CSP MAP COLOURING

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PROGRAM:

```
class Graph:
    def __init__(self, vertices):
        self.V = vertices
        self.graph = [[0 for _ in range(vertices)] for _ in range(vertices)]
    def isSafe(self, v, colour, c):
        for i in range(self.V):
            if self.graph[v][i] == 1 and colour[i] == c:
                return False
        return True
    def graphColourUtil(self, m, colour, v):
        if v == self.V:
            return True
        for c in range(1, m + 1):
            if self.isSafe(v, colour, c):
                colour[v] = c
                if self.graphColourUtil(m, colour, v + 1):
                    return True
                colour[v] = 0
    def graphColouring(self, m):
        colour = [0] * self.V
        if not self.graphColourUtil(m, colour, 0):
            print("Solution does not exist")
```

```
                return False
            print("Solution exists and Following are the assigned colours:")
            for c in colour:
                print(c, end=' ')
            return True
if __name__ == '__main__':
    g = Graph(4)
    g.graph = [[0, 1, 1, 1], [1, 0, 1, 0], [1, 1, 0, 1], [1, 0, 1, 0]]
    m = 3
    g.graphColouring(m)
```

OUTPUT: