CS 326 – Project #03

Purpose: Become familiar with Quorum arrays and subroutines
Points: 75

Assignment:
Write a simple Quorum program main and several subroutines. The main should call the following routines:

- **GetData** – Routine to create a list of random numbers. The routine should request the *count* of numbers to create from the user (via input). Then, the routine must place *count* many numbers in the array. Create random numbers between 0 and 10,000 (i.e., use: `random:RandomIntegerBetween(0, 10000)`)
- **DisplayNums** – Routine to display the numbers in the array (up to *count*).
- **QuickSort** – Routine to sort the numbers into ascending order (small to large) using the Quick Sort. The algorithm for the Quick Sort is as follows:

```
void quicksort (int[] a, int lo, int hi)
{
//  lo is the lower index, hi is the upper index
//  of the region of array a that is to be sorted
    int i=lo, j=hi, h;
    int x=a[(lo+hi)/2];

    //  partition
    do
    {
        while (a[i]<x) i++;
        while (a[j]>x) j--;
        if (i<=j)
        {
            h=a[i]; a[i]=a[j]; a[j]=h;
            i++; j--;
        }
    } while (i<=j);

    //  recursion
    if (lo<j) quicksort(a, lo, j);
    if (i<hi) quicksort(a, i, hi);
}
```

- **Stats** – Routine to find the average, variance, and standard deviation of the numbers in the array.

$$variance = \frac{\left(\sum_{0}^{len-1} (array(i) - ave)^2 \right)}{len - 1}$$

$$standard\ deviation = \sqrt{variance}$$

- **Display Data** – Routine to display the results of the program, including the average, variance, and standard deviation and sorted numbers. This routine must call the DisplayNums routine to display the sorted array (10 per line).

Create a simple main to test the functions. The main should prompt for the count of numbers to generate and call the applicable routines. The count should be between MIN=10 and MAX=1,000,000 (inclusive). The MIN and MAX should be declared as constants. The input need only handle integer input.

Submission:

- Submit a copy of the program source file (.quorum).

Assignments received after the due date/time will not be accepted.

You may re-submit as many times as desired.