

AI LAB EXP-2

DEVELOPING AGENT PROGRAMS FOR REAL WORLD PROBLEMS

Graph Coloring Problem

Date: 13-01-2022

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CODE: (vertex coloring)

```
class Graph:

    def __init__(self, edges, n):

        self.adjList = [[] for _ in range(n)]

        for(src, dest) in edges:

            self.adjList[src].append(dest)

            self.adjList[dest].append(src)

def colorGraph(graph, n):

    result = {}

    for u in range(n):

        assigned=set([result.get(i) for i in graph.adjList[u] if i in result])

        color=1

        for c in assigned:

            if color != c:

                break

            color=color+1

        result[u]=color

    for v in range(n):
```

```
print(f'color assigned to vertex {v} is {colors[result[v]]}')

if __name__=='__main__':

    colors = ['', 'BLUE', 'GREEN', 'RED', 'YELLOW', 'ORANGE', 'PINK', 'BLACK',

              'BROWN', 'WHITE', 'PURPLE', 'VIOLET']

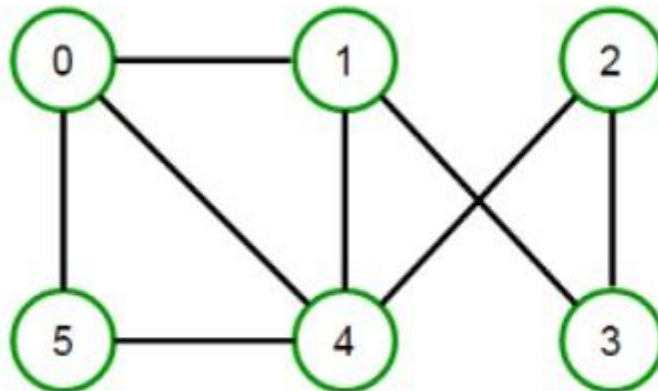
    edges=[(0, 1), (0, 4), (0, 5), (4, 5), (1, 4), (1, 3), (2, 3), (2, 4)]

    n = 6

    graph = Graph(edges, n)

    colorGraph(graph, n)
```

GRAPH BEFORE VERTEX COLORING:



OUTPUT SCREENSHOT:

```
Day 4 P37P38 Q2 | Meet - dmd-sruj-sv | Welcome To Colaboratory | EXP2.ipynb - Colaboratory | +
colab.research.google.com/drive/1k2PZDw2DSL_FH3zTiy4tgm6NPQ-OJ0#scrollTo=c-9K9Dhegv4x&line=1&uniqifier=1
EXP2.ipynb
File Edit View Insert Runtime Tools Help All changes saved
+ Code + Text
class Graph:
    def __init__(self, edges, n):
        self.adjlist = [[] for _ in range(n)]
        for (src, dest) in edges:
            self.adjlist[src].append(dest)
            self.adjlist[dest].append(src)

    def colorGraph(graph, n):
        result = {}
        for u in range(n):
            assigned=set([(result.get(i) for i in graph.adjlist[u] if i in result)])
            color=1
            for c in assigned:
                if color != c:
                    break
                color=color+1
            result[u]=color
        for v in range(n):
            print(f'color assigned to vertex {v} is {colors[result[v]]}')

if __name__ == '__main__':
    colors = ['BLUE', 'GREEN', 'RED', 'YELLOW', 'ORANGE', 'PINK', 'BLACK',
              'BROWN', 'WHITE', 'PURPLE', 'VIOLET']
    edges=[(0, 1), (0, 4), (0, 5), (4, 5), (1, 4), (1, 3), (2, 3), (2, 4)]
    n = 6
    graph = Graph(edges, n)
    colorGraph(graph, n)

color assigned to vertex 0 is BLUE
color assigned to vertex 1 is GREEN
color assigned to vertex 2 is BLUE
color assigned to vertex 3 is RED
color assigned to vertex 4 is RED
color assigned to vertex 5 is GREEN
0s completed at 2:08 PM
```

```
color assigned to vertex 0 is BLUE
color assigned to vertex 1 is GREEN
color assigned to vertex 2 is BLUE
color assigned to vertex 3 is RED
color assigned to vertex 4 is RED
color assigned to vertex 5 is GREEN
```

GRAPH BEFORE VERTEX COLORING:

