1. Give two example computer applications for which connection-oriented service is appropriate. Now give two examples for which connectionless service is best.

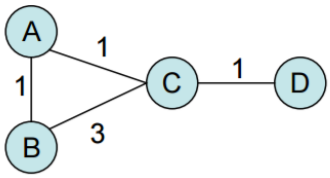
Solution: File transfer, remote login, and video on demand need connection-oriented service. On the other hand, credit card verification and other point-of-sale terminals, electronic funds transfer, and many forms of remote database access are inherently connectionless, with a query going one way and the reply coming back the other way.

2. Consider the network of Fig. 5-12(a). Distance vector routing is used, and the following vectors have just come in to router C: from B: (5, 0, 8, 12, 6, 2); from D: (16, 12, 6, 0, 9, 10); and from E: (7, 6, 3, 9, 0, 4). The cost of the links from C to B, D, and E, are 6, 3, and 5, respectively. What is C's new routing table? Give both the outgoing line to use and the cost.

Solution:
a) Going via B gives (11, 6, 14, 18, 12, 8).
b) Going via D gives (19, 15, 9, 3, 9, 10).
c) Going via E gives (12, 11, 8, 14, 5, 9).
d) Taking the minimum for each destination except C gives (11, 6, 0, 3, 5, 8).
e) The outgoing lines are (B, B, –, D, E, B).

3. Please give an example in which the poisoned reverse technique cannot prevent the count-to-infinity problem and explain why.

Solution:



For example:
Original distance to D: A(2) B(3) C(1)
If D goes down, A will send infinity to C, but B
Will not, so C(6) …

4. A router has just received the following new IP addresses: 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, can they be aggregated? If so, to what? If not, why not?

Solution: They can be aggregated to 57.6.96.0/19

5. The set of IP addresses from 29.18.0.0 to 29.18.128.255 has been aggregated to 29.18.0.0/17. However, there is a gap of 1024 unassigned addresses from 29.18.60.0 to 29.18.63.255 that are now suddenly assigned to a host using a different outgoing line. Is it now necessary to split up the aggregate address into its constituent blocks, add the new block to the table, and then see if any reaggregation is possible? If not, what can be done instead?

Solution: It is sufficient to add one new table entry: 29.18.60.0/22 for the new block. If an incoming packet matches both 29.18.0.0/17 and 29.18.60.0./22, the longest one wins. This rule makes it possible to assign a large block to one outgoing line but make an exception for one or more small blocks within its range.

6. A router has the following (CIDR) entries in its routing table: Address/mask Next hop 135.46.56.0/22 Interface 0 135.46.60.0/22 Interface 1 192.53.40.0/23 Router 1 default Router 2 For each of the following IP addresses, what does the router do if a packet with that address arrives?
   (a) 135.46.63.10
   (b) 135.46.57.14
   (c) 135.46.52.2
   (d) 192.53.40.7
   (e) 192.53.56.7

Solution:
(a) Interface 1
(b) Interface 0
(c) Router 2
(d) Router 1
(e) Router 2

7. When the IPv6 protocol is introduced, does the ARP protocol have to be changed? If so, are the changes conceptual or technical?

Solution: Conceptually, there are no changes. Technically, the IP addresses requested are now bigger, so bigger fields are needed

8. Consider the user of differentiated services with expedited forwarding. Is there a guarantee that expedited packets experience a shorter delay than regular packets? Why or why not?

Solution: There is no guarantee. If too many packets are expedited, their channel may have even worse performance than the regular

9. A token bucket scheme is used for traffic shaping. A new token is put into the bucket every 5 µsec. Each token is good for one short packet, which contains 48 bytes of data. What is the maximum sustainable data rate?

Solution: 48 / 5*10^(-6) = 9.6MB/s