# CSE 373 – Data Structures
# Homework 6

Assigned:        Wednesday, May 15, 2002
Due:             Wednesday, May 22, 2002
                 At the start of class

Remember:
    Attach a copy of the tabular timing data
    Attach a copy of your plot of the timing data
    Attach a copy of your turnin receipt
    Do a web turnin of sort.c.

Your name:        _____

Student number:   _____

1. What are the increments that your implementation of ShellSort uses when it sorts the 100 symbols from file U-sym100.txt?

2. Write down your code that calculates the increments listed in Question 1, and explain how it calculates those values.

3.  Write down your code that implements InsertionSort and identify all the loops in it.

4.  If all N of the symbols in the array to be sorted are equal, what is the run time of this code, expressed in big-Oh notation in terms of N? Explain how you derived this result.

5.  Consider the code that implements MergeSort, specifically the function MSort. When the program is sorting the 10 symbols from the file U-sym10.txt, the first call to MSort is made by MergeSort and the values of Left and Right are 0 and 9. In the table below, fill in a row for each following call to MSort until you hit a row where the values of Left and Right are the same. Fill in one more row after that.

There are more rows in the table than you need.

| MSort(A, Tmp, | *Left value,* | *Right value,* | C); |
|---|---|---|---|
| MSort(A, Tmp, | 0 | 9 | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |
| MSort(A, Tmp, | | | C); |

6.  Consider the following list, which we would like to have in increasing order. How many inversions are there?

$$3 \qquad 63 \qquad 31 \qquad 15 \qquad 7 \qquad 127$$

7.  If we applied the QuickSort algorithm to the list shown in question 6 and used the Median3 function to pick the pivot, what would be the first pivot value?