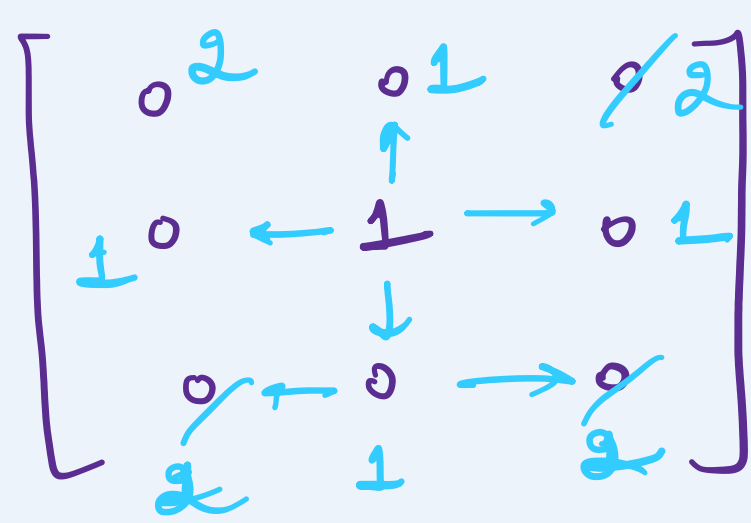


Q Given a $n \times m$ matrix (boolean), for every cell (i, j) find the distance of cell (i, j) from nearest 1. → shortest BFS

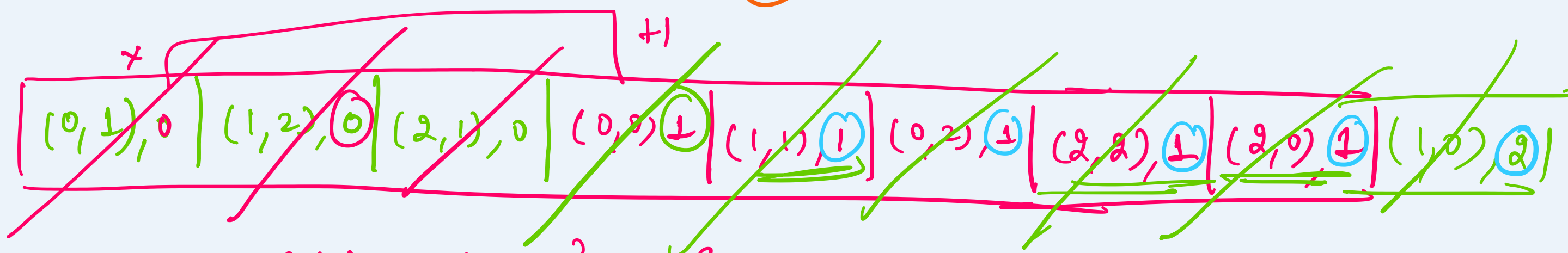
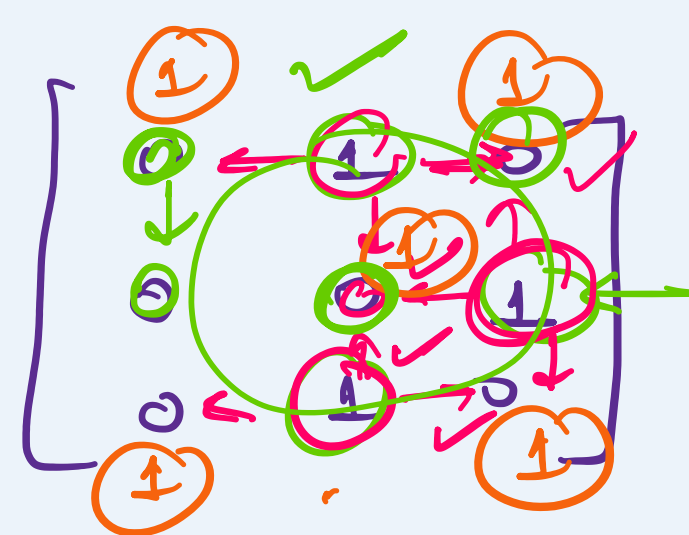
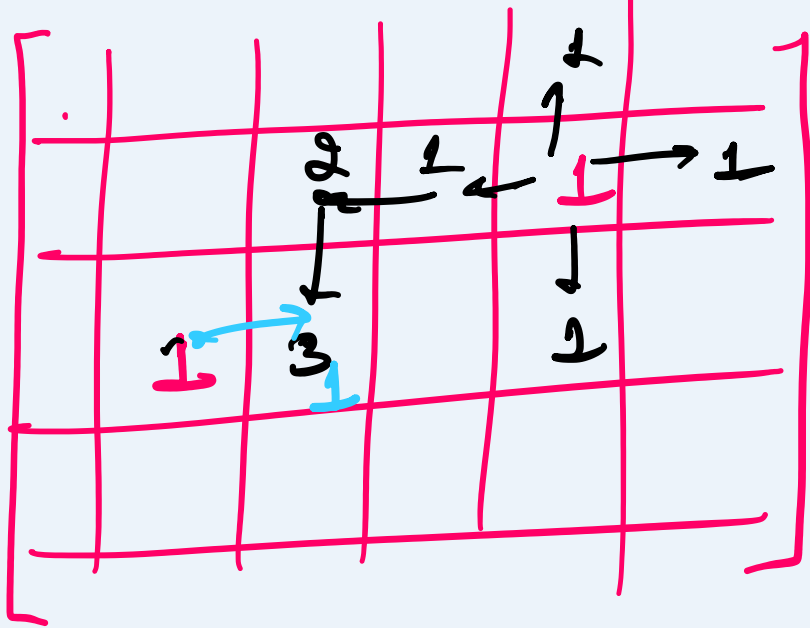
Manhattan distance
 $|x_i - x_j| + |y_i - y_j|$

I/P → $\begin{bmatrix} 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \rightarrow \begin{bmatrix} 3 & 2 & 1 & 0 \\ 2 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 \end{bmatrix}$

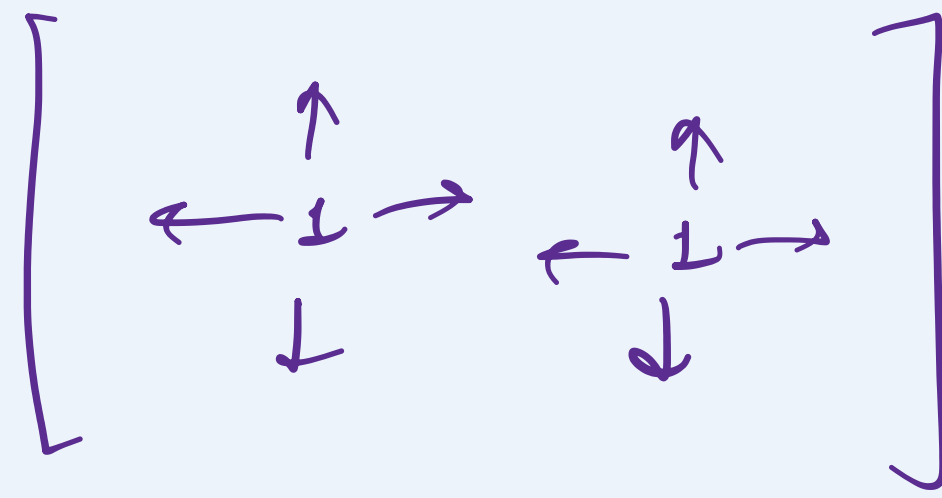
only 1 1 in the matrix.



Multi-Source BFS



Add all 1's in queue

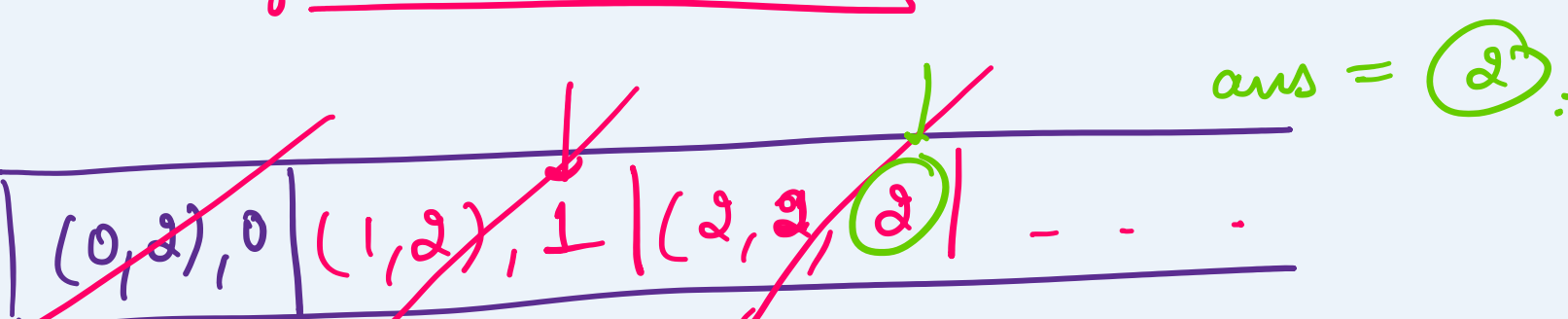
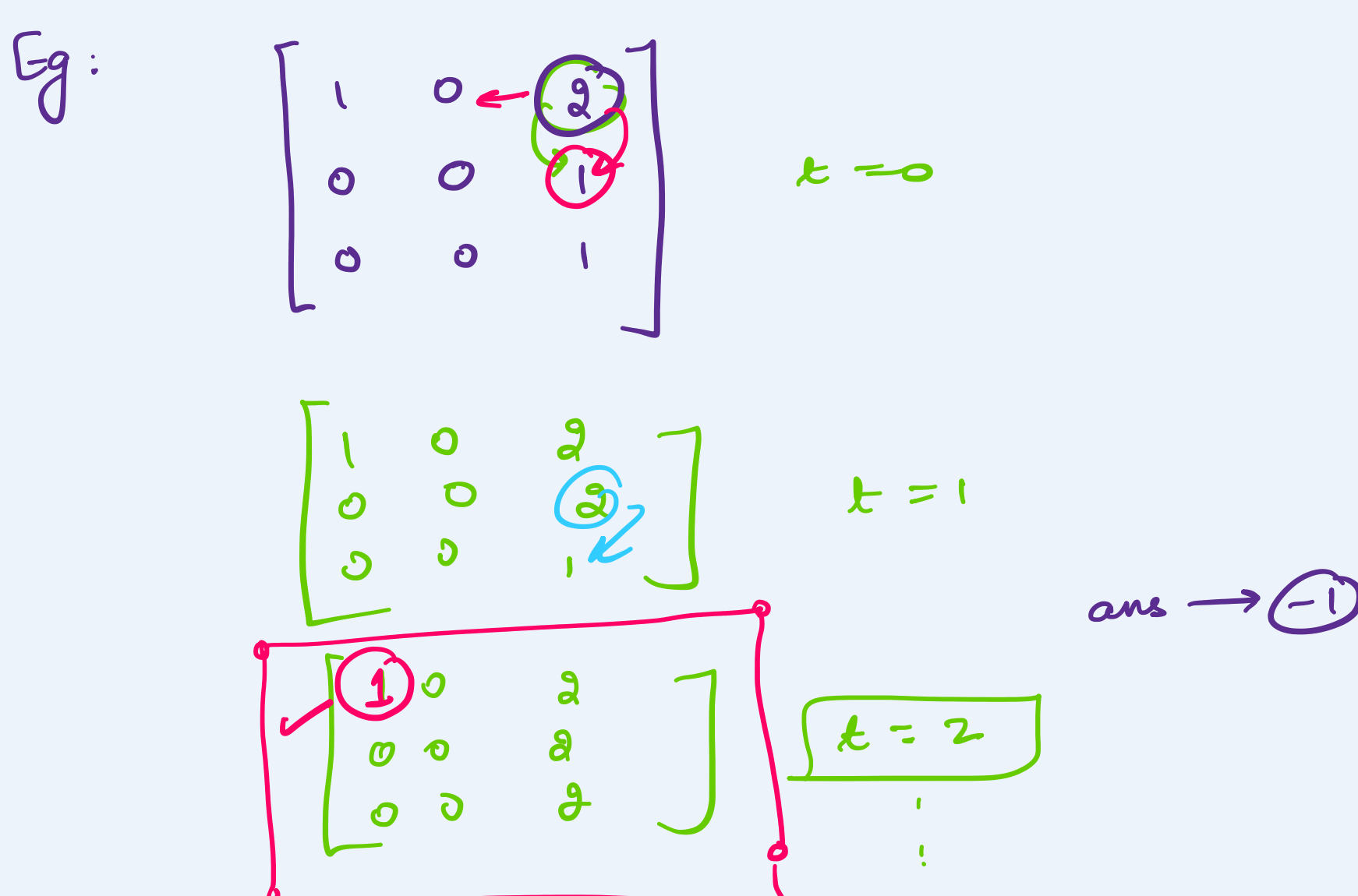
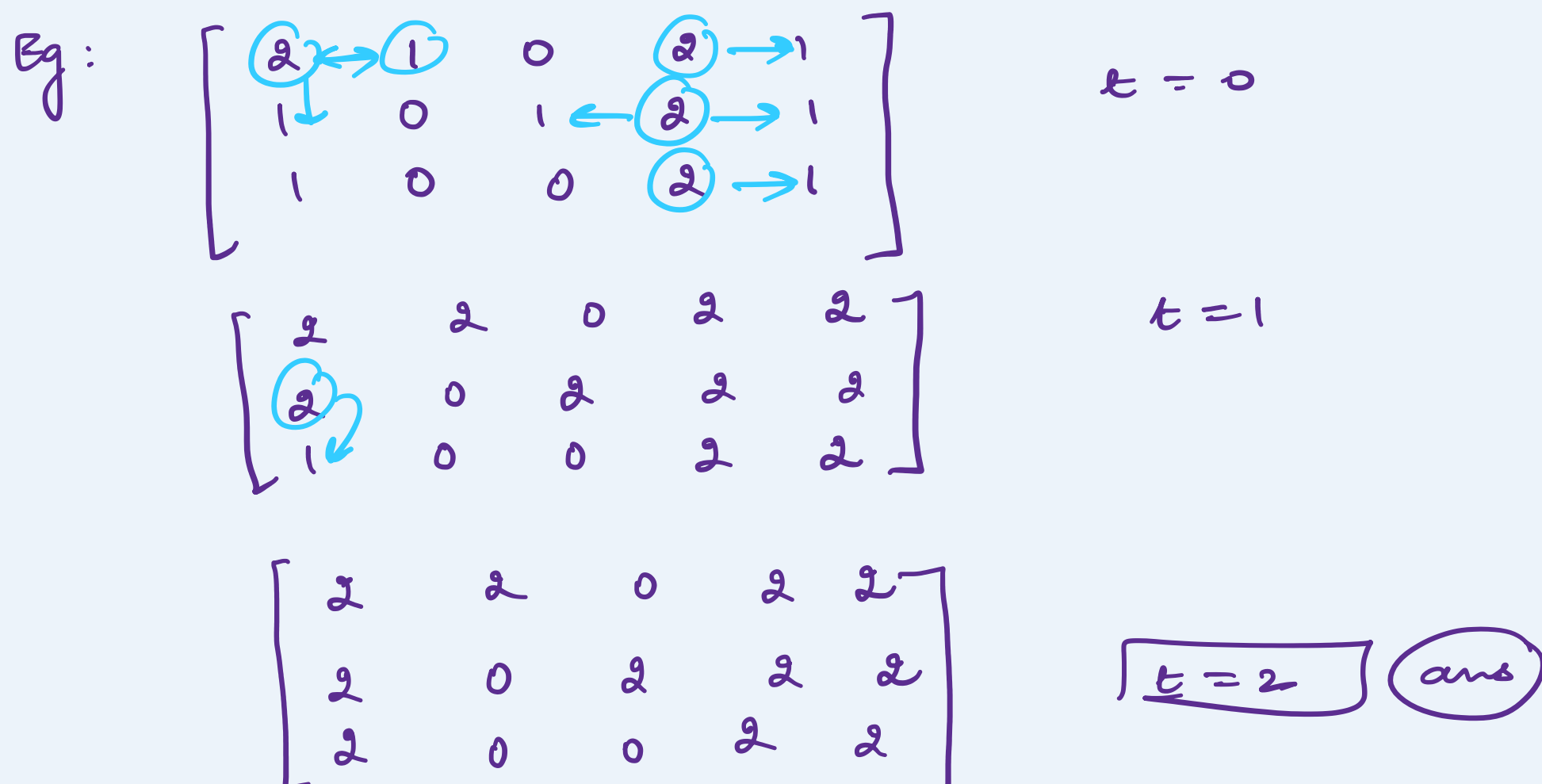


Q matrix $m \times n$

0: empty
 1: fresh orange
 2: Rotten orange

→ A rotten orange rots all its adjacent cells.

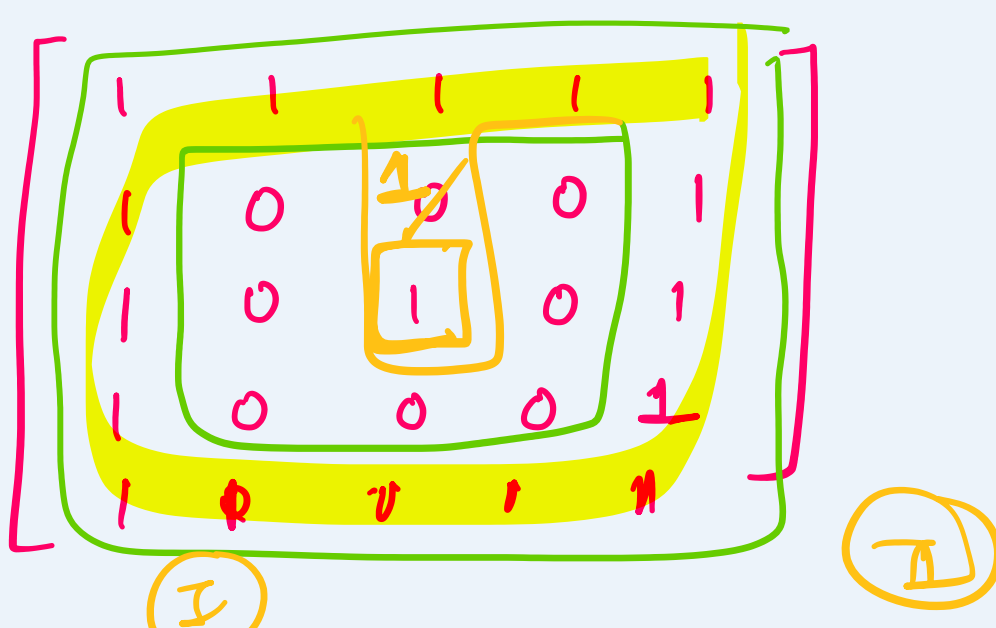
→ min time it takes to rot all oranges.



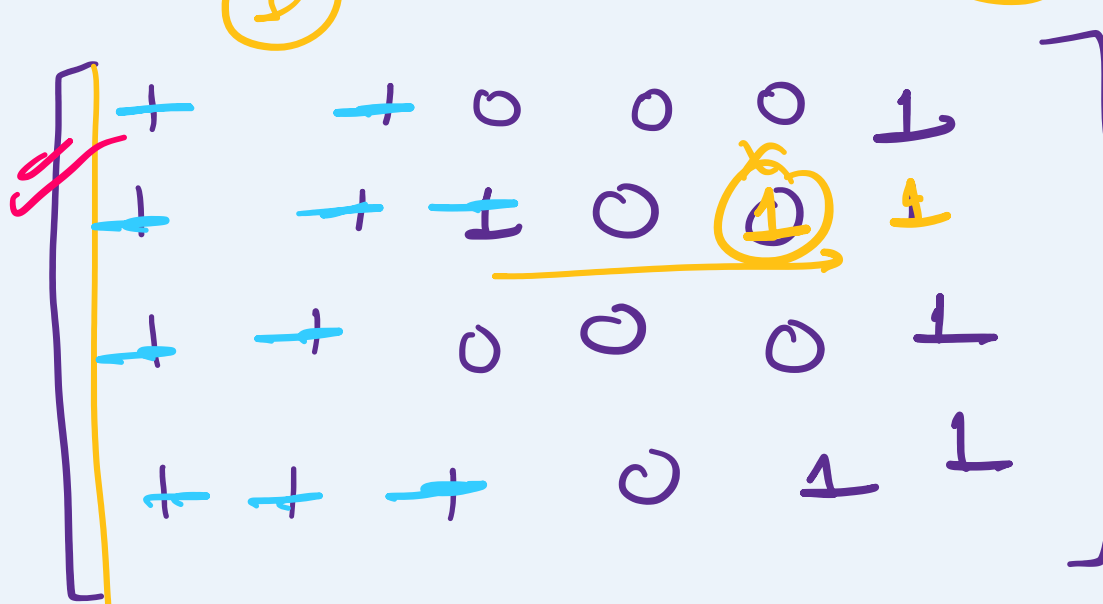
ans = 2

Q Shortest Bridge

1 → land
 0 → water



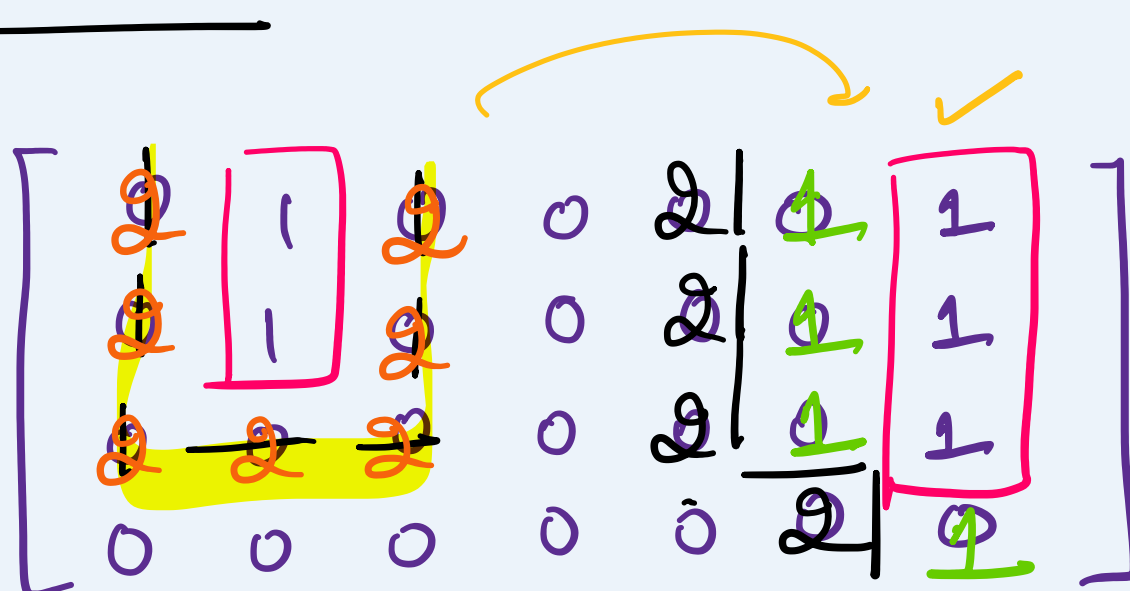
ans → 1



Multi-Source BFS

Trigger BFS from all points of 1 island.

Q Contain virus



Q Smallest rectangle enclosing black pixels