CSE 5311 Lab Assignment 2

Due July 30, 2015

Goals:

1. Review of network flow concepts.

2. Understanding of flow decomposition.

Requirements:

1. Write (and test) a C/C++ program to extract a *flow decomposition* from a provided flow. Your program must compile and execute on at least one of OMEGA or Visual Studio.

    The input to your program will be:

    a. n and m, the number of vertices and edges. $n \leq 50$ and $m \leq 1250$.
    b. m lines, each giving an edge: tail, head, flow. Vertices are numbered $0 \ldots n - 1$. The source is vertex 0. The sink is vertex $n - 1$. The flow will be positive. Inverse pairs of edges will not appear in the input. The source will never be the head of an edge. Likewise, the sink will never be the tail of an edge. Finally, the edges will be sorted lexicographically by tails, then heads.

    The output from your program will be:

    a. The total verified flow. If there is an issue with flow conservation, your program should terminate.
    b. For each cycle that is found, output the limiting edge and the amount of the flow that is cancelled.
    c. The *S-T* paths in the flow decomposition. Besides listing each path of vertices and its contribution to flow, your program should also indicate an edge on each *S-T* path that is cancelled down to zero flow.

2. Submit your C/C++ code on Blackboard before 10:15 a.m. on July 30.

Getting Started:

1. You may use existing code, but be sure to give appropriate credit.

2. Flow decomposition is discussed in Notes 12.