Question:12

MAP COLOURING ALGORITHM

AIM

To implement map colouring algorithm using Python

ALGORITHM

1. Initialize an empty dictionary colored_map to store the colored regions.
2. Iterate over each region in the graph.
3. Create a set available_colors containing all the colors initially.
4. For each neighbor of the current region, if the neighbor is already colored, remove its color from the available_colors set.
5. Assign the first available color from available_colors to the current region and add it to the colored_map.
6. Repeat steps 2-5 for all regions in the graph.
7. Return the colored_map.

CODE

```
def color_map(graph, colors):
    colored_map = {}
    for region in graph:
        available_colors = set(colors)
        for neighbor in graph[region]:
            if neighbor in colored_map:
                available_colors.discard(colored_map[neighbor])
        colored_map[region] = next(iter(available_colors))
    return colored_map

graph = {
    'A': {'B', 'C', 'D'},
    'B': {'A', 'C'},
    'C': {'A', 'B', 'D'},
    'D': {'A', 'C'}
}
```

```
colors = ['Red', 'Green', 'Blue']

print(color_map(graph, colors))
```

OUTPUT

```
================== RESTART: C:\Users\Saaniya\Downloads\ai\12.py ==================
{'A': 'Red', 'B': 'Blue', 'C': 'Green', 'D': 'Blue'}
```