

Topic: Arrays and Strings

Question 1

Develop a menu driven program to process the marks for N students where $1 \leq N \leq 10$ performs following services:

1. Enter scores and store them in a one dimension array called **scores**
2. Display entered score (each score on a separate line)
3. Display the maximum, minimum, average and standard deviation
4. Display the statistical summary of the grades
5. Display how many passed and how many failed
6. Terminate the program

Note: The value of **N** should be entered when user selects option number 1 and it must be restricted to allowable range. Scores should be within allowable range (0-100). Take care if the user chooses options 2-5 before entering the data. Statistical summary of the grades (for service number 4) should be as follows (Using UDSM grading system):

Grade	No. of students
A	X
B+	X
..	...
E	X

Note: Each service (except number 6) should be serviced by a method. Use following method names: **enterData**, **displayData**, **displayMaxMinAvgStd**, **statSummary** and **passedFailed** respectively. Use **only one class**.

Question 2

Modify the code you developed for question 2 LAB Questions SET 4, by including following two arrays in your code. Insert all the months in the monthNames.

```
String[] monthNames={"January", "February", "March"...};  
int[] daysMonth={31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31};
```

Now utilize the above two arrays in answering the question. This will by all means reduce the number of lines in your code compared to your previous solution of question 2 LAB SET 4.

Question 3

Write a program which receives N integer numbers from the keyboard, where $1 \leq N \leq 10$ and store them in an array called **numbers**. Using **numbers** array, find and display the largest number and count the occurrence of that largest number, find and display the smallest number and count the occurrence of that smallest number. For example, if $N=7$ and you entered the numbers 3, 5, 2, 5, 5, 2 and 5, then the largest number is 5 and its occurrence count is 4. The smallest number is 2 and its occurrence count is 2. Then display all numbers from **numbers** array using *enhanced for* loop (all numbers in the same line), and then by using *counter-controlled for* loop.

Question 4

Write a program which receives N **double** numbers from the keyboard, where $1 \leq N \leq 7$ and store them in an array called **numbers**. Develop a method called **swap** which can be used to swap (interchange) two array elements at positions **pos1** and **pos2**. The method header will look like:

```
static void swap(double[] numArray, int pos1, int pos2)
```

numArray will receive the array passed to **swap** method, **pos1** and **pos2** will identify which positions to swap. Test **swap** method within **main** method by prompting the user to enter the positions (indices) to swap. You should make sure that the entered positions (indices) are within the range. For example, if $N=5$, then valid indices will be from 0 up to 4. After calling **swap** method, display all elements in an array and check if the two specified elements have been swapped.

Question 5

Modify code of question 4 above so that the user enters elements in an array **numbers** and display the elements in ascending order using bubble sort algorithm. Pseudocode for **Bubble sort** in ascending order for N elements in **numbers** array is as follows:

```
for (int i=0; i<N-1; i++){
    for (int j=i+1; j<N; j++){
        if (numbers[j] < numbers[i])
            swap(numbers,i,j);
    }
}
```

==END==