EECS 122 - COMMUNICATION NETWORKS - *Fall 1998*
Midterm 2 - 11/2/1998. See <u>Solutions</u>.
 Name (Last, First): SID: Score:

Please answer neatly on these pages. Good luck! The solutions will be posted on the web by tonight.

1. Short Answers [30%].

1.1. [20%] True or False (check one box per question)

a. GBN retransmits fewer packets than ABP.	T[ ]	F[ ]
b. The efficiency of ABP decreases with the line rate[i.e., decreases as the line rate decreases].	T[ ]	F[ ]
c. ABP would not operate correctly in the Internet.	T[ ]	F[ ]
d. RED routers improve the throughput of TCP by reducing multiple losses.	T[ ]	F[ ]
e. Slow start is designed to limit the congestion by transmitting slowly.	T[ ]	F[ ]
f. TCP shares the network links fairly and efficiently among connections.	T[ ]	F[ ]
g. Using reservations, the efficiency of ALOHA increases from 18% to 36%.	T[ ]	F[ ]
h. CSMA/CD is more efficient then ALOHA when PROP << TRANSP.	T[ ]	F[ ]
i. ATM controls congestion by regulating the streams that users send.	T[ ]	F[ ]
j. The throughput of an input-buffer switch is limited by the bus speed.	T[ ]	F[ ]

1.2 [5%] Using LAN emulation, hosts attached to Ethernet switches with an ATM backbone (check one or more boxes)

a. Get a guaranteed quality of service.	[ ]
b. Cannot select the parameters of the virtual circuits.	[ ]
c. May benefit from a well-provisioned backbone.	[ ]
d. Must implement AAL-5.	[ ]

1.3 [5%] The effect of congestion on TCP is to (check one or more boxes)

a. Increase the loss rate seen by applications.	[ ]
b. Limit the number of connections that can be set up at one time.	[ ]
c. Reduce the throughput of connections.	[ ]

2. Problem [20%]. The TCP state diagram is shown below. The states are numbered on the diagram. Consider two hosts A and B. We indicate by (A1, B3) the situation when TCP is in state 1 in host A and in state 3 in host B. More generally, we use the notation (Ai, Bj).

TCP State Diagram.

Assume the following scenario. Host A opens a TCP connection to host B. This start of connection is not received by host B. Host A tries again. This time, host B gets the message and acknowledges. Host A then sends packets to B who acknowledges them. Host A then closes the connection from A to B and B acknowledges. Host B then closes the connection and A acknowledges the close but its acknowledgment does not reach B. Host B then repeats its close message which this time is correctly acknowledged.

Indicate the list of pairs of states of the TCP protocols in the two hosts. For instance, your answer might look like

A1, B1	A2, B1	A2, B4	A3, B4	A3, B5			

The sequence is read from left to right and top to bottom. Note that all the cells of the table may not need to be filled in if there are not as many states as cells. Your answer:

3. Problem [20%]. Consider the network of bridged Ethernets shown below:

List the control packets generated on Ethernet A when the bridges execute the spanning tree algorithm. Use the notation [source ID | presumed root ID | distance to presumed root] for the control packets.

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4. Problem [20%]. Consider a slotted ALOHA protocol. There are ten stations that compete for slots by transmitting with probability 0.1 each in one slot. They always have packets to transmit. Find the average time it takes one station to transmit five packets.

5. Problem [10%]. Consider a leaky bucket that polices traffic. The parameters of the leaky bucket are as follows:

- leaking rate = 100 units per second;
- capacity of bucket = 3 units.

Cells arrive at the policer at the following times (expressed in milliseconds). Indicate which cells, if any, are marked as eligible for discard by the policer:

Cell Number	Arrival Time (ms)	Eligible for discard (Yes or No)
1	0	
2	1	
3	2	
4	3	
5	4	
6	11	
7	20	
8	29	