



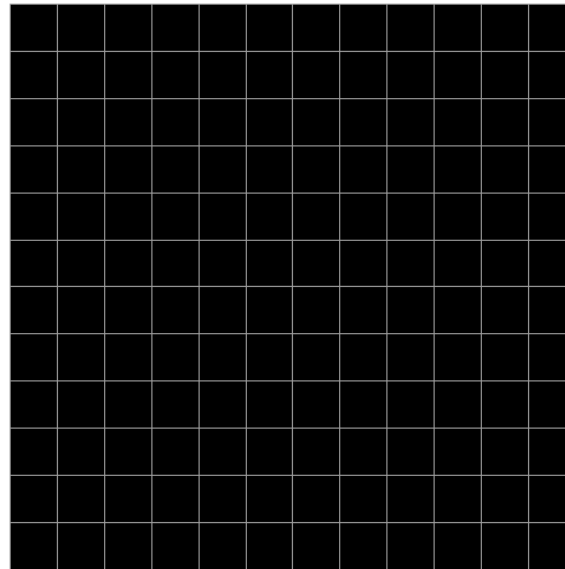
# Fundamental Coding with C

Multidimensional Arrays



# Multidimensional Arrays

- We can define multidimensional arrays in simple words as array of arrays. Data in multidimensional arrays are stored in tabular form (in row major order).
- The most popular form of multidimensional arrays is the two-dimensional arrays by which matrices can be implemented.





# Multidimensional Arrays

- C programming language allows multidimensional arrays. Here is the general form of a multidimensional array declaration.

```
type name[size1][size2]...[sizeN];
```

- For example, the following declaration creates a three dimensional integer array

```
int threedim[5][10][4];
```



# Multidimensional Arrays

- The simplest form of multidimensional array is the two-dimensional array.
- A two-dimensional array is, in essence, a list of one-dimensional arrays.
- To declare a two-dimensional integer array of size [x][y], you would write something as follows:

```
type arrayName [ x ] [ y ] ;
```

- For example, the following declaration creates a two dimensional integer array

```
int threedim[5][10];
```

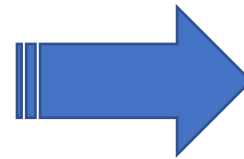


# Multidimensional Arrays

## Initializing Two-Dimensional Arrays

- Multidimensional arrays may be initialized by specifying bracketed values for each row.
- For example, the following declaration creates a two dimensional integer array

```
int a[3][4] = {  
    {0, 1, 2, 3},  
    {4, 5, 6, 7},  
    {8, 9, 10, 11}  
};
```



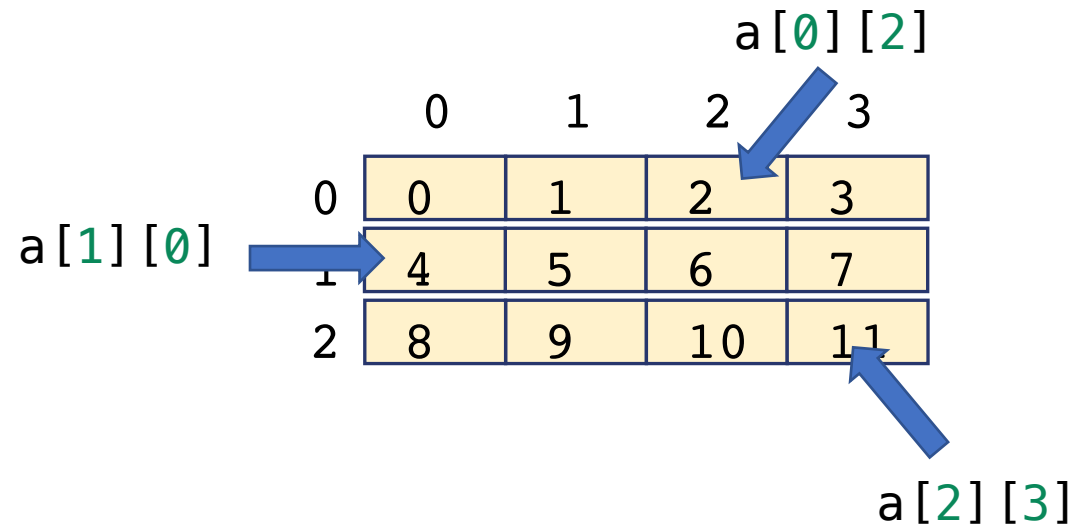
	0	1	2	3
0	0	1	2	3
1	4	5	6	7
2	8	9	10	11



# Multidimensional Arrays

## Accessing Two-Dimensional Array Elements:

- Every element in the two-dimensional 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 'a'.





# Multidimensional Arrays

Two-Dimensional Array Elements example:

```
int a[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++ )  
    {  
        printf("a[%d][%d] = %d\n", i,j, a[i][j] );  
    }  
}
```

This "for"  
loops the  
rows

This "for"  
loops the  
columns



Fundamental  
Coding with C

# Is time to Try

<https://repl.it/languages/c>







# Multidimensional Arrays

```
#include <stdio.h>
int main ()
{
    /* an array with 5 rows and 2 columns*/
    int a[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++ ) {
            printf("a[%d][%d] = %d\n", i,j, a[i][j] );
        }
    }
    return 0;
}
```