

CSE 5311 Lab Assignment 3

Due August 11, 2010

Goals:

Understanding of edge coloring

Requirements:

1. Write (and test) a C/C++ program to *edge color* a provided bipartite graph. Your program must compile and execute on at least one of OMEGA or Visual Studio.

The input to your program will be:

- a. n_l , n_r , and m , the numbers of left column vertices, right column vertices, and edges. $n_l \leq n_r \leq 50$ and $m \leq 1000$.
- b. m lines, each giving an edge: left column vertex, right column vertex. Left column vertices are numbered $0 \dots n_l - 1$. Right column vertices are numbered $0 \dots n_r - 1$. The edges will be sorted lexicographically by left column vertex, then right column vertex. Duplicate edges will not occur.

The output from your program will be:

- a. A trace of the processing. Each edge will be processed by either 1) using a color that is “free” at both incident vertices, or 2) using an alternating (a, b) path. For (1), simply indicate the free color that is used for the edge. For (2), indicate the colors (e.g. numbers) for a and b .
 - b. A list of the edges (input order) and the final color for each edge.
2. Email your code (as attachments) to `arjundasgupta@uta.edu` before 3:15 pm on August 11. The subject should include your name as recorded by the University.

Getting Started:

1. You may use existing code, but be sure to give appropriate credit.
2. Bipartite edge coloring is discussed in Notes 18. Do not use the approach for general graphs, since the number of colors you may use is bounded by the degree (Δ) of the bipartite graph (not $\Delta + 1$). Assigned colors must be in the range $0 \dots \Delta - 1$.