

C++ Multidimensional Arrays

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In C++, we can create an array, known as a multidimensional array. For example.

```
int x[3][4];
```

Here, x is a two-dimensional array. It can hold a maximum of 12 element.

We can think of this array as a table with 3 rows & each has 4 column as shown.

	Col1	Col2	Col3	Col4
Row1	$x[0]$	$x[0][1]$	$x[0][2]$	$x[0][3]$
Row2	$x[1]$	$x[1][1]$	$x[1][2]$	$x[1][3]$
Row3	$x[2]$	$x[2][1]$	$x[2][2]$	$x[2][3]$
Row4	$x[3]$	$x[3][1]$	$x[3][2]$	$x[3][3]$

Three-dimensional array also work in similar way.

```
float x[2][4][3];
```

This array x can hold a maximum of 24 element.

We can find out total number of element in array.

$$2 \times 4 \times 3 = 24$$

* Multidimensional Array Initialization

Like a normal way, we can initialize a multidimensional array is more than one way.

* Initialization of two-dimensional Array.

```
int test[2][3] = { 2, 4, 5, 9, 0, 19 };
```

The ^{above} method is not preferred.
A better way to initialize this array with the same array element.

```
int test[2][3] = { { 2, 4, 5 }, { 9, 0, 19 } };
```

This array has 2 row 3 column, which is why we have to give element with 3 element.

* Initialization of three-dimensional Array

```
int test[2][3][4] = { { 3, 4, 2, 9, 0, -3, 9, 11, 23  
12, 23, 2, 13, 4, 56, 3, 5, 9, 13  
5, 5, 1, 4, 9 } };
```

This is not a good way to initialize an array.

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A better way to initialize is

```
int test[2][3][4] = {
    { 3, 4, 2, 3 }, { 0, -3, 9, 11 },
    { 23, 12, 23, 2 },
    { 13, 4, 46, 3 }, { 5, 9, 3, 5 }, { 5, 1, 4, 9 }
};
```

Quick Quiz :-

Write a C++ program to display all element of an initialization two dimensional array.

Taking Input for two Dimensional Array.

```
#include <iostream>
using namespace std;
```

```
int main() {
    int numbers[2][3];
```

```
    cout << "Enter 6 numbers: " << endl;
```

```
    // Storing user input in tree
```

```

for (int i = 0; i < 2; ++i) {
    for (int j = 0; j < 3; ++j) {
        cin >> numbers[i][j];
    }
}

```

cout << "The numbers are: " << endl;

// printing array element

```

for (int i = 0; i < 2; ++i) {
    for (int j = 0; j < 3; ++j) {
        cout << "Numbers [" << i << "][" << j << "]"
            << Numbers[i][j] << endl;
    }
}
getchar();
}

```

Here, we have to use nested for loop to take the input of 2D array. Once all the input has been taken, we have to use to print the array members.