COMP 1098 Midterm Fall 2022

1) (10 marks) Write a function named abs_val that returns the absolute value of an int passed to it by value. You cannot use the abs() function library.

```
public class Program1
{
    // Question1
    public static int abs_val(int number)
    {
        if (number < 0) // If the number is negative then it will be converted into
positive
        {
            number = number * -1;
        }
        else // If the number is positive then it will simply assign the same value in
the integer
        {
            number = number;
        }
        return number; // return the number
    }


    public static void Main(string[] args)
    {
        // Asking user for the integer value
        Console.Write("Enter an integer value here:");
        // Reading the integer value
        String x = Console.ReadLine();
        // Converting the string value into integer
        int y = Convert.ToInt16(x);
        // Calling the function
        int answer = abs_val(y);
        // Printing the answer
        Console.Write("The Absolute value is: "+answer);
    }
}
```

2) (10 marks) Write a rangeSum function which

- Prompt the user for two positive integers and b. (asks for input)

- Write a separate function, **rangeSum** to compute the sum of the consecutive integers from a to b inclusive (that includes both a and b).

- The rangeSum function should only calculate the sum. It should print a, b and sum.
- Example: a = 5, b = 7. Output is a is 5, b is 7, sum is 18.

```
public class Program1
{

    public static int rangeSum(int firstInt, int secondInt)
    {

        int sum = 0;
        for (int i = firstInt; i <= secondInt; i++)
        {
            sum += i;
        }

        return sum;
    }



    public static void Main(string[] args)
    {
        // Asking user for the first integer value
        Console.Write("Enter 1st Integer here:");
        String first = Console.ReadLine();
        int firstInt = Convert.ToInt16(first);

        // Asking user for the second integer value
        Console.Write("Enter 2nd Integer here:");
        String second = Console.ReadLine();
        int secondInt = Convert.ToInt16(second);

        // Calling the function
        int finalAnswer = rangeSum(firstInt,secondInt);
        Console.WriteLine("The value of first integer is:"+firstInt);
        Console.WriteLine("The value of second integer is:"+secondInt);
        Console.Write("The sum of the numbers from "+firstInt+" to "+secondInt+" is:
"+finalAnswer);
    }
}
```

3) Short answers and theoretical questions (2 marks each)

a) What initial value should be assigned to **b** at line **6** so that the output of this program is **10**?

The value of b is 5.

```
public static void Main(string[] args)
{
 int sum=0; int n=1;
 int b;

 b=??;
 while(n<b)
{
  sum += n;
```

```
  n += 1;
}
 Console.WriteLine(sum);
```

3b) What is the function prototype to declare a reference to the int "numPlayers"?

Void name_of_the_function(int& numPlayers);

Public can also be used before void to make it available publicly.

Here the name of the function is not given, so I used name_of_the_functions

3c) What is the purpose of a pointer and when would you use it? (Describe with an example)

A pointer is only a variable that stores the memory address of another type or variable. The default setting for C# prohibits the use of pointers. In C#, pointers can only be used on value types and arrays. Pointer is used to get the memory address of a variable and it is used whenever the code has unsafe content.

```
// Example
int val = 50; //creating and assigning a value to a variable
int *x = & val;
// here &val gives the memory address of val
// *x is the pointer variable
Console.WriteLine((int)x); // Displays the memory address of the variable
Console.WriteLine(*x);  // Displays the value at the memory address.
```

3d) What is the difference between an Array and Arraylist?

Array	ArrayList
(1) An array can hold both primitives and objects. (2) Array is static in nature. (3) It is faster than arraylist due to its static behavior. (4) Array can be multi-dimensional (5) For and ForEach loop is used to transverse in an array. (6) It is unsafe as compared to arraylist (7) Array.Length() method is used to find the length of an array in c#.	An arraylist can hold only objects. Arraylist is dynamic. It is slower than array due to its dynamic behavior. ArrayList is always single-dimensional. Iterator is used to transverse in an array. It is safe as compared to array. ArrayList.Count is used to find the length of the arraylist in c#

3e) What is the difference between public, static and void?

public –It is an access specifier that states that the method can be accesses publicly. The public method can be accessed anywhere, in the same file or linked file. There are other modifiers too such as private and protected but this modifier cannot be accessed anywhere.

static – Here, the object is not required to access static members.

void – This states that the method doesn't return any value.