Lab1

The objective of this lab is to familiarize you with C# and its console. In the following, you will review some basics in C# to refresh and prepare your mind.

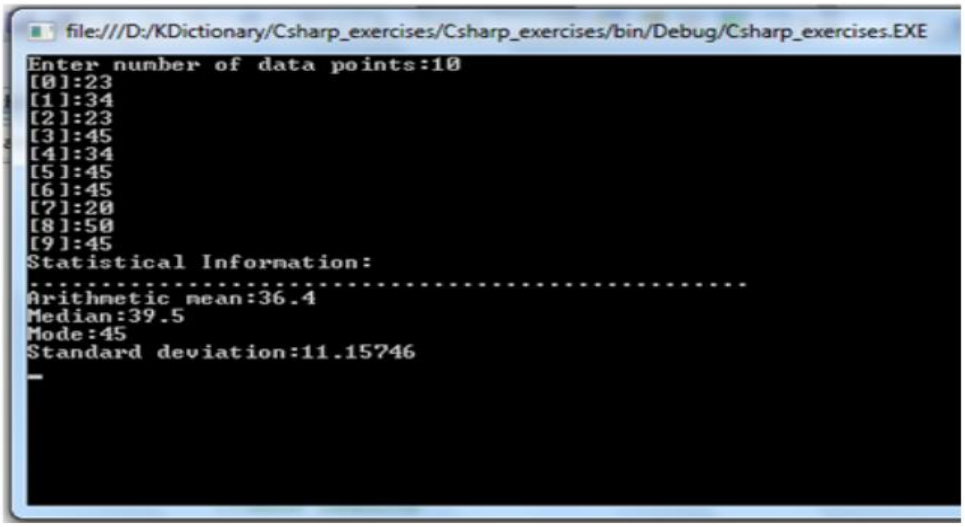
I. Using if, while, for, switch etc

I.1 Create a C# program to return the change of a purchase, using coins (or bills) as large as possible. Assume we have an unlimited amount of coins (or bills) of 100, 50, 20, 10, 5, 2 and 1, and there are no decimal places. Thus, the execution could be something like this:

Price? 44
Paid? 100
Your change is 56: 50 5 1
Price? 1
Paid? 100
Your change is 99: 50 20 20 5 2 2

I.2 Write a C# program to display alphabet pattern like 'X' with an asterisk.

I.3 Write a C# program to answer about the statistical information such as arithmetic mean, median, mode, and standard deviation of an integer data set. The data points are input by the user from keyboard. This program will display the output similar to the one shown below:



I.4 Write a program using a switch statement that takes one value from the user and asks about the type of conversion and then performs a conversion depending on the type of conversion. If user enters:

I -> convert from inches to centimeters.
G -> convert from gallons to liters.
M -> convert from mile to kilometer.
P -> convert from pound to kilogram.

If the user enters any other character then show a proper message.

I.5 Write a program that takes coordinates (x, y) of a center of a circle and its radius from the user, the program will determine whether a point lies inside the circle, on the circle or outside the circle.

II. Creating the functions

II.1 Create a function named “GetInt”, which displays on screen the text received as a parameter, asks the user for an integer number, repeats if the number is not between the minimum value and the maximum value which are indicated as parameters, and finally returns the entered number:

age = GetInt(“Enter your age”, 0, 150);

would become:

Enter your age: 180
Not a valid answer. Must be no more than 150.
Enter your age: -2
Not a valid answer. Must be no less than 0.
Enter your age: 20

II.2 Write a program in C# Sharp to create a recursive function to find the factorial of a given number.

II.3 Create a function named “WriteTitle” to write a text centered on screen, uppercase, with extra spaces and with a line over it and another line under it:

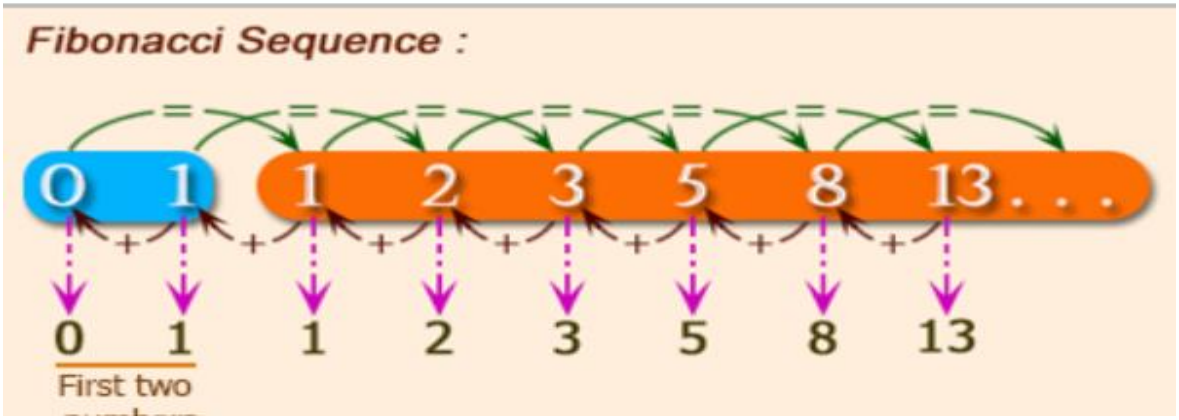
WriteTitle(“Welcome!”);

would write on screen (centered on 80 columns):

---------- W E L C O M E ! ----------

(Obviously, the number of hyphens should depend on the length of the text).

II.4 Write a program in C# Sharp to create a recursive function to calculate the Fibonacci number of a specific term.



II.5 Write a C# program to allow a user to guess a number(from 1 to 6) that will be randomly generated by computer and the user has chances to continue.

III. Array

III.1 A two-dimensional array stores values in rows and columns. By using two-dimensional array, write C# program to display a table of numbers as shown below:

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

III.2 By using two-dimensional array of C# language, write C# program to display a table that represents a Pascal triangle of any size. In Pascal triangle, the first and the second rows are set to 1. Each element of the triangle (from the third row downward) is the sum of the element directly above it and the element to the left of the element directly above it. See the example Pascal triangle(size=5) below:

1				
1	1			
1	2	1		
1	3	3	1	
1	4	6	4	1

IV. Exceptions

IV.1 Write a program in which the user is asked to enter an integer by handling the exception in the case where he does not enter an integer correctly by asking him to redo the entry.

IV.2 Write a program in which the user is asked to enter his date of birth, handling the exception in the case that he does not enter a valid date by asking him to redo the entry.

IV.3 Write a program that asks the user for a departure date and an arrival date, generate an exception if the arrival date is less than the departure date.