DAA

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Section – A4

Roll No. – 24

Practical 8

Code:

```c
#include <stdio.h>
#include <stdbool.h>

#define V 4

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

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

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

bool graphColoring(int graph[V][V], int m)
{
    int i;
```

```
    int color[V];
    for (i = 0; i < V; i++)
        color[i] = 0;

    if (!graphColoringUtil(graph, m, color, 0))
    {
        printf("Solution does not exist.\n");
        return false;
    }

    printf("Assigned colors are:\n");
    for (i = 0; i < V; i++)
        printf("Vertex %d ---> Color %d\n", i + 1, color[i]);
    return true;
}

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

    int m = 3; // Number of colors available
    graphColoring(graph, m);
    return 0;
}
```

Output:

```
PS C:\Users\DT USER\Desktop\A4-B2-24> gcc pr8.c
PS C:\Users\DT USER\Desktop\A4-B2-24> ./a
Assigned colors are:
Vertex 1 ---> Color 1
Vertex 2 ---> Color 2
Vertex 3 ---> Color 3
Vertex 4 ---> Color 2
```