C DS Assignment-1

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Download codes from

https://github.com/adyasa611/EE4013/tree/main/Assignment−1/codes

and latex-tikz codes from

https://github.com/adyasa611/EE4013/tree/main/Assignment−1/figures

1 Question

The Chromatic Number of the following graph is

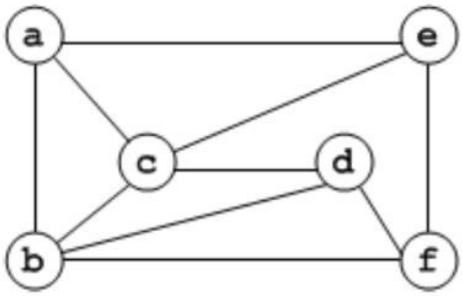

Fig. 0: Question

2 Solution

The chromatic number of a graph is the smallest number of colors needed to color the vertices of the graph so that no two adjacent vertices share the same color.

2.1 Steps to Calculate Chromatic Number

1) We color first vertex with the first color.
2) For the remaining (V-1) vertices we do the following one by one:
3) We color the currently picked vertex with the lowest numbered color if the color has not been used to color any of its adjacent vertices.
4) If it has been used, then we choose the next least numbered color.
5) If all the previously used colors have been used, then we assign a new color to the currently picked vertex.

3 For given graph

1) We color first vertex with the first color.

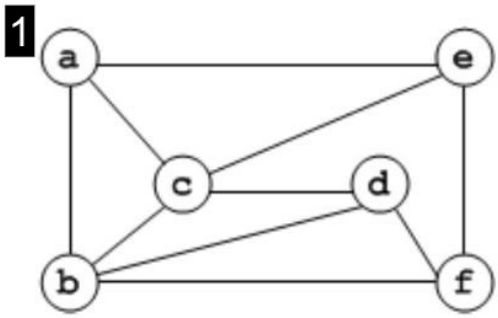

Fig. 1: STEP 1

2) We assign color to the vertices which share an edge with the first vertex.

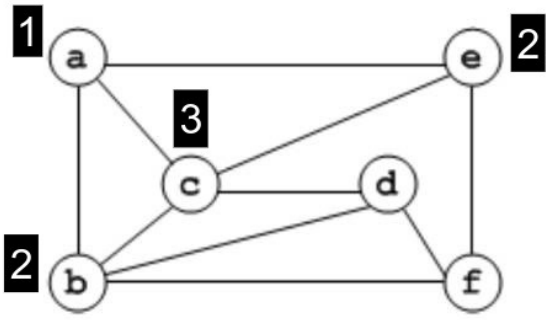

Fig. 2: STEP 2

3) We assign color to the remaining vertices.

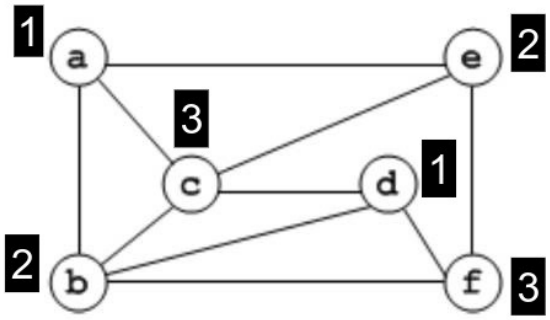

Fig. 3: STEP 3

4) The number of colours used is 3. Hence the Chromatic Number is 3.

The code below is the C code to obtain chromatic number of a graph.

codes/ChromaticNumber.c