TASK:6

Solve a Map Coloring problem using constraint satisfaction approach by applying following constraintS

Aim: To Solve a Map Coloring problem using constraint satisfaction approach using Graphonline and visualago online

Algorithm:

Step 1: Confirm whether it is valid to color the current vertex worth the current color (by checking whether any of its adjacent vertices are colored with the same color)

Step 2: If yes then color it and otherwise try a different color

Step 3: check if all vertices are colored or not

Step 4: If not then move to the next adjacent uncolored vertex

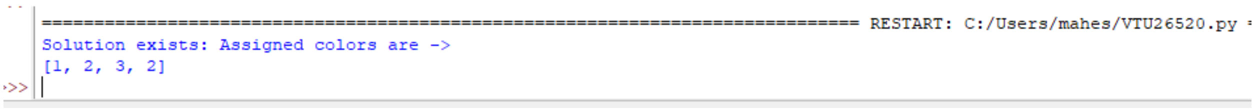
Step 5: Here backtracking means to stop further recursive calls on adjacent vertices.

Program:

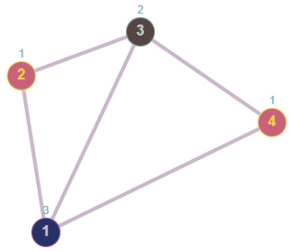
```
class Graph:

  def __init__(self, vertices):

  self.v = vertices

  self.graph = [[0 for column in range(vertices)] for row in range(vertices)]

  # A utility function to check if the current color assignment is safe for vertex v

  def is_safe(self, v, color, c):

  for i in range(self.v):

  if self.graph[v][i] == 1 and color[i] == c:

  return False

  return True

  # A recursive utility function to solve m-coloring problem

  def graph_color_util(self, m, color, v):

  if v == self.v:
```

```
  return True
  for c in range(1, m+1):
  if self.is_safe(v, color, c):
  color[v] = c
  if self.graph_color_util(m, color, v+1):
  return True

  def graph_coloring(self, m):
  color = [0] * self.v
  if not self.graph_color_util(m, color, 0):
  return False
  # Print the solution
  print("Solution exists and following are the assigned colors:")
  for c in color:
  print(c, end=" ")
# Driver Code
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
  # Function call
  g.graph_coloring(m)
```

OUTPUT :



```
=============================================================================== RESTART: C:/Users/mahes/VTU26520.py =
Solution exists: Assigned colors are ->
[1, 2, 3, 2]
>>> |
```



RESULT :

Thus Solving a Map Coloring problem using constraint satisfaction approach using

Graphonline and visulago online simulator was successfully executed and output was verified.