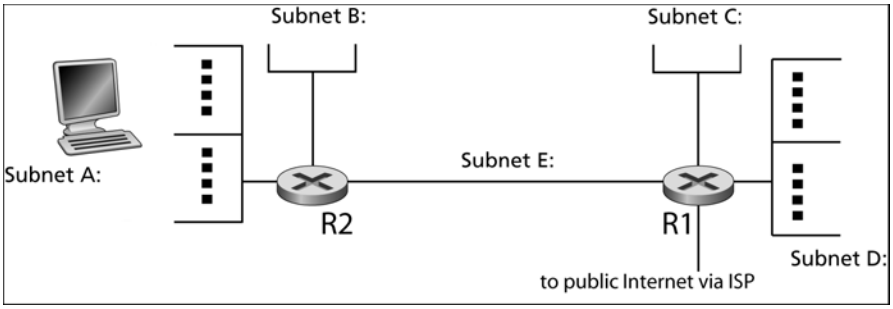
Worksheet 11

1. Do routers have IP addresses? If so, how many?

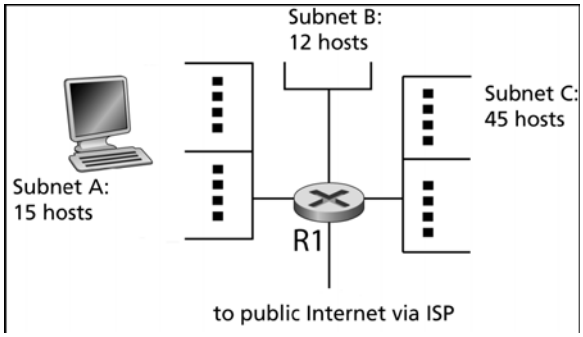
2. Suppose an application generates chunks of 40 bytes of data every 20 msec, and each chuck gets encapsulated in a TCP segment and then an IP datagram. What percentage of each datagram will be overhead, and what percentage will be application data?

3. Consider the network shown below. Each of the subnets A-D contains at most 30 hosts; subnet E connects routers R1 and R2.



   a. Assign network addresses to the five subnets shown above (that is, write the addresses you have assigned).
   b. Suppose that there are 17 hosts in A–D. Does your answer to Question a) change? If so why or why not?
   c. What is the network prefix advertised by router R1 to the public Internet?

4. IP addressing.
   a. Consider an Internet address of the form 129.19.40.0/23. What does the /23 signify?



   b. Consider the network shown above, consisting of a single router, R1, with three subnets A, B and C, with 15, 12, and 45 hosts respectively on these subnets. Assign an address range to the hosts in subnets A, B, and C so that only a single aggregated address needs to be advertised by R1 to the public Internet, and that the size of the advertised aggregated address range is minimized. In a sentence or two, explain how you arrived at your answer.

5. Consider the scenario shown in the figure on Slide 55. Suppose that host 10.0.0.2 initiates a connection, using source port 5500 to a Web server listening at port 80 at 128.119.40.186.
   a. Complete the NAT translation table for this TCP connection.
   b. What are the source and destination IP addresses and port numbers on the IP datagram arriving to the WAN side of the router with interface address 138.76.29.7?

6. How does the router at the destination end of a tunnel know that the IPv4 datagram contains an IPv6 datagram that it should extract from the IPv4 packet?

7. Name three header fields in an IP datagram that can be “matched” in Open-Flow 1.0 generalized forwarding. What are three IP datagram header fields that *cannot* be “matched” in OpenFlow?