CSE 5311 Lab Assignment 3

Due August 13, 2015

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 $0 \ldots n_l$ - 1. Right column vertices are numbered $0 \ldots n_r$ - 1. 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. Submit your C/C++ code on Blackboard before 10:15 a.m. on August 13.

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 $0 \ldots \Delta$ - 1.