DAA PRACTICAL 8

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Section:A3_B1_13

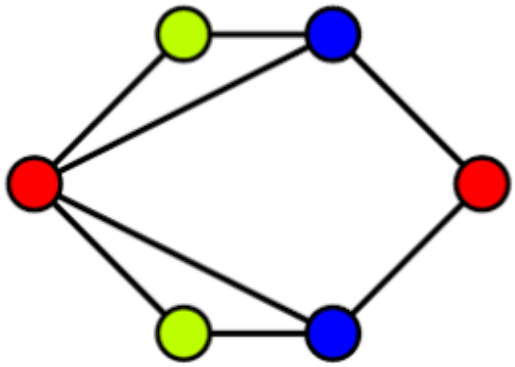
Aim: Implement Graph Colouring algorithm use Graph colouring concept.

Code:

```c
#include <stdio.h>

int isSafe(int v, int graph[20][20], int color[], int c, int V) {
    for (int i = 0; i < V; i++)
        if (graph[v][i] && color[i] == c)
            return 0;
    return 1;
}

int solve(int graph[20][20], int m, int color[], int v, int V) {
    if (v == V)
        return 1;

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

```c
int main() {
    int V, m;
    int graph[20][20], color[20] = {0};

    printf("Enter number of vertices: ");
    scanf("%d", &V);

    printf("Enter adjacency matrix:\n");
    for (int i = 0; i < V; i++)
        for (int j = 0; j < V; j++)
            scanf("%d", &graph[i][j]);

    printf("Enter number of colors: ");
    scanf("%d", &m);

    if (!solve(graph, m, color, 0, V)) {
        printf("No solution\n");
        return 0;
    }

    printf("Assigned Colors:\n");
    for (int i = 0; i < V; i++)
        printf("Vertex %d -> Color %d\n", i, color[i]);

    return 0;
}
```

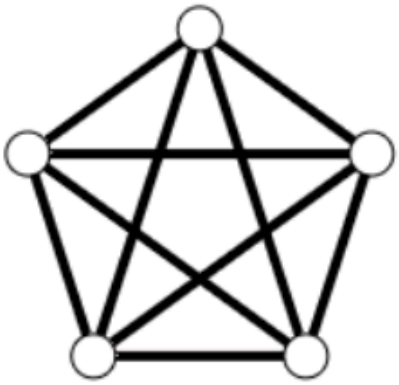
Graph 1:



Output:

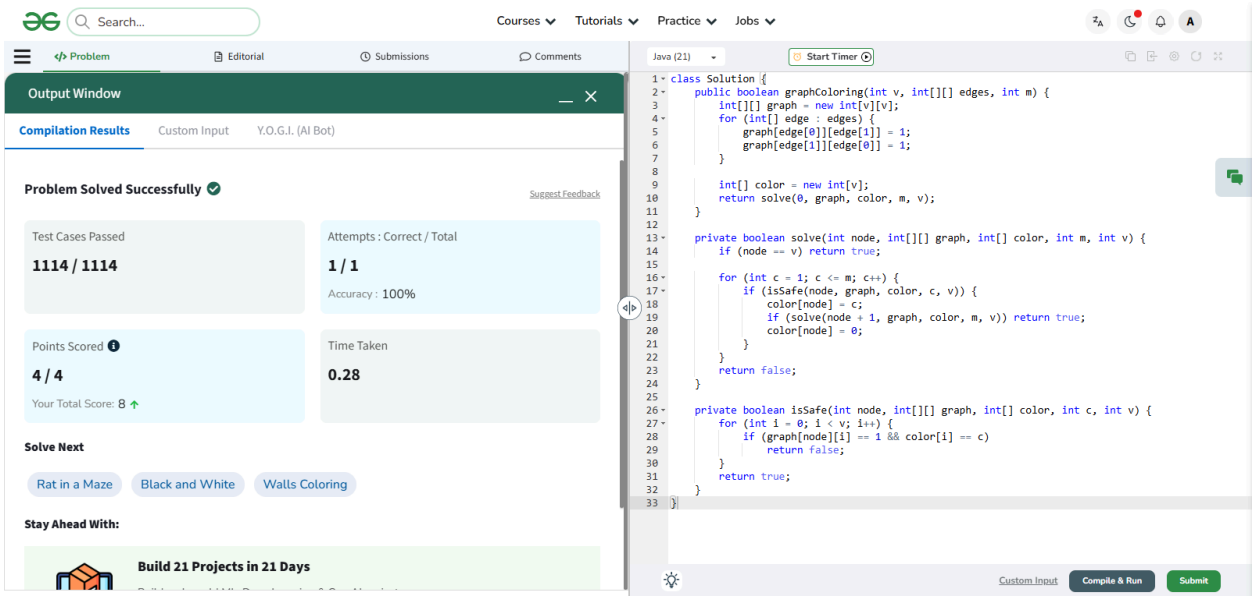
```
Output                                                    Clear
Enter number of vertices: 6
Enter adjacency matrix:
0 1 1 0 1 1
1 0 1 0 0 0
1 1 0 1 0 0
0 0 1 0 1 0
1 0 0 1 0 1
1 0 0 0 1 0
Enter number of colors: 3
Assigned Colors:
Vertex 0 -> Color 1
Vertex 1 -> Color 2
Vertex 2 -> Color 3
Vertex 3 -> Color 1
Vertex 4 -> Color 2
Vertex 5 -> Color 3


=== Code Execution Successful ===
```

Graph 2:



main.c Output

```
Enter number of vertices: 5
Enter adjacency matrix:
0 1 1 1 1
1 0 1 1 1
1 1 0 1 1
1 1 1 0 1
1 1 1 1 0
Enter number of colors: 1
No solution
```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1114 / 1114
Attempts : Correct / Total
1 / 1
Accuracy : 100%
Points Scored
4 / 4
Your Total Score: 8
Time Taken
0.28
Solve Next
Rat in a Maze
Black and White
Walls Coloring
Stay Ahead With:
Build 21 Projects in 21 Days
Java (21)
Start Timer
class Solution {
public boolean graphColoring(int v, int[][] edges, int m) {
int[][] graph = new int[v][v];
for (int[] edge : edges) {
graph[edge[0]][edge[1]] = 1;
graph[edge[1]][edge[0]] = 1;
}
int[] color = new int[v];
return solve(0, graph, color, m, v);
}
private boolean solve(int node, int[][] graph, int[] color, int m, int v) {
if (node == v) return true;
for (int c = 1; c <= m; c++) {
if (isSafe(node, graph, color, c, v)) {
color[node] = c;
if (solve(node + 1, graph, color, m, v)) return true;
color[node] = 0;
}
}
return false;
}
private boolean isSafe(int node, int[][] graph, int[] color, int c, int v) {
for (int i = 0; i < v; i++) {
if (graph[node][i] == 1 && color[i] == c)
return false;
}
return true;
}
}
Custom Input
Compile & Run
Submit