C# Multidimensional Arrays

The multidimensional array is also known as rectangular arrays in C#. It can be two dimensional or three dimensional. The data is stored in tabular form (row * column) which is also known as matrix.

To create multidimensional array, we need to use comma inside the square brackets. For example:

1. **int**[,] arr=**new int**[3,3];//declaration of 2D array
2. **int**[,,] arr=**new int**[3,3,3];//declaration of 3D array

C# Multidimensional Array Example

Let's see a simple example of multidimensional array in C# which declares, initializes and traverse two dimensional array.

1. **using** System;
2. **public class** MultiArrayExample
3. {
4.   **public static void** Main(**string**[] args)
5.   {
6.   **int**[,] arr=**new int**[3,3];//declaration of 2D array
7.   arr[0,1]=10;//initialization
8.   arr[1,2]=20;
9.   arr[2,0]=30;
10.
11.   //traversal
12.   **for**(**int** i=0;i<3;i++){
13.   **for**(**int** j=0;j<3;j++){
14.   Console.Write(arr[i,j]+**" "**);
15.   }
16.   Console.WriteLine();//new line at each row
17.   }
18.   }
19. }

Output:

```
0 10 0
0 0 20
30 0 0
```

C# Multidimensional Array Example: Declaration and initialization at same time

There are 3 ways to initialize multidimensional array in C# while declaration.

1. **int**[,] arr = **new int**[3,3]= { { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };

   We can omit the array size.

1. **int**[,] arr = **new int**[,]{ { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };

   We can omit the new operator also.

1. **int**[,] arr = { { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };

   Let's see a simple example of multidimensional array which initializes array at the time of declaration.

```
using System;
public class MultiArrayExample
{
    public static void Main(string[] args)
    {
        int[,] arr = { { 1, 2, 3 }, { 4, 5, 6 }, { 7, 8, 9 } };//declaration and initialization

        //traversal
        for(int i=0;i<3;i++){
            for(int j=0;j<3;j++){
                Console.Write(arr[i,j]+" ");
            }
            Console.WriteLine();//new line at each row
        }
    }
}
```

   Output:

```
1 2 3
4 5 6
7 8 9
```