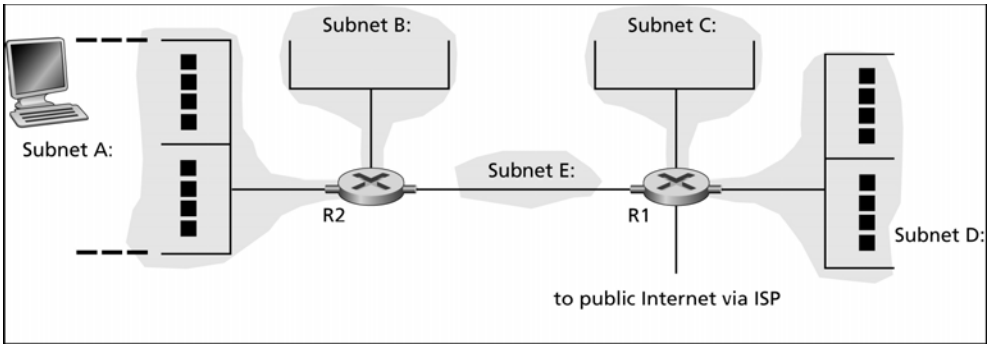
Worksheet 18

1. Link-layer services and Ethernet. Slide 6-6 and Slide 6-7 list a number of different services that a link layer can potentially provide to the network layer. These services include: a) framing, b) medium access, c) reliable delivery, d) flow control, e) error detection, f) error correction, g) full-duplex and half-duplex. For each of these services, discuss how or how not Ethernet provides the service.

2. List two protocols that require Ethernet to use broadcast frames. Explain.

3. What is the maximum number of VLANs that can be configured on a switch supporting the 802.1Q protocol? Why?

4. Consider the network shown below. Each of the subnets A-D contains at most 31 hosts; subnet E connects routers R1 and R2.



a. Assign network addresses to the five subnets shown above (that is, write down the addresses you have assigned).
b. Assign (write down) a full (32-bit) IP address for each the two hosts shown in subnets A and D.
c. Assign (write down) a full IP address to the router interface on subnet E.
d. What is the network prefix advertised by router R1 to the public Internet?
e. Assign (write down) a MAC address to D.
f. Does the host in A ever need to know the MAC address of the R1's interface in subnet E in order to send an IP packet to the host in D? Explain your answer in one or two sentences.

Now suppose that router R2 above is replaced by an Ethernet switch, S2 (Router R1 remains a router).

g. Are the interfaces that previously were in subnets A, B, and E still in the same separate three IP subnets now that R2 is replaced by S2? Explain your answer in a few sentences.
h. In order to send an IP packet to the host in D, does the host in A ever need to know the MAC address of the R1's left interface now that R2 is replaced by S2? If so, how does it get the MAC address of R1's left interface? Explain your answer in one or two sentences.