

Problem – 3 Given an undirected graph with V vertices and E edges, check whether it contains any cycle or not. (using DFS)

```
from collections import defaultdict
```

```
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):
```

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

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

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

```
                if self.is_cyclic_util(neighbor, visited, v):
```

```
                    return True
```

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

```
                return True
```

```
        return False
```

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

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

```
        for i in range(self.V):
```

```
            if not visited[i]:
```

```
                if self.is_cyclic_util(i, visited, -1):
```

```
return True
```

```
return False
```

```
V = 5
```

```
E = 4
```

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

```
edges = [(0, 1), (1, 2), (2, 1), (3, 4)]
```

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

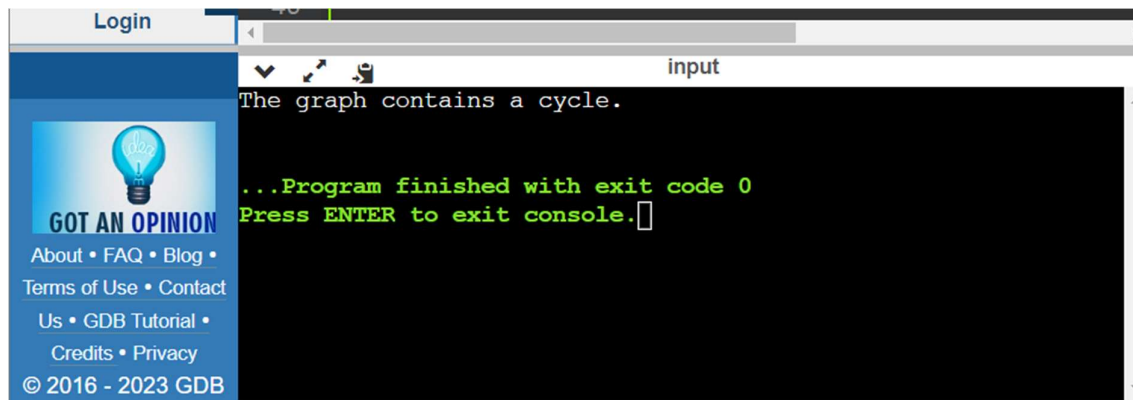
```
    g.add_edge(u, v)
```

```
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 with a sidebar on the left and a main content area on the right. The sidebar has a blue header with 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 has a black background with green text. At the top, there is a "Login" button and a search bar labeled "input". Below the search bar, the text "The graph contains a cycle." is displayed. Further down, the text "...Program finished with exit code 0" and "Press ENTER to exit console." is shown, followed by a cursor icon.