

Input

$$\begin{array}{c}
 \begin{array}{ccc}
 0 & 1 & 2 \\
 0 & 1 & 2 \\
 \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}
 \end{array}
 \end{array}$$

Rotation of 2D Matrix

$$\begin{bmatrix} 7 & 4 & 1 \\ 8 & 5 & 2 \\ 9 & 6 & 3 \end{bmatrix}$$

output

$$\begin{array}{l}
 i=0 \quad (2 \& 4) \quad (3 \& 7) \\
 J=0 \quad J=1 \quad J=2
 \end{array}$$

Rotation of matrix 90° in clockwise direction

1) Transpose of 2D Matrix

$$\begin{array}{l}
 i=1 \\
 J=1 \quad J=2 \\
 (6 \& 8)
 \end{array}$$

$$\begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$$

Rows \longleftrightarrow columns

$$\begin{array}{l}
 i=2 \\
 J=2
 \end{array}$$

2) Swap b/w columns

$$\begin{bmatrix} 7 & 4 & 1 \\ 8 & 5 & 2 \\ 9 & 6 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix}_{4 \times 4} \xrightarrow[\text{1st step}]{\text{Transpose}} \begin{bmatrix} 1 & 5 & 9 & 13 \\ 2 & 6 & 10 & 14 \\ 3 & 7 & 11 & 15 \\ 4 & 8 & 12 & 16 \end{bmatrix}$$

$$\begin{bmatrix} 13 & 9 & 5 \\ 14 & 10 & 6 \\ 15 & 11 & 7 \\ 10 & 12 & 8 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ 3 \\ 4 \end{bmatrix}_{4 \times 4} \xrightarrow{\text{swap}}$$