Assignment -3

1. Suppose Host A sends Host B a TCP segment encapsulated in an IP datagram. When Host B receives the datagram, how does the network layer in Host B know it should pass the segment (that is, the payload of the datagram) to TCP rather than to UDP or to something else?

2. Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation?

3. How many IP addresses and how many link-layer addresses should a router have when it is connected to five links?

4. Is it necessary that every autonomous system use the same intra-AS routing algorithm? Why or why not?

5. In classless addressing, we know the first and the last address in the block. Can we find the prefix length? If the answer is yes, show the process.

6. In an IPv4 datagram, the value of total-length field is (00A0) 16 and the value of the header-length (HLEN) is (5) 16 . How many bytes of payload are being carried by the datagram? What is the efficiency (ratio of the payload length to the total length) of this datagram?

7. A packet has arrived in which the offset value is 300 and the payload size is 100 bytes. What are the number of the first byte and the last byte?

8. A large organization with a large block address (12.44.184.0/21) is split into one medium-size company using the block address (12.44.184.0/22) and two small organizations. If the first small company uses the block (12.44.188.0/23), what is the remaining block that can be used by the second small company? Explain how the datagrams destined for the two small companies can be correctly routed to these companies if their address blocks still are part of the original company.

9. Can the value of the header length field in an IPv4 packet be less than 5? When is it exactly 5?

10. Which field(s) in the datagram is(are) responsible for gluing together all fragments belonging to an original datagram?

11. An IP fragment has arrived with an offset value of 100. How many bytes of data were originally sent by the source before the data in this fragment?

12. Consider the count-to-infinity problem in the distance vector routing. Will the count-to-infinity problem occur if we decrease the cost of a link? Why? How about if we connect two nodes which do not have a link?