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Data Structure & Algorithms

Lab 11

Task 03

1. Comparisons and Swaps Calculation

For each test case and algorithm:

→ **Nearly Sorted Array** { 1, 2, 3 ,5 ,4 }

- ◆ **Insertion Sort:** Comparisons = 4, Swaps = 1
- ◆ **Bubble Sort:** Comparisons = 10, Swaps = 1
- **Completely Unsorted Array** {9,7,5,3,1}
 - ◆ **Insertion Sort:** Comparisons = 10, Swaps = 10
 - ◆ **Bubble Sort:** Comparisons = 10, Swaps = 10
- **Random Array** {4, 2, 9 ,1, 5 ,6, 3}
 - ◆ **Insertion Sort:** Comparisons = 12, Swaps = 8
 - ◆ **Bubble Sort:** Comparisons = 21, Swaps = 14

2. Algorithm Performance Summary

- **Nearly Sorted Array:** Insertion Sort performs better with minimal swaps.
- **Completely Unsorted Array:** Both algorithms perform similarly, but Bubble Sort takes more passes.
- **Random Array:** Insertion Sort is more efficient due to fewer swaps and comparisons.

3. Report Summary

- **Insertion Sort** is faster for nearly sorted data due to fewer required operations.
- **Bubble Sort** is less efficient across test cases due to its repetitive comparisons, especially on random and unsorted arrays.