Manas Jha
RA1911003010643

Date

Lab-2

Problem Formulation: Color the edges of a graph so that no two neighbouring edges have the same colour, using the fewest colors possible, and return the chromatic no.

~~Problem Solving~~

Algorithum:

(i) Color first vertex with first color.
Loop for remaining V-1 vertices
(ii) Consider the currently picked vertex and color it with the lowest numbered color that has not been used on any previously colored vertices adjacent to it.
(iii) If all previously used colors appear on vertices adjacent to v, assign a new color to it.

(iv) Repeat the following for all edges.
(v) Index of color used is the chromatic number.

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```
#graph coloring
# class to represent a graph object
class Graph:

    # Constructor
    def __init__(self, edges, N):

        self.adj = [[] for _ in range(N)]

        # add edges to the undirected graph
        for (src, dest) in edges:
            self.adj[src].append(dest)
            self.adj[dest].append(src)


# Function to assign colors to vertices of graph
def colorGraph(graph):

    # stores color assigned to each vertex
    result = {}

    # assign color to vertex one by one
    for u in range(N):

        # set to store color of adjacent vertices of u
```

```
        # check colors of adjacent vertices of u and store in set
        assigned = set([result.get(i) for i in graph.adj[u] if i in result])

        # check for first free color
        color = 1
        for c in assigned:
            if color != c:
                break
            color = color + 1

        # assigns vertex u the first available color
        result[u] = color

    for v in range(N):
        print("Color assigned to vertex", v, "is", colors[result[v]])



# Greedy coloring of graph


    # Add more colors for graphs with many more vertices
colors = [ "","BLUE","GREEN","RED","YELLOW","ORANGE","PINK","BLACK","BROWN","WHITE",
          "PURPLE","VIOLET"]

    #  of graph edges as per above diagram
edges = [(0, 1), (0, 4), (0, 5), (4, 5), (1, 4), (1, 3), (2, 3), (2, 4)]

    # Set number of vertices in the graph
```

```
N = 6
   # create a graph from edges
graph = Graph(edges, N)
   # color graph using greedy algorithm
colorGraph(graph)
```