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Section – A8_B2

Roll number – 31

Practical – 8

Code –

```c
#include <stdio.h>

#define V 5

int graph[V][V] = {
    {0, 1, 1, 1, 1},
    {1, 0, 1, 0, 0},
    {1, 1, 0, 1, 0},
    {1, 0, 1, 0, 1},
    {1, 0, 0, 1, 0}
};

int isSafe(int v, int graph[V][V], int color[V], int c) {
    for (int i = 0; i < V; i++) {
        if (graph[v][i] && color[i] == c)
            return 0;
    }
    return 1;
}

int graphColoringUtil(int graph[V][V], int m, int color[V], int v) {
    if (v == V)
        return 1;

    for (int c = 1; c <= m; c++) {
        if (isSafe(v, graph, color, c)) {
            color[v] = c;
            if (graphColoringUtil(graph, m, color, v + 1))
                return 1;
            color[v] = 0;
        }
    }
    return 0;
}

void graphColoring(int graph[V][V], int m) {
    int color[V] = {0};
    if (!graphColoringUtil(graph, m, color, 0)) {
        printf("Solution does not exist with %d frequencies\n", m);
        return;
    }
    printf("Assigned colours:\n");
    for (int i = 0; i < V; i++)
        printf("Vertex %d: Colour %d\n", i, color[i]);
}

int main() {
```

```
47    int main() {
48        for (int freq = 1; freq <= 4; freq++) {
49            printf("\nTrying with %d frequencies:\n", freq);
50            graphColoring(graph, freq);
51        }
52        return 0;
53    }
54
```

Output –

```
Trying with 1 frequencies:
Solution does not exist with 1 frequencies

Trying with 2 frequencies:
Solution does not exist with 2 frequencies

Trying with 3 frequencies:
Assigned colours:
Vertex 0: Colour 1
Vertex 1: Colour 2
Vertex 2: Colour 3
Vertex 3: Colour 2
Vertex 4: Colour 3

Trying with 4 frequencies:
Assigned colours:
Vertex 0: Colour 1
Vertex 1: Colour 2
Vertex 2: Colour 3
Vertex 3: Colour 2
Vertex 4: Colour 3
```