

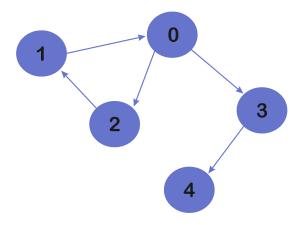
# **Graph-02 Questions**

# 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:



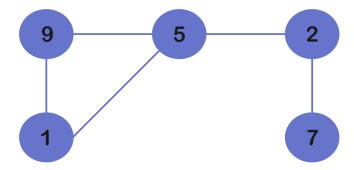
## **Output** : 0

# 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
```

# Ouestion 5:

#### Find number of closed islands

We have a binary matrix mat[]] of dimensions NxM 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:

```
 \begin{split} \text{N} &= 5, \; \text{M} = 8 \\ \text{mat}[][] &= \{\{0, \; 0, \; 0, \; 0, \; 0, \; 0, \; 1\}, \\ &\quad \{0, \; 1, \; 1, \; 1, \; 1, \; 0, \; 0, \; 1\}, \\ &\quad \{0, \; 1, \; 0, \; 1, \; 0, \; 0, \; 0, \; 1\}, \\ &\quad \{0, \; 1, \; 1, \; 1, \; 1, \; 0, \; 1, \; 0\}, \\ &\quad \{0, \; 0, \; 0, \; 0, \; 0, \; 0, \; 0, \; 1\} \} \\ \end{split}
```

## Sample Output 2 : 2