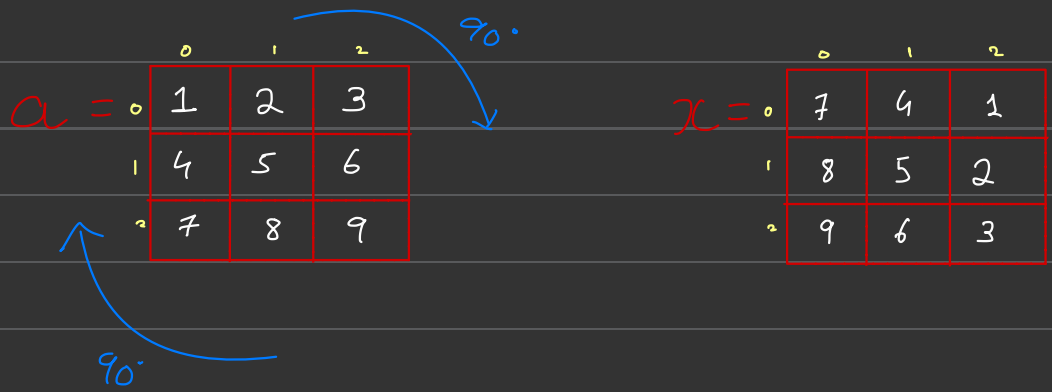
Method 1 → Extra space solution.



- Take an empty vector of same size as that of a & initialise all rows with 0

```
vector< vector <int>> rotate (n, vector <int> (n, 0));
```

- We can see : x ⇒ a relationship

0,0 ⇒ 2,0 (2-0)	1,0 ⇒ 2,1 (2-0)	2,0 ⇒ 2,2 (2-0)
0,1 ⇒ 1,0 (2-1)	1,1 ⇒ 1,1 (2-1)	2,1 ⇒ 1,2 (2-1)
0,2 ⇒ 0,0 (2-2)	1,2 ⇒ 0,1 (2-2)	2,2 ⇒ 0,2 (2-2)
i j → n-1-i i	i j → n-1-i i	i j → n-1-i i

```
rotate [i] [j] = matrix [n-1-i] [i]
```

T.C → $O(n^2)$: SC → $O(n^2)$

Method 2 → Matrix arithmetics

To rotate a matrix by 90°

- Take transpose of the matrix (rows ⇌ columns)
- Reverse each row

a =	0	1	2
0	1	2	3
1	4	5	6
2	7	8	9

Transpose : `swap(a[i][j], a[j][i]);`

a =	0	1	2
0	1	4	7
1	2	5	8
2	3	6	9

Reverse : `reverse(a[i].begin(), a[i].end());`

rows

a =	0	1	2
0	7	4	1
1	8	5	2
2	9	6	3

T.C → $O(n^2)$ | S.C → $O(1)$