[CSL202]-Data Structures **2024-25-M**

LAB-VIII

Date: **Oct 03, 2024**.

You need to upload your solutions to canvas portal before 11:59pm on Oct 03, 2024.

1. In your favorite programming language, implement:

   (a) the Insertion Sort algorithm.

   (b) the Merge Sort algorithm.

   (c) the Bubble Sort algorithm.

   (d) the HeapSort algorithm (use Max-Heap)

   Run the above four sorting algorithms on input of sizes 500, 1000, 5000, 10000, 20000, 50000, and 100000.

   (You need to write a code generate the inputs of various sizes as mentioned above)

   For every size run your algorithm at least three times (on three different inputs of same size) and take the average time.

   You should plot results as follows: on the X-axis is the length of the array input. The Y-axis is the measured runtime (average) in milliseconds (or you can plot number comparisons on Y-axis).

   For all the four sorting algorithms, briefly discuss whether their running times grow at the rate you would expect, given their theoretical asymptotic complexity, or grow faster/slower.

   REMARK: Except the Merge sort you have already implemented the other sorting algorithms in the previous Lab sessions. So you can re-use them.