

Exercises for “Computer Science II” — SS 2003

No. 8

Due: July 4, 2003

Computer Networks

1. **(5 points)** Explain the following terms:
 - (1) protocol and service
 - (2) packet-switching and circuit-switching
 - (3) layering
 - (4) flow control
 - (5) RTT
2. **(2 points)** List the seven layers of the ISO/OSI reference model and for each layer provide an example of a function commonly performed at that layer.
3. **(5 points)** Consider an IP packet that has a 20-byte header, an initial `totalLength` of 2000 bytes and an initial identification value of 3251. Assume the packet traverses two networks, one with an MTU of 1500 bytes and the next with an MTU of 620 bytes. Give the values of `totalLength`, `identification`, `moreFlag` and `fragmentationOffset` for each fragment received at the destination.
4. Consider the simple network shown in Figure 1:
 - (1) **(4 points)** Write down an IP address for all interfaces at all hosts and routers in the network. The IP addresses for A and E are as given. You should assign IP addresses so that interfaces on the same network have the same network-part of their IP address. Indicate the number of bits in the network-part of this address.
 - (2) Focus on the actions taken at both the network and data link layers at sender A, the intervening router, and destination E in moving an IP datagram from A to E:
 - 2a) **(2 point)** How do A, E and the router determine the IP addresses needed for the IP datagram?
 - 2b) **(2 points)** What, specifically, are the addresses in the IP datagram that flows from A to the router.
What, specifically, are the addresses in the IP datagram that flows from the router to E.

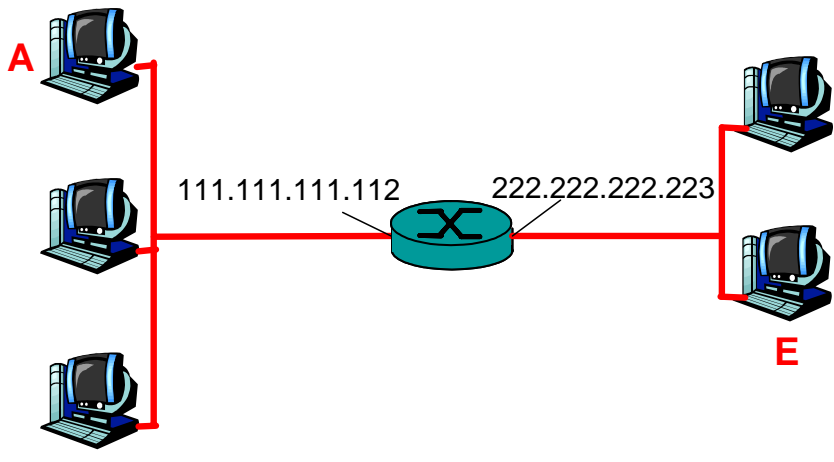


Figure 1: A Simple Network