

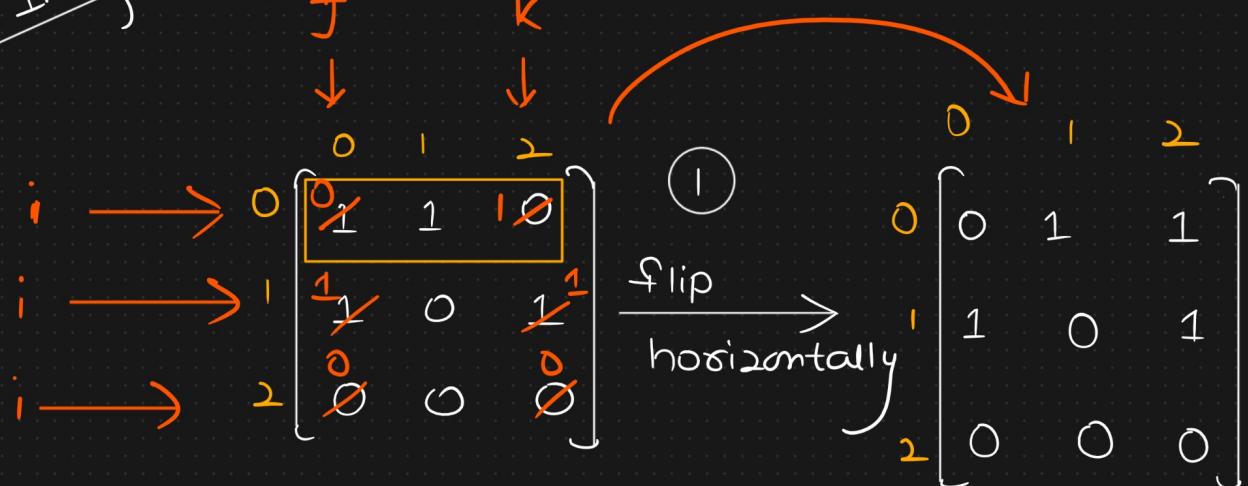
2D Array

Easy - Medium

↳ Leetcode Problems

Complete DSA Python

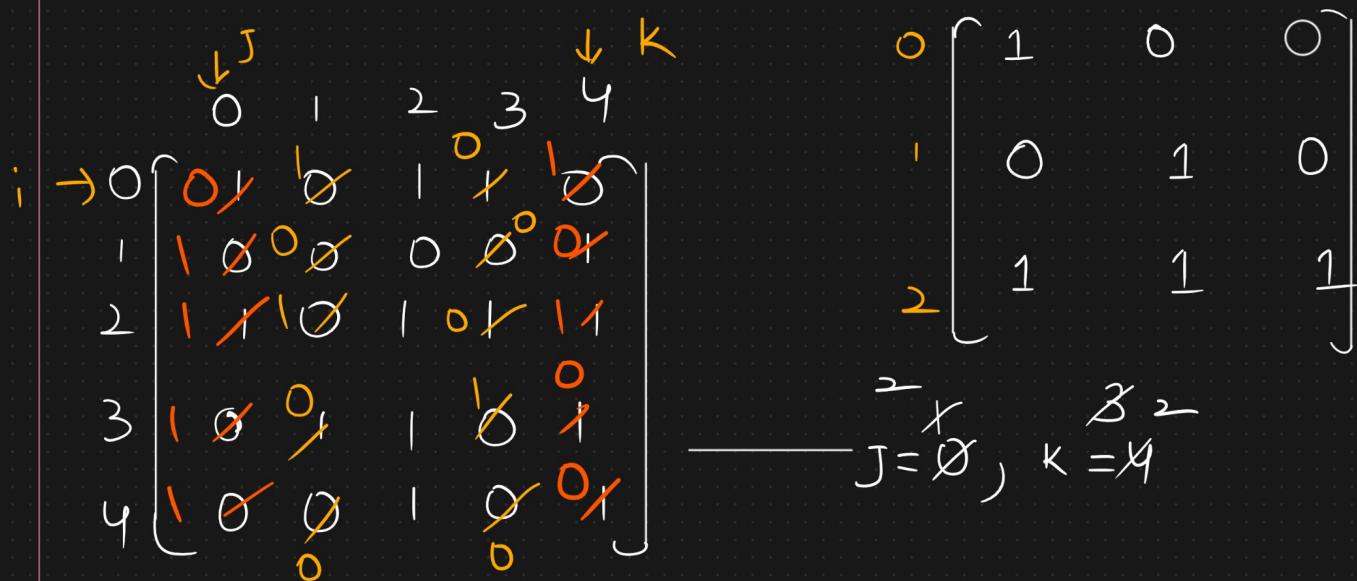
flipping
an Image



→ Data Science

② Replacing 0's with 1's is Inversion

$$0 \leftrightarrow 1$$



Logic

$\text{rows} = \text{image.length} = 3$

$\text{for } (i=0 \text{ to } \text{rows}-1) \{$

$J = 0$ — **first column index**

$J = \cancel{0} 1 \leftarrow$
 $K = \cancel{2} 1 \leftarrow$

last
column
index

$K = \underline{\text{image}[0].length - 1};$

while ($J < K$) {

swap $\underline{\text{image}[i](J)}$
 $\underline{\text{image}[i](K)}$

$J++;$

$K--;$

}

(1)

Horizontal
flipping

(2)

$\text{for } (i=0 \rightarrow n-1) \{$

$\text{image}(i)(j) = \underline{\text{image}(i)(j) == 1}$

? 0 : 1

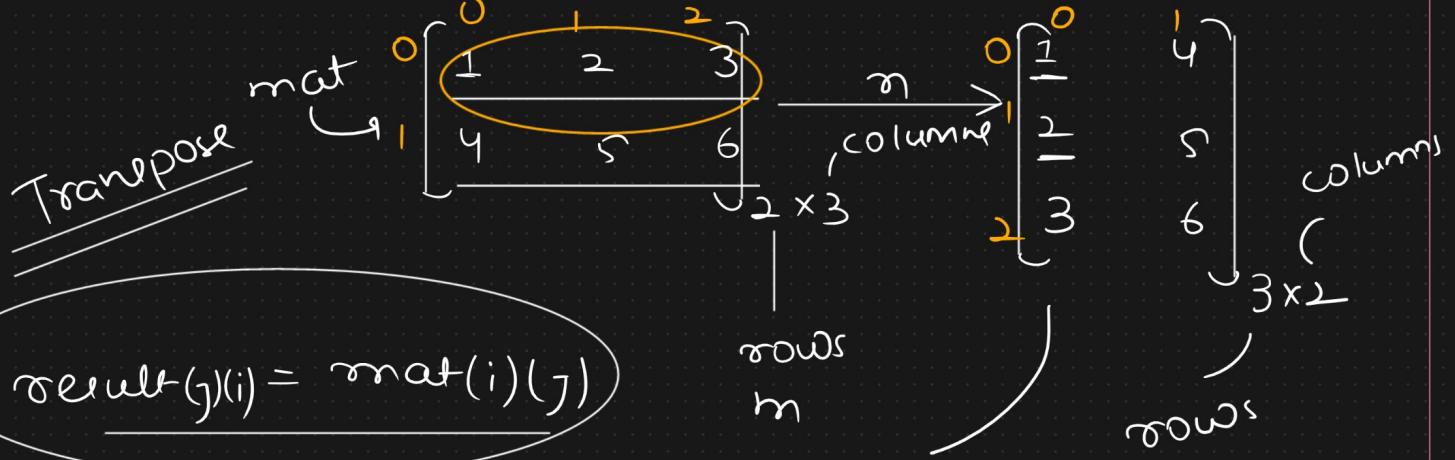


conditional
statement

return image

}

Inversion



$\text{result}(n)(m)$

$$\# \text{rows} = \underline{\text{mat.length}} = 2$$

$$\# \text{cols} = \frac{\text{mat}[0].\text{length}}{\text{1st Row}} = 3$$

$\hookrightarrow \# \text{Element}$

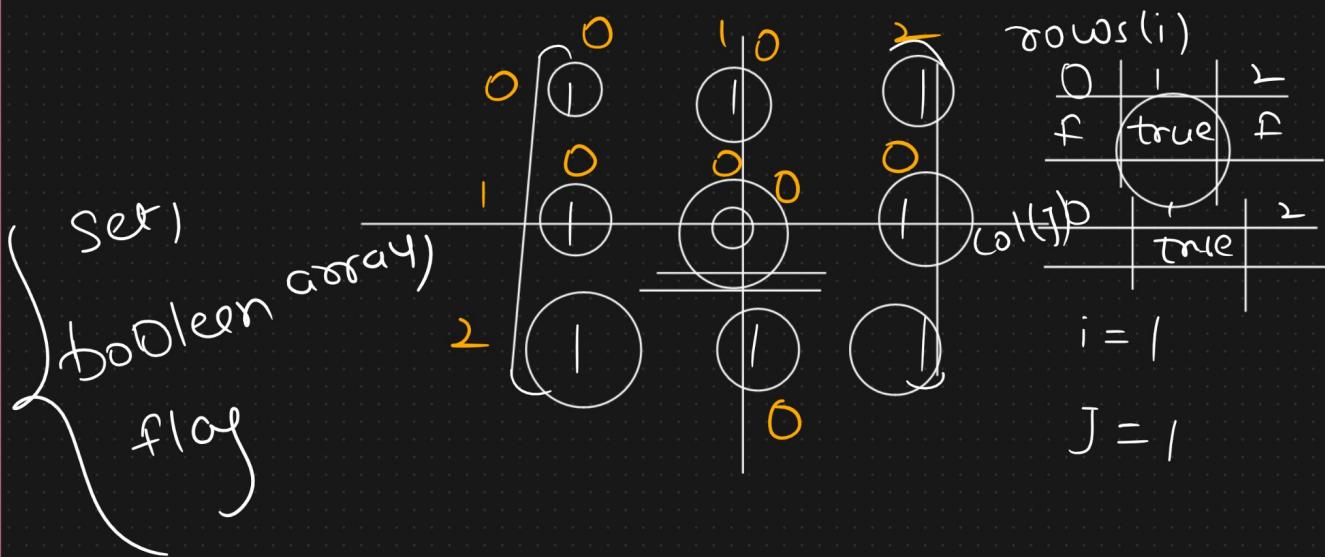
Set Matrix
Zeros

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

1) To find out at what position (i, j) 0's are present

2) $(i, j) \xrightarrow{\text{matrix}(i)(j) = 0}$

Logic



Search 2D Matrix

	0	1	2	3
0	1	3	5	7
1	10	11	16	20
2	23	30	34	60

$\text{target} = 3$

3×4

true - Result

Brute force Approach

$\mathcal{O}(m \times n)$

```
for (i = 0 to rows - 1) {
    for (j = 0 to cols - 1) {
        if (mat(i)(j) == target) {
            return true;
        }
    }
}
```

return false;

Binary Search

Optimized Solution → $\mathcal{O}(\log(m \times n))$

0	1	2	3
1	3	5	7
10	11	16	20
23	30	34	60

2D Array

$$m = 3$$

$$n = 4$$

0 to

$$m \times m - 1$$

ID

array

arr(1)(2)

Map

Row Major Form

Memory

0	1	2	3	4	5	6	7	8	9	10	11
1	3	5	7	10	11	16	20	23	30	34	60

$$10/4$$

$$0 \rightarrow 0 \quad m \times m - 1 \quad \text{row} = 2$$

$$\text{col} = 2$$

Row-wise

$$10 \% 4$$

+ columns

$$\text{row num} = \text{id} \% m = 6 \% 4 = 1$$

$$\text{col num} = \text{id} \% n = 6 \% 4 = 2$$

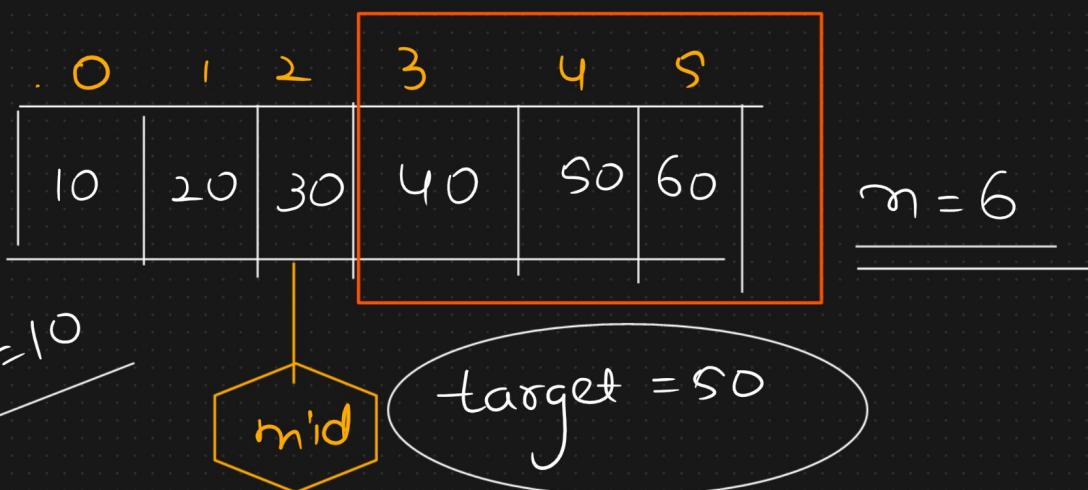
Binary Search

→ Sorted data

↓

Left side
of mid

right side
of mid



$$\text{mid} = \frac{\text{low} + (\text{high} - \text{low})/2}{2}$$

$$= \frac{0 + (5-0)/2}{2}$$

$$= 2$$

if ($\text{arr}(\text{mid}) < \text{target}$)

$\text{low} = \text{mid} + 1$ Right side

↳

else

$\text{high} = \text{mid} - 1$

