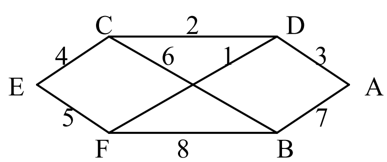
Homework #6: April 29, 2004
5 Points Each

Problem #1
Answer the questions for parts a and b below.
(a) Briefly describe the difference between store-and-forward and cut-through switches.
A store-and-forward switch stores each incoming frame in its entirety, then examines it and forwards it. A cut-through switch starts to forward incoming frames before they have arrived completely. As soon as the destination address is in, the forwarding can begin.

(b)Store-and-forward switches have an advantage over cut-through switches with respect to damaged frames. Explain what it is.

Store-and-forward switches store entire frames before forwarding them. After a frame comes in, the checksum can be verified. If the frame is damaged, it is discarded immediately. With cut=through, damaged frames cannot be discarded by the switch because by the time the error is detected, the frame is already gone. Trying to deal with the problem is like locking the barn door after the horse has escaped.

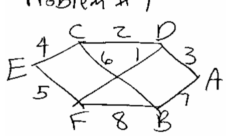
Problem #2



Consider the subnet above. Distance vector routing is used, and the following vectors have just come in to router C: from B: (8,0,5,2,6,12); from D: (9,10,6,0,16,12); and from E: (4,6,3,9,0,7). The measured delays to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the expected delay.

Problem #1

1



Vectors that have come into router C
from B(8,0,5,2,6,12)
from D(9,10,6,0,16,12)
from E(4,6,3,9,0,7)

What is Cs new routing table? Give both the outgoing line to use and the expected delay

	To B	To D	To E	Delay	Line
A	8	9	4	9	E
B	0	10	6	6	B
C	5	6	3	0	–
D	2	0	9	3	D
E	6	16	0	5	E
F	12	12	7	12	E
	w/ CB delay 6	w/ CD delay 3	w/ CE delay 5		

C to A: CDA→3+9=12, CBA→6+8=14
$\boxed{\text{CEA}\to 5+4=9}$

C to F $\boxed{\text{CEF}\to 5+7=12}$, CDF→3+12=15
CBF→6+12=18

Problem #3
Looking at the subnet of Fig. 5.9 (a), how many packets are generated by a broadcast from D, using
(a) reverse path forwarding?
(b) the sink tree?

1

Problem #3

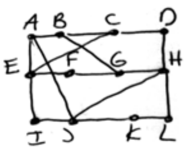


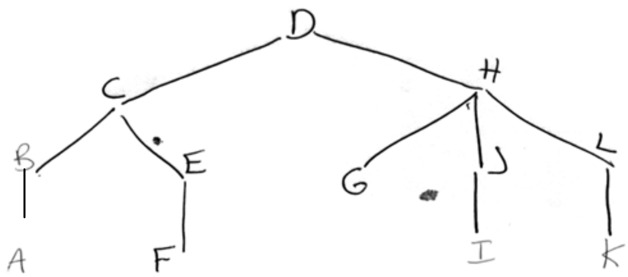
Fig 5.9

how many packets are generated by a broadcast from D, using (a) reverse path forwarding? (b) the sink tree?

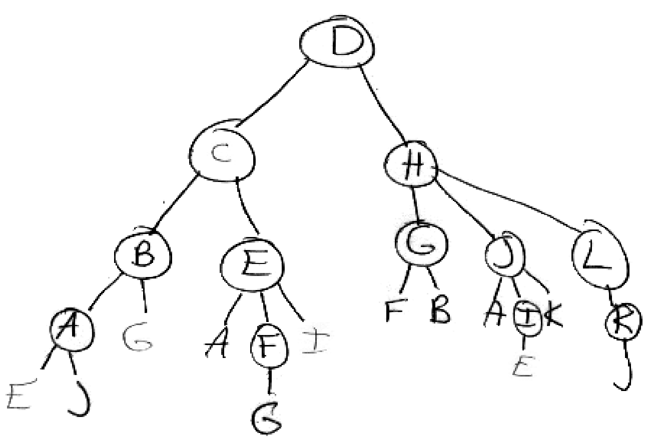
Since no timing information (delay) is given with respect to router D, there are several possible solutions to the sink tree.

Use number of hops for this case. (Still several possible solutions.)

Sink tree for router



(a) reverse path forwarding? 33 packets



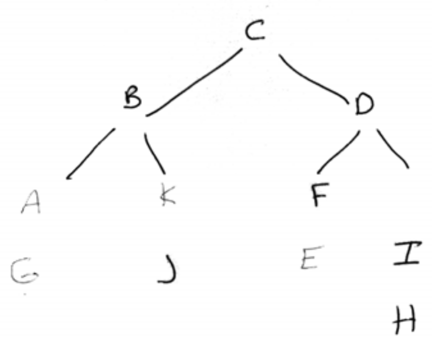
(b) sink tree? 11 packets

Problem 5.10
If delays are recorded as 8-bit numbers in a 50-router network, and delay vectors are exchanged twice a second, how much bandwidth per (full-duplex) line is chewed up by the distributed routing algorithm? Assume that each router has three lines to other routers.

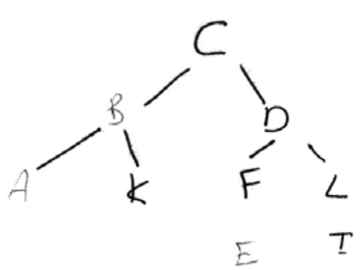
The routing table is 400 bits. Twice a second this table is written onto each line, so 800 bps are needed on each line in each direction.

Problem 5.16
Compute a multicast spanning tree for router C in the following subnet for a group with members at routers A, B, C, D, E, F, I, and K.

Sink tree for router C (more than 1 solution)



Multicast spanning tree for C with members A B, C D E, F, I K



Problem #6
Pick a component of the network layer in the Internet (section 5.6) that is of interest to you and a write up to a one page description of that component. Address issues such as the impact on the evolution of the Internet and importance to the operation of the Internet.

Answers will vary.