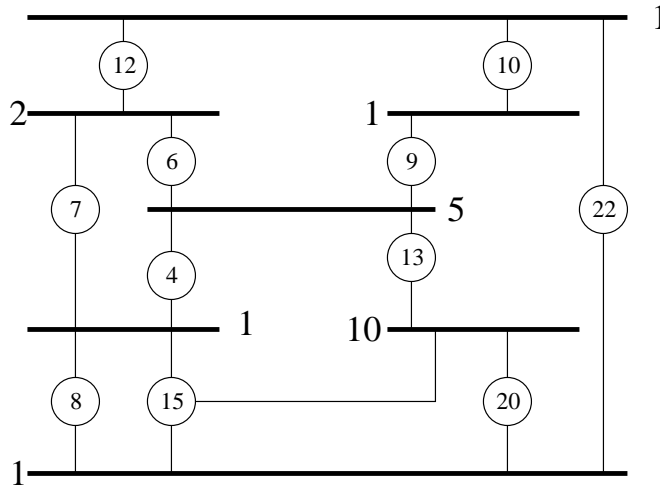


HW #5

ELEN E4710 - Intro to Network Engineering
Fall 2004

Due 11/24/2004
Prof. Rubenstein

Homework must be turned in at the beginning of class on the due date indicated above. CVN students have one additional day. Late assignments will not be accepted.



1. In the LAN above, switch IDs are indicated upon the switch, and wire weights, assigned by a network administrator, are depicted adjacent to the wire.
 - (a) Perform the spanning tree algorithm to determine the interfaces (ports) of the switches that are turned on for forwarding.
 - (b) Suppose the switch with ID 22 is removed. Redraw the spanning tree after this modification.
 - (c) Suppose the switch with ID 4 is removed. Redraw the spanning tree now.

2. Prove the spanning tree algorithm used on LANs guarantees a single path between any pair of nodes.
 - (a) First show that a path exists. Show this by showing every node can reach the root. Then, given this, describe a path between any pair of switches.
 - (b) Show the path is unique. Show this by contradiction: assume there are two nodes with 2 paths between them (i.e., a cycle of switched). Use the fact that no switch can have both interfaces marked 'S', and at most one switch can have an interface marked with both 'R's. Show first that the root cannot lie on the cycle formed by these paths. Then show that a cycle without a root node violates a distance property.

3. Draw the trie structure that maps addresses to the interface corresponding to the longest matching prefix in the table below:

prefix	interface
0	2
1	2
01	1
111	1
011	3
0110	1
1011	3