

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

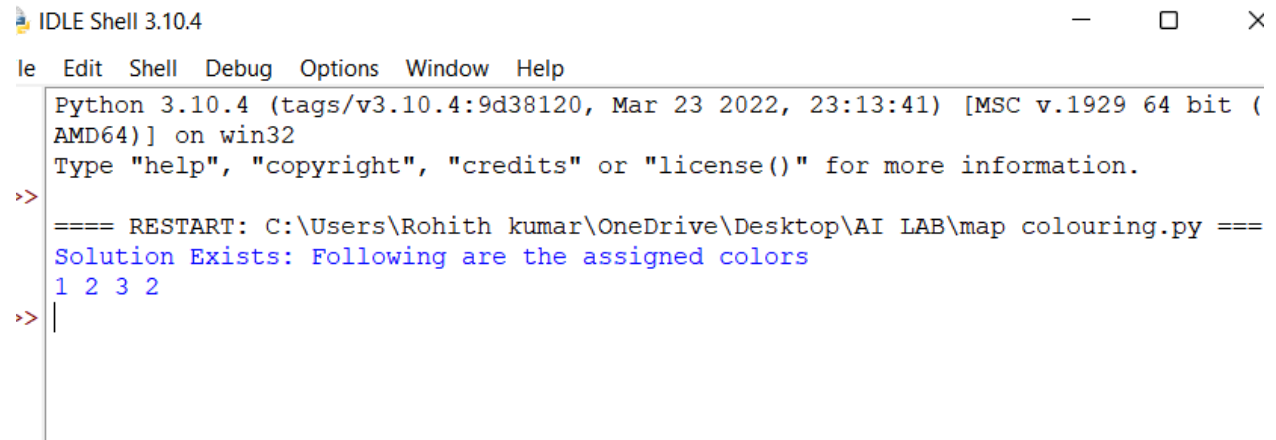
def printSolution(color):
    print("Solution Exists:" " Following are the assigned colors ")
    for i in range(4):
        print(color[i], end=" ")

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:



The screenshot shows the IDLE Shell 3.10.4 window. The title bar reads "IDLE Shell 3.10.4". The menu bar includes "le", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The shell area displays the following text:

```
Python 3.10.4 (tags/v3.10.4:9d38120, Mar 23 2022, 23:13:41) [MSC v.1929 64 bit (AMD64)] on win32  
Type "help", "copyright", "credits" or "license()" for more information.  
>>  
==== RESTART: C:\Users\Rohith kumar\OneDrive\Desktop\AI LAB\map colouring.py ===  
Solution Exists: Following are the assigned colors  
1 2 3 2  
>> |
```