Tutorial – 02

1. Predict and write output for the following code.

```
using System;
namespace DecisionMaking
{
   class Program
   {
      static void Main(string[] args)
      {
         /* local variable definition */
         int a = 10;
         /* check the boolean condition using if statement */
         if (a < 20)
         {
            /* if condition is true then print the following */
            Console.WriteLine("a is less than 20");
         }
         Console.WriteLine("value of a is : {0}", a);
         Console.ReadLine();
      }
   }
}
```

Output :

```
a is less than 20
value of a is : 10
```

2. Write missing statement to get the desired output.

```
using System;
namespace DecisionMaking
{
   class Program
   {
      static void Main(string[] args)
      {
         /* local variable definition */
         int a = 100;
        /* check the boolean condition */
         if (a < 20)
         {
            /* if condition is true then print the following */
            Console.WriteLine("a is less than 20");
         }
         else
         {
            /* if condition is false then print the following */
              //……Missing statement-1……..//
          }
           //……Missing statement-2……..//
           Console.ReadLine();
      }
   }
}
```

Update Code :

```
using System;
namespace DecisionMaking
{
   class Program
   {
      static void Main(string[] args)
      {
         /* local variable definition */
         int a = 100;
         /* check the boolean condition */
         if (a < 20)
         {
            /* if condition is true then print the following */
            Console.WriteLine("a is less than 20");
         }
         else
         {
            /* if condition is false then print the following */
            Console.WriteLine("a is not less than 20"); // Missing statement-1
         }
         Console.WriteLine("value of a is : {0}", a); // Missing statement-2
         Console.ReadLine();
      }
   }
}
```

Output :

```
a is not less than 20
value of a is : 100
```

3. Correct the following code and write output for the corrected code.

```
using System;
namespace ConsoleApplication
{
   class Program
   {
      static void Main(string[] args)
      {
         char firstName = "John";
         char lastName = "Doe";
         Console.WriteLine("Name: " + firstName + " " + lastName);
         Console.WriteLine("Please enter a new first name:")
         firstName = Console.ReadLine();
         Console.WriteLine("New name: "  firstName  " "  lastName);
         Console.ReadLine();
      }
   }
}
```

Update Code :

```
using System;
namespace ConsoleApplication1
{
   class Program
   {
      static void Main(string[] args)
      {
         string firstName = "John";
```

```
            string lastName = "Doe";
            Console.WriteLine("Name: " + firstName + " " + lastName);
            Console.WriteLine("Please enter a new first name:");
            firstName = Console.ReadLine();
            Console.WriteLine("New name: " + firstName + " " + lastName);
            Console.ReadLine();
        }
    }
}
```

Output :

```
Name: John Doe
Please enter a new first name:
Jaydeep Virani
New name: Jaydeep Virani Doe
```

4. Input two number A and B. perform different operations using different operators and different data types available in C#. (Note : Follow all the operators and data types to do above task. Use Online help whenever necessary.)

Code :

```
using System;
namespace OperationsDemo
{
    class Program
    {
        static void Main(string[] args)
        {
            // Input two numbers
            Console.WriteLine("Enter the first number (A):");
            int A = Convert.ToInt32(Console.ReadLine());
```

```
Console.WriteLine("Enter the second number (B):");
int B = Convert.ToInt32(Console.ReadLine());

// Perform arithmetic operations
int sum = A + B;
int difference = A - B;
int product = A * B;
double quotient = (double)A / B;
int remainder = A % B;

// Perform relational operations
bool isEqual = A == B;
bool isNotEqual = A != B;
bool isGreater = A > B;
bool isLess = A < B;
bool isGreaterOrEqual = A >= B;
bool isLessOrEqual = A <= B;

// Perform logical operations (assuming A and B are considered as boolean)
bool andResult = (A > 0) && (B > 0);
bool orResult = (A > 0) || (B > 0);
bool notResult = !(A > 0);

// Perform bitwise operations
int bitwiseAnd = A & B;
int bitwiseOr = A | B;
int bitwiseXor = A ^ B;
```

```
int leftShift = A << 2;
int rightShift = A >> 2;

// Perform operations with other data types
double doubleResult = A + 0.5;
float floatResult = B * 1.5f;
decimal decimalResult = (decimal)A / 2.5m;
long longResult = (long)A * 100000L;
short shortResult = (short)(A + B);
byte byteResult = (byte)(A & B);
char charResult = (char)(A + 65);
string stringResult = A.ToString() + B.ToString();

// Display results
Console.WriteLine("\nArithmetic Operations:");
Console.WriteLine("Sum: " + sum);
Console.WriteLine("Difference: " + difference);
Console.WriteLine("Product: " + product);
Console.WriteLine("Quotient: " + quotient);
Console.WriteLine("Remainder: " + remainder);

Console.WriteLine("\nRelational Operations:");
Console.WriteLine("Is Equal: " + isEqual);
Console.WriteLine("Is Not Equal: " + isNotEqual);
Console.WriteLine("Is Greater: " + isGreater);
Console.WriteLine("Is Less: " + isLess);
Console.WriteLine("Is Greater or Equal: " + isGreaterOrEqual);
```

```
            Console.WriteLine("Is Less or Equal: " + isLessOrEqual);

            Console.WriteLine("\nLogical Operations:");
            Console.WriteLine("AND Result: " + andResult);
            Console.WriteLine("OR Result: " + orResult);
            Console.WriteLine("NOT Result: " + notResult);

            Console.WriteLine("\nBitwise Operations:");
            Console.WriteLine("Bitwise AND: " + bitwiseAnd);
            Console.WriteLine("Bitwise OR: " + bitwiseOr);
            Console.WriteLine("Bitwise XOR: " + bitwiseXor);
            Console.WriteLine("Left Shift (A << 2): " + leftShift);
            Console.WriteLine("Right Shift (A >> 2): " + rightShift);

            Console.WriteLine("\nOther Data Types Operations:");
            Console.WriteLine("Double Result: " + doubleResult);
            Console.WriteLine("Float Result: " + floatResult);
            Console.WriteLine("Decimal Result: " + decimalResult);
            Console.WriteLine("Long Result: " + longResult);
            Console.WriteLine("Short Result: " + shortResult);
            Console.WriteLine("Byte Result: " + byteResult);
            Console.WriteLine("Char Result (A + 65): " + charResult);
            Console.WriteLine("String Concatenation: " + stringResult);

            Console.ReadLine();
        }
    }
```

```
}
```

Output :

```
Enter the first number (A):
10
Enter the second number (B):
20

Arithmetic Operations:
Sum: 30
Difference: -10
Product: 200
Quotient: 0.5
Remainder: 10

Relational Operations:
Is Equal: False
Is Not Equal: True
Is Greater: False
Is Less: True
Is Greater or Equal: False
Is Less or Equal: True

Logical Operations:
AND Result: True
OR Result: True
NOT Result: False

Bitwise Operations:
Bitwise AND: 0
Bitwise OR: 30
Bitwise XOR: 30
Left Shift (A << 2): 40
Right Shift (A >> 2): 2

Other Data Types Operations:
Double Result: 10.5
Float Result: 30
Decimal Result: 4
Long Result: 1000000
Short Result: 30
Byte Result: 0
Char Result (A + 65): K
String Concatenation: 1020
```

5. Rearrange the given code to correct the program. The resultant program will be to enter 5 elements into an array and print sum of these elements.

```
using System;
namespace ConsoleApplication1
{
   class Program
   {
      static void Main(string[] args)
      {
         for (int i = 0; i < 5; i++)
         {
            string str = Console.ReadLine();
         }
         for (int i = 0; i < 5; i++)
         {
            sum = sum + arr[i];
         }
         Console.WriteLine("Sum of Elements : {0}",sum);
         int[] arr = new int[5];
         int sum = 0;
        arr[i] = Convert.ToInt32(str);
        Console.Write("Enter Element {0}: ", i);
         Console.Read();
      }
   }
}
```

Update Code :

```
using System;

namespace ConsoleApplication1

{

   class Program

   {

      static void Main(string[] args)

      {

         int[] arr = new int[5];  // Initialize the array to hold 5 integers

         int sum = 0;  // Initialize sum to 0


         for (int i = 0; i < 5; i++)

         {

            Console.Write("Enter Element {0}: ", i);

            string str = Console.ReadLine();  // Read the input as a string

            arr[i] = Convert.ToInt32(str);  // Convert the string to an integer and store it
in the array

         }


         for (int i = 0; i < 5; i++)

         {

            sum = sum + arr[i];  // Add each array element to sum

         }


         Console.WriteLine("Sum of Elements: {0}", sum);  // Print the sum

         Console.Read();  // Wait for user input before closing the console

      }

   }

}
```

Output :

```
Enter Element 0: 1
Enter Element 1: 2
Enter Element 2: 3
Enter Element 3: 4
Enter Element 4: 5
Sum of Elements: 15
```

6. Write missing statement to get the desired output.

```
using System;
public class Hello3
{
  public static void Main(string[] args)
  {
    Console.WriteLine("Hello, World!");
    Console.WriteLine("You entered the following {0} command line arguments:",
      args.Length );
      //……Missing statement-1……//
      //……Missing statement-2……//
      //……Missing statement-3……//
      //……Missing statement-4……//
  }
}
```

Update Code :

```
using System;
public class Hello3
{
   public static void Main(string[] args)
   {
      Console.WriteLine("Hello, World!");
```

```
        Console.WriteLine("You entered the following {0} command line arguments:",
    args.Length);

        // Missing statement-1

        for (int i = 0; i < args.Length; i++)

        {

          // Missing statement-2

          Console.WriteLine(args[i]); // Print each argument on a new line

        }

      }

    }
```

Output:

```
Hello, World!
You entered the following 0 command line arguments:
```

7. Predict and write the output of the given code.

```
using System;

namespace CalculatorApplication

{

  class NumberManipulator

  {

    public void swap(ref int x, ref int y)

    {

      int temp;

      temp = x; /* save the value of x */

      x = y;   /* put y into x */

      y = temp; /* put temp into y */

     }

  }

 class TestRef
```

```
    {
      static void Main(string[] args)
      {
        NumberManipulator n = new NumberManipulator();
        /* local variable definition */
        int a = 100;
        int b = 200;
        Console.WriteLine("Before swap, value of a : {0}", a);
        Console.WriteLine("Before swap, value of b : {0}", b);
        /* calling a function to swap the values */
        n.swap(ref a, ref b);
        Console.WriteLine("After swap, value of a : {0}", a);
        Console.WriteLine("After swap, value of b : {0}", b);
        Console.ReadLine();
      }
    }
  }
```

Output:

```
Before swap, value of a : 100
Before swap, value of b : 200
After swap, value of a : 200
After swap, value of b : 100
```

8. Find out error code and correct it. Write the output of the corrected code.

```
using System;
namespace CalculatorApplication
{
  class NumberManipulator

  {
```

```
    public int getValues(out int x, out int y, out int z )
    {
       Console.WriteLine("Enter the first value: ");
       x = Convert.ToInt32(Console.ReadLine());
       Console.WriteLine("Enter the second value: ");
       y = Convert.ToInt32(Console.ReadLine());
       sum = “x” + “y” + “z”;
       return “sum”;
    }
  }
class TestOut
{
    static void Main(string[] args)
    {
      NumberManipulator n = new NumberManipulator();
      /* local variable definition */
      int a , b, c, sum;
      /* calling a function to get the values */
      sum = n.getValues(out a, out b, out c);
      Console.WriteLine("After method call, value of a : {0}", a);
      Console.WriteLine("After method call, value of b : {0}", b);
      Console.WriteLine("After method call, value of c : {0}", c);
      Console.WriteLine("Sum : {0}", );
    }
  }
}
```

Update Code :

```
using System;
```

```
namespace CalculatorApplication
{
   class NumberManipulator
   {
      public int getValues(out int x, out int y, out int z)
      {
         Console.WriteLine("Enter the first value: ");
         x = Convert.ToInt32(Console.ReadLine());

         Console.WriteLine("Enter the second value: ");
         y = Convert.ToInt32(Console.ReadLine());

         Console.WriteLine("Enter the third value: ");
         z = Convert.ToInt32(Console.ReadLine());

         // Calculate the sum of x, y, and z
         int sum = x + y + z;

         // Return the sum
         return sum;
      }
   }

   class TestOut
   {
      static void Main(string[] args)
      {
         NumberManipulator n = new NumberManipulator();
```

```
            // Local variable definitions
            int a, b, c, sum;

            // Calling a function to get the values
            sum = n.getValues(out a, out b, out c);

            // Display the values and sum
            Console.WriteLine("After method call, value of a : {0}", a);
            Console.WriteLine("After method call, value of b : {0}", b);
            Console.WriteLine("After method call, value of c : {0}", c);
            Console.WriteLine("Sum : {0}", sum);

            Console.ReadLine();
        }
    }
}
```

Output :

```
Enter the first value:
10
Enter the second value:
20
Enter the third value:
30
After method call, value of a : 10
After method call, value of b : 20
After method call, value of c : 30
Sum : 60
```

9. Given an array A containing 2*N+2 positive numbers, out of which 2*N numbers exist in pairs whereas the other two number occur exactly once and are distinct. Find the other two numbers.

Example 1:Input:

N = 2

arr[] = {1, 2, 3, 2, 1, 4}

Output:

3 4

Explanation:

3 and 4 occur exactly once.

Example 2:

Input:

N = 1

arr[] = {2, 1, 3, 2}

Output:

1 3

Explanation:

1 3 occur exactly once.

Code :

```
using System;

class Program
{
   static void Main(string[] args)
   {
      int[] arr = { 1, 2, 3, 2, 1, 4 }; // Example input
      FindDistinctNumbers(arr);
   }

   static void FindDistinctNumbers(int[] arr)
   {
      int xorResult = 0;
```

```
        // Step 1: XOR all elements to get XOR of the two distinct numbers
        foreach (int num in arr)
        {
            xorResult ^= num;
        }

        // Step 2: Find the rightmost set bit in xorResult
        int rightmostSetBit = xorResult & -xorResult;

        int num1 = 0, num2 = 0;

        // Step 3: Partition the array based on the set bit and XOR elements in each
group
        foreach (int num in arr)
        {
            if ((num & rightmostSetBit) == 0)
            {
                num1 ^= num; // Elements where the bit is not set
            }
            else
            {
                num2 ^= num; // Elements where the bit is set
            }
        }

        // Output the results
```

```
            Console.WriteLine($"{num1} {num2}");
        }
    }
```

Output :

```
4 3
```

10. Given a matrix mat[][] of size N x M, where every row and column is sorted in increasing order, and a number X is given. The task is to find whether element X is present in the matrix or not.

Example 1:

Input:

N = 3, M = 3

mat[][] = 3 30 38

44 52 54

57 60 69

X = 62

Output:

0

Explanation:

62 is not present in the

matrix, so output is 0

Example 2:

Input:

N = 1, M = 6

mat[][] = 18 21 27 38 55 67

X = 55

Output:

1

Explanation:

55 is present in the

matrix at 5th cell.

Your Task:

You don't need to read input or print anything. You just have to complete the function matSearch() which takes a 2D matrix mat[][], its dimensions N and M and integer X as inputs and returns 1 if the element X is present in the matrix and 0 otherwise.

Expected Time Complexity: O(N+M).

Expected Auxiliary Space: O(1).

Constraints:

1 <= N, M <= 1005

1 <= mat[][] <= 10000000

1<= X <= 10000000

Code :

```
using System;
class Program
{
   public static int MatSearch(int[,] mat, int N, int M, int X)
   {
      int row = 0;
      int col = M - 1;

      while (row < N && col >= 0)
      {
         if (mat[row, col] == X)
         {
            return 1;  // Element found
         }
         else if (mat[row, col] > X)
         {
            col--;  // Move left
```

```
            }
            else
            {
                row++;  // Move down
            }
        }
        return 0;  // Element not found
    }
    static void Main(string[] args)
    {
        int[,] mat1 = {
            { 3, 30, 38 },
            { 44, 52, 54 },
            { 57, 60, 69 }
        };
        Console.WriteLine(MatSearch(mat1, 3, 3, 62));  // Output: 0
        int[,] mat2 = {
            { 18, 21, 27, 38, 55, 67 }
        };
        Console.WriteLine(MatSearch(mat2, 1, 6, 55));  // Output: 1
    }
}
```

Output :

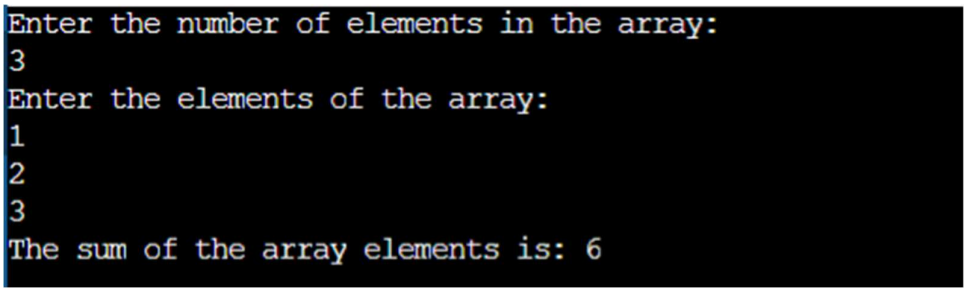
11. Write a program to find the sum of N elements of an Array.

Code :

```
using System;
```

```
class Program
{
    static void Main(string[] args)
    {
        // Input the number of elements
        Console.WriteLine("Enter the number of elements in the array:");
        int N = Convert.ToInt32(Console.ReadLine());

        // Initialize the array
        int[] array = new int[N];

        // Input elements into the array
        Console.WriteLine("Enter the elements of the array:");
        for (int i = 0; i < N; i++)
        {
            array[i] = Convert.ToInt32(Console.ReadLine());
        }

        // Calculate the sum of elements
        int sum = 0;
        for (int i = 0; i < N; i++)
        {
            sum += array[i];
        }

        // Output the sum
        Console.WriteLine($"The sum of the array elements is: {sum}");
    }
}
```

Output :



12. Write a program to find the element from an Array and print 1 if element is found else print 0.

Code :

```
using System;

class Program

{

   static void Main(string[] args)

   {

      // Input the number of elements

      Console.WriteLine("Enter the number of elements in the array:");

      int N = Convert.ToInt32(Console.ReadLine());


      // Initialize the array

      int[] array = new int[N];


      // Input elements into the array

      Console.WriteLine("Enter the elements of the array:");

      for (int i = 0; i < N; i++)

      {

         array[i] = Convert.ToInt32(Console.ReadLine());

      }
```

```
        // Input the element to search for
        Console.WriteLine("Enter the element to search for:");
        int elementToFind = Convert.ToInt32(Console.ReadLine());

        // Search for the element
        bool found = false;
        for (int i = 0; i < N; i++)
        {
            if (array[i] == elementToFind)
            {
                found = true;
                break;
            }
        }

        // Print the result
        if (found)
        {
            Console.WriteLine(1); // Element found
        }
        else
        {
            Console.WriteLine(0); // Element not found
        }
    }
}
```

Output :

```
Enter the number of elements in the array:
3
Enter the elements of the array:
1
2
2
Enter the element to search for:
2
1
```

13. Write a Program that will accept the amount and find how many minimum no of notes you required for that.

(Using the rupee notes of 1, 2, 5, 10, 20, 50, 100, 200, 500, 2000)

Input: 5748

Code :

```
using System;
class Program
{
   static void Main(string[] args)
   {
      // Input the amount
      Console.WriteLine("Enter the amount:");
      int amount = Convert.ToInt32(Console.ReadLine());

      // Define the denominations in descending order
      int[] denominations = { 2000, 500, 200, 100, 50, 20, 10, 5, 2, 1 };

      // Array to hold the number of notes for each denomination
      int[] notes = new int[denominations.Length];
```

```
            // Calculate the number of notes required for each denomination
            for (int i = 0; i < denominations.Length; i++)
            {
               notes[i] = amount / denominations[i];
               amount %= denominations[i];
            }

            // Print the results
            for (int i = 0; i < denominations.Length; i++)
            {
               if (notes[i] > 0)
               {
                  Console.WriteLine($"Notes of Rs.{denominations[i]} = {notes[i]}");
               }
            }
         }
      }
```

Output :

```
Enter the amount:
5748
Notes of Rs.2000 = 2
Notes of Rs.500 = 3
Notes of Rs.200 = 1
Notes of Rs.20 = 2
Notes of Rs.5 = 1
Notes of Rs.2 = 1
Notes of Rs.1 = 1
```

14. Write a Program to find the eligibility of admission for a professional course based on the following criteria:

Marks in Maths >=65

Marks in Phy >=55

Marks in Chem>=50 and

Total in all three subject >=180 or

Total in Math and Physics >=140

INPUT:

Input the marks obtained in Maths :72

Input the marks obtained in Physics :65

Input the marks obtained in Chemistry :51

OUTPUT:

The candidate is eligible for admission.

Code :

```
using System;

class Program
{
   static void Main(string[] args)
   {
      // Input marks obtained in Maths, Physics, and Chemistry
      Console.WriteLine("Input the marks obtained in Maths:");
      int maths = Convert.ToInt32(Console.ReadLine());

      Console.WriteLine("Input the marks obtained in Physics:");
      int physics = Convert.ToInt32(Console.ReadLine());

      Console.WriteLine("Input the marks obtained in Chemistry:");
      int chemistry = Convert.ToInt32(Console.ReadLine());
```

```
        // Check eligibility based on the given criteria
        bool isEligible = (maths >= 65 && physics >= 55 && chemistry >= 50 &&
                          (maths + physics + chemistry >= 180 || (maths + physics >= 140)));

        // Output the result
        if (isEligible)
        {
            Console.WriteLine("The candidate is eligible for admission.");
        }
        else
        {
            Console.WriteLine("The candidate is not eligible for admission.");
        }
    }
}
```

Output :

```
Input the marks obtained in Maths:
72
Input the marks obtained in Physics:
65
Input the marks obtained in Chemistry:
51
The candidate is eligible for admission.
```

15. Write a Program which accepts name from the user and prints the same

INPUT : R K University

OUTPUT: R K University

Code :

```
using System;
```

```
class Program
{
   static void Main(string[] args)
   {
      // Prompt the user to enter their name
      Console.WriteLine("Please enter your name:");

      // Read the input from the user
      string name = Console.ReadLine();

      // Print the input back to the user
      Console.WriteLine(name);
   }
}
```

Output :

```
Please enter your name:
R K University
R K University
```