

542. 01 Matrix

Medium

4415

220

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Given an $m \times n$ binary matrix `mat`, return *the distance of the nearest 0 for each cell*.

The distance between two adjacent cells is 1.

| | | |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 1 |

mat

| | | |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 2 | 1 |

ans

→ start bfs
from 0'

| | 0 | 1 | 2 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 2 | 1 | 1 | 1 |

| | 0 | 1 | 2 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 2 | 1 | 2 | 1 |

~~0,0,0~~ | ~~0,1,0~~ | ~~0,2,0~~ | ~~1,0,0~~ | ~~1,2,0~~ | ~~1,1,1~~ | ~~2,0,1~~ | ~~2,2,1~~ | ~~2,1,2~~

i, j, dist

| | 0 | 1 | 2 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 2 | 1 | 1 | 1 |

| | 0 | 1 | 2 |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 2 | 1 | 2 | 1 |

```
//bfs
while(q.size() > 0) {
    Pair rem = q.remove();

    for(int k=0; k < 4;k++) {
        int ni = rem.i + dir[k][0];
        int nj = rem.j + dir[k][1];

        if(ni >= 0 && ni < m && nj >= 0 && nj < n && ans[ni][nj] == -1) {
            q.add(new Pair(ni,nj,rem.dist + 1));
            ans[ni][nj] = rem.dist + 1;
        }
    }
}
```

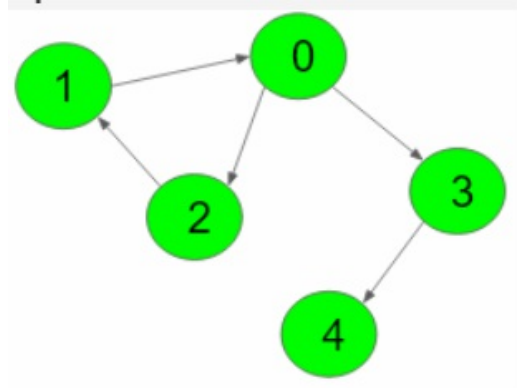
0,0,0 | 0,1,0 | 0,2,0 | 1,0,0 | 1,2,0 | 1,1,1 | 2,0,1 | 2,2,1 | 2,1,2

Mother Vertex

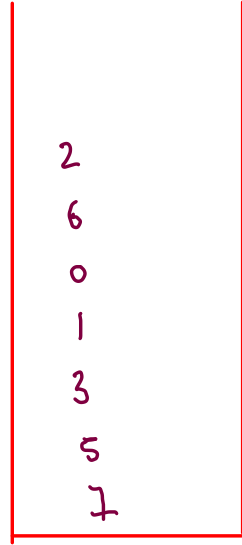
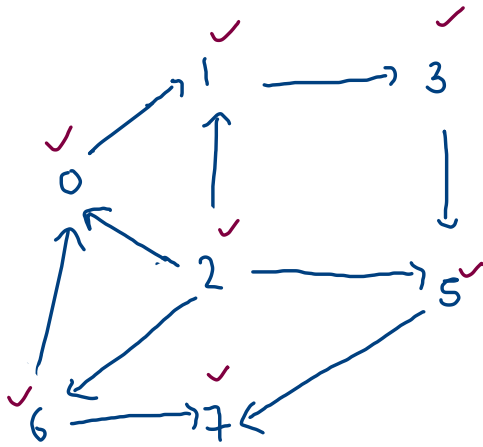
Easy Accuracy: 49.76% Submissions: 18713 Points: 2

Given a Directed Graph, find a Mother Vertex in the Graph (if present).
A Mother Vertex is a vertex through which we can reach all the other vertices of the Graph.

- (i) no mother vertex
- (ii) more than one mother vertex.



DFS / BFS
→ $O(V+E)$



(i) do dfs and fill the stack in post-order.

(ii) verify if `st-peek()` is mother vertex.

| | |
|---|-------|
| 2 |] pmv |
| 6 | |
| 0 |] ros |
| 1 | |
| 3 | |
| 5 | |
| 7 | |

pmv

ros

✓

X

(only one mv)

✓

✓

(more than one mv)

X

X

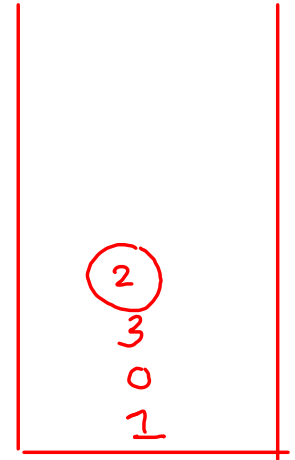
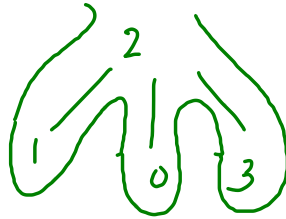
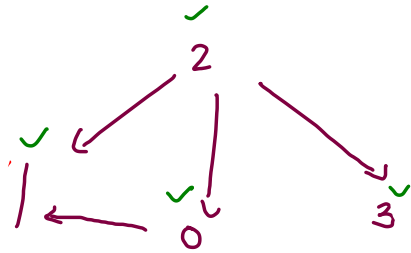
(no mother vertex)

X

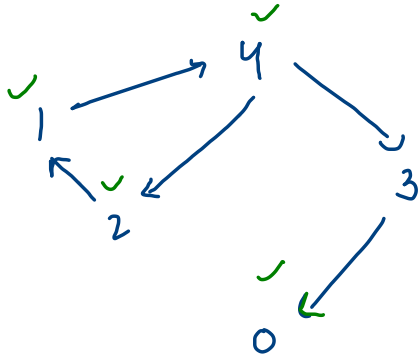
✓

(
→ impossible

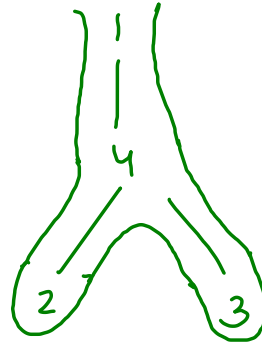
only one mother vertex



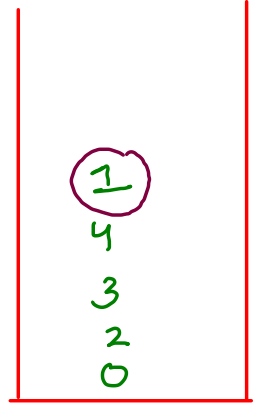
more than one mother vertex



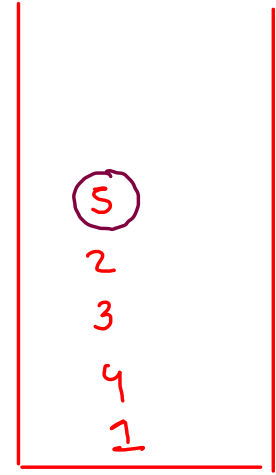
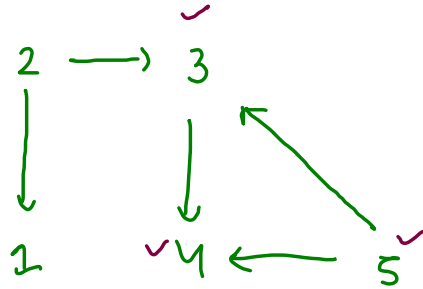
0



mother vertex : 1

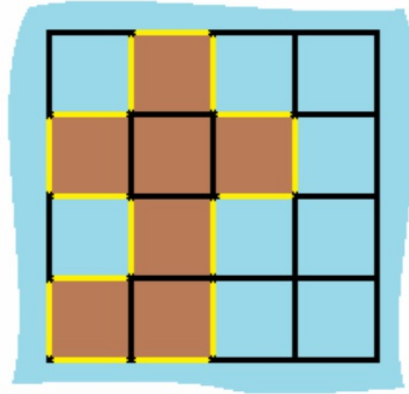


no mother vertex:



no mother vertex

463. Island Perimeter



| | | | |
|---|---|---|---|
| 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 |

count = 16

```
public void dfs(int[][]grid,int i,int j) {  
    if(i < 0 || i >= grid.length || j < 0 || j >= grid[0].length || grid[i][j] == 0) {  
        count++;  
        return;  
    }  
  
    if(grid[i][j] == 2) {  
        return;  
    }  
  
    grid[i][j] = 2;  
  
    dfs(grid,i-1,j);  
    dfs(grid,i,j-1);  
    dfs(grid,i+1,j);  
    dfs(grid,i,j+1);  
}
```

| | | | |
|--------------|--------------|--------------|---|
| 0 | 2 | 0 | 0 |
| 2 | 2 | 2 | 0 |
| 0 | 2 | 0 | 0 |
| 2 | 2 | 0 | 0 |