Problem 1.7 Rotate Matrix → Write a function to rotate a matrix 90°. Can you do this in place?

Parameters (NxN 2D array) → Can I trust this?

Return (NxN array → 90° clockwise?)

Simplest Problem

IN → $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ → $\begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$

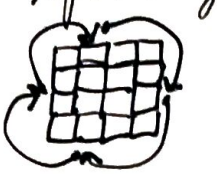
$\begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}$

Solution

reverse each row

reverse back-diagonals

rotate each layer separately



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

1,1 1,2 1,3 2,3 3,3 3,2 3,1

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

IN → $\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \\ 13 & 14 & 15 & 16 \end{bmatrix}$ → $\begin{bmatrix} 4 & 3 & 2 & 1 \\ 8 & 7 & 6 & 5 \\ 12 & 11 & 10 & 9 \\ 16 & 15 & 14 & 13 \end{bmatrix}$

1,1 2,2 3,3 4,4

OUT → $\begin{bmatrix} 13 & 9 & 5 & 1 \\ 14 & 10 & 6 & 2 \\ 15 & 11 & 7 & 3 \\ 16 & 12 & 8 & 4 \end{bmatrix}$

1,3 2,4

1,2 2,3 3,4

1,1 2,2 3,3 4,4

2,1 3,2 4,3

3,1 4,2

1, N-1

1, N-2

N-1, N-1

N-2, 1

N-1, 1

$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ →