Q.1. What would be the output of the following program? By considering your output, explain stepby-step how the successive calls of replace method is executed in this program?

```
using System;
namespace HelloWorld
{
    class Program
    {
        static void Main(string[] args)
        {
            string s1, s2, s3;
            Console.WriteLine(" Enter your First Name : ");
            s1 = Console.ReadLine();
            Console.WriteLine(" Enter your Second Name : ");
            s2 = Console.ReadLine();
            s3 = s2.Replace(s1, s2).Replace(s2, s1);
            Console.WriteLine("The final string: '{0}'", s3);
            Console.ReadKey();
        }
    }
}
```

• s1 must be your first name, e.g. for name: Salman Ahmed s1 would be Salman.

• s2 must be your last name, e.g. for name: Salman Ahmed s2 would be Ahmed.

OUTPUT:

The s1 and s2 will be assigned with the inputs from the keyboard as follows.

s1 = "Amaan"

s2 = "Ahmed"

The Replace functions work as follows

s3 = s2.Replace(s1, s2).Replace(s2, s1);

First the below Replace function will be executed

s2.Replace(s1, s2)

When the Replace function is executed, the actual values will be substituted as follows

"Amaan".Replace("Amaan", "Ahmed");

In the above statement, the string "Ahmed" will be searched for any presence of the string "Amaan" in it. If anything is found, it will be replaced with the string "Ahmed". But in this case, it is not there. So there will be no change to the original string "Ahmed".

So "Amaan".Replace("Amaan", "Ahmed") will return "Ahmed".

Coming back to the complete statement

s3 = s2.Replace(s1, s2).Replace(s2, s1) will be substituted as s3 = "Amaan".Replace(s2, s1)

The statement now becomes "Amaan".Replace(s2, s1)

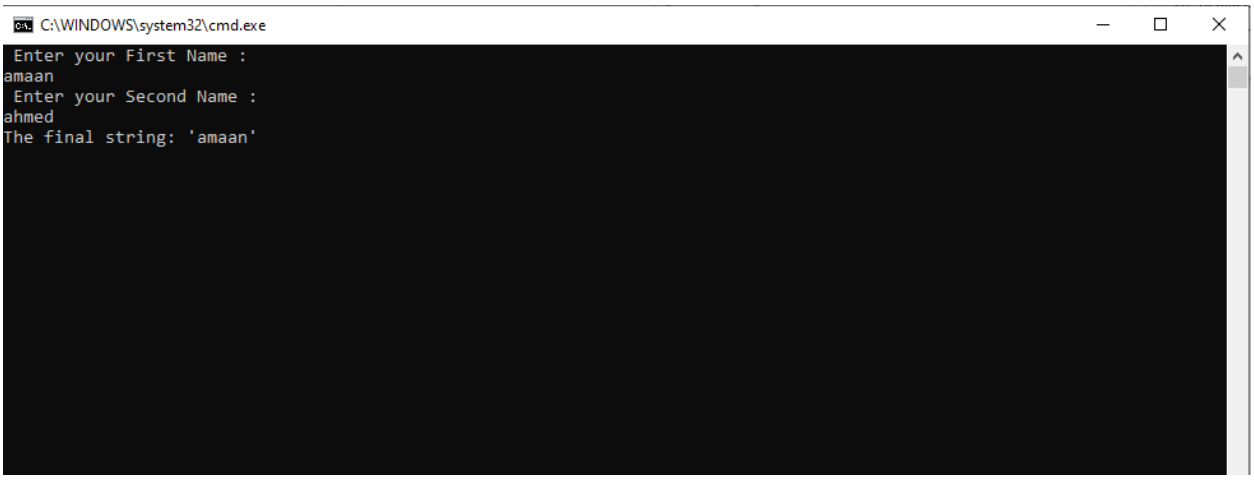
This will be substituted with the actual values as

"Amaan".Replace("Ahmed", "Amaan")

The above statement will take the string "Ahmed" and the replace statement checks for any presence of the string "Ahmed" in it and if found replace it with the string "Amaan". Thus the original string is replaced with "Amaan".

Thus the statement "Amaan".Replace("Ahmed", "Amaan") will return "Amaan"

To conclude s2.Replace(s1, s2).Replace(s2, s1) will return "Amaan" and get assigned to the variable s3.



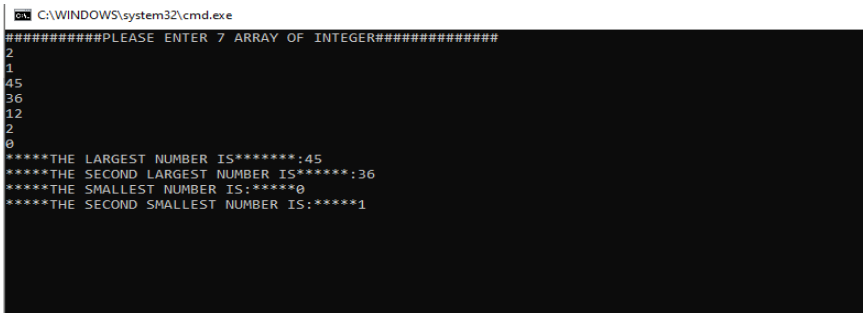
Q2 Write a program in C# to read a one dimensional integer array of size N (N elements) from the user and determine the following based on the value of X: X = Y % 3 i. Find the largest and second largest values from the array if X = 0. ii. Find the smallest and largest values from the array if X = 1. iii. Find the smallest and second smallest values from the array if X = 2. Where • "Y" must be your roll number, e.g. for roll no. 2020F-CS-010 the value of Y would be 10. • "N" will be the sum of last 3 digits of your CNIC Number, e.g. for CNIC Number: 42101-1234567-8 → 6+7+8= 21, the value of N will be 21. Note: In case you don't have CNIC then use your father's CNIC number.

INPUT:

```
using System;
namespace ConsoleApplication255
{
    class Program
    {
        static void Main(string[] args)
        {
            int w;
            int x;
            int y = 49;
            x = y % 3;
            int largest = 0;
            int second_largest = 0;
            int L1;
            int L2;

            int[] size = new int[7];

            Console.WriteLine("###########PLEASE ENTER 7 ARRAY OF
INTEGER##############");
            for (w = 0; w < 7; w++)
            {
                size[w] = Convert.ToInt32(Console.ReadLine());
            }
            for (w = 0; w < 7; ++w)
            {
                if (size[w] > largest)
                {
                    largest = size[w];
                    L1 = w;
                }
            }
            for (w = 0; w < 7; ++w)
            {
                if (size[w] > second_largest)
                {
                    if (size[w] == largest)
```

```
                    continue;
                second_largest = size[w];
                L2 = w;
            }
        }
        int min = size[0];

        for (w = 0; w < 7; w++)
        {
            if (size[w] < min)
            {
                min = size[w];
            }
        }

        int fir = size.Length;
        int second_smallest = size.Length;

        for (w = 0; w < size.Length; w++)
        {
            if (size[w] < fir)
            {
                second_smallest = fir;
                fir = size[w];
            }
            else if (size[w] < second_smallest)
            {
                second_smallest = size[w];
            }
        }



        Console.WriteLine("*****THE LARGEST NUMBER IS*******:" + largest);
        Console.WriteLine("*****THE SECOND LARGEST NUMBER IS******:" +
second_largest);
        Console.WriteLine("*****THE SMALLEST NUMBER IS:*****" + min);
        Console.WriteLine("*****THE SECOND SMALLEST NUMBER IS:*****" +
second_smallest);
        Console.ReadLine();
    }
  }
}
```

OUTPUT:



Q.3. A parking garage charges a Rs(10+X) minimum fee to park for up to N hours. The garage charges an additional Rs(X) per hour for each hour in excess of N hours. Write an app that calculates and displays the parking charges for each customer who parked in the garage. You should enter the hours parked for each customer. The app should implement the above scenario by using following concept based on the value of N: i. Static class (if value of N is between 0 and 9) ii. Abstract Class (if value of N is between 10 and 18) iii. Interface (if value of N is between 19 and 27) Where • "X" must be your roll number, e.g. for roll no. 2020F-CS-010 the value of X would be 10. • "N" will be the sum of last 3 digits of your CNIC Number, e.g. for CNIC Number: 42101- 1234567-8 → 6+7+8= 21, the value of N will be 21. Note: In case you don't have CNIC then use your father's CNIC number.

INPUT:

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;

namespace oop
{
    static class Parking
    {
        public static int X = 49;
        public static int N = 7;
        public static int hours = 0;
        public static int charge = 0;

        public static void calculateCharge()
        {
            string a;
            Console.WriteLine("PLEASE ENTER THE NO.OF HOURS:");
            a = Console.ReadLine();
            hours = Convert.ToInt32(a);
            if (hours > 0)
            {
                if (hours <= N)
                {
                    charge = 10 + X;
                }
                else
                {
                    charge = 10 + X;
                    for (int i = 0; i < (hours - N); i++)
                    {
                        charge = charge + X;
                    }
                }
            }
            else
            {
                Console.WriteLine("OOPS!!..Invalid Input...");
            }
        }
```

```
        public static void display()
        {
            Console.WriteLine("THE TOTAL CHARGE IS: {0}", charge);
        }
    }

    class Program
    {
        static void Main(string[] args)
        {
            Parking.calculateCharge();
            Parking.display();
            Console.ReadKey();
        }
    }
}
```

OUTPUT:

Q.4. a) Create a Simple Array of N Integers. Ask the user which array element he wants to see. Output the integer which user asked for and provide a way for the user to indicate whether he wants to see another integer, or to end the program.

a) INPUT:

```
using System;
using System.IO;

class Program
{

    static void Main()
    {

        int[] array = new int[7];

        array[0] = 1;
        array[1] = 2;
        array[2] = 3;
        array[3] = 4;
        array[4] = 5;
        array[5] = 6;
        array[6] = 7;


        do
        {


            Console.Write("WHICH ARRAY DO YOU WANT TO SEE: ");
            int ind = Convert.ToInt32(Console.ReadLine());


            Console.Write("AT INDEX " + ind + " is " + array[ind] + "\n");


            Console.Write("WANNA CONTINUE (Q OR q): ");
            char ch = Console.ReadLine()[0];

            if (ch.CompareTo('q') == 0)
                break;

        } while (true);
    }
}
```

OUTPUT:

b) Modify the above Question 4(a) to handle one specific exception based on the value of N. i. IndexOutOfrangeException (if value of N is between 0 and 7) ii. FormatException (if value of N is between 8 and 14) iii. ArrayTypeMismatchException (if value of N is between 15 and 21) iv. DivideByZeroException (if value of N is between 22 and 27) Where “N” will be the sum of last 3 digits of your CNIC Number, e.g. for CNIC Number: 42101-1234567-8 → 6+7+8= 21, the value of N will be 21. Note: In case you don't have CNIC then use your father's CNIC number.

INPUT:

```
using System;
using System.IO;

class Program
{

    static void Main()
    {


        int[] array = new int[7];

        array[0] = 1;
        array[1] = 2;
        array[2] = 3;
        array[3] = 4;
        array[4] = 5;
        array[5] = 6;
        array[6] = 7;


        do
        {

            Console.Write("WHICH ARRAY DO YOU WANT TO SEE: ");
            int ind = Convert.ToInt32(Console.ReadLine());
```

```
            try
            {
                Console.Write("AT INDEX  " + ind + " is " + array[ind] + "\n");
            }
            catch (System.IndexOutOfRangeException)
            {
                Console.Write("Not a valid index\n");
            }

            Console.Write("WANNA CONTINUE (Q OR q): ");
            char ch = Console.ReadLine()[0];

            if (ch.CompareTo('q') == 0)
                break;

        } while (true);
    }
}
```

OUTPUT: