# Graph theory and applications
# Practise Problem – 4

## To check if a given Graph is Bipartite or not

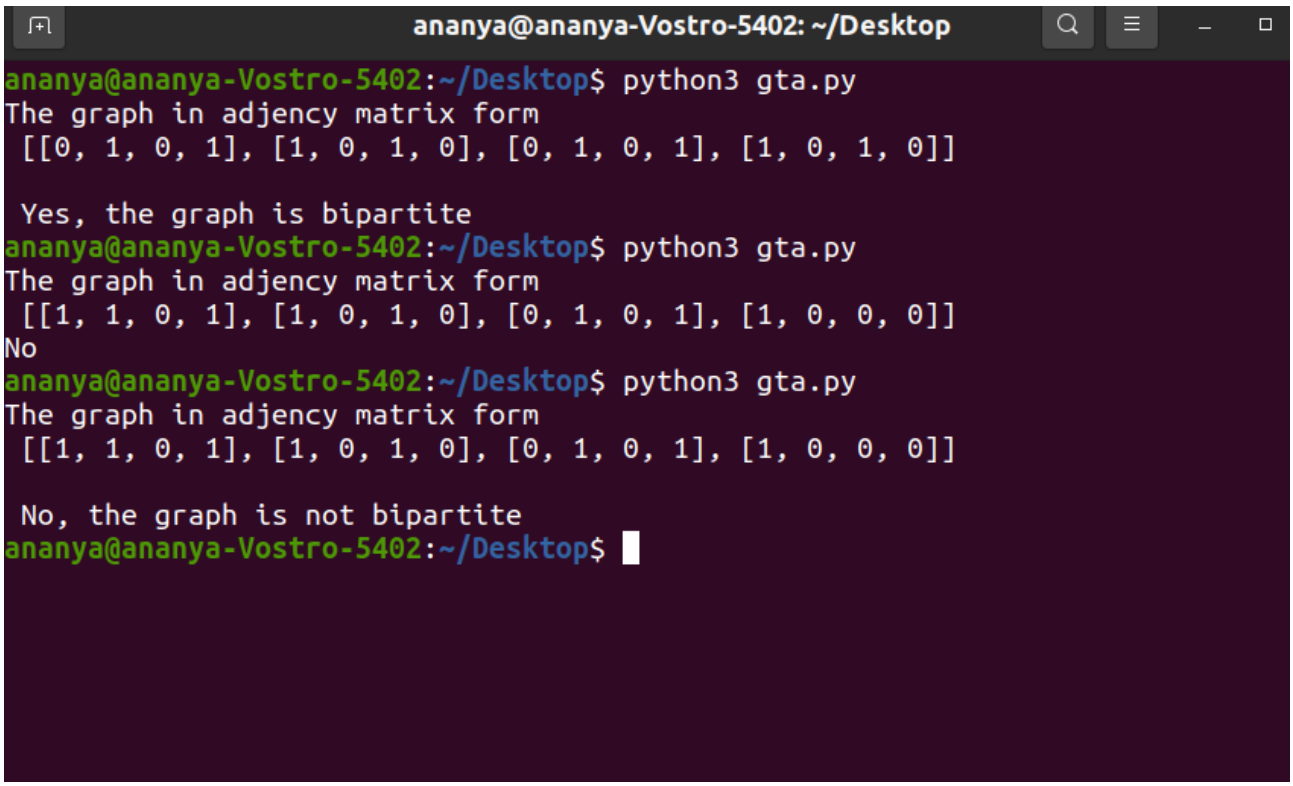
Name: Ananya Rao
SRN: PES1UG20CS046

Code-

```
class Graph():

    def __init__(self, V):
        self.V = V
        self.graph = [[0 for column in range(V)] \
                                                for row in range(V)]


    def isBipartite(self, src):


        colorArr = [-1] * self.V

        # Assign first color to source
        colorArr[src] = 1

        # Create a queue (FIFO) of vertex numbers and
        # enqueue source vertex for BFS traversal
        queue = []
        queue.append(src)

        while queue:

            u = queue.pop()

            # Return false if there is a self-loop
            if self.graph[u][u] == 1:
```

```
                return False;

            for v in range(self.V):


                if self.graph[u][v] == 1 and colorArr[v] == -1:

                    # Assign alternate color to this
                    # adjacent v of u
                    colorArr[v] = 1 - colorArr[u]
                    queue.append(v)


                elif self.graph[u][v] == 1 and colorArr[v] ==
colorArr[u]:
                    return False


        return True


g = Graph(4)
g.graph = [[1, 1, 0, 1],
                [1, 0, 1, 0],
                [0, 1, 0, 1],
                [1, 0, 0, 0]
                ]
print("The graph in adjency matrix form \n", g.graph)
print ("\n No, the graph is not bipartite" if g.isBipartite(0) else "\n No, the graph
is not bipartite")
```

Output Screenshot-


ananya@ananya-Vostro-5402: ~/Desktop
ananya@ananya-Vostro-5402:~/Desktop$ python3 gta.py
The graph in adjency matrix form
[[0, 1, 0, 1], [1, 0, 1, 0], [0, 1, 0, 1], [1, 0, 1, 0]]
Yes, the graph is bipartite
ananya@ananya-Vostro-5402:~/Desktop$ python3 gta.py
The graph in adjency matrix form
[[1, 1, 0, 1], [1, 0, 1, 0], [0, 1, 0, 1], [1, 0, 0, 0]]
No
ananya@ananya-Vostro-5402:~/Desktop$ python3 gta.py
The graph in adjency matrix form
[[1, 1, 0, 1], [1, 0, 1, 0], [0, 1, 0, 1], [1, 0, 0, 0]]
No, the graph is not bipartite
ananya@ananya-Vostro-5402:~/Desktop$