

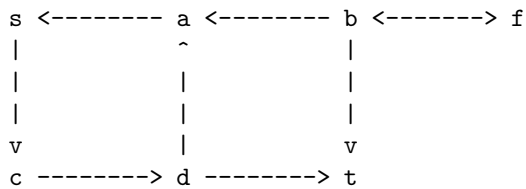
15-451 Mini 4

March 25, 2008

This mini is due via *email* to your TA, by midnight Tuesday April 1
Please use the subject line "15-451 MINI #4" in your email.
Questions/concerns/comments to Dafna Shahaf <dshahaf+451@cs.cmu.edu>

1 Question 1

Apply Tarjan's SCC algorithm to the following graph. Give the pair of numbers $\langle \text{dfsnum}(v), \text{low}(v) \rangle$ associated with each vertex v at the termination of the algorithm.



2 Question 2

One naive algorithm for solving bipartite matching is to do what is called "chronological backtracking". You look at the nodes on the left-hand-side one at a time: for each node, take the first (highest) available edge and recursively solve the rest of the problem. If the recursion returns failure, then try a different edge. If all edges fail, then return failure.

Describe an n -by- n bipartite graph that has a perfect matching, but where this algorithm would take exponential time to find it.