

## Q1)

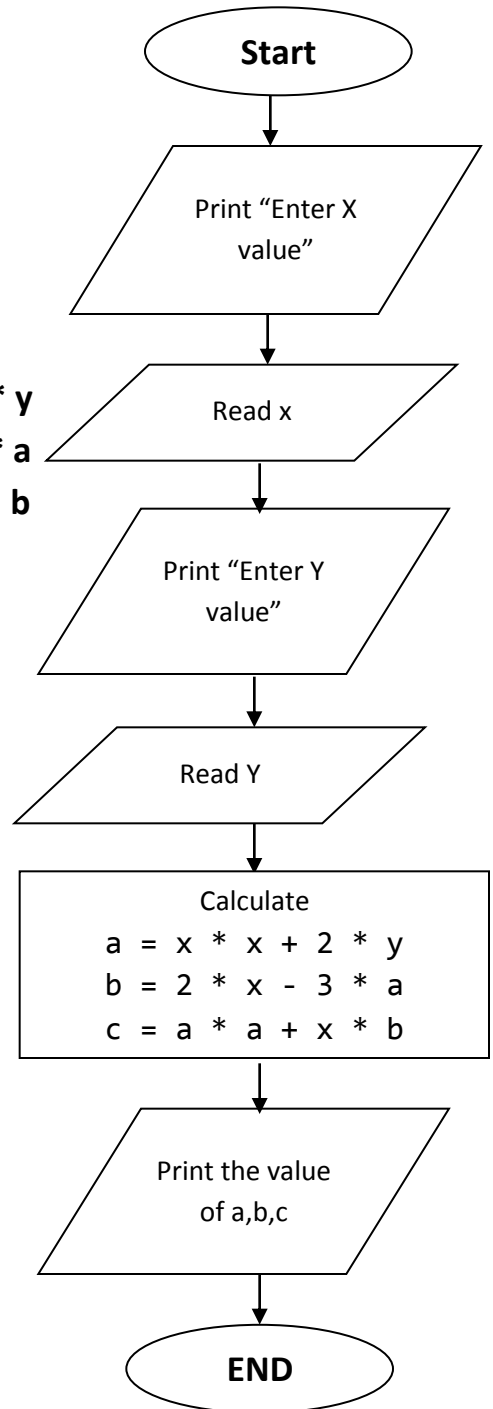
A)

### PseudoCode:

1. Ask user to enter value of x
2. Read the value of x from user
3. Ask user to enter value of y
4. Read the value of y from user
5. Declare variable a and calculate a equal to  $x * x + 2 * y$
6. Declare variable b and calculate b equal to  $2 * x - 3 * a$
7. Declare variable c and calculate c equal to  $a * a + x * b$
8. Print out to user the values of a,b,c

### The programming Code:

```
static void Main(string[] args)
{
    Console.WriteLine("Enter X Value:");
    int x = int.Parse(Console.ReadLine());
    Console.WriteLine("Enter Y Value:");
    int y = int.Parse(Console.ReadLine());
    int a = x * x + 2 * y;
    int b = 2 * x - 3 * a;
    int c = a * a + x * b;
    Console.WriteLine("a = {0}, b= {1},
                      c= {2}", a, b, c);
}
```



b)

PseudoCode:

1. Ask user to enter value of x
2. Read the value of x from user
3. Declare W as int equal to Zero
4. If x value greater than Zero then Calculate  $w = x*x+1$
5. If x value equal to Zero then Calculate  $w = x+5$
6. If x value less than Zero then Calculate  $w = 2*x*x*x -1$
7. Print the value of w

The programming Code:

```
static void Main(string[] args)
{
    Console.WriteLine("Enter X Value:");
    int x = int.Parse(Console.ReadLine());
    int w=0;
    if(x>0)
        w = x*x+1;
    if(x==0)
        w= x+5;
    if(x<0)
        w = 2*x*x*x -1;
    Console.WriteLine("w=" + w);
}
```

c)

- The programming Code of Factorial By While loop

```
static void Main(string[] args)
{
    Console.WriteLine("please enter the value of n");
    int n = int.Parse(Console.ReadLine());
    long factorial = 1;
    int i = 1;
    while(i<=n)
    {
        factorial = factorial * i;
        i++;
    }
    Console.WriteLine("factorial of n={0}", factorial);
}
```

- The programming Code of Factorial By For loop

```
static void Main(string[] args)
{
    Console.WriteLine("please enter the value of n");
    int n = int.Parse(Console.ReadLine());
    long factorial = 1;
    for (int i = 1; i <= n; i++)
    {
        factorial = factorial * i;
    }
    Console.WriteLine("factorial of n={0}", factorial);
}
```

## Q2) The programming Code to Check if the Number (N) is Prime or not

```
static void Main(string[] args)
{
    Console.WriteLine("please enter the value of n");
    int n = int.Parse(Console.ReadLine());
    if (n == 1)
    {
        Console.WriteLine("the number is not prime");
    }
    int i;
    for(i=2;i<=n-1;i++)
    {
        if (n % i == 0)
        {
            Console.WriteLine("the number is not prime");
            break;
        }
    }
    if (n == i)
    {
        Console.WriteLine("the number is prime");
    }
}
```

**Q3) The programming Code to Check if the Number (M) is Even or Odd, and print that on the Console Application:**

- **Using While Loop:**

```
static void Main(string[] args)
{
    Console.WriteLine("Enter Number to check is Even or Odd:");
    int m = int.Parse(Console.ReadLine());
    while ( m % 2 == 0 )
    {
        Console.WriteLine("{0} is Even", m);
        break;
    }

    while ( m % 2 != 0 )
    {
        Console.WriteLine("{0} is Odd", m);
        break;
    }
}
```

- **Using For Loop:**

```
static void Main(string[] args)
{
    Console.WriteLine("Enter Number to check is Even or Odd:");
    int m = int.Parse(Console.ReadLine());
    for (; m % 2 == 0; )
    {
        Console.WriteLine("{0} is Even", m);
        break;
    }

    for (; m % 2 != 0; )
    {
        Console.WriteLine("{0} is Odd", m);
        break;
    }
}
```

**Q4) The programming Code to detect all prime numbers in an interval [N...M] for the two integer numbers N and M, and print that on the Console Application**

```
static void Main(string[] args)
{
    Console.WriteLine("please enter the value of n");
    int n = int.Parse(Console.ReadLine());
    Console.WriteLine("please enter the value of m");
    int m = int.Parse(Console.ReadLine());
    for (int i = n; i <= m; i++)
    {
        int x = 1;
        for (x = 2; x <= i - 1; x++)
        {
            if (i % x == 0)
            {
                break;
            }
        }
        if (i == x)
        {
            Console.WriteLine("{0} is prime",i);
        }
    }
}
```

**Q5) The programming Code to Calculate  $N^M$  for the two integer numbers N and M, and print that on the Console Application:**

```
static void Main(string[] args)
{
    Console.WriteLine("please enter the value of n ");
    int n = int.Parse(Console.ReadLine());
    Console.WriteLine("please enter the value of m ");
    int m = int.Parse(Console.ReadLine());
    int result = 1;
    for (int i=1;i<=m;i++)
    {
        result = result * n;
    }

    Console.WriteLine("the result of {0} power {1}={2}",n,m,result);

}
```

**Q6) The programming Code to compute the Factorial of a large number (N=100), using Do ..While Loop:**

```
static void Main(string[] args)
{
    Console.WriteLine("please enter the value of n");
    int n = int.Parse(Console.ReadLine());
    double factorial = 1;
    int i=1;
    do
    {
        factorial = factorial * i;
        i++;
    }
    while (i <= n);

    Console.WriteLine("factorial of n={0}", factorial);
}
```

**Q7) the programming Code to reads your age from the console and prints your age after 10 years:**

```
static void Main(string[] args)
{
    Console.WriteLine("plaease enter your age");
    int n = int.Parse(Console.ReadLine());
    n = n + 10;
    Console.WriteLine("your age after 10 years = {0}", n);
}
```

**Q8: Declare two variables of type int. Assign to them values 5 and 10 respectively. Exchange (swap) their values and print them on Console application screen.**

```
static void Main(string[] args)
{
    int x, y;
    x = 5;
    y = 10;
    int z = x;
    x = y;
    y = z;
    Console.WriteLine("the frist number is {0}, the second number is {1}", x,y);
}
```

**Q9: Which of the following values can be assigned to variables of type float, double and decimal:**

5 → float, double , decimal

-5.01 → float, double , decimal

34.567839023 → float, double , decimal

12.345 → float, double , decimal

8923.1234857 → float, double , decimal

3456.091124875956542151256683467 → decimal

**Q10: Write an expression that checks whether an integer is odd or even.**

```
if ( m % 2 == 0 ) { Console.WriteLine("{0} is Even", m); }
Else { Console.WriteLine("{0} is Odd", m); }
```

**Q11: Write a Boolean expression that checks whether a given integer is divisible by both 5 and 7, without a remainder.**

```
if ( m % 5 == 0 && m % 7 == 0 )
```



**Q12: the programming Code that reads an integer number N from the console and prints all numbers in the range [1...N], each on a separate line.**

```
static void Main(string[] args)
{
    Console.WriteLine("enter the value of n");
    int n = int.Parse(Console.ReadLine());
    for (int i=1;i<=n;i++)
    {
        Console.WriteLine(i);
    }
}
```

**Q13: the programming Code that reads an integer number N from the console. After that reads N numbers from the console and prints their SUM.**

```
static void Main(string[] args)
{
    Console.WriteLine("enter count of numbers");
    int n = int.Parse(Console.ReadLine());
    int sum = 0;
    for (int i=1;i<=n;i++)
    {
        Console.WriteLine("enter the next number");
        sum = sum + int.Parse(Console.ReadLine());
    }
    Console.WriteLine("the sumation of numbers is {0}",sum);
}
```

**Q14: the programming that gets the coefficients  $a$ ,  $b$  and  $c$  of a quadratic equation:  $ax^2 + bx + c$ , calculates and prints its real roots (if they exist), check it has real roots or imagine roots, at the values 0, 1 or 2.**

```
static void Main(string[] args)
{
    Console.Write("Enter a:");
    double a = double.Parse(Console.ReadLine());
    Console.Write("Enter b:");
    double b = double.Parse(Console.ReadLine());
    Console.Write("Enter c:");
    double c = double.Parse(Console.ReadLine());

    double sqrtpart = b * b - 4 * a * c;
    double x, x1, x2, img;

    if (sqrtpart > 0)
    {
        x1 = (-b + System.Math.Sqrt(sqrtpart)) / (2 * a);
        x2 = (-b - System.Math.Sqrt(sqrtpart)) / (2 * a);
        Console.WriteLine("Two Real Solutions: {0,8:f4} or {1,8:f4}", x1, x2);
    }
    else if (sqrtpart < 0)
    {
        sqrtpart = -sqrtpart;
        x = -b / (2 * a);
        img = System.Math.Sqrt(sqrtpart) / (2 * a);
        Console.WriteLine("Two Imaginary Solutions: {0,8:f4} + {1,8:f4} i or
{2,8:f4} + {3,8:f4} i", x, img, x, img);
    }
    else
    {
        x = (-b + System.Math.Sqrt(sqrtpart)) / (2 * a);
        Console.WriteLine("One Real Solution: {0,8:f4}", x);
    }
}
```

**Q15: the programming Code that Sort three real numbers in descending order.**

**Use Nested If statements.**

```
static void Main(string[] args)
{
    Console.Write("Enter number one:");
    double frist = double.Parse(Console.ReadLine());
    Console.Write("Enter number second:");
    double second = double.Parse(Console.ReadLine());
    Console.Write("Enter number third:");
    double third = double.Parse(Console.ReadLine());
    if (frist >= second)
        if (second >= third)
            Console.Write("the numbers in descending order: {0},{1},{2} ", frist,
                second, third);
    if (frist >= third)
        if (third >= second)
            Console.Write("the numbers in descending order: {0},{1},{2} ",
                frist,third ,second );
    if (second >= frist)
        if (frist >= third)
            Console.Write("the numbers in descending order: {0},{1},{2} ",
                second, frist, third);
    if (second >= third)
        if (third >= frist)
            Console.Write("the numbers in descending order: {0},{1},{2} ",
                second,third , frist);
    if (third >= frist)
        if (frist >= second )
            Console.Write("the numbers in descending order: {0},{1},{2} ",third ,
                frist, second);
    if (third >= second)
        if (second >= frist )
            Console.Write("the numbers in descending order: {0},{1},{2} ", third,
                second ,frist );
}
```

**Q16: the programming Code that finds the biggest of three integers, using Nested If statements.**

```
static void Main(string[] args)
{
    Console.Write("Enter number one:");
    double frist = double.Parse(Console.ReadLine());
    Console.Write("Enter number second:");
    double second = double.Parse(Console.ReadLine());
    Console.Write("Enter number third:");
    double third = double.Parse(Console.ReadLine());
    if (frist > second)
        if (frist > third) Console.Write("the biggest Number is {0}", frist);
    if (second > frist)
        if (second > third) Console.Write("the biggest Number is {0}", second);
    if (third > frist)
        if (third > second) Console.Write("the biggest Number is {0}", third);
}
```

**Q17:**

- **the programming Code that calculates  $N! \cdot K! / (N-K)!$  for given N and K ( $1 < K < N$ ).**

```
static void Main(string[] args)
{
    long factorialn = 1, factorialk = 1, factorialnk = 1, result=1;

    Console.WriteLine("please enter the value of n");
    int n = int.Parse(Console.ReadLine());
    Console.WriteLine("please enter the value of k");
    int k = int.Parse(Console.ReadLine());

    if (n>k && k>1)
    {
        for (int i = 1; i <= n; i++)
        {
            factorialn = factorialn * i;
        }
        for (int j = 1; j <= k; j++)
        {
            factorialk = factorialk * j;
        }
        for (int l = 1; l <= n - k; l++)
```

```

    {
        factorialnk = factorialnk * l;
    }
    result = (factorialn * factorialk) / factorialnk;
    Console.WriteLine(result);
}
else
{
    Console.WriteLine("n must be greater than k and k must be geater than 1");
}
}

```

- the programming Code that calculates  $N! \cdot K! / (N-K)!$  for given N and K ( $1 < K < N$ ) using Methods:

**class Program**

```

{
    static long factorial(int x)
    {
        long factorial = 1;
        for (int i = 1; i <= x; i++)
        {
            factorial = factorial * i;
        }
        return factorial;
    }
    static void Main(string[] args)
    {
        Console.WriteLine("please enter the value of n");
        int n = int.Parse(Console.ReadLine());
        Console.WriteLine("please enter the value of k");
        int k = int.Parse(Console.ReadLine());
        if (n > k && k > 1)
        { Console.WriteLine((factorial(n) * factorial(k)) / factorial(n - k)); }
        else {
            Console.WriteLine("n must be greater than k and k must be geater than 1");
        }
    }
}

```

**Q18: the programming Code that creates an Array of 20 elements of type integer and initializes each of the elements with a value equals to the index of the element multiplied by 5. Print the elements to the console.**

```
static void Main(string[] args)
{
    int[] array = new int[20];
    for(int i=0 ; i<20; i++)
    {
        array[i] = i * 5;
    }

    for (int i = 0; i < 20; i++)
    {
        Console.Write(array[i] + " ");
    }
}
```

**Q19: the programming Code that creates square matrices like those in the figures below and prints them formatted to the console. The size of the matrices will be read from the console. See the examples for matrices with size of 4 x 4 and make the other sizes in a similar fashion:**

1	5	9	13
2	6	10	14
3	7	11	15
4	8	12	16

1	8	9	16
2	7	10	15
3	6	11	14
4	5	12	13

7	11	14	16
4	8	12	15
2	5	9	13
1	3	6	10

1	12	11	10
2	13	16	9
3	14	15	8
4	5	6	7

```

a)
static void Main(string[] args)
{
    Console.Write("Enter number n:");
    int n = int.Parse(Console.ReadLine());
    int[,] arrary = new int[n, n];
    int x = 1;
    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < n; j++)
        {
            arrary[i, j] =x;
            Console.Write(arrary[i, j] + " ");
            x++;
        }
        Console.WriteLine();
    }

    for (int i = 0; i < n; i++)
    {
        for (int j = 0; j < n; j++)
        {
            Console.Write(arrary[j, i] + " ");
        }
        Console.WriteLine();
    }
}

```





## Q20: Use the Methods in C# to create program do Triangles with Different Size

```
class Program
{
    static void Main(string[] args)
    {
        Console.Write("Enter number n");
        int n = int.Parse(Console.ReadLine());
        t1(n);
        t2(n);
    }

    static void t1(int x)
    {
        for (int i = 1; i <= x; i++)
        {
            for (int j = 1; j <= i; j++)
            { Console.Write(j + " "); }
            Console.WriteLine();
        }
    }

    static void t2(int x)
    {
        for (int i = x-1; i >= 1; i--)
        {
            for (int j = 1; j <= i; j++)
            { Console.Write(j + " "); }
            Console.WriteLine();
        }
    }
}
```