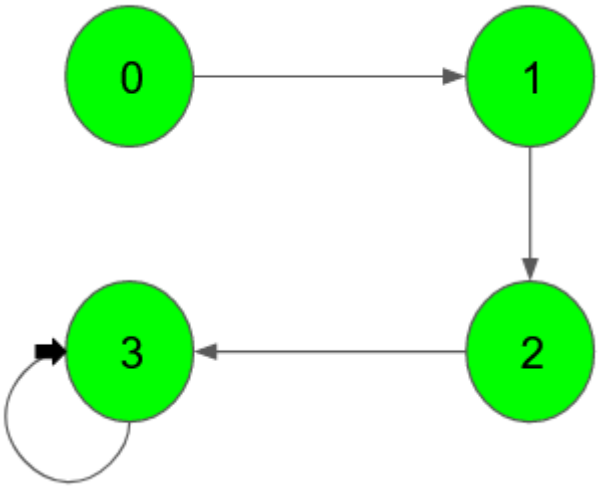
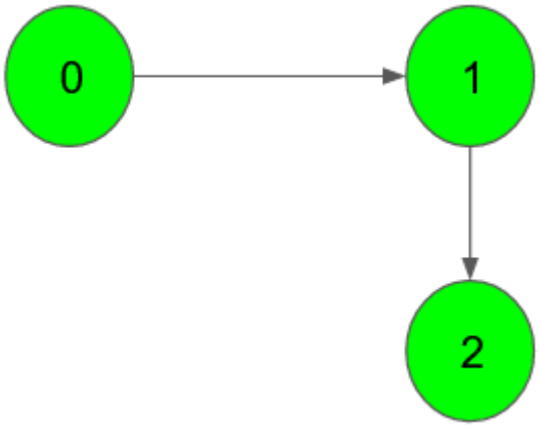
Detect cycle in an un/directed graph

Given an undirected graph with V vertices and E edges, check whether it contains any cycle or not.

Example 1:



Example 2:



Your Task:
You don't need to read or print anything. Your task is to complete the function isCycle() which takes V denoting the number of vertices and adjacency list as input parameters and returns a boolean value denoting if the undirected graph contains any cycle or not.

Expected Time Complexity: O(V + E)
Expected Space Complexity: O(V)

Constraints:
1 ≤ V, E ≤ 105

```
from collections import deque
class Solution:

    #Function to detect cycle in an undirected graph.
    def isCycle(self, V, adj):
        #Code here
        visited = [False for i in range(V)]
        for vert in range(V):
            if visited[vert] is False:
                if self.findCycle(V,adj,visited,vert):
                    return True
        return False


    def findCycle(self,V,adj,visited,vert):
        stack = []
        stack.append(vert)

        while stack:
            temp = stack.pop(0)
            if visited[temp] == True:
                return True
            visited[temp] = True

            for neigh in adj[temp]:
                if visited[neigh]==False:
                    stack.append(neigh)

        return False
```

```
def isCycle(self, V, adj):
        #Code here

        if self.isCyclicUtility(V,adj):
            return True
        else:
            return False

    def isCyclicUtility(self,V,adj):
        parent = [-1]*V
        for i in range(V):
            for j in adj[i]:
                if self.sameParent(i,parent)==self.sameParent(j,parent):
```

```
                    return True
                self.union(i,j,parent)
        return False

    def sameParent(self,v,parent):
        if parent[v]==-1:
            return v
        return self.sameParent(parent[v],parent)

    def union(self,i,j,parent):
        xs = self.sameParent(i,parent)
        ys = self.sameParent(j,parent)
        parent[xs] = ys
```

Undirected:

Given a Directed Graph with **V** vertices (Numbered from **0** to **V-1**) and **E** edges, check whether it contains any cycle or not.

Example 1:

```
Input:

![]
```
(
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Output: 1
Explanation: 3 -> 3 is a cycle
```

Example 2:

```
Input:
![]
(
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Output: 0
Explanation: no cycle in the graph
```

Your task:
You don’t need to read input or print anything. Your task is to complete the function **isCyclic()** which takes the integer V denoting the number of vertices and adjacency list as input parameters and returns a boolean value denoting if the given directed graph contains a cycle or not.

Expected Time Complexity: O(V + E)
Expected Auxiliary Space: O(V)

```python
class Solution:

    #Function to detect cycle in a directed graph.
    def isCyclic(self, V, adj):
        # code here
        visited = [False]*V
        helper = [False]*V

        for i in range(V):
            if visited[i]==False:
                ans = self.helperDFS(adj,visited,helper,i)
                if ans:
                    return True
        return False

    def helperDFS(self,graph,visited,helper,src):
        visited[src]=True
        helper[src] = True

        for nbr in graph[src]:
            if helper[nbr]==True:
                return True
            if visited[nbr]==False:
                ans = self.helperDFS(graph,visited,helper,nbr)
```

```
                if ans is True:
                    return True
        helper[src] = False
        return False
```