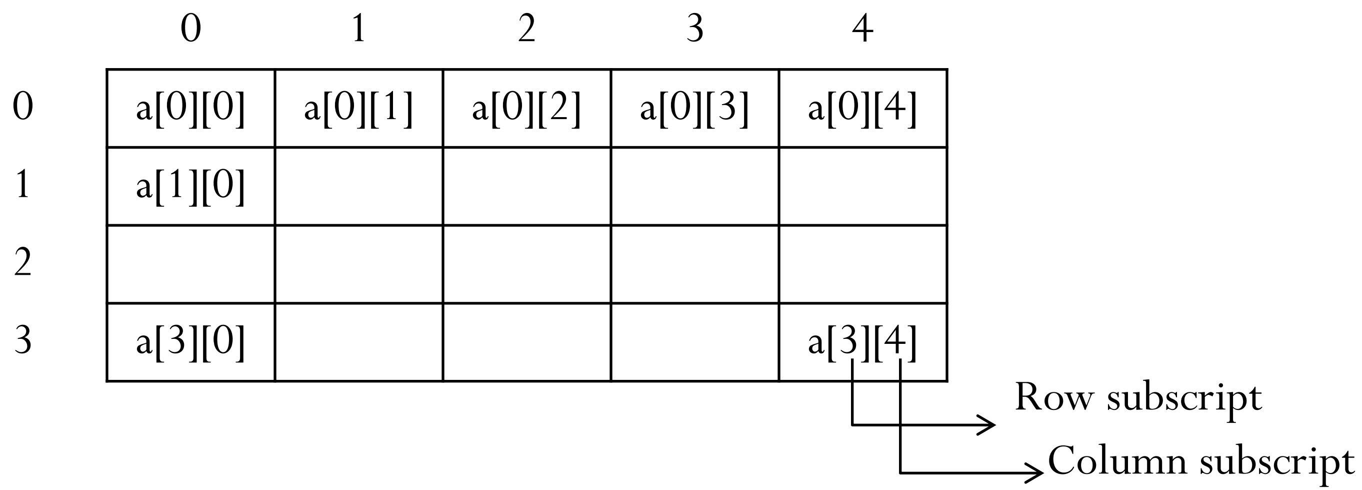
Two Dimensional Array in C

Multidimensional array

- Arrays of two or more dimension
- int count[10][12];
- 2-d array
  - Array of one dimensional arrays
  - Row, column format
  - Accessed a row at a time from left to right



	0	1	2	3	4
0	a[0][0]	a[0][1]	a[0][2]	a[0][3]	a[0][4]
1	a[1][0]				
2					
3	a[3][0]				a[3][4]

Row subscript

Column subscript

Multidimensional array

- Example:
- float yeartemp[12][31];

Multidimensional array

```
#include<stdio.h>

int main()
{
        int td[4][5];
        int i, j;
        for(i=0; i<4; i++) {
                for(j=0; j<5; j++) {
                        td[i][j]=i;
                }
        }
        for(i=0; i<4; i++)
        {
                for(j=0; j<5; j++) {
                        printf("%d ", td[i][j]);
                }
                printf("\n");
        }
        return 0;
}
```

Output:

```
0 0 0 0 0
1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
```

Multidimensional array

```
#include<stdio.h>

int main()
{
        int td[4][5];
        int i, j;
        for(i=0; i<4; i++) {
                for(j=0; j<5; j++) {
                        td[i][j]=i*j;
                }
        }
        for(i=0; i<4; i++)
        {
                for(j=0; j<5; j++) {
                        printf("%d ", td[i][j]);
                }
                printf("\n");
        }
        return 0;
}
```

Output:

```
0 0 0 0 0
0 1 2 3 4
0 2 4 6 8
0 3 6 9 12
```

Multidimensional array

- Initialization:

```
int sqr[3][3] = {
    1,2,3,
    4,5,6,
    7,8,9
};
```

	Col no. 0	Col no. 1	Col no. 2
Row no. 0	1	2	3
Row no. 1	4	5	6
Row no. 2	7	8	9

- Initialization:
- Specify all but the leftmost dimension

```
int sqr[][3] = {
    1,2,3,
    4,5,6,
    7,8,9
};
```

Multidimensional array

- Initialization:

```
int sqr[3][3] ={
                    {1,2,3},
                    {4,5,6},
                    {7,8,9}
};
int sqr[3][3] ={1,2,3,4,5,6,7,8,9};
int sqr[][3] ={1,2,3,4,5,6,7,8,9};
```

Multidimensional array

- Initialization:

```
int sqr[3][] ={1,2,3,4,5,6,7,8,9};
int sqr[][] ={1,2,3,4,5,6,7,8,9};
```

- This would never work

Multidimensional array

- Arrangement of 2-D array in memory
- Memory doesn't contain row and columns
- Elements are stored in one continuous chain

S[0][0]	S[0][1]	S[0][2]	S[1][0]	S[1][1]	S[1][2]	S[2][0]	S[2][1]	S[2][2]
1	2	3	4	5	6	7	8	9
5002	5004	5006	5008	5010	5012	5014	5016	5018

Multidimensional array

- 100-character one dimensional requires 100 bytes of memory
- 100×100 character two dimensional array requires 10,000 bytes of memory