

EXPERIMENT-20

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Course: CSA1789 Artificial Intelligence

Q) 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)):
            display(color)
            return True
        return False

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

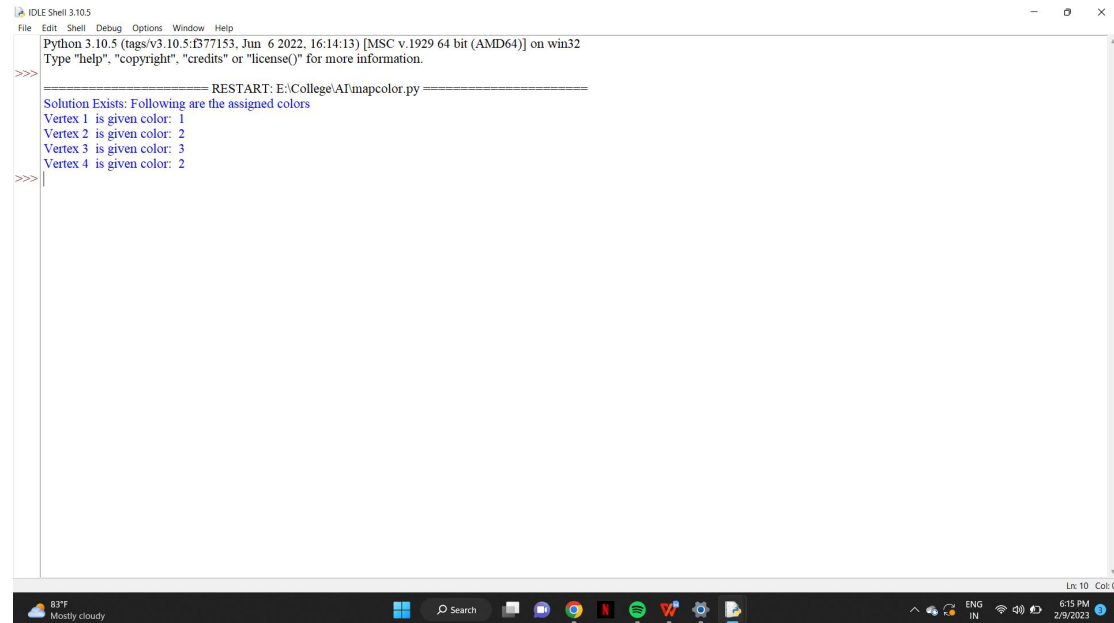
        if (graphColoring(graph, m, i + 1, color)):
            return True
        color[i] = 0
    return False

def display(color):
    print("Solution Exists:" " Following are the assigned colors ")
    for i in range(4):
        print("Vertex", i+1, " is given color: ",color[i])

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 a Python IDE window titled 'IDLE Shell 3.10.5'. The shell displays the following output:

```
Python 3.10.5 (tags/v3.10.5:f377153, Jun 6 2022, 16:14:13) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
=====RESTART: E:\College\AI\mapcolor.py=====
Solution Exists: Following are the assigned colors
Vertex 1 is given color: 1
Vertex 2 is given color: 2
Vertex 3 is given color: 3
Vertex 4 is given color: 2
>>>
```

The IDE window includes a menu bar with 'File', 'Edit', 'Shell', 'Debug', 'Options', 'Window', and 'Help'. The status bar at the bottom shows 'Ln: 10 Col: 0'. The Windows taskbar at the very bottom displays the date and time as '6:15 PM 2/9/2023' along with various system icons.