COSC 501

Lab 7

Program 1 (30 points)

Write a C++ program that inserts 10 numbers into an array, and calculates the average of even/odd elements of the array. The program should call the function "printArray" that lists the elements of the array. The function "printArray" takes as input an array of integers and an integer that specifies how many entries are in the array. The average should be displayed with only two decimal places using "cout.setf" and "cout.precision".

*even element: array[0], array[2], array[4], array[6], and array[8]
odd element: array[1], array[3], array[5], array[7], and array[9]

Sample Output: Red colored texts are user inputs. Other texts are the output of the program.

```
Enter 10 numbers:
10 16 21 44 31 8 74 6 3 61

List the array elements
array[0]: 10
array[1]: 16
array[2]: 21
array[3]: 44
array[4]: 31
array[5]: 8
array[6]: 74
array[7]: 6
array[8]: 3
array[9]: 61

Average of even elements: 27.80
Average of odd elements: 27.00
```

Program 2 (30 points)

Write a C++ program that creates an array with 20 random numbers between 1 and 100, and passes the array to functions in order to print the array, print the array in reverse order, find the maximum element of the array, and find the minimum element of the array.

List of functions:

- void printArray(int a[], int size) //Print array elements from a[0] to a[size-1]
- void printArrayReverse(int a[], int size) //Print array elements from a[size-1] to a[0]
- int max(int a[], int size) //return the maximum value of the array
- int min(int a[], int size) //return the minimum value of the array

Sample Output: Red colored texts are user inputs. Other texts are the output of the program.

```
Random Array: [17 67 49 26 24 26 70 42 2 22 20 87 42 73 33 21 87
37 84 66 ]
Random Array In Reverse Order: [66 84 37 87 21 33 73 42 87 20 22
2 42 70 26 24 26 49 67 17 ]
Max value of the array: 87
Min value of the array: 2
```

Program 3 (40 points)

Write a program that reads in a list of integers into an array with base type int. The program should read this array from a file "Lab7_3input.txt". You may assume that there are fewer than 50 entries in the array. Your program determines how many entries there are. The output is to be a two-column list. The first column is a list of the distinct array elements; the second column is the count of the number of occurrences of each element.

(Optional: The list should be sorted on entries in the first column, largest to smallest.)

For example, for the input

```
-12 3 -12 4 1 1 -12 1 -1 1 2 3 4 2 3 -12
```

the output should be

```
N      Count
-12    4
3      3
4      2
1      4
-1     1
2      2
```

After sorting,

```
N      Count
4      2
3      3
2      2
1      4
-1     1
-12    4
```

Submission:

You should submit your source files (.cpp). Please name your files to include the lab number and program number, e.g. Lab0Program1.cpp. Also create a word or pdf document for the answers to the lab questions and screenshots of running results.