Feb 9th Assignment

By

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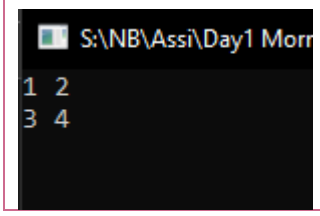
1. **Declare a 2 dimentional array of size (2,2) and initialize using indexes and print the values using nested for loop**

Code:

```
using System;

/*********************************************************************
* Author: Surya Teja
* Purpose: Declare a 2 dimentional array of size (2,2) and initialize using
indexes and print the values
* *******************************************************************/

namespace Array1
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int[,] data = new int[,]{ { 1, 2 }, { 3, 4 } };

            for (int i = 0; i < data.GetLength(0); i++)
            {
                for (int j = 0; j < data.GetLength(1); j++)
                {
                    Console.Write($"{data[i, j]} ");
                }
                Console.WriteLine();
            }
            Console.ReadLine();
        }
    }
}
```

Output:

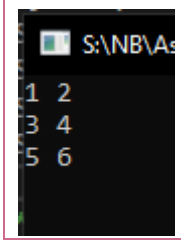


2. **Declare a 2-D array of size (3,2) and initialize in the same line while declaring and print the values using nested for loop**

Code:

```
using System;

/*****************************************************************
* Author: Surya Teja
* Purpose: 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
* ****************************************************************/

namespace Array1
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int[,] data = new int[,]{ { 1, 2 }, { 3, 4 }, { 5, 6 } };

            for (int i = 0; i < data.GetLength(0); i++)
            {
                for (int j = 0; j < data.GetLength(1); j++)
                {
                    Console.Write($"{data[i, j]} ");
                }
                Console.WriteLine();
            }
            Console.ReadLine();
        }
    }
}
```

Output:

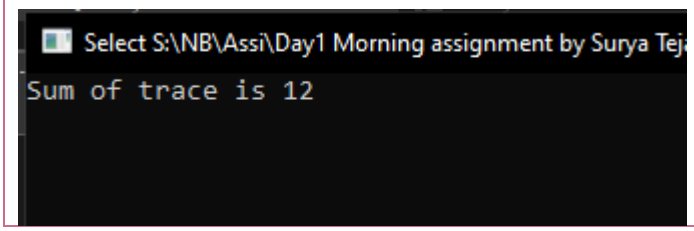


3. Declare a 2-D array of size (3,3) and print trace of the array

Code:

```
using System;

/*********************************************************************
* Author: Surya Teja
* Purpose: Declare a 2-D array of size (3,3) and print trace of the array
* *******************************************************************/

namespace Array1
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int sum = 0;
            int[,] data = new int[,]{ { 1, 2, 3 }, { 3, 4, 5 }, { 5, 6, 7 } };

            for (int i = 0; i < data.GetLength(0); i++)
            {
                for (int j = 0; j < data.GetLength(1); j++)
                {
                    if(i == j)
                        sum = sum + data[i, j];
                }
            }
            Console.WriteLine($"Sum of trace is {sum}");
            Console.ReadLine();
        }
    }
}
```

Output:

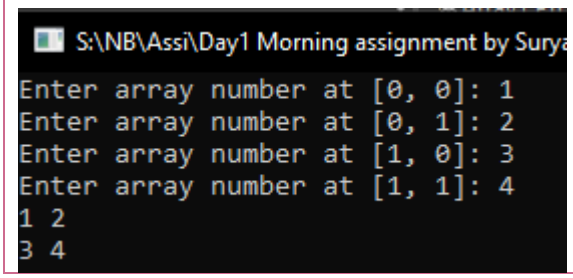


4. Declare a 2-D array of size (2,2) and read values from user and print the array values.

Code:

```
using System;

/*********************************************************************
* Author: Surya Teja
* Purpose: Declare a 2-D array of size (2,2) and read values from user and print
the array values.
* *********************************************************************/

namespace Array1
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int sum = 0;
            int[,] data = new int[2, 2];

            //User input
            for (int i = 0; i < data.GetLength(0); i++)
            {
                for (int j = 0; j < data.GetLength(1); j++)
                {
                    Console.Write($"Enter array number at [{i}, {j}]: ");
                    data[i,j] = Convert.ToInt32(Console.ReadLine());
                }
            }

            //Print
            for (int i = 0; i < data.GetLength(0); i++)
            {
                for (int j = 0; j < data.GetLength(1); j++)
                {
                    Console.Write($"{data[i, j]} ");
                }
                Console.WriteLine();
            }
            Console.ReadLine();
        }
    }
}
```

Output:



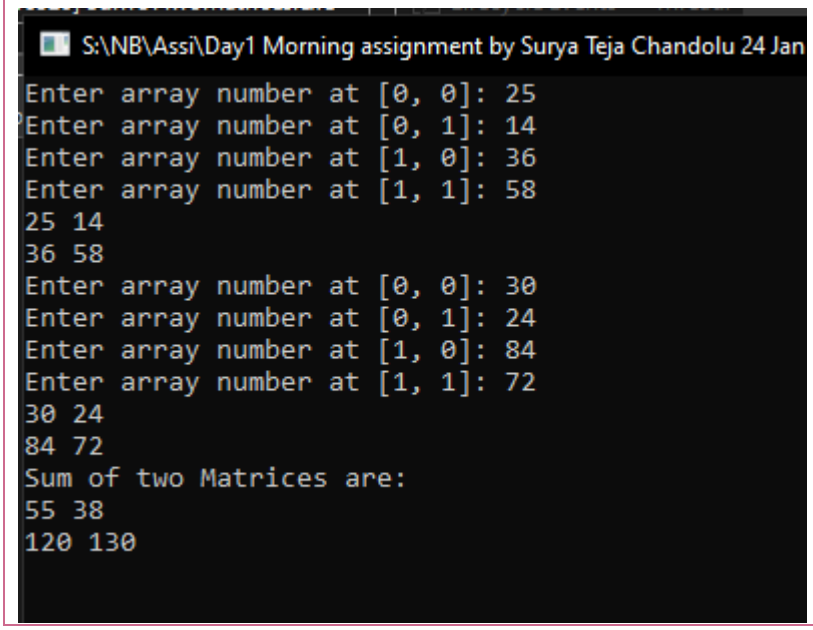
5. Declare TWO 2-D arrays of size (2,2) and read values from user and print the sum of the two matrices.

Code:

```
using System;

/*********************************************************************
* Author: Surya Teja
* Purpose: Declare TWO 2-D arrays of size (2,2) and read values from user and print
the sum of the two matrices.
* ********************************************************************/

namespace SumOfTwoMatrices
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int[,] data1 = new int[2, 2];
            int[,] data2 = new int[2, 2];
            int[,] data3 = new int[2, 2];

            //User input for data1
            for (int i = 0; i < data1.GetLength(0); i++)
            {
                for (int j = 0; j < data1.GetLength(1); j++)
                {
                    Console.Write($"Enter array number at [{i}, {j}]: ");
                    data1[i, j] = Convert.ToInt32(Console.ReadLine());
                }
            }

            //Print for data1
            for (int i = 0; i < data1.GetLength(0); i++)
            {
                for (int j = 0; j < data1.GetLength(1); j++)
                {
                    Console.Write($"{data1[i, j]} ");
                }
                Console.WriteLine();
            }


            //User input for data2
            for (int i = 0; i < data2.GetLength(0); i++)
            {
                for (int j = 0; j < data2.GetLength(1); j++)
                {
                    Console.Write($"Enter array number at [{i}, {j}]: ");
                    data2[i, j] = Convert.ToInt32(Console.ReadLine());
                }
            }

            //Print for data2
            for (int i = 0; i < data2.GetLength(0); i++)
            {
```

```
                for (int j = 0; j < data2.GetLength(1); j++)
                {
                    Console.Write($"{data2[i, j]} ");
                }
                Console.WriteLine();
            }

            //Logic for sum of two matrices
            for (int i = 0; i < data3.GetLength(0); i++)
            {
                for (int j = 0; j < data3.GetLength(1); j++)
                {
                        data3[i, j] = data1[i, j] + data2[i, j];
                }
            }

            //Print sum of two matrices
            Console.WriteLine("Sum of two Matrices are: ");
            for (int i = 0; i < data3.GetLength(0); i++)
            {
                for (int j = 0; j < data3.GetLength(1); j++)
                {
                    Console.Write($"{data3[i, j]} ");
                }
                Console.WriteLine();
            }

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

Output:



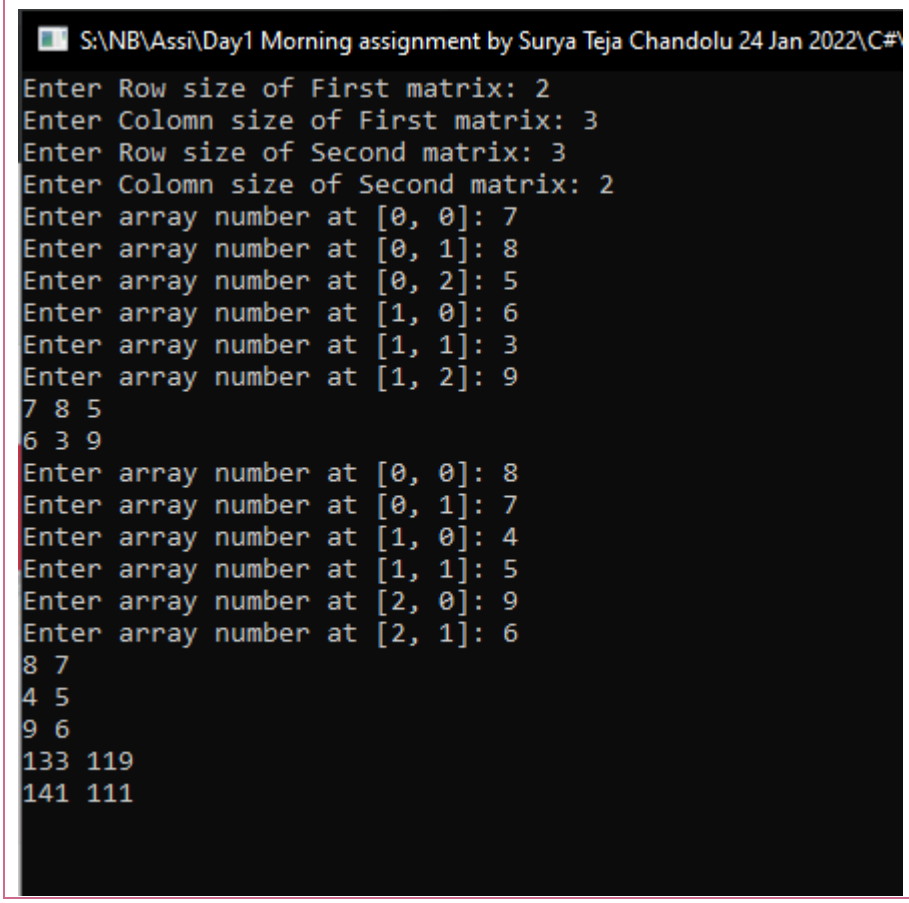
6. Declare TWO 2-D arrays of size (2,2) and read values from user and print the product of the two matrices.

Code:

```
using System;

/*************************************************************************
* Author: Surya Teja
* Purpose: Product Of Matrix
* ***********************************************************************/

namespace ProductOfMatrix
{
    internal class Program
    {
        static void Main(string[] args)
        {
            int f1, f2, s1, s2;

            //Read Data
            Console.Write("Enter Row size of First matrix: ");
            f1 = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter Colomn size of First matrix: ");
            f2 = Convert.ToInt32(Console.ReadLine());

            Console.Write("Enter Row size of Second matrix: ");
            s1 = Convert.ToInt32(Console.ReadLine());
            Console.Write("Enter Colomn size of Second matrix: ");
            s2 = Convert.ToInt32(Console.ReadLine());

            //Array
            int[,] first = new int[f1, f2];
            int[,] second = new int[s1, s2];
            int[,] product = new int[f1, s2];

            //User input for first matrix
            for (int i = 0; i < f1; i++)
            {
                for (int j = 0; j < f2; j++)
                {
                    Console.Write($"Enter array number at [{i}, {j}]: ");
                    first[i, j] = Convert.ToInt32(Console.ReadLine());
                }
            }

            //Print for first matrix
            for (int i = 0; i < f1; i++)
            {
                for (int j = 0; j < f2; j++)
                {
                    Console.Write($"{first[i, j]} ");
                }
                Console.WriteLine();
            }

            //User input for second matrix
```

```
            for (int i = 0; i < s1; i++)
            {
                for (int j = 0; j < s2; j++)
                {
                    Console.Write($"Enter array number at [{i}, {j}]: ");
                    second[i, j] = Convert.ToInt32(Console.ReadLine());
                }
            }

            //Print for second matrix
            for (int i = 0; i < s1; i++)
            {
                for (int j = 0; j < s2; j++)
                {
                    Console.Write($"{second[i, j]} ");
                }
                Console.WriteLine();
            }

            //Logic for mutlipcation table
            if(f2 == s1)
            {
                for(int i = 0; i < f1; i++)
                {
                    for(int j = 0; j < s2; j++)
                    {
                        product[i, j] = 0;
                        for(int k = 0; k < f2; k++)
                        {
                            product[i, j] += first[i, k] * second[k, j];
                        }
                    }
                }

                //Print Mul Table
                for(int i = 0; i < f1; i++)
                {
                    for(int j = 0; j < s2; j++)
                    {
                        Console.Write($"{product[i, j]} ");
                    }
                    Console.WriteLine();
                }
            }

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

Output:



7. What is a jagged array What is the benefit of jagged array

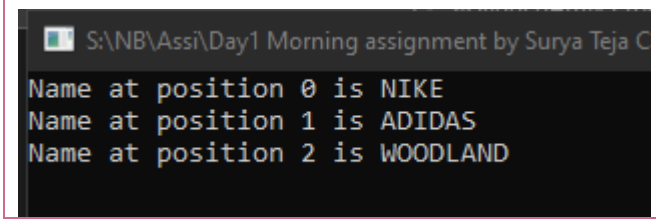
- A jagged array is an array whose elements are arrays, possibly of different sizes. A jagged array is sometimes called an "array of arrays."
- Each of the elements is a single-dimensional array of integers.
- It makes things easy where there is a need to store data in a multidimensional way using the same variable name.
- It helps in memory management which makes the program to be executed very smoothly and fast as well.

8. 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;

/*************************************************************************
* Author: Surya Teja
* Purpose: Jagged Array
* ************************************************************************/

namespace JaggedArray
{
    internal class Program
    {
        static void Main(string[] args)
        {
            char[][] names = new char[3][];

            names[0] = new char[] { 'N','I','K','E' };
            names[1] = new char[] { 'A','D','I','D','A','S' };
            names[2] = new char[] { 'W','O','O','D','L','A','N','D' };

            // Display the array elements.
            for (int i = 0; i < names.Length; i++)
            {
                Console.Write($"Name at position {i} is ");
                for (int j = 0; j < names[i].Length; j++)
                {
                    Console.Write(names[i][j]);
                }
                Console.WriteLine();
            }


            Console.ReadKey();
        }
    }
}
```

Output:



9. What is Recursion

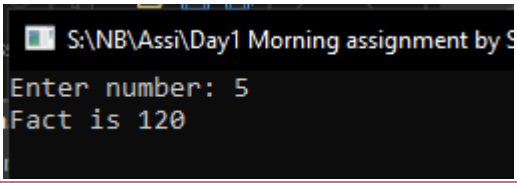
- **A recursion function is which call itself again and again until the condition satisfy.**
- **Thes will call function with parameters and receive new parameter after every execution.**

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

Code:

```
using System;

/*************************************************************************
* Author: Surya Teja
* Purpose: Factorial Recursion
* ***********************************************************************/

namespace FactorialRecursion
{
    internal class Program
    {
        class Factorial
        {
            public int Fact(int number)
            {
                if (number == 1)
                    return 1;
                else
                    return number * Fact(number - 1);
            }
        }
        static void Main(string[] args)
        {
            int input;

            Console.Write("Enter number: ");
            input = Convert.ToInt32(Console.ReadLine());

            Factorial f = new Factorial();
            Console.WriteLine($"Fact is {f.Fact(input)}");

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

Output:

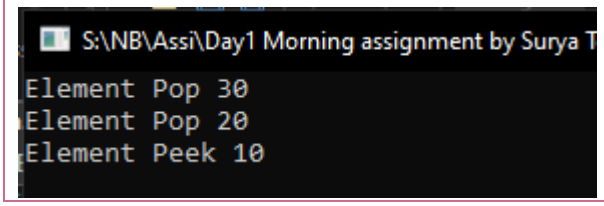


11. WACP to illustrate usage of Stack<> Write couple of points about Stack

Code:

```
using System;
using System.Collections.Generic;

/*************************************************************************
* Author: Surya Teja
* Purpose: Stack
* ***********************************************************************/

namespace StackB
{
    internal class Program
    {
        static void Main(string[] args)
        {
            Stack<int> data = new Stack<int>();
            data.Push(10);
            data.Push(20);
            data.Push(30);

            for (int i = 0; i <= data.Count; i++)
                Console.WriteLine($"Element Pop {data.Pop()}");
            Console.WriteLine($"Element Peek {data.Peek()}");

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

Output:



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

Code:

```
using System;
using System.Collections.Generic;

/*************************************************************************
* Author: Surya Teja
* Purpose: Queue
* ***********************************************************************/

namespace QueueB
{
    internal class Program
    {
        static void Main(string[] args)
        {
            Queue<int> data = new Queue<int>();
            data.Enqueue(10);
            data.Enqueue(20);
            data.Enqueue(30);

            for (int i = 0; i <= data.Count; i++)
                Console.WriteLine($"Element Remove {data.Dequeue()}");
            Console.WriteLine($"Element Peek {data.Peek()}");

            Console.ReadLine();

        }
    }
}
```

Output: