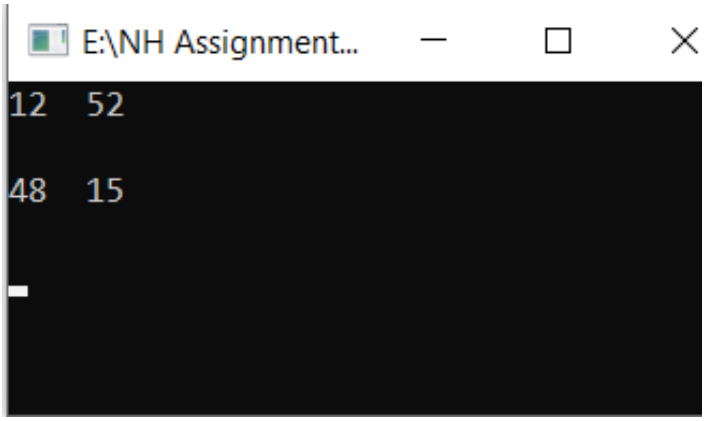
Day 13
Assignment
By M Mary Margarette
On 09-02-2022

Declare a 2-dimensional array of size (2,2) and initialize using indexes and print the values using nested for loop

Code:

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

namespace Day_13_Project_1
{
   //Author: Mary Margaret
   //Two-Dimensional Array
   internal class Program
   {
      static void Main(string[] args)
      {
         //2-D Array Initialization
         int[,] data = new int[2, 2];
         data[0, 0] = 12;
         data[0,1] = 52;
         data[1, 0] = 48;
         data[1, 1] = 15;

         for(int i = 0; i < 2; i++)
         {
            for(int j=0;j<2;j++)
            {
               Console.Write(data[i,j]+"  ");
            }
            Console.WriteLine("\n");
         }
         Console.ReadLine();

      }
   }
}
```

Output:



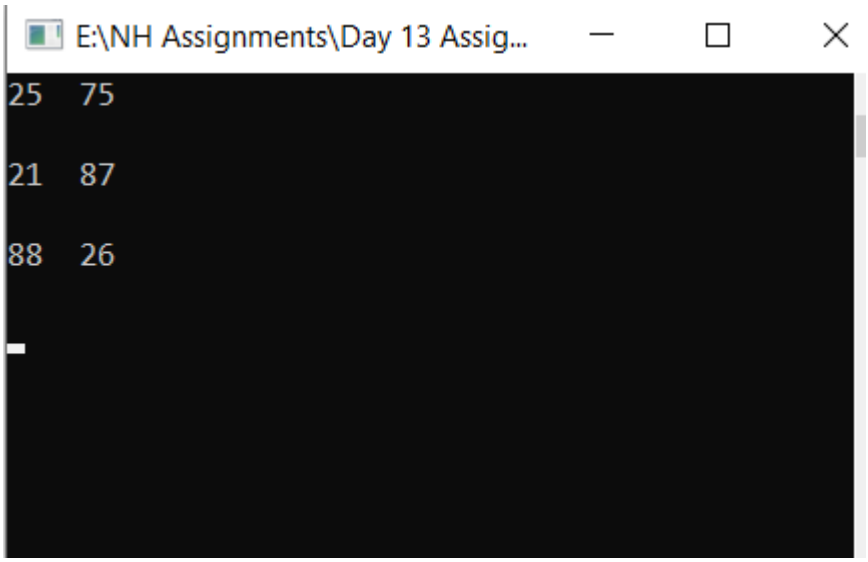
Declare a 2-D array of size (3,2) and initialize in the same line while declaring and print the values using nested for loop

Code:

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

namespace Day_13_Project_2
{
   //Author: Mary Margaret
   //Two-Dimensional Array with size (3,2)

   internal class Program
   {
            static void Main(string[] args)
      {
         //2-D Array Initialization
         int[,] data = new int[3, 2] { { 25, 75 }, { 21, 87 },{88,26} };

         for (int i = 0; i < 3; i++)
         {
            for (int j = 0; j < 2; j++)
            {
               Console.Write(data[i, j] + "  ");
            }
```

```
            Console.WriteLine("\n");
        }
        Console.ReadLine();
    }
  }
}
```

Output:



Declare a 2-D array of size (3,3) and print trace of the array

Code:

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

namespace Day_13_Project_3
{
  //Author: Mary Margaret
  //Trace of the matrix with size (3,3)
  internal class Program
  {
    static void Main(string[] args)
    {
      int i, j;
```

```
        int sum = 0;
        int[,] data = new int[3, 3] { { 25, 75, 44 }, { 21, 87, 29 }, { 88, 26, 71} };

        //To print matrix
        for (i = 0; i < 3; i++)
        {
           for (j = 0; j < 3; j++)
           {
              Console.Write(data[i,j] + "  ");
           }
           Console.WriteLine("\n");
        }

        //To print Trace of matrix
        for (i = 0; i < 3; i++)
        {
           for (j = 0; j < 3; j++)
           {

              if (i == j)
                 sum = sum + data[i, j];
           }
        }
        Console.WriteLine("Trace of the given matrix is : {0}", sum);


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

Output:

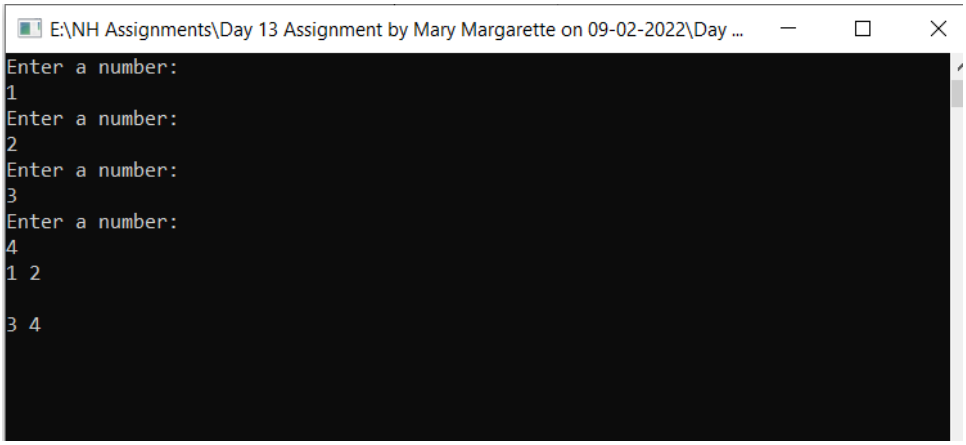
Declare a 2-D array of size (2,2) and read values from user and print the array values.

Code:

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

namespace Day_13_Project_4
{
   //Author: Mary Margaret
   //2-D Array with user inputs
   internal class Program
   {
      static void Main(string[] args)
      {
         int i, j;

         int[,] data = new int[2, 2] ;
         for ( i = 0; i < 2; i++)
         {
            for ( j = 0; j < 2; j++)
            {
               Console.WriteLine("Enter a number:");
               data[i, j] = Convert.ToInt32(Console.ReadLine());
```

```
            }

        }
        for( i = 0; i < 2;i++)
        {
           for( j = 0;j < 2;j++)
           {
              Console.Write(data[i, j] + " ");
           }
           Console.WriteLine("\n");
        }
        Console.ReadLine();
     }
   }
}
```

Output:



Declare TWO 2-D arrays of size (2,2) and read values from user and print the sum of the two matrices.

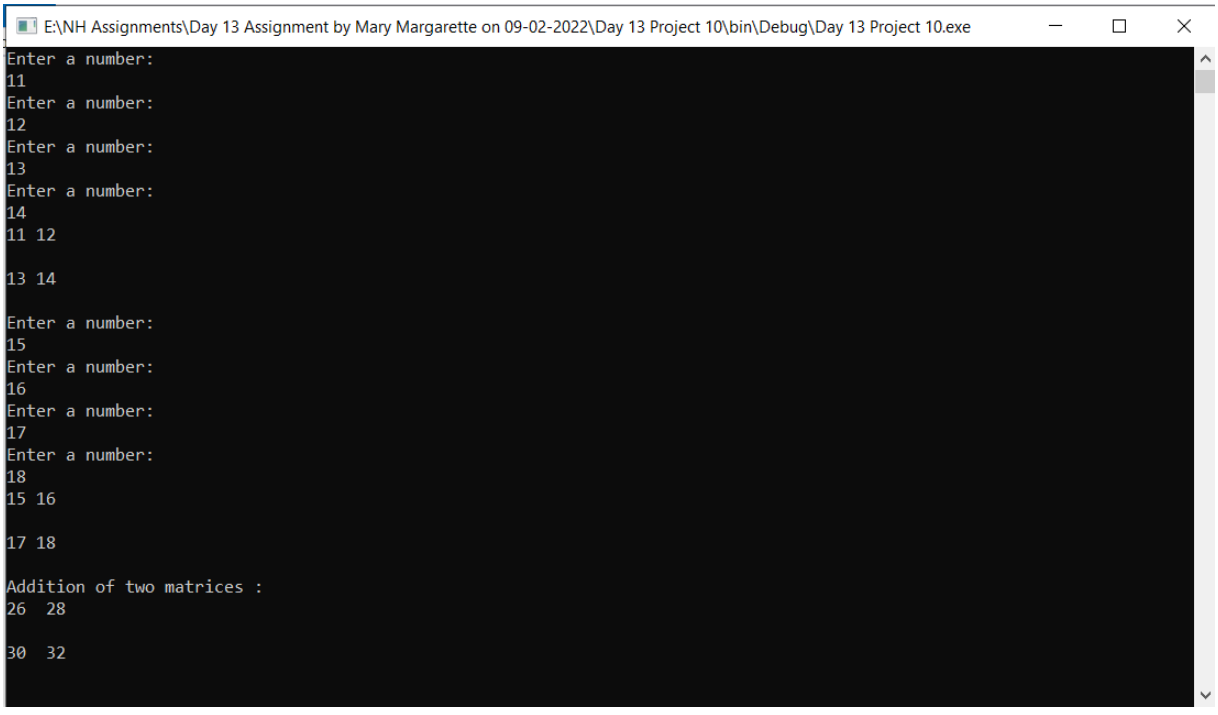
Code:

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

namespace Day_13_Project_10
```

```
{
   //Author: Mary Margaret
   //Adding of two Matrices
   internal class Program
   {
      static void Main(string[] args)
      {
         int i, j;
         int[,] data1 = new int[2, 2];
         int[,] data2 = new int[2, 2];
         int[,] data3 = new int[2, 2];

         //Matrix 1
         for (i = 0; i < 2; i++)
         {
            for (j = 0; j < 2; j++)
            {
               Console.WriteLine("Enter a number:");
               data1[i, j] = Convert.ToInt32(Console.ReadLine());
            }
         }
         for (i = 0; i < 2; i++)
         {
            for (j = 0; j < 2; j++)
            {
               Console.Write(data1[i, j] + " ");
            }
            Console.WriteLine("\n");
         }

         //Matrix 2
            for (i = 0; i < 2; i++)
            {
               for (j = 0; j < 2; j++)
               {
                  Console.WriteLine("Enter a number:");
                  data2[i, j] = Convert.ToInt32(Console.ReadLine());
               }
            }
         for (i = 0; i < 2; i++)
         {
            for (j = 0; j < 2; j++)
            {
               Console.Write(data2[i, j] + " ");
            }
            Console.WriteLine("\n");
         }
```

```
        //Adding two matrices

        Console.WriteLine("Addition of two matrices :");

        for (i = 0; i < 2; i++)
           {
              for (j = 0; j < 2; j++)
              {
                 data3[i, j] = data1[i,j]+data2[i,j];
                 Console.Write(data3[i,j] + "  ");
              }
           Console.WriteLine("\n");
           }


        Console.ReadLine();

     }
   }
}
```

Output:



Declare TWO 2-D arrays of size (2,2) and read values from user and print the product of the two matrices.

Code:

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

namespace Day_13_Project_11
{
   //Author: Mary Margaret
   //Multiplication of two matrices
   internal class Program
   {
      static void Main(string[] args)
      {
         //r1,c1 are rows and columns of matrix data1
         //r2,c2 are rows and columns of matrix data2
         int i, j;
         int r1 = 2;
         int r2 = 2;
         int c1 = 2;
         int c2 = 2;
         int[,] data1 = new int[r1, c1];//array of data1
         int[,] data2 = new int[r2, c2];//array of data2


         //Matrix 1 reading  input
         for (i = 0; i < 2; i++)
         {
            for (j = 0; j < 2; j++)
            {
               Console.WriteLine("Enter a number:");
               data1[i, j] = Convert.ToInt32(Console.ReadLine());
            }
         }
         //printing matrix data1

         for (i = 0; i < 2; i++)
         {
            for (j = 0; j < 2; j++)
            {
               Console.Write(data1[i, j] + " ");
            }
            Console.WriteLine("\n");
```

```
        }

        //Matrix 2 reading input
        for (i = 0; i < 2; i++)
        {
           for (j = 0; j < 2; j++)
           {
              Console.WriteLine("Enter a number:");
              data2[i, j] = Convert.ToInt32(Console.ReadLine());
           }
        }
        //Printing matrix data2
        for (i = 0; i < 2; i++)
        {
           for (j = 0; j < 2; j++)
           {
              Console.Write(data2[i, j] + " ");
           }
           Console.WriteLine("\n");
        }

        //Multiplication of two matrices
        if (c1 == r2) //condition for matrix multiplication
        {
           int[,] c = new int[r1, c2];
           Console.WriteLine("Matrix Multiplication:");
           for (i = 0; i < r1; i++)
           {
              for (j = 0; j < c2; j++)
              {
                 c[i, j] = 0;
                 for (int k = 0; k < r2; k++)
                 {
                    c[i, j] += data1[i, k] * data2[k, j];
                 }
                 Console.Write(c[i, j] + " ");
              }
              Console.WriteLine("\n");
           }
           Console.ReadLine();
        }
     }
  }
}
```

Output:

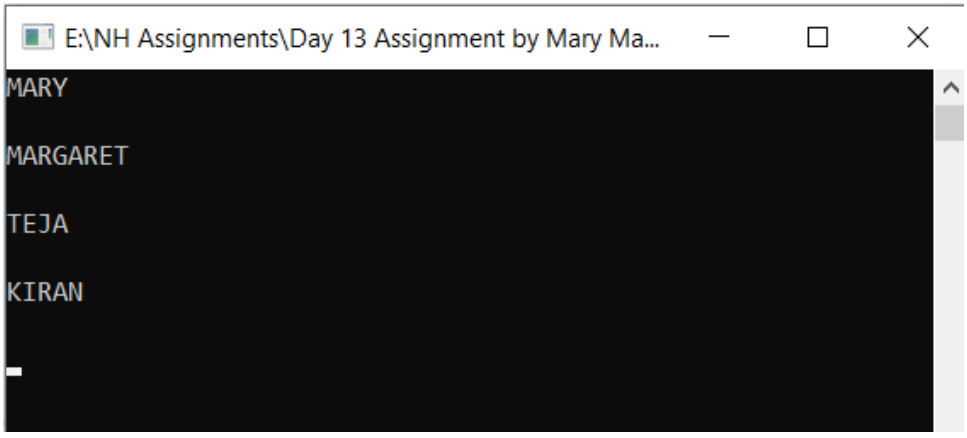
What is a jagged array, What is the benefit of jagged array
→ Jagged Array is a Two-Dimensional Array that can change size of the data dynamically.
→ It is used to prevent Wastage of data.
→ Syntax: char [ ] [ ] names = new char [8] [ ];
→ Jagged Array saves data by changing size of array as per requirement.

WACP to declare a jagged array and print values
Code:

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

namespace Day_13_Project_5
{
   //Author: Mary Margaret
```

```
//Jagged Array
internal class Program
{
    static void Main(string[] args)
    {
        char[][] names = new char[4][];
        names[0]= new char[] { 'M','A','R','Y'};
        names[1] = new char[] { 'M', 'A', 'R', 'G','A','R','E','T' };
        names[2] = new char[] { 'T', 'E', 'J', 'A' };
        names[3] = new char[] { 'K','I','R', 'A', 'N' };

        for (int i = 0; i < 4; i++)
        {
            for(int j = 0; j < names[i].Length; j++)
            {
                Console.Write(names[i][j]);
            }
            Console.WriteLine("\n");
        }
        Console.ReadLine();

    }
}
}
```

Output:



What is Recursion

→ Function which calls itself until a specific condition is satisfied.

→ Recursion is applied for Algorithms.

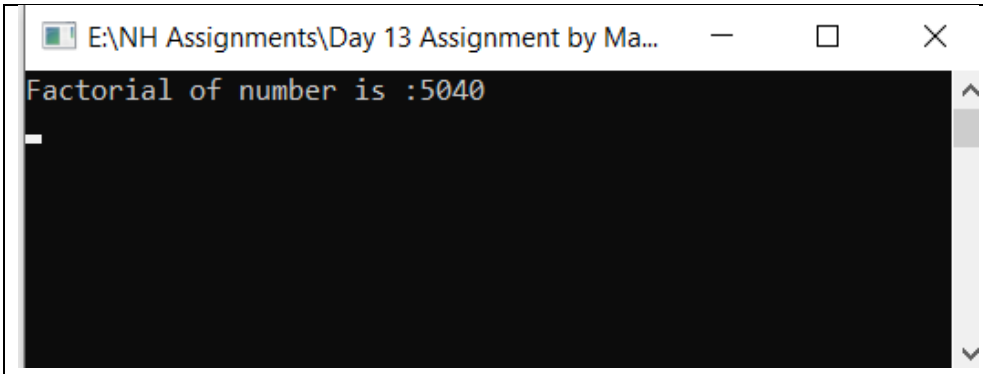
→ Recursion is used for repeated calculations.

WACP to illustrate usage of Recursion. What are the benefits of recursion

Code:

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

namespace Day_13_Project_8
{
   //Author: Mary Margaret
   //Factorial with Recursion
   internal class Program
   {
      class Factorial
      {
         public static int Fact(int n)
         {
            if (n == 0)
            {
               return 1;
            }

            else
            {
               return n * Fact(n - 1);
            }


         }

      }
      static void Main(string[] args)
      {
         Console.WriteLine("Factorial of number is :{0}",Factorial.Fact(7));
         Console.ReadLine();
      }

   }
}
```

Output:

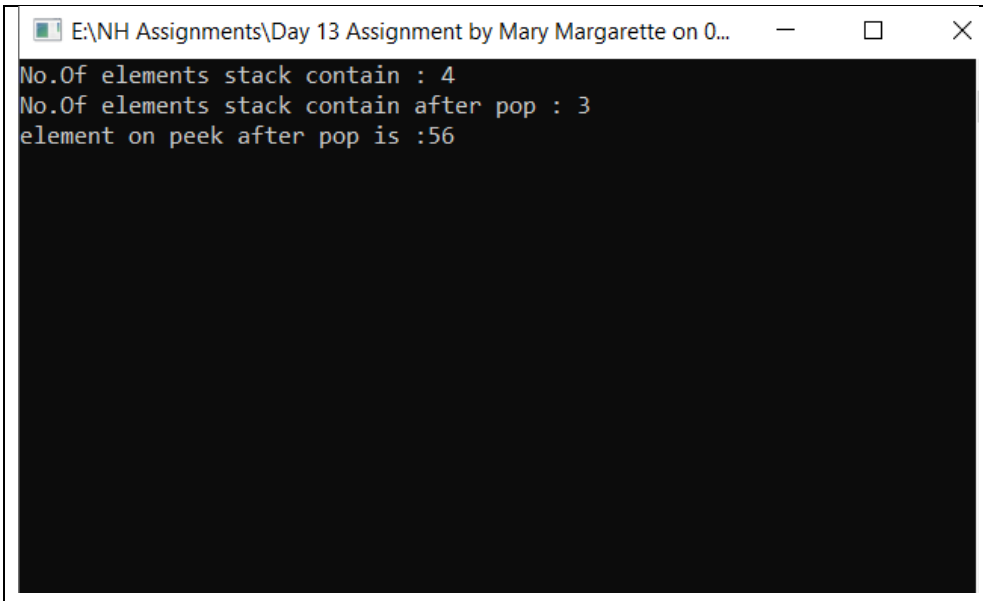


WACP to illustrate usage of Stack<>. Write couple of points about Stack

Code:

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

namespace Day_13_Project_6
{
   //Author: Mary Margaret
   //Stack Implementation
   internal class Program
   {
      static void Main(string[] args)
      {
         Stack<int> data = new Stack<int>();
         data.Push(18);
         data.Push(85);
         data.Push(56);
         data.Push(12);
         Console.WriteLine("No.Of elements stack contain : {0}", data.Count());
         data.Pop();
         Console.WriteLine("No.Of elements stack contain after pop : {0}", data.Count());
         Console.WriteLine("element on peek after pop is :{0}",data.Peek());
         Console.ReadLine();
      }
   }
}
```

Output:



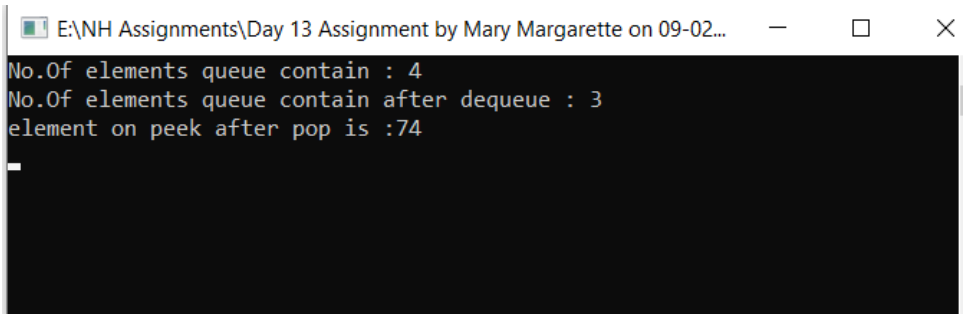
WACP to illustrate usage of Queue<>. Write couple of points about Stack

Code:

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

namespace Day_13_Project_7
{
   //Author: Mary Margaret
   //Queue Implementation
   internal class Program
   {
      static void Main(string[] args)
      {
         Queue<int> data = new Queue<int>();
         data.Enqueue(45);
         data.Enqueue(74);
         data.Enqueue(26);
         data.Enqueue(37);
         Console.WriteLine("No.Of elements queue contain : {0}", data.Count());
         data.Dequeue();
         Console.WriteLine("No.Of elements queue contain after dequeue : {0}", data.Count());
         Console.WriteLine("element on peek after pop is :{0}", data.Peek());
         Console.ReadLine();
```

```
    }
  }
}
```

Output:


E:\NH Assignments\Day 13 Assignment by Mary Margarette on 09-02...
No.Of elements queue contain : 4
No.Of elements queue contain after dequeue : 3
element on peek after pop is :74