CSCI 230 -- PA 3

Sorting – Part I

Feel free to discuss and help each other out but does not imply that you can give away your code or your answers! Make sure to read all instructions before attempting this lab.

You can work with a lab partner and each one must submit the same PDF file (include both names in the submission file). Each person must include a brief statement about your contribution to this assignment.

You must use an appropriate provided template from Canvas and output "Author: Your Name(s)" for all your programs. If you are modifying an existing program, use "Modified by: Your Name(s)".

Exercise 1 – Implement Insertion Sort and collect data regarding number of key comparisons and data moves for a small list of 10 integer values. You must try a sorted list, a descending list, and a random list. In addition, collect data for a random list of 100 values.

Exercise 2 – Implement/use Merge Sort from the book and test it on a small list of 10 random integer values first. Collect data regarding number of key comparisons and data moves for a small list of 10 integer values. You must try a sorted list, a descending list, and a random list. In addition, collect data for a random list of 100 values.

Question 1: Do the counts of key comparisons and data moves for insertion sort seem reasonable? Explain why or why not.

Question 2: Do the counts of key comparisons between 10 random values and 100 random values seem reasonable for both insertion and merge sort? Explain why or why not.

Extra Credit Option A: Collect actual run times for both insertion sort and merge sort for a random list of values of various sizes. Try the following random lists: 1000, 10000, and 100000 random integer values.

or

Extra Credit Option B: Conduct a simulation to determine how many levels are needed and number of values at each level for n elements when a skip list is used. Run the simulation 10 times with n = 100 and provide average number of levels, highest level, and average number of values at each level.

Fill out and turn in the PA submission file for this assignment (save as PDF format)