**DAA PRACTICAL NO. 8**

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**SECTION: A4\_B1 ROLL NO.: 11**

**Aim:** Implement Graph Colouring algorithm use Graph colouring concept.

**Problem Statement:** A GSM is a cellular network with its entire geographical range divided into

hexadecimal cells. Each cell has a communication tower which connects with mobile

phones within cell. Assume this GSM network operates in different frequency

ranges. Allot frequencies to each cell such that no adjacent cells have same

frequency range. Consider an undirected graph G = (V, E) shown in fig. Find the colour assigned to each node using Backtracking method. Input is the adjacency matrix of a graph G(V, E), where V is the number of Vertices and E is the number of edges.

**CODE**

#include <stdio.h>

#define MAX 20

int n, m;

int G[MAX][MAX];

int x[MAX];

void NextValue(int k){

int j;

while (1){

x[k] = (x[k] + 1) % (m + 1);

if (x[k] == 0)

return;

for (j = 1; j <= n; j++) {

if (G[k][j] != 0 && x[k] == x[j])

break;

}

if (j == n + 1)

return;

}

}

void mColoring(int k){

int i;

while (1){

NextValue(k);

if (x[k] == 0)

return;

if (k == n){

printf("\nValid Coloring: ");

for (i = 1; i <= n; i++)

printf("%d ", x[i]);

}

else

mColoring(k + 1);

}

}

int main(){

int i, j;

printf("Enter number of vertices: ");

scanf("%d", &n);

printf("Enter adjacency matrix (%d x %d):\n", n, n);

for (i = 1; i <= n; i++)

for (j = 1; j <= n; j++)

scanf("%d", &G[i][j]);

printf("Enter number of colors (frequencies) available: ");

scanf("%d", &m);

for (i = 1; i <= n; i++)

x[i] = 0;

printf("\nAll possible valid colorings are:\n");

mColoring(1);

printf("\n");

return 0;

}

**OUTPUT**

