AI LAB MANUAL

Exp 2: Agent Problems

Name:	SHAMUNESH P
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Problem:	Graph Coloring Problem
Date:	14-01-22

Code: (Python)

```
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)]

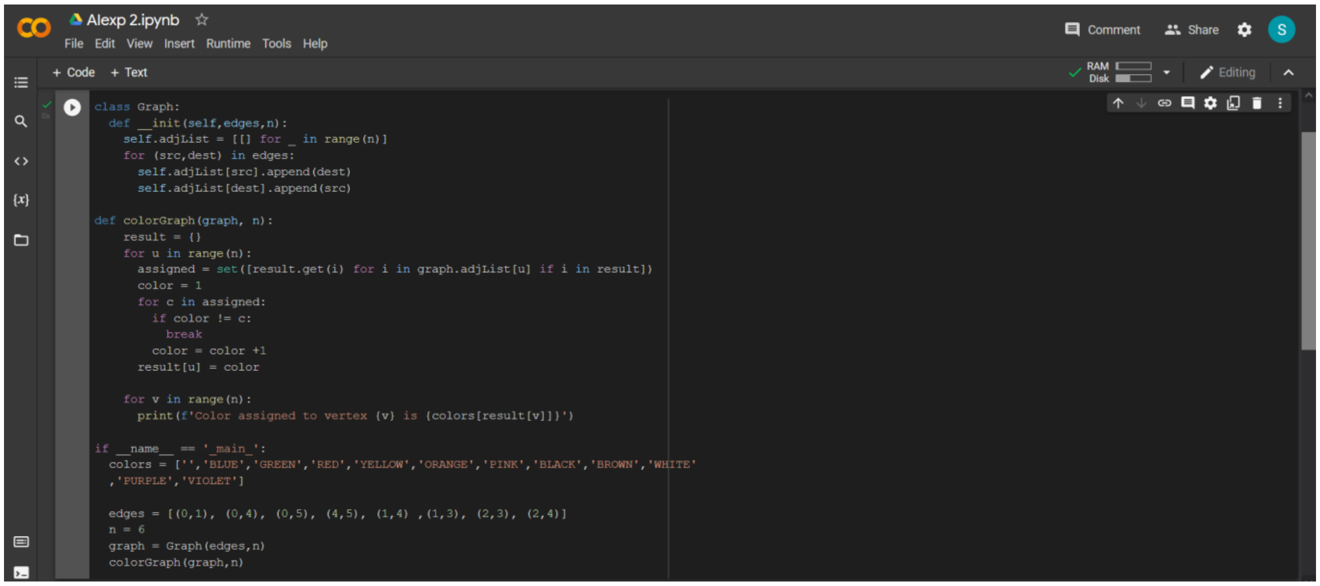
n = 6

graph = Graph(edges,n)

colorGraph(graph,n)

Implementation:

Screenshots



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    self.adjList = [[] for _ in range(n)]
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      color = 1
      for c in assigned:
        if color != c:
          break
        color = color +1
      result[u] = color

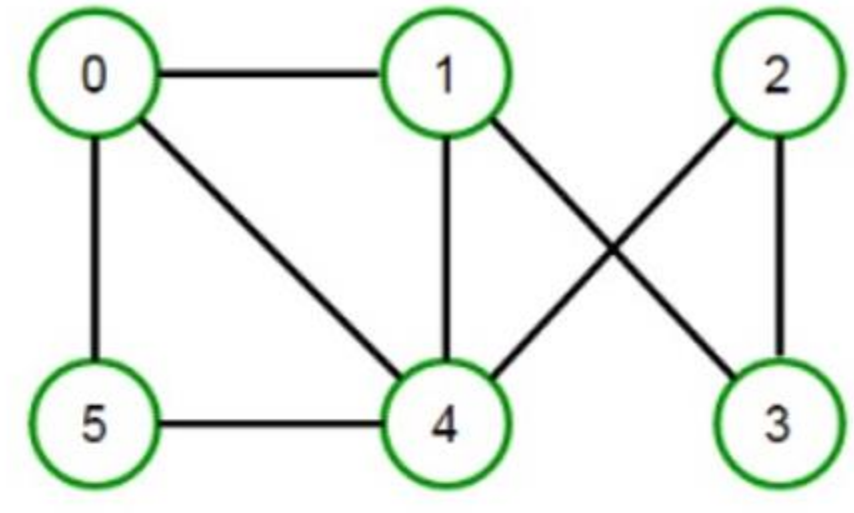
    for v in range(n):
      print(f'Color assigned to vertex {v} is {colors[result[v]]}')

if __name__ == '_main_':
  colors = ['','BLUE','GREEN','RED','YELLOW','ORANGE','PINK','BLACK','BROWN','WHITE'
  ,'PURPLE','VIOLET']

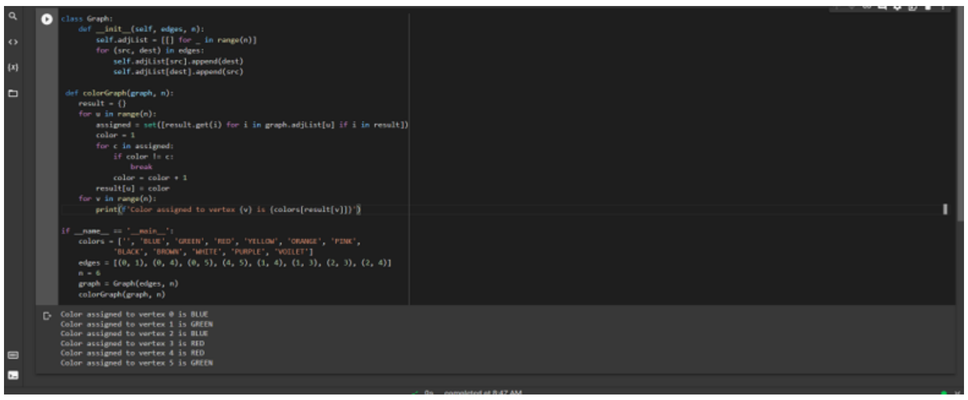
  edges = [(0,1), (0,4), (0,5), (4,5), (1,4) ,(1,3), (2,3), (2,4)]
  n = 6
  graph = Graph(edges,n)
  colorGraph(graph,n)
```

Observation:

Graph Before Vertex Coloring:



Output:

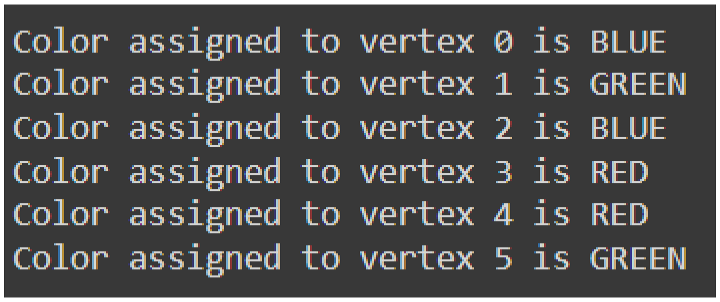


```
class Graph:
    def __init__(self, edges, n):
        self.adjList = [[] for _ in range(n)]
        for (src, dest) in edges:
            self.adjList[src].append(dest)
            self.adjList[dest].append(src)

 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', 'VOILET']
    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
```



```
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 After Vertex Coloring: