ECE 331
Homework 8

Objective:

Compare execution times of Counting Sort and Merge Sort algorithms while sorting arrays of different sizes. The input arrays to be sorted shall be the same for each algorithm, in order to make a valid comparison.

Assignment:

1. Generate c functions that implement the Counting Sort and Merge Sort algorithms using the pseudo-code given in the course textbook as the basis. (You should already have Merge Sort code from a previous assignment.) Do not use library versions of these two algorithms, nor should you just copy this algorithm from an on-line source.
2. In your main program, include a provision to generate identical, varying size, input arrays for each sorting algorithm. Populate the arrays with integers, using a random number generator function (a library function is fine). For the input arrays, limit the values to a range of 0..1000, to keep the count array to a reasonable size.
3. Use a timing function to measure the execution time for each algorithm to sort the input arrays.
4. Test your sorting algorithms using arrays of size, such as 10, 100, and 1000 elements. Record the execution times and summarize the execution times in a table, ensuring that you provide time units for the execution times, ie seconds, milliseconds, clock cycles, etc.. For better insight, you should plot the results so that you can compare the two algorithm's order of growth. As you will be executing your programs on machines that are supporting multi-processing, you will find that repeated tests using the same size input arrays will give you varying results. Repeat each test a few times to find average execution times for each size of input array.
5. Generate a short summary of your experimental observations and based on your results, provide a commentary on when you would use each algorithm. (You may want to conduct more experiments to refine your recommendations.)