# 1 Ethernet Medium Access Control

1. Ethernet Medium Access Control (MAC) uses 1-persistent CSMA/CD with binary exponential backoff. Explain this access method.

2. What is the minimum frame size in case of classical Ethernet (10 Mbit/s)?

3. Why is there a minimum frame size for Ethernet frames?

4. What can be done if a frame is too short?

5. What is the maximum frame length in case of classical Ethernet (10 Mbit/s)?

6. An IP packet to be transmitted by Ethernet is 60 Byte long, including all its headers. Is padding needed in the Ethernet frame, and if so, how many bytes?

# 2 Repeaters, Hubs, Switches and Bridges

1. What is the difference between a repeater, a hub, and a switch?

2. What is a collision domain? How are collision domains different for hubs and switches?

3. What is a switching table? How does a transparent (i.e. self-learning) bridge/switch fill its switching table?

4. Why do we need the spanning tree algorithm? How does it work?

5. Given the extended LAN below, what does its corresponding spanning tree look like?
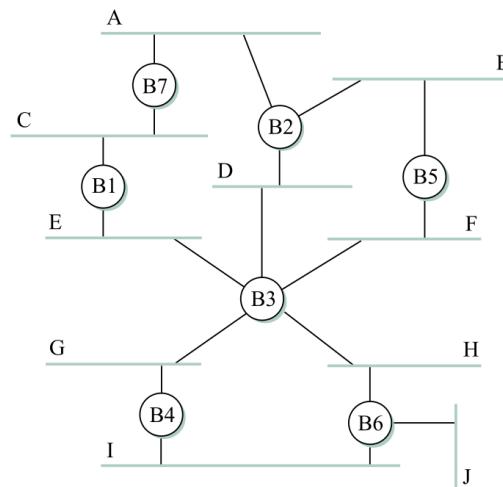


[Source: Peterson, Computer Networks: A Systems Approach]

# 3 VLANs

1. What is a VLAN? What are some advantages of using VLANs? How can packets be forwarded to correct VLANs?

2. To make VLANs work, configuration tables are needed in the bridges. What if the VLANs used hubs rather than switches or bridges ? Do the hubs need configuration tables, too? Why or why not?

3. How can legacy 802.3 Ethernet cards in PCs be supported in a network that uses the 802.1Q VLAN features?