

## **Programming Assignment**

Implement the following sorting algorithms and to collect time performance measurements on them.

1. Insertion sort
2. Heap sort
3. Merge sort
4. Quick sort.

The running time of each sorting algorithm must be measured **in two ways**:

**A. Count the number of key comparisons, COMPCOUNT.**

To obtain this count, it is suggested that you write a function COMPARE(X ,Y ), which will perform a comparison between X and Y and increment COMPCOUNT.

Then, wherever you need to perform a key comparison in your algorithms, you simply make a call to this function.

**B. Use the actual measured CLOCK time.**

**The experiment in two parts.**

For simplicity, you may use integers. For each case, make sure the same original data is input to all four algorithms

1. A small array size,  $n = 32$ , to verify correctness  
Run each algorithm on two sets of data:  
(1) Sorted, (2) Randomly generated.
2. Large array sizes ( $n=2^{10}=1024$ ) for randomly generate data to determine time complexity

Tabulate the performance results, listing both the number of comparisons and the measured clock times.

**File attachments**

- Programming code (source)
- Input file
- Output file produced by your program
- Documentation
- Lessons learned from programming assignment.

**Due to 28<sup>th</sup> Nov.**