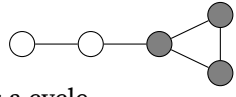
Cycles in graphs

(a) Assume that the graph $G = (V, E)$ is an *undirected* graph. The graph contains a cycle if there exists a path from a node u back to the same node u that passes through at least one other node v.

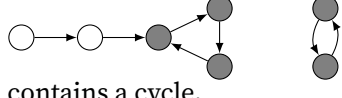


Write a procedure that determines whether the graph contains a cycle.

Input: An undirected graph $G = (V, E)$
Output: Returns **true** if the graph contains a cycle, and **false** otherwise

```
1 Procedure isCyclicUndirected(G)
  |   // ...
```

(b) Assume that the graph $G = (V, E)$ is a *directed* graph. The graph contains a cycle if there exists a path from a node u back to the same node u.



Write a procedure that determines whether the graph contains a cycle.

Input: A directed graph $G = (V, E)$
Output: Returns **true** if the graph contains a cycle, and **false** otherwise

```
1 Procedure isCyclicDirected(G)
  |   // ...
```
