

## Graph-02 Questions

Question 1 :

### **Mother Vertex**

We have 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.

**Input :**



**Output :** 0

Question 2 :

### **Union-Find**

Here implement Union-Find Algorithm to check whether an undirected graph contains cycle or not.

**Sample Input 1 :**



**Sample Output 1 :** Yes

Question 3 :

### Find whether it is possible to finish all tasks or not

There are a total of  $n$  tasks you have to pick, labelled from 0 to  $n-1$ . Some tasks may have prerequisites, for example to pick task 0 you have to first pick task 1, which is expressed as a pair: [0, 1] Given the total number of tasks and a list of prerequisite pairs, is it possible for you to finish all tasks?.

**Sample Input 1 :** [[1, 0], [0, 1]]

**Sample Output 1 :** false

**Sample Input 2 :** [[1, 0]]

**Sample Output 2 :** true

### Question 4 :

#### Alien Dictionary

We have a sorted dictionary of an alien language having  $N$  words and  $k$  starting alphabets of standard dictionary. Find the order of characters in the alien language. Many orders may be possible for a particular test case, thus you may return any valid order and output will be 1 if the order of string returned by the function is correct else 0 denoting incorrect string returned.

**Sample Input 1 :**

$N = 3, K = 3$

dict = {"caa", "aaa", "aab"}

**Sample Output 1 :** 1

**Sample Input 2 :**

$N = 5, K = 4$

dict = {"baa", "abcd", "abca", "cab", "cad"}

**Sample Output 2 :** 1

### Question 5 :

#### Find number of closed islands

We have a binary matrix  $mat[][]$  of dimensions  $N \times M$  such that 1 denotes land and 0 denotes water. Find the number of closed islands in the given matrix.

A closed island is known as the group of 1s that is surrounded by only 0s on all the four sides (excluding diagonals). If any 1 is at the edges of the given matrix then it is not considered as the part of the connected island as it is not surrounded by all 0's.

**Sample Input 1 :**

$N = 3, M = 3$

$mat[][] = \{\{1, 0, 0\},$   
 $\{0, 1, 0\},$   
 $\{0, 0, 1\}\}$

**Sample Output 1 : 1**

**Sample Input 2 :**

$N = 5, M = 8$

$mat[][] = \{\{0, 0, 0, 0, 0, 0, 0, 1\},$   
 $\{0, 1, 1, 1, 1, 0, 0, 1\},$   
 $\{0, 1, 0, 1, 0, 0, 0, 1\},$   
 $\{0, 1, 1, 1, 1, 0, 1, 0\},$   
 $\{0, 0, 0, 0, 0, 0, 0, 1\}\}$

**Sample Output 2 : 2**