EECE 4040 - Homework 2
Group: Matthew Jackson (jacks3mh), Nathan Sucher (suchernm)
Group Number: 2
Due: 10/7/19

Merge Sort			**Quick Sort**		
List Size	*Threshold*	*Sort Count*	*List Size*	*Threshold*	*Sort Count*
100	8	93	100	8	62
500	8	492	500	8	396
1000	8	992	1000	8	900
10000	8	9995	10000	8	9900
100	12	87	100	12	62
500	12	492	500	12	403
1000	12	992	1000	12	890
10000	12	9990	10000	12	9900
100	16	87	100	16	67
500	16	484	500	16	400
1000	16	984	1000	16	891
10000	16	9990	10000	16	9900

Figure 1: Merge Sort v. Quick Sort

Our group ran many tests of different list sizes and threshold values through our Threshold sort program. We tested 3 (8, 12, 16) different threshold values, with 4 (100, 500, 1000, 10,000) increasing larger list sizes for each threshold value. We noticed that once the list size got to a certain size (in our case 10,000), there didn't seem to be a big difference based on threshold between Mergesort and Quicksort. The threshold value had very little, if not zero, impact of the amount of comparisons. Our largest percent difference between Mergesort and Quicksort occurred with a threshold value of 12 and a list size of 500. Overall, from our data, threshold value didn't have much effect on the sort counts regardless of the list size. The Quicksort algorithm consistently had a lower sort count compared to Mergesort regardless of

both threshold value and list size. The best sorting routined was Quicksort with a threshold of 12. That routine consistently had lower sort counts compared to its counterparts.

```
The purpose of this program is to allow for user testing
of Mergesort and Quicksort algorithms where Insertionsort
is used as a threshold sort.

The program will begin by asking the user for inputs to be
used in the program. These being:
     -Threshold Value
     -Size of sortable list
     -Whether the list should be created manually/automatically
     -Whether the list should be displayed or not

After valid values are provided, the program will either create
an array of random numbers or the user will input list values depending
on their inputs. The display of the initialized unsorted list will be displayed
or not depending on these values as well.

The implemented sorting algorithms will process the list and when complete,
display the sorted list.



Please enter the threshold value.
12

Please enter the size of the list to sort.
500
Merge Sort Counter: 492
Quick Sort Counter: 403

Would you like to play again? [y or n]?
n
matthew@matthews-air:~/Files/EECE4040_DS/EECE4040_DataStructures$
```

```
Please enter the threshold value.
8

Please enter the size of the list to sort.
10

Would you like the values in the list to be initialized Manually[1] or Automatically[2]?
2

Would you like to have the array displayed Yes[1] or No[0]?
1


Unsorted Array...
Value 0 is: 86
Value 1 is: 69
Value 2 is: 13
Value 3 is: 20
Value 4 is: 95
Value 5 is: 97
Value 6 is: 93
Value 7 is: 46
Value 8 is: 55
Value 9 is: 80


Merge Sort...
Value 0 is: 13
Value 1 is: 20
Value 2 is: 46
Value 3 is: 55
Value 4 is: 69
Value 5 is: 80
Value 6 is: 86
Value 7 is: 93
Value 8 is: 95
Value 9 is: 97

Quick Sort...
Value 0 is: 13
Value 1 is: 20
Value 2 is: 46
Value 3 is: 55
Value 4 is: 69
Value 5 is: 80
Value 6 is: 86
Value 7 is: 93
Value 8 is: 95
Value 9 is: 97

Merge Sort Counter: 5
Quick Sort Counter: 4

Would you like to play again? [y or n]?
```