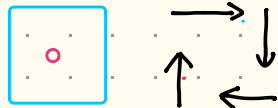


48. Rotate Image

$n \times n$ matrix rotate 90° clockwise

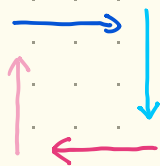
0 1 2 $n = 3$

0 1 2 3 2 borders
1 4 5 6
2 7 8 9



0 1 2 3 $n = 4$

0 1 2 3 4
1 5 6 7 8
2 9 10 11 12
3 13 14 15 16

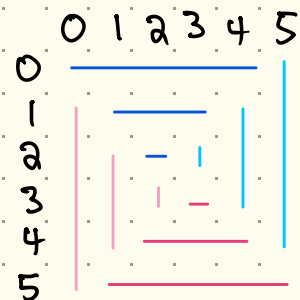


0,0 0,3 3,3 3,0
0,1 1,3 3,2 2,0
0,2 2,3 3,1 1,0

k, i
 $i, n-k-1$
 $n-k-1, n-i-1$
 $n-i-1, k$

$k \in [0, (n+1) // 2)$ 5 \rightarrow 3 Border Iterator
6 \rightarrow 3
7 \rightarrow 4

$i \in [k, n-1-k)$ Iterator for shrinking



$k \in [0, 3)$
 $i \in [k, n-1-k)$

$i \in [0, 4]$ $6-1-0=5$
 $[1, 3]$ $6-1-1=4$
 $[2]$ $6-1-2=3$

Edge Case: n is odd, last k iteration don't swap