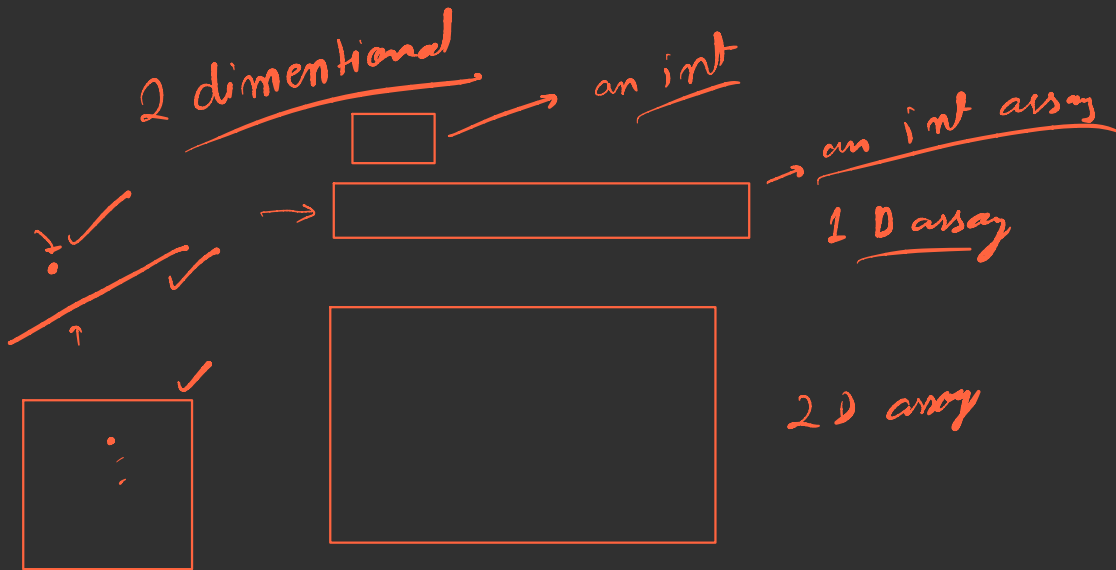


# L9

## 2D arrays

For Discord email - [support@learnyard.com](mailto:support@learnyard.com)

## What are 2D Arrays ?



## Use-case of 2D Arrays

`int ar[5][4];`

Rows  
Cols

	0	1	2	3
0				
1				
2				
3				
4				

H → 0  
E → 1  
M → 2  
S → 3

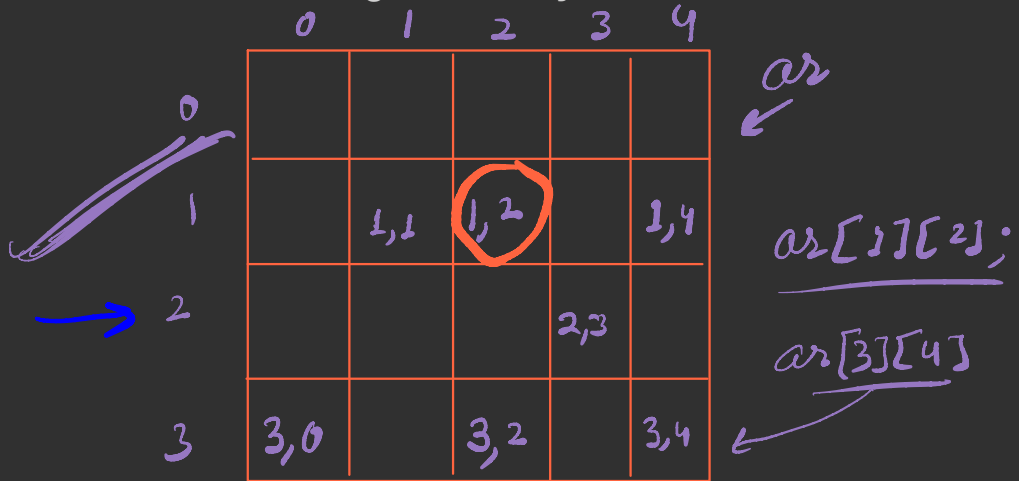
$5 \times 4 = 20$  int

Size  $20 \times 4 = 80$  bytes

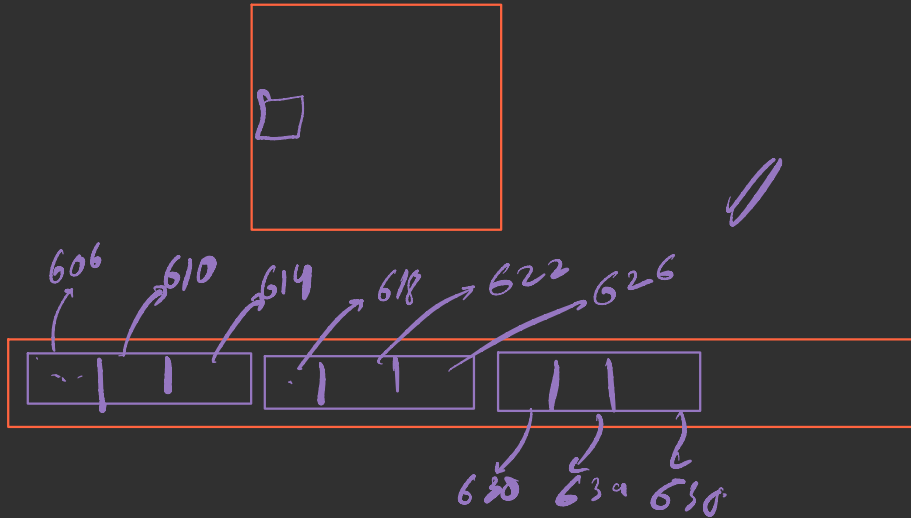
## Declaring different 2D arrays

```
int ar [10][20];  
char ar [5][6];
```

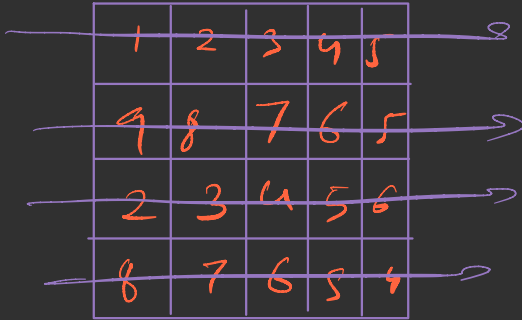
## Element Access in 2D array and Indexing in 2D array



## Memory Allocation of 2D Array

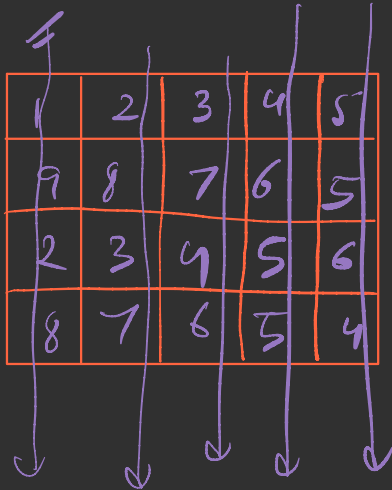


## Print Row wise traversal of 2D array



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

## Print Column wise traversal of 2D array



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

$$j = 0$$

$$i = 0 - 3$$

$$j = 1$$

$$i = 0 - 3$$



**Sum of each row and each  
column in 2D array**

## Find sum of diagonal elements in 2D array

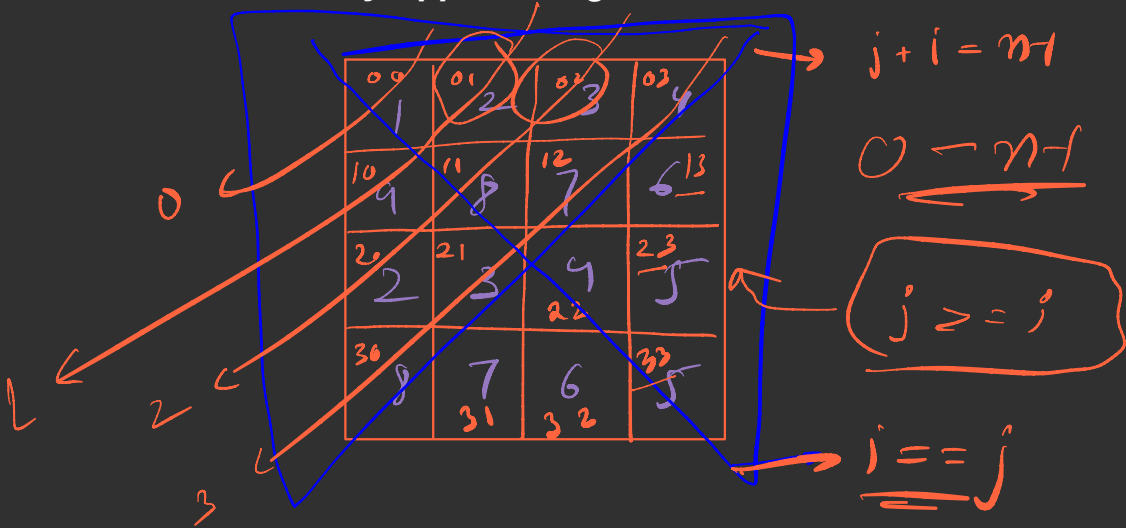
$n \times n$

4 00	6 01	8 02	7 03
3 10	9 11	5 12	11 13
12 20	6 21	7 22	5 23
30 8	31 9	32 9	33 0

$\begin{matrix} 00 \\ 11 \\ 22 \\ 33 \end{matrix}$

$i + j = 3 = n - 1$

## Print Only Upper Triangular Elements



## Interchange the diagonals in 2D array

~~|   |   |   |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |~~

Original matrix

3	2	1
4	5	6
9	8	7

Matrix diagonal  
interchanged

$00 \rightarrow 0?$   
 $11 \rightarrow 1?$   
 $22 \rightarrow 2?$   
 $31 \rightarrow 3?$

$$i + j = n - 1$$

$00$  ✓  
 $02$  ✓  
 $11$   
 $20$   
 $22$  ✓

$0,0$      $0,2$   
 $1,1$      $1,1$   
 $2,2$      $2,0$

# Practice and Homework Questions

## Homework questions -

1. <https://codeforwin.org/c-programming/c-program-to-add-two-matrices>
2. <https://codeforwin.org/c-programming/c-program-to-subtract-two-matrices>
3. <https://codeforwin.org/c-programming/c-program-to-find-lower-triangular-matrix>
4. <https://codeforwin.org/c-programming/c-program-to-find-sum-of-upper-triangular-matrix>
5. <https://codeforwin.org/c-programming/c-program-to-find-sum-of-lower-triangular-matrix>

# Thank You!

Please practice more questions and examples as above !!