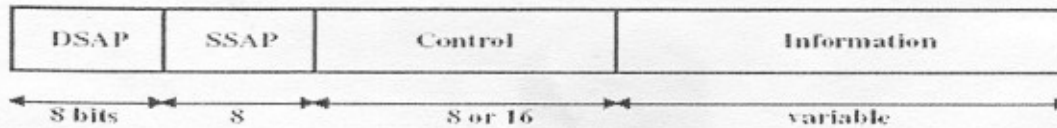
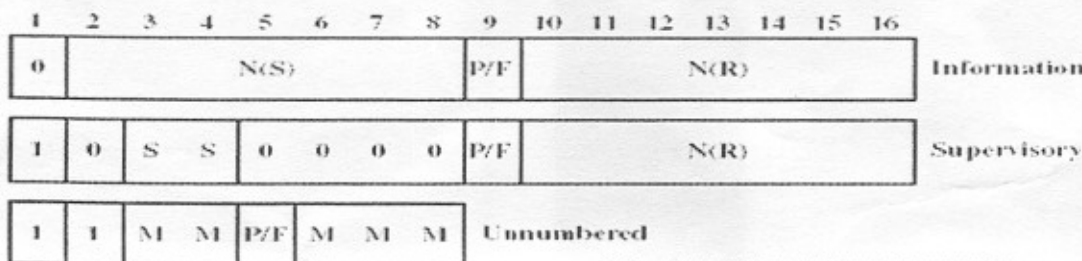


CS4231 Final Exam

- (5%) IP address represents both *ID* and *location* of a host. Discuss the major advantage and disadvantage of such design principle.
- (10%) What is "reverse tunneling" in Mobile IP? Why do we need it?
- (5%) In the LLC header format shown below, when does the "P/F" bit is referred to as the P bit? When does the "P/F" bit is referred to as the F bit?

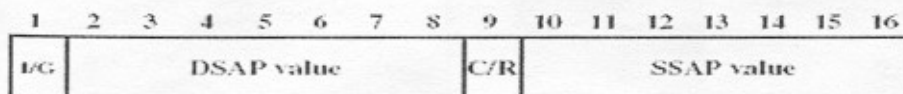


(a) PDU format



N(S) = transmitter send sequence number
 N(R) = transmitter receive sequence number
 S = supervisory function bit
 M = modifier function bit
 P/F = poll/final bit

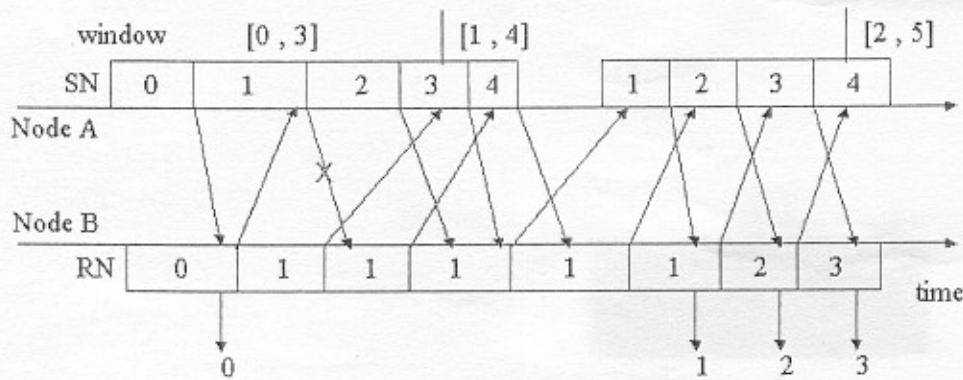
(b) Control field formats



I/G: 0 = individual DSAP; 1 = group DSAP
 C/R: 0 = command; 1 = response

- (5%) DHCP can allocate a new IP address for a mobile terminal. It is also less complicated than Mobile IP. What is the major reason for using Mobile IP rather than using DHCP to deal with IP mobility?
- (5%) The IEEE 802.11 has already defined procedures for a station to reassociate to a new Access Point (AP) from another AP. That is, a station can disconnect from one AP and connect to another AP. In a WLAN environment, in what situation we may still need Mobile IP to deal with mobility management?
- (5%) What is IP-in-IP encapsulation? When do we need it in Mobile IP?
- (5%) When performing route optimization in Mobile IPv4, why it is better to send binding update to a CH by HA rather than by MH?
- (5%) What is Gratuitous ARP? What is its purpose?
- (5%) What are the lowest and highest addresses of 128.211.0.0/16?
- (10%) Redraw the following figure with the same frame lengths and the same set of frames in error,

but focusing on the frames from B to A. That is, show SN and the window for node B, and show RN and frames out for node A (assume that all frames are carrying packets).

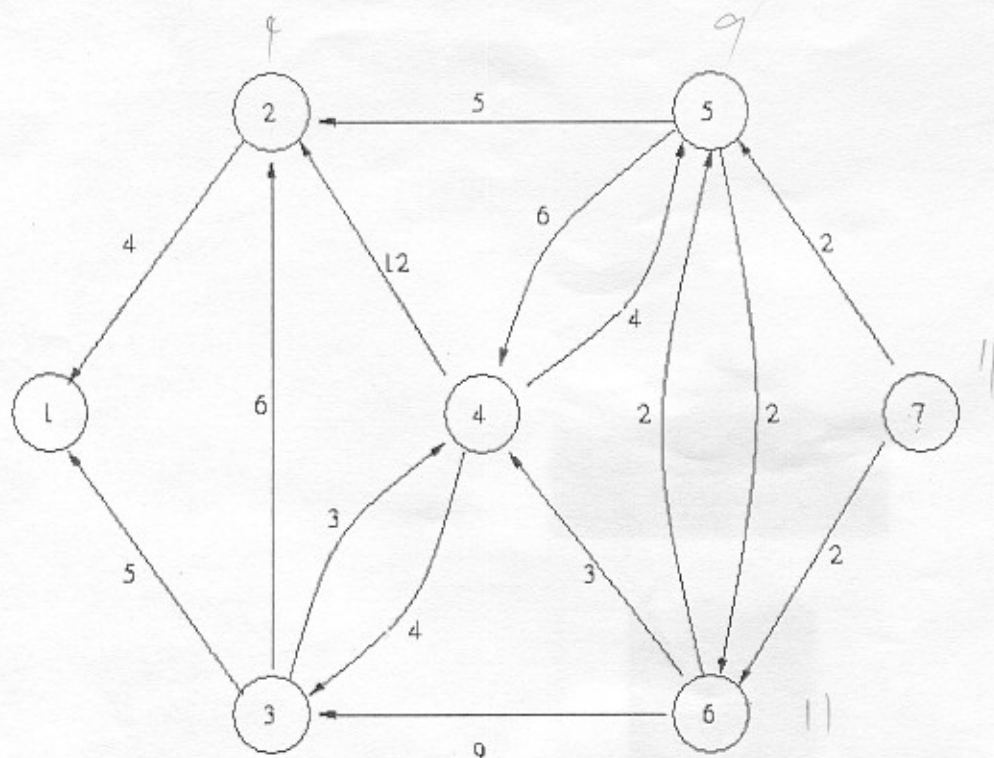


11. (10%) A bridge with ID 92 has five ports. On port 1, the best configuration message it has received is 81.0.81, where 81 is the root ID, 0 is the cost to the root, and 81 is the ID of the bridge transmitting the configuration message, which in this case assumes at the moment that it is the root. Assuming that the one hop cost from bridge 92 to all other bridges is 2. On the remaining ports, the best configuration messages the bridge has received are as follows:

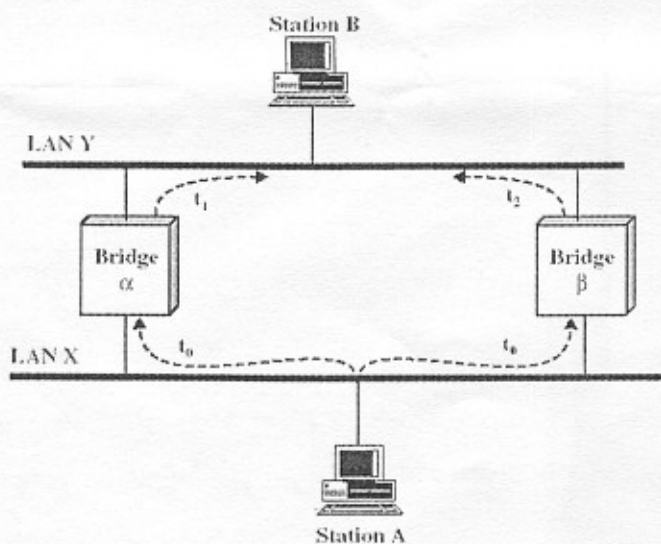
Port 2	41.19.125
Port 3	41.11.315
Port 4	41.12.411
Port 5	41.15.90

port 1 81.0.81
R, C, B

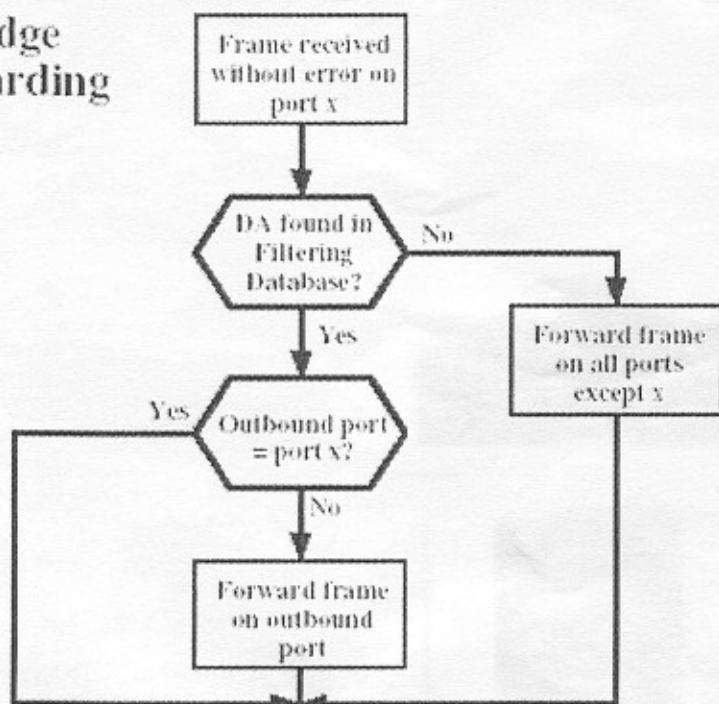
- Which bridge will bridge 92 chose as the root? (1%)
 - What is the best cost to that root? (2%)
 - Which port will bridge 92 select as the root port? (1%)
 - For which port(s) will bridge 92 assume that it is the designated bridge? (3%)
 - Which port(s) will bridge 92 select for inclusion in the spanning tree? (2%)
 - Which port(s) will bridge 92 classify as in the blocking state? (1%)
12. (20%) Find the shortest path tree from every node to node 1 for the following graph by using the Bellman-Ford and Dijkstra algorithms.



13. (10%) Based on the following flow chart, show what will go wrong if we have a network topology as that in the following figure. Assuming that Station A has a frame to be transmitted to Station B. Explain your answer clearly by showing the filtering database in both bridges in each step. Consider the cases when the address is *in the database* and *not in the database* initially.



Bridge Forwarding



Bridge Learning

