Practical No 8 : Competitive Coding

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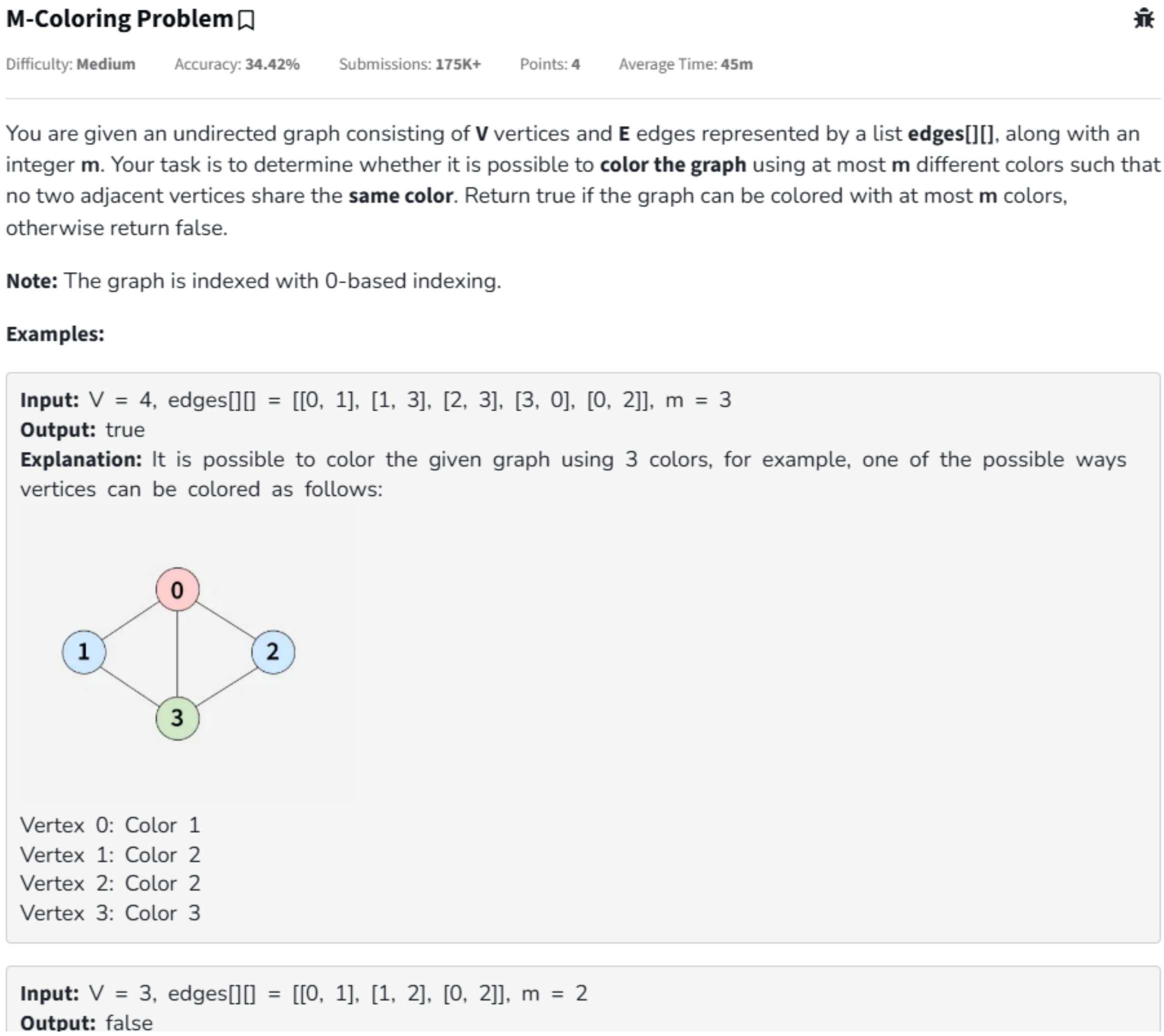
Section- A4-B2

Roll no- 25



M-Coloring Problem

Difficulty: **Medium** Accuracy: **34.42%** Submissions: **175K+** Points: **4** Average Time: **45m**

You are given an undirected graph consisting of **V** vertices and **E** edges represented by a list **edges[][]**, along with an integer **m**. Your task is to determine whether it is possible to **color the graph** using at most **m** different colors such that no two adjacent vertices share the **same color**. Return true if the graph can be colored with at most **m** colors, otherwise return false.

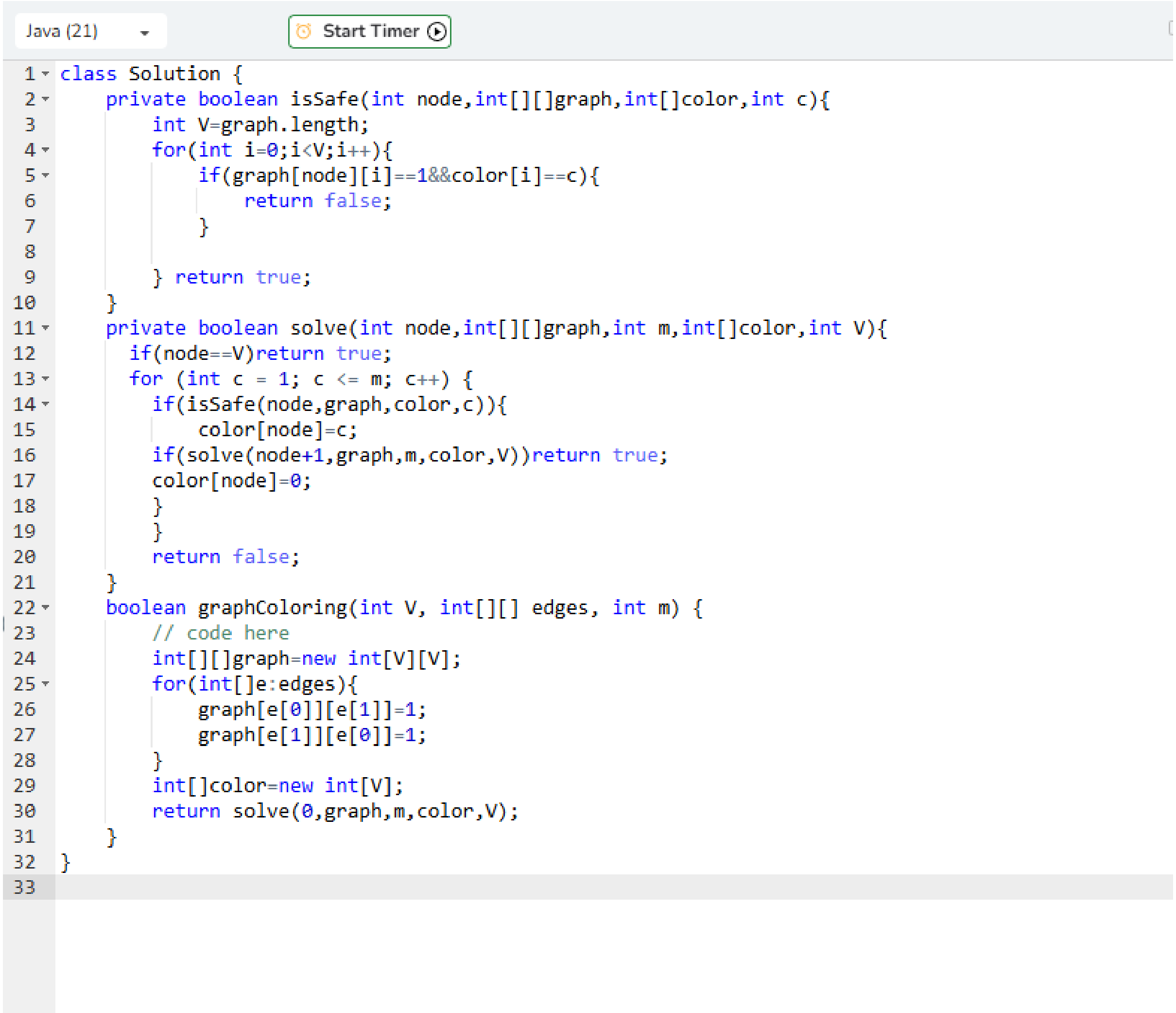
Note: The graph is indexed with 0-based indexing.

Examples:

Input: V = 4, edges[][] = [[0, 1], [1, 3], [2, 3], [3, 0], [0, 2]], m = 3
Output: true
Explanation: It is possible to color the given graph using 3 colors, for example, one of the possible ways vertices can be colored as follows:

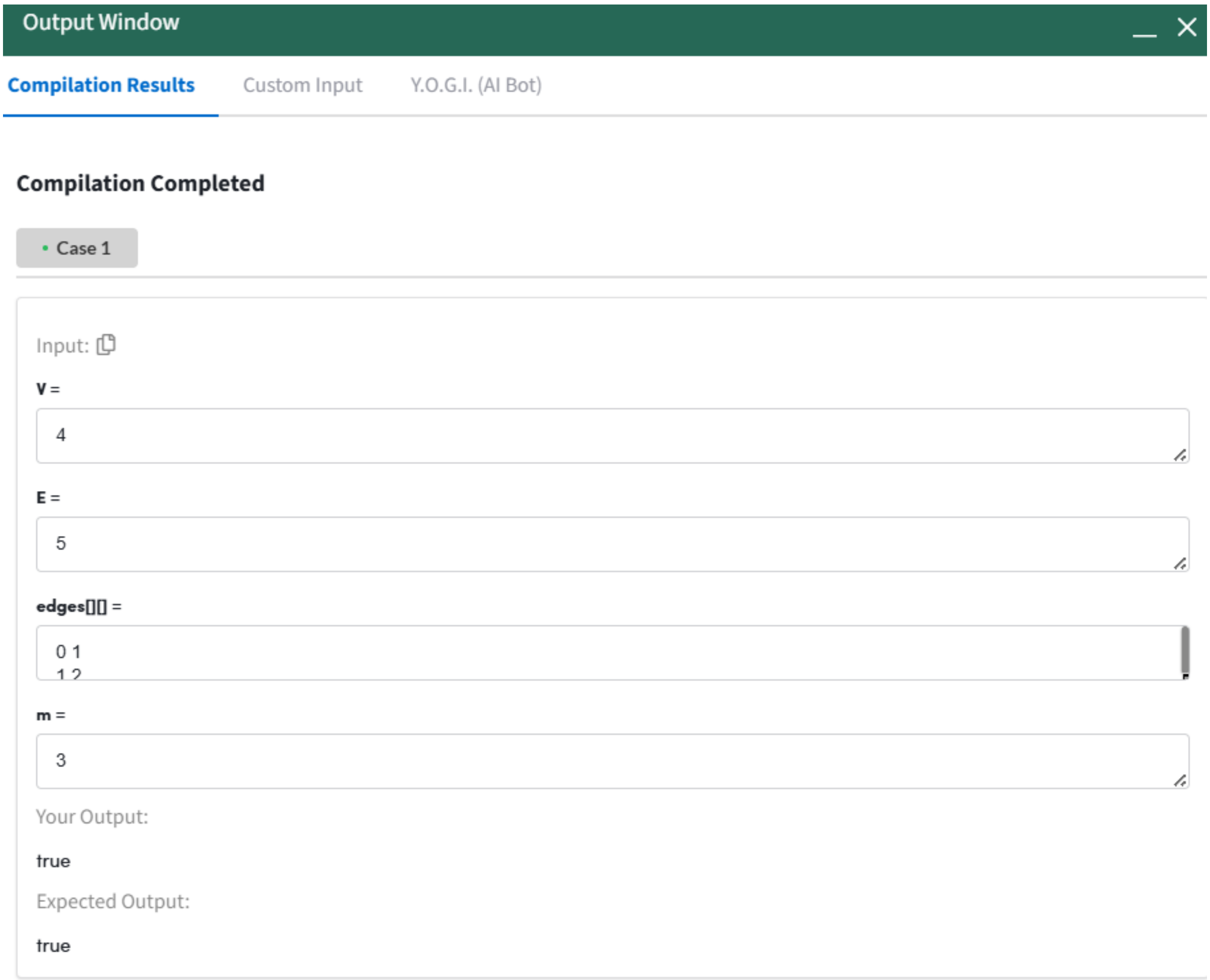
Vertex 0: Color 1
Vertex 1: Color 2
Vertex 2: Color 2
Vertex 3: Color 3

Input: V = 3, edges[][] = [[0, 1], [1, 2], [0, 2]], m = 2
Output: false



```java
class Solution {
    private boolean isSafe(int node,int[][]graph,int[]color,int c){
        int V=graph.length;
        for(int i=0;i<V;i++){
            if(graph[node][i]==1&&color[i]==c){
                return false;
            }

        } return true;
    }
    private boolean solve(int node,int[][]graph,int m,int[]color,int V){
      if(node==V)return true;
      for (int c = 1; c <= m; c++) {
        if(isSafe(node,graph,color,c)){
            color[node]=c;
        if(solve(node+1,graph,m,color,V))return true;
        color[node]=0;
        }
        }
        return false;
    }
    boolean graphColoring(int V, int[][] edges, int m) {
        // code here
        int[][]graph=new int[V][V];
        for(int[]e:edges){
            graph[e[0]][e[1]]=1;
            graph[e[1]][e[0]]=1;
        }
        int[]color=new int[V];
        return solve(0,graph,m,color,V);
    }
}
```



Compilation Completed

• Case 1

Input:

V =

4

E =

5

edges[][] =

0 1
1 2

m =

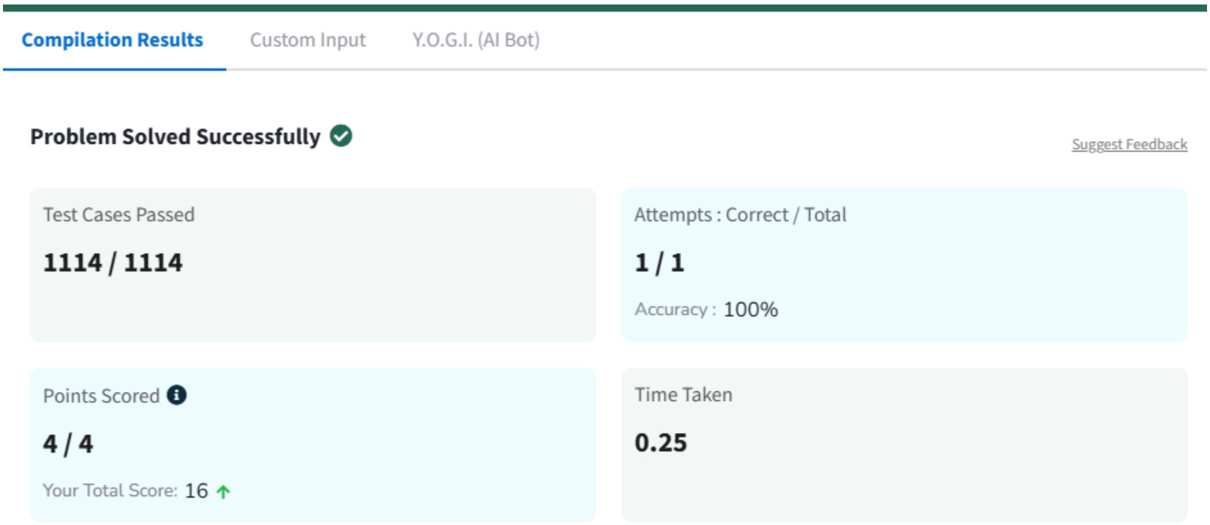
3

Your Output:

true

Expected Output:

true



Problem Solved Successfully ✓

Test Cases Passed

1114 / 1114

Attempts : Correct / Total

1 / 1

Accuracy : 100%

Points Scored

4 / 4

Your Total Score: 16 ↑

Time Taken

0.25