Assignment 4 EMPIRICAL STUDY OF SORTING ALGORITHMS – INDIVIDUAL PROJECT – DUE DATE – 28th FEB 2017 11:59 PM:

Your job is to perform empirical study to determine which of the following sorting algorithms perform best under a number of conditions such as size and the nature of input (random, partially sorted, fully sorted). The sorting algorithms to consider: merge sort, quicksort, insertion sort, selection sort, and heapsort.

Part of your study is to empirically determine which algorithms do well for small input sizes (n) and which ones do well for large n. For example, it is known that insertion sort works well for small n while quicksort does well for large n. In that case, combine quicksort and insertion sort into a new algorithm and study its <u>optimal</u> performance. Compare the performance of the optimized algorithm to your previous results.

You must use the Knuth shuffle algorithm to generate random instances for testing purposes. You are required to generate data and collect metrics for input sizes @100 increments and up to 1,000,000. Each case must be averaged over 10 rounds of repeated tests to overcome the fluctuation in the results.

For each of the algorithms you must determine the exact constants associated with the run-time formulae for their expected run-time performance (see the average-case analysis of quicksort, for example).