

**Problem – 4** Given an undirected graph with V vertices and E edges, check whether it contains any cycle or not. (using BFS)

```
from collections import defaultdict, deque
```

```
class Graph:
```

```
    def __init__(self, vertices):
```

```
        self.V = vertices
```

```
        self.graph = defaultdict(list)
```

```
    def add_edge(self, u, v):
```

```
        self.graph[u].append(v)
```

```
        self.graph[v].append(u)
```

```
    def is_cyclic_util(self, v, visited, parent):
```

```
        queue = deque([(v, parent)])
```

```
        visited[v] = True
```

```
        while queue:
```

```
            current_node, parent = queue.popleft()
```

```
            for neighbor in self.graph[current_node]:
```

```
                if not visited[neighbor]:
```

```
                    queue.append((neighbor, current_node))
```

```
                    visited[neighbor] = True
```

```
                elif parent != neighbor:
```

```
                    return True
```

```
        return False
```

```
    def contains_cycle(self):
```

```
        visited = [False] * self.V
```

```
for v in range(self.V):  
    if not visited[v]:  
        if self.is_cyclic_util(v, visited, -1):  
            return True
```

```
    return False
```

```
V = 4
```

```
E = 4
```

```
g = Graph(V)
```

```
edges = [(0, 1), (1, 2), (2, 3), (3, 0)]
```

```
for u, v in edges:
```

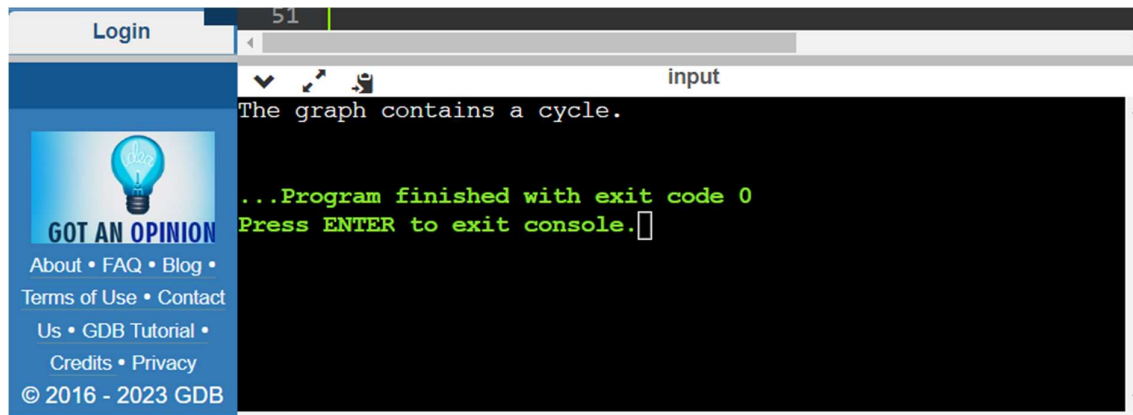
```
    g.add_edge(u, v)
```

```
if g.contains_cycle():
```

```
    print("The graph contains a cycle.")
```

```
else:
```

```
    print("The graph does not contain any cycle.")
```



The screenshot shows a web browser window. On the left, there is a sidebar with a blue header containing a lightbulb icon and the text "GOT AN OPINION". Below this, there are links: "About • FAQ • Blog • Terms of Use • Contact Us • GDB Tutorial • Credits • Privacy" and a copyright notice "© 2016 - 2023 GDB". The main content area of the browser displays a terminal window. The terminal has a title bar with "input" and shows the output "The graph contains a cycle." followed by "...Program finished with exit code 0" and "Press ENTER to exit console." with a cursor.