

# 2D Array

Syntax:

1D `int arr[] = new Array[ ]`

2D `int arr[ ][ ] = new Array[ ][ ]`

0 — [5]  
1 — [5]  
2 — [5]

Cn: no. of class rooms { student roll numbers

rows { columns  
tabular format

→ rows

no. of class  
rooms

		Students			
0	A	101	102	103	104
1	B	201	202	203	204
2	C	301	302	303	304

[0] → class A

[1] → class B

[ 101, 102, 103, 104, 201, 202, 203, 204, 301, 302 ]

matrices

3x3  $\begin{bmatrix} - & - & - \\ - & - & - \\ - & - & - \end{bmatrix}$   
2x2  $\begin{bmatrix} - & - \\ - & - \end{bmatrix}$

→ 0

rows

for loop

→ 1  
→ 2

		Columns	
		↓ j	↓
0	Students	0	2
10	20		
	20		

3 class, 3 sections  
A0 D1 E

→ 0 8	40	50	60
1 9	70	80	90
2 10	10	20	30

`arr[0][0] = 10`

`arr[0][1] = 20`

Transpose matrix

$A \rightarrow A^T$

2D Array

$$\begin{bmatrix} 5 & 1 & 1 \\ 5 & 2 & 0 \end{bmatrix} = \begin{bmatrix} 5 & 5 \\ 1 & 2 \\ 1 & 0 \end{bmatrix}$$

2x3      3x2

< 90°

5 0 5 → 5 4 1  
6 1 4 → 6 1 2  
2 2 1 → 5 6 2

> 90°

$$\begin{bmatrix} 5 & 4 & 1 \\ 0 & 1 & 2 \\ 5 & 6 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 0 & 5 \\ 6 & 1 & 4 \\ 2 & 2 & 1 \end{bmatrix}$$

$$\rightarrow \begin{matrix} 0 \\ 1 \end{matrix} \begin{bmatrix} 0 & 1 & 2 \\ 5 & 4 & 3 \\ 1 & 2 & 3 \end{bmatrix}$$

$i \rightarrow 0$   $\hat{J}=0$   $20$   $21$   $22$   
 $23$   $24$   $25$

$$21 = 3$$

→ new Matrix  $\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix}$  = org matrix  $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$$i \begin{bmatrix} 0 & 20 \\ 1 & 21 \\ 2 & \end{bmatrix}$$

$$\begin{array}{c}
 0 \quad 1 \quad 2 \\
 > 90^\circ \\
 \begin{array}{c} 0 \\ 1 \\ 2 \end{array}
 \begin{bmatrix}
 \textcircled{5} & \textcircled{4} & 1 \\
 0 & \textcircled{1} & 2 \\
 5 & 6 & 2
 \end{bmatrix}
 =
 \begin{array}{c} 0 \\ 1 \\ 2 \end{array}
 \begin{bmatrix}
 \textcircled{5} & 0 & \textcircled{5} \\
 6 & 1 & \textcircled{4} \\
 2 & 2 & 1
 \end{bmatrix}
 \end{array}$$

new i

$$22 \dots = 2$$

$$26 \times 100 = 2600$$

$$\begin{array}{r} 1 \\ 1 \\ 1 \\ \hline 3 \end{array}$$

Colum

new matrix [j] [

row  $\rightarrow$   $\begin{pmatrix} 0 & 2 \end{pmatrix}$

row  $\begin{pmatrix} 1 & -1 \end{pmatrix}$

row  $\begin{pmatrix} 2 & -0 \end{pmatrix}$

$\left[ (row_{j+1} - i) \right]$

$(3 - 1 - 0)$

$= 2$

$\begin{pmatrix} 2 \end{pmatrix}$

$> 90^\circ$

$$\text{new Matrix}[j][\text{row} - i]$$

$$i=1 \quad (3-1)-1$$

$$i=2 \quad (3-1)-2$$

0  
6  
8