C# - MULTIDIMENSIONAL ARRAYS

http://www.tutorialspoint.com/csharp/csharp_multi_dimensional_arrays.htm

C# allows multidimensional arrays. Multi-dimensional arrays are also called rectangular array. You can declare a 2-dimensional array of strings as:

```
string [,] names;
```

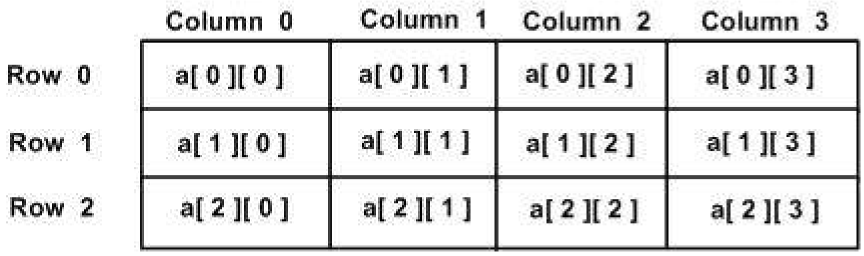
or, a 3-dimensional array of int variables as:

```
int [ , , ] m;
```

Two-Dimensional Arrays

The simplest form of the multidimensional array is the 2-dimensional array. A 2-dimensional array is a list of one-dimensional arrays.

A 2-dimensional array can be thought of as a table, which has x number of rows and y number of columns. Following is a 2-dimensional array, which contains 3 rows and 4 columns:



	Column 0	Column 1	Column 2	Column 3
Row 0	a[0][0]	a[0][1]	a[0][2]	a[0][3]
Row 1	a[1][0]	a[1][1]	a[1][2]	a[1][3]
Row 2	a[2][0]	a[2][1]	a[2][2]	a[2][3]

Thus, every element in the array a is identified by an element name of the form a[i , j], where a is the name of the array, and i and j are the subscripts that uniquely identify each element in array a.

Initializing Two-Dimensional Arrays

Multidimensional arrays may be initialized by specifying bracketed values for each row. The Following array is with 3 rows and each row has 4 columns.

```
int [,] a = new int [3,4] {
   {0, 1, 2, 3} ,   /*  initializers for row indexed by 0 */
   {4, 5, 6, 7} ,   /*  initializers for row indexed by 1 */
   {8, 9, 10, 11}   /*  initializers for row indexed by 2 */
};
```

Accessing Two-Dimensional Array Elements

An element in 2-dimensional array is accessed by using the subscripts. That is, row index and column index of the array. For example,

```
int val = a[2,3];
```

The above statement takes 4th element from the 3rd row of the array. You can verify it in the above diagram. Let us check the program to handle a two dimensional array:

```
using System;
namespace ArrayApplication
{
   class MyArray
   {
      static void Main(string[] args)
      {
         /* an array with 5 rows and 2 columns*/
         int[,] a = new int[5, 2] {{0,0}, {1,2}, {2,4}, {3,6}, {4,8} };
         int i, j;

         /* output each array element's value */
         for (i = 0; i < 5; i++)
         {
            for (j = 0; j < 2; j++)
            {
               Console.WriteLine("a[{0},{1}] = {2}", i, j, a[i,j]);
            }
         }
         Console.ReadKey();
      }
   }
}
```

When the above code is compiled and executed, it produces the following result:

```
a[0,0]: 0
a[0,1]: 0
a[1,0]: 1
a[1,1]: 2
a[2,0]: 2
a[2,1]: 4
a[3,0]: 3
a[3,1]: 6
a[4,0]: 4
a[4,1]: 8
```