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| **Al Imam Mohammad Ibn Saud Islamic University**  **College of Computer and Information Sciences**  **Computer Science Department** |
| |  | | --- | | **Programming Assignment 1** | |

Implement the insertion and merge sort algorithms. Compare their performance theoretically and experimentally.

**Part One:**

1. Write the insertion and merge sort algorithms.
2. Conduct a theoretical analysis of the time complexity of both algorithms. Compare and explain their time complexity.

**Part Two:**

1. Implement the insertion and merge sort algorithms.
2. Test and analyze the implemented algorithms using randomly arrays of varying sizes (10, 50, 100, 1000) and record the runtime.
3. Analyze the experimental results and compare them with the theoretical analysis. Write your conclusion (i.e., which algorithm is better).

**Deliverables:**

1. The source code, and
2. Report including the details of part one and two.

**Submission:** 15/1/2024