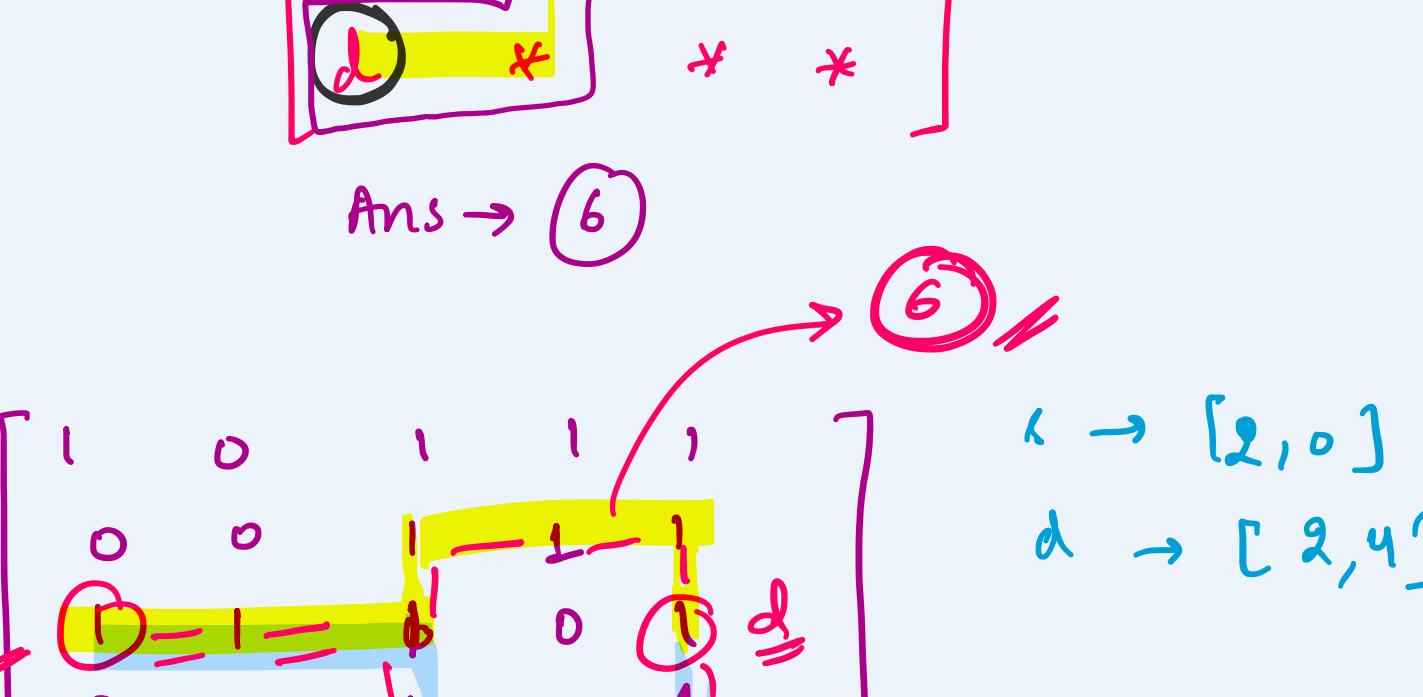
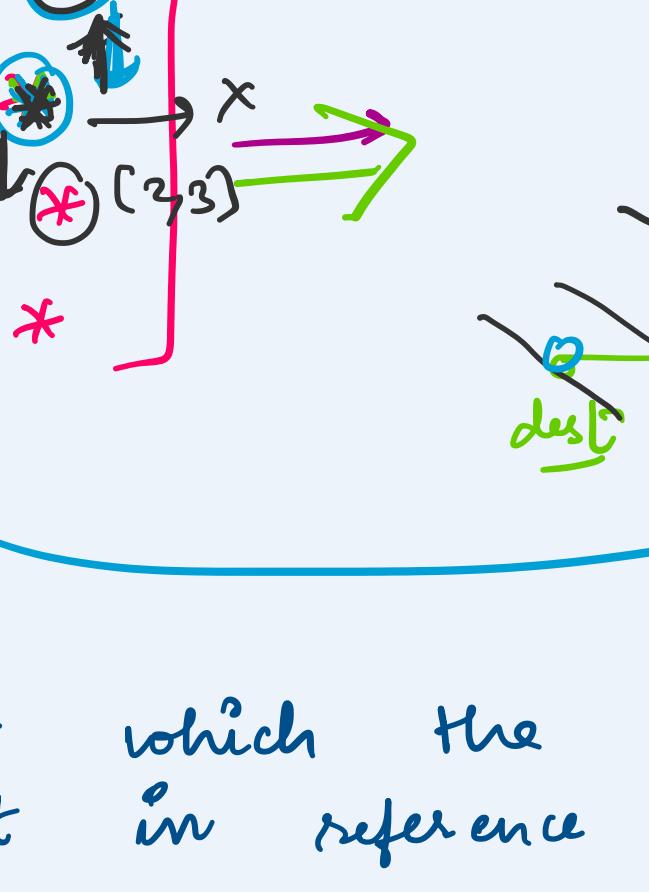


Problem SolvingQues: Given a  $m \times n$  matrix

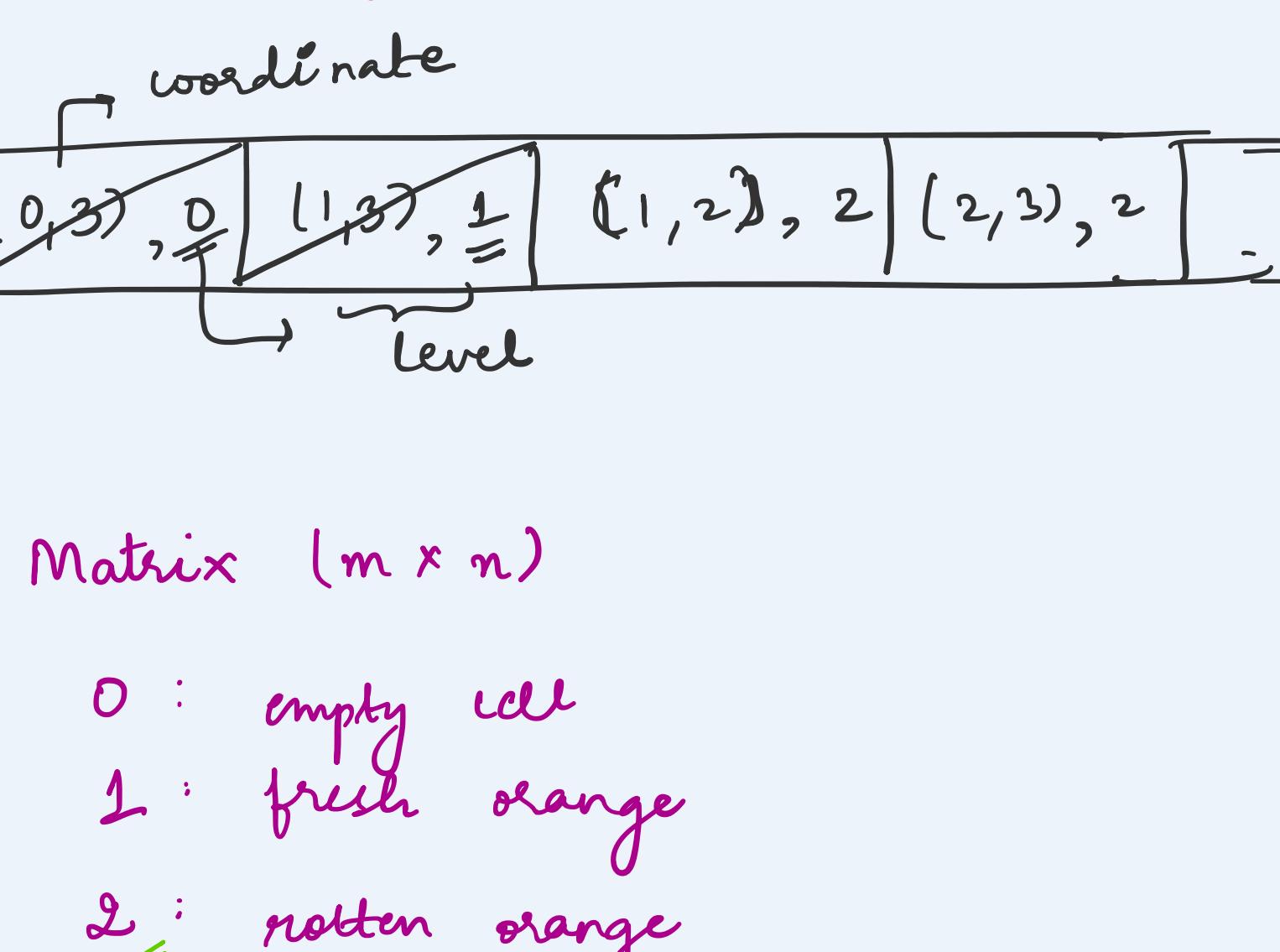
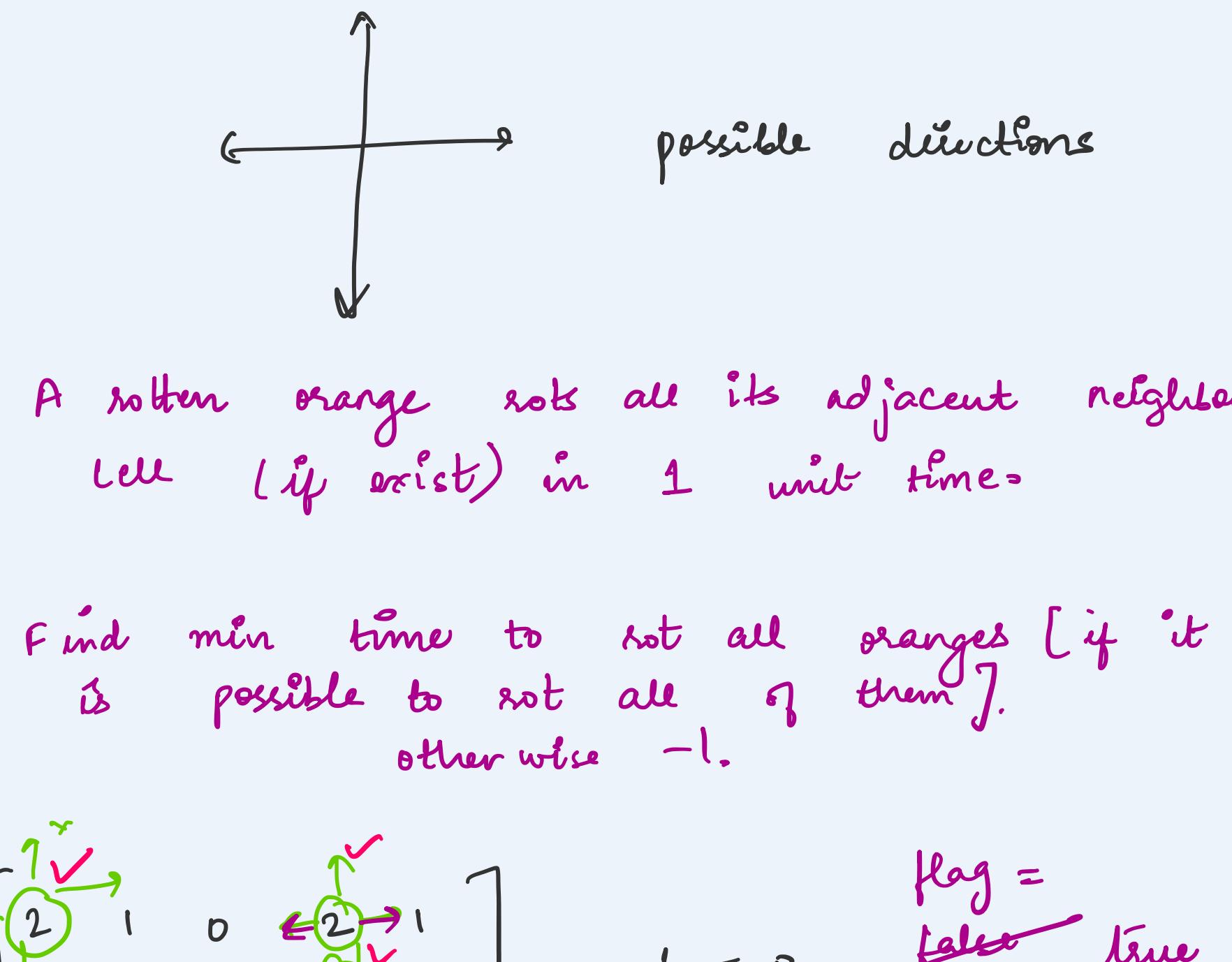
- $\delta$ : source
  - $d$ : destination
  - $*$ : safe to travel
  - $0$ : unsafe to travel
- $\rightarrow$  only 1  
 $\rightarrow$  many

find shortest path from  $\delta$  to  $d$ ??1: 3D

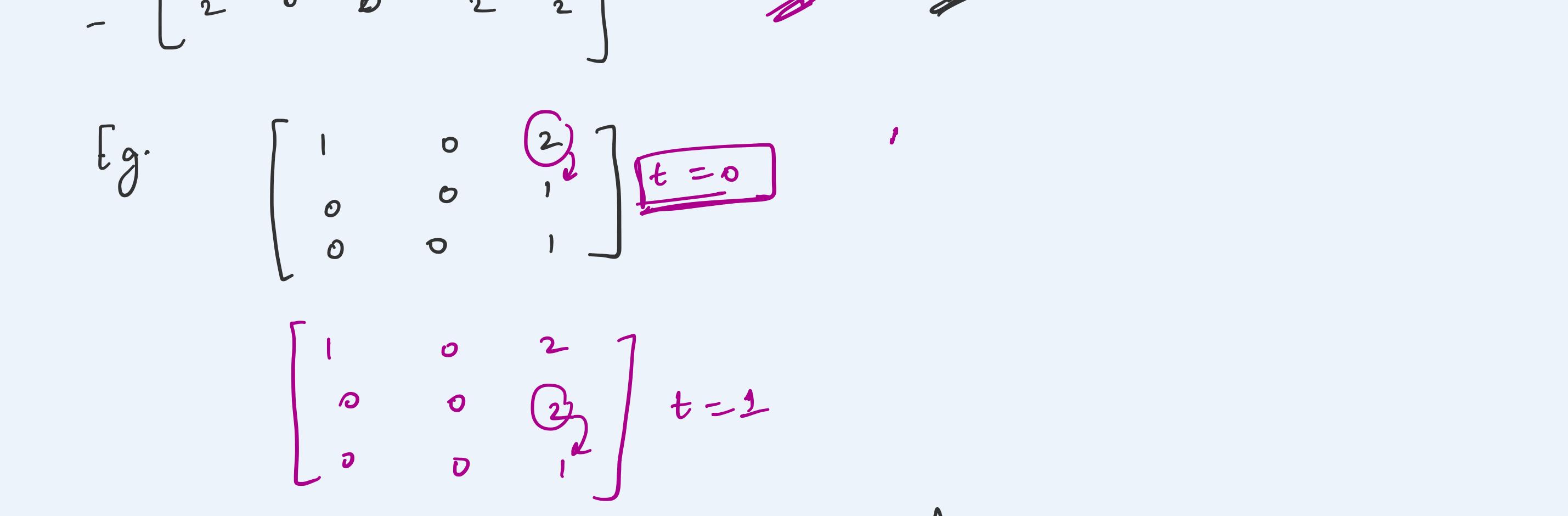
I/P:



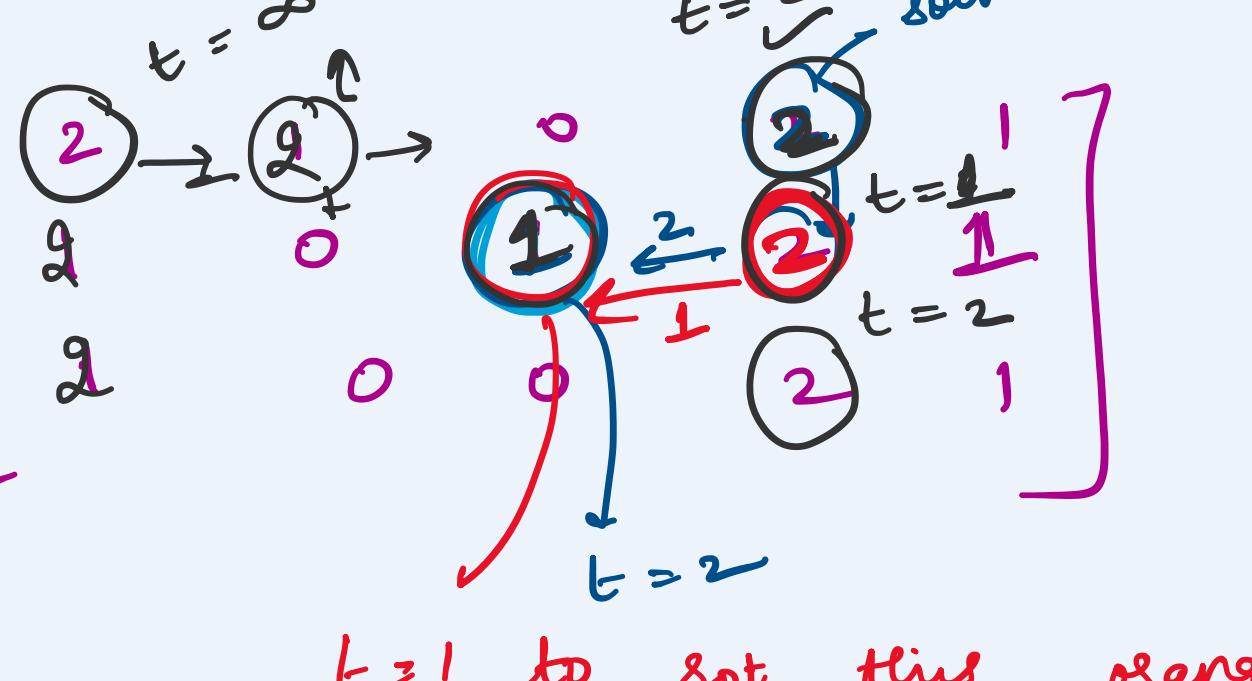
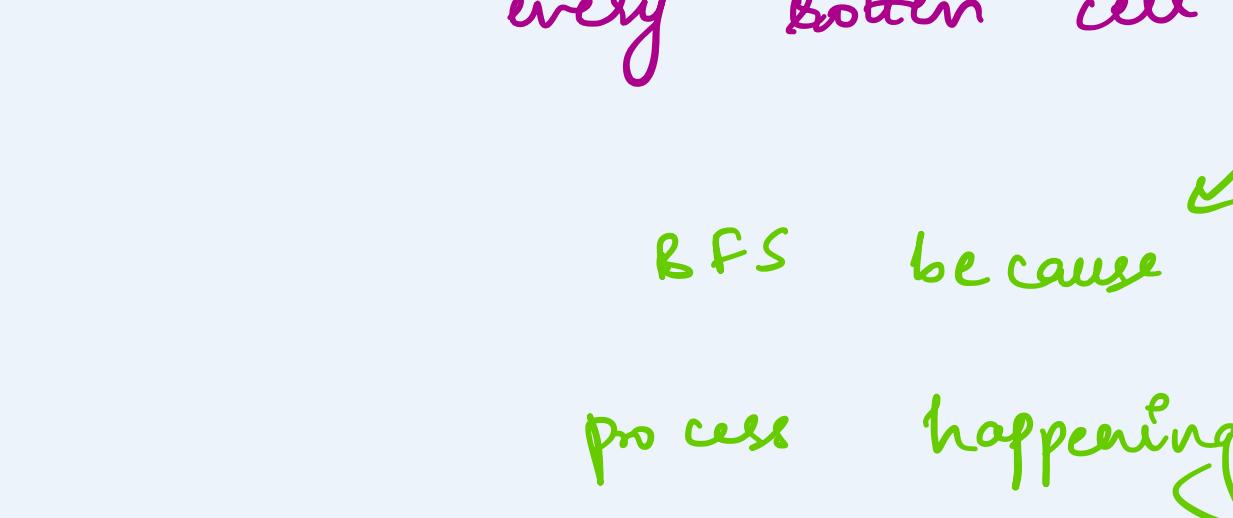
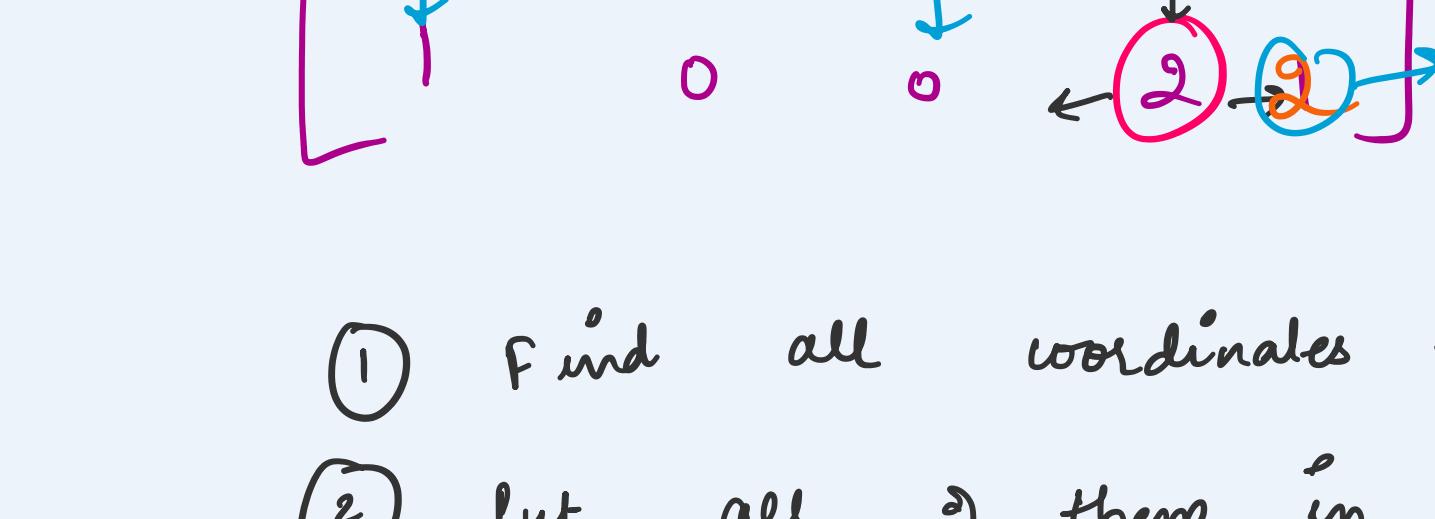
Ans → 6

 $\delta \rightarrow [2, 0]$   
 $d \rightarrow [2, 4]$ The level at which the destination node is present in reference to source node, is the shortest distance from  $\delta$  to  $d$ .

To apply BFS from source,

Ques: Matrix ( $m \times n$ )

- 0: empty cell
- 1: fresh orange
- 2: rotten orange

2: 00 $t = 0$  flag = false $t = 1$  flag = false true

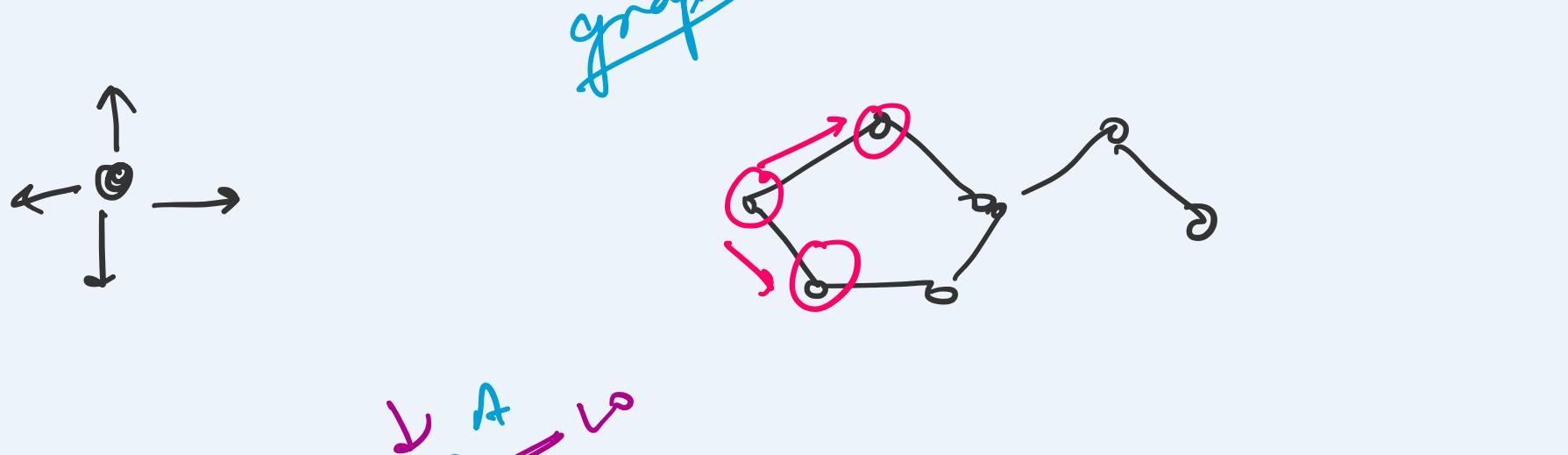
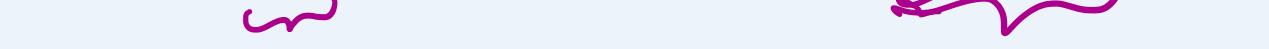
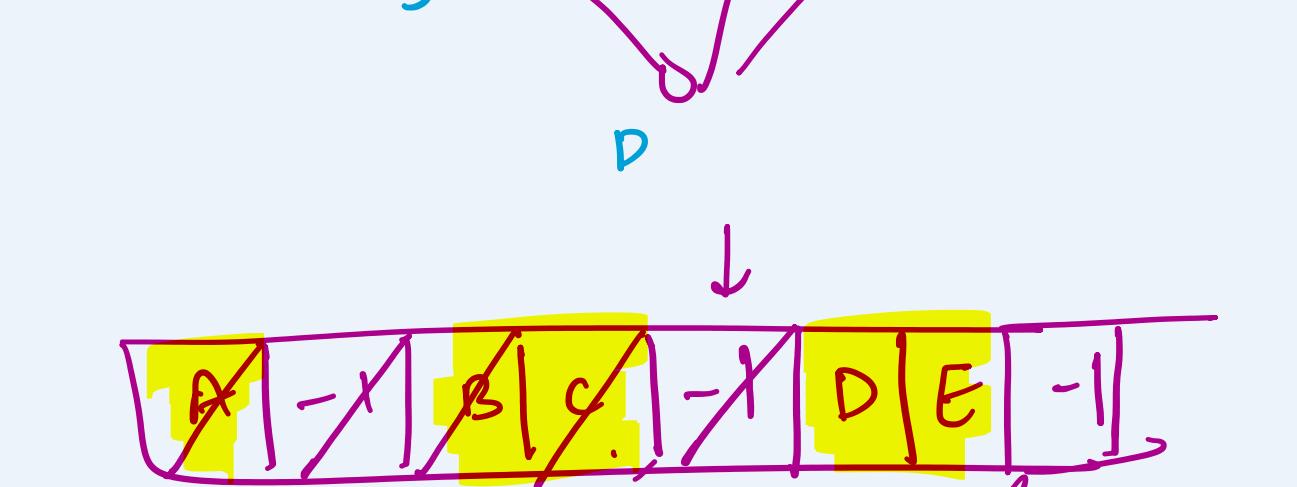
Ans = 2

flag = false

E.g.  $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$   $t = 0$  $t = 1$ not rotten →  $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$   $t = 2$ 

Ans

(-1)

graph  $\times \sim$ 

In the end, check the matrix to see if all oranges are rotten or not.

① Find all coordinates of 2.

② Put all of them in queue

 $(i_1, j_1, 0) | (i_2, j_2, 0) | (i_3, j_3, 0) | \dots$ 

+ 1

Apply BFS → Total levels = ans

In the end, check the matrix to see if all oranges are rotten or not.

