**Design and Analysis of Algorithms**

**CO 206**

**Assignment: 3**

**Title: Analysis of Sorting Algorithms**

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**Introduction :-**

The aim of this analysis is to compare how various sorting algorithms perform in the context of the execution time as input size changes. Sorting is a basic activity in computer science, applied across many applications, including searching, data organization, and optimization issues. Through efficiency analysis of different sorting methods, we can learn which algorithm excels under a variety of situations, including randomized data sets.

In this study, we will compare the following five sorting algorithms:

**- Bubble Sort**

**- Insertion Sort**

**- Selection Sort**

**- Heap Sort**

**- Merge Sort**

We will compare their performance by comparing execution time for different input sizes, from small (100 elements) to large (500,000 elements). The results will be graphically represented using statistics and graphs to give a clear picture of each algorithm's scalability with an increase in data size.

**Observations :-**

For Arrays:-

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No. of elements/**  **Algorithm** | **Time taken in**  **Bubble Sort**  **(in ms)** | **Time taken in**  **Insertion Sort**  **(in ms)** | **Time taken in**  **Selection Sort**  **(in ms)** | **Time taken in**  **Heap Sort**  **(in ms)** | **Time taken in**  **Merge Sort**  **(in ms)** |
| **100** |  |  |  |  |  |
| **500** |  |  |  |  |  |
| **1000** |  |  |  |  |  |
| **2000** |  |  |  |  |  |
| **5000** |  |  |  |  |  |
| **10000** |  |  |  |  |  |
| **50000** |  |  |  |  |  |
| **75000** |  |  |  |  |  |
| **100000** |  |  |  |  |  |
| **200000** |  |  |  |  |  |
| **500000** |  |  |  |  |  |