

## 2D Array

Array: Collection of homogeneous elements

arr →

10	20	30	40	50
0	1	2	3	4

int arr[] = new int[5];

2D: It can be represented as rows & column

$$\begin{bmatrix} \downarrow & \downarrow \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$$

m × n  
2 × 2

	Column
row	0 1
	1 0

example: How do we plot the 2D data in an array

students per section

class room

	A	B	C	D
0	35	40	60	40
1	25	35	45	60
2	25	60	25	30
3	40	20	15	25

arr[0][0] → 35  
arr[i][j]

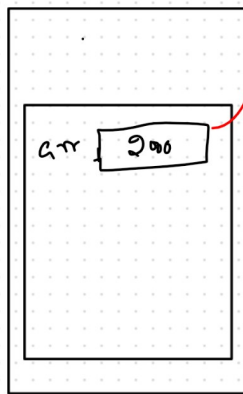
How do we represent my data in 2D Array

[ ] open bracket closed  
( ) open parenthesis  
{ } open brace

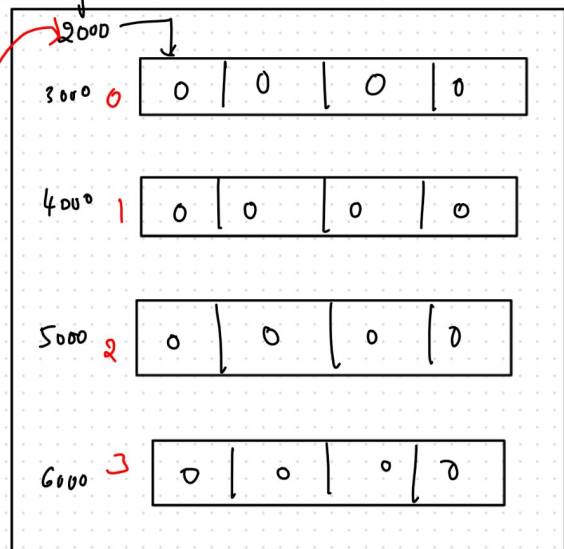
Declaration:

✓ int arr[7][ ] = new int[4][4]  
✓ int[ ][ ] arr

int arr[ ][ ] = new int[4][4]



RAM



Heap

## Practical Examples of 2D Array

- 1, Transpose of an matrix
- 2, Rotation of an matrix

1, Transpose of an matrix:

$$\begin{bmatrix} a & b & c \\ d & e & f \end{bmatrix}_{2 \times 3} = \begin{bmatrix} a & d \\ b & e \\ c & f \end{bmatrix}_{3 \times 2}$$

		<sup>j</sup> 0	1	2
<sup>i</sup> 0		a	b	c
1		d	e	f

$$a = [0][0]$$

$$b = [0][1]$$

$$c = [0][2]$$

$$d = [1][0]$$

		0	1
0	a	d	
1	b	e	
2	c	f	g

$$a = [0][0]$$

$$b = [1][0]$$

$$c = [2][0]$$

$$d = [0][1]$$

$$\longleftrightarrow$$

$$\text{arr}[i][j] = \text{arr}[j][i]$$

logic

	1	2
0	a	d
1	b	
2		

Reason for using arr[i].length ↓

