\frac{2}{25} = 0.08$.

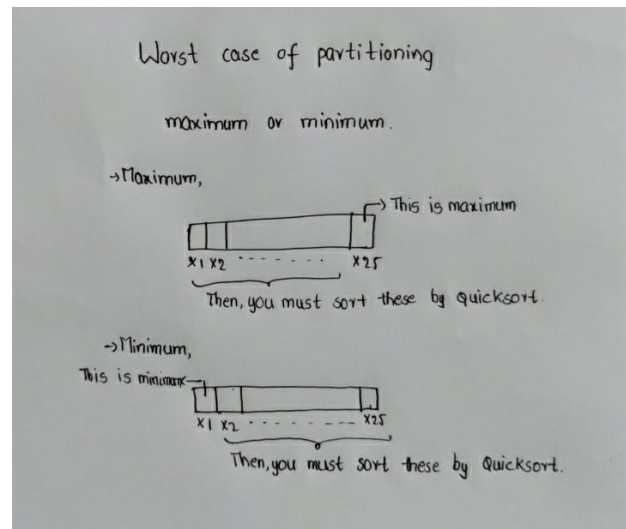


Fig. 0: Theory of worst possible case of partitioning