Problem Solving

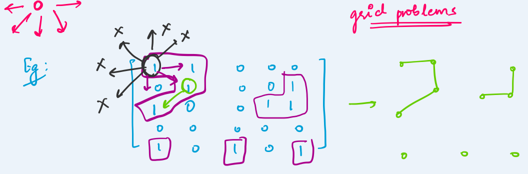
Q Given a 2-D grid [m x n] of land (1) and water → 0

return the no. of islands.

An island is surrounded by water and is formed by connecting adjacent lands horizontally horizontally or vertically.

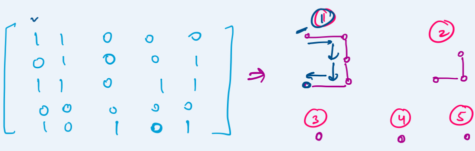
→ continuous streak of land.

grid problems



Ans → 5

Intuition: Treat the 2D grid map as an undirected graph and there is an edge between two horizontally or vertically adjacent nodes of value 1.



5 connected components

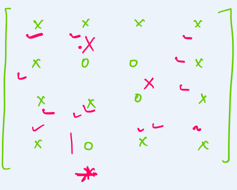
```
vis[m][n];
main() {

    count = 0;   // no. of times DFS is called.

    for (i ← 0 to m-1) {
        for ( j ← 0 to n-1){
            if (!vis[i][j]){
                vis[i][j] = true,
                DFS (i,j);
                count++;
            }
        }
    }
}
```

Q2 Given a 2-D board containing 'X' and 'O'.

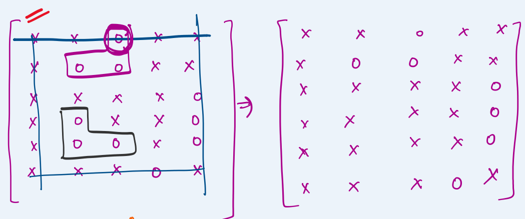
I/P →

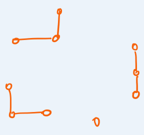


If there is any streak of 0's which is surrounded by X, it can be captured → Convert them into X.

Tell which streaks of 0's can be captured??

Output the resultant matrix.

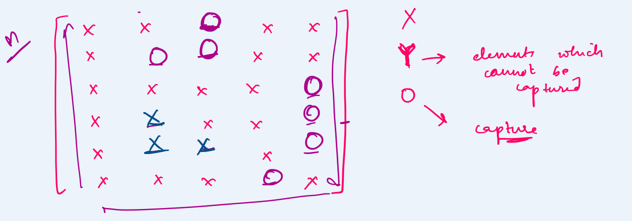




→ 0's can form a connected component if the entire grid is assumed to be a undirected graph.

If there is a connected component, which has even one zero on boundary, it cannot be captured.

→ Instead of finding those components which can be captured, find those which cannot be captured.



① Traverse all elements of boundary

② If m[i][j] = = 0 && !visited [i][j]
DFS (i,j)

③ Mark all visited nodes during DFS with a special character.

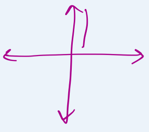
④ Traverse over the matrix again and make all 0 → X
Y → 0

Q Given a m x n matrix.

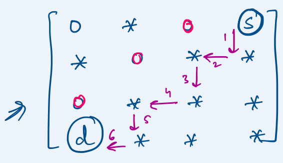
s : source
d : destination
} → only ①

* : safe to travel
0 : unsafe to travel
} → many

possible directions

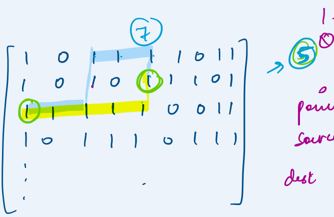


I/P



Shortest path from source to destination??

s → d → ⑥



1 → safe
0 → unsafe
1, 0
point
source → (2, 0)
dest → (1, 4)