11.Write the python program for Map Coloring to implement CSP.

Program:

```
def isSafe(graph, color):

        for i in range(4):
                for j in range(i + 1, 4):
                        if (graph[i][j] and color[j] == color[i]):
                                return False
        return True



def graphColoring(graph, m, i, color):

        if (i == 4):

                if (isSafe(graph, color)):

                        printSolution(color)
                        return True
                return False

        for j in range(1, m + 1):
                color[i] = j

                if (graphColoring(graph, m, i + 1, color)):
                        return True
                color[i] = 0
        return False



def printSolution(color):
        print("Solution Exists:" " Following are the assigned colors ")
        for i in range(4):
                print(color[i], end=" ")

if __name__ == '__main__':

        graph = [
                [0, 1, 1, 1],
                [1, 0, 1, 0],
                [1, 1, 0, 1],
```

```
        [1, 0, 1, 0],
    ]
    m = 3
    color = [0 for i in range(4)]

    if (not graphColoring(graph, m, 0, color)):
        print("Solution does not exist")
```

OUTPUT: