School of Computer and Information Sciences
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# Computer Networks and Distributed Computing - Minor 2

**Date: 21 Oct. 2014** **Max. Marks: 20**

**NOTE:** Answer **ALL THE** questions.

1. A user has configured an IP address manually in a network that is using DHCP to configure addresses. Is this possible? If so, is there a way for DHCP to prevent duplicate IP addresses from being assigned given that when the user assigned an address, no other system had that address already assigned? The user does not know what the default gateway, DNS server etc. are and wishes that this information be obtained from DHCP. Is this possible and how?

2. Answer either I or II.

   I. Explain a scenario where TCP responds with the RST bit set.

   II. Explain how the link-state algorithm works.

3. The following advertisement is received by a router R1 from a neighbor N1.R2 using RIP: ((N1, 1), (N2, 1), (N0, 2)) and from another neighbor N0.R0 ((N0, 1), (N1, 2), (N2, 3)) at time 0 and 10s respectively. At time 10s R1 gets the advertisement ((N2, 16)) from N1.R2. What is the topology? Which of the various methods to prevent count-to-infinity are definitely enabled as can be seen from these advertisements? Which are definitely NOT enabled? What are the routing table entries in R0, R1 and R2 after all these advertisements have been received?

4. A TCP client sends segments of the following sizes after reaching a steady state of receiver window size as there is no congestion in the network. The Path MTU is 1500B, RTT=30ms and RTO=60ms. The receiver window is 8KB. The client writes segments of sizes 1024, 512, 1500, 2000, 200, 288 bytes at 15ms intervals. Assume time=0 for the first segment. Give the acknowledgements received if every segment reaches in order. Suppose that the second segment got lost, what is the time of retransmission using *Fast Retransmit* and without using it?

   [**ANSWER:**] The first segment is sent at time=0. After 30ms, the ack comes back as 1025. At this point, the next segment is transmitted. Since at this point (512+1500) bytes are accumulated, 1460B is transmitted at time=30ms. The remaining 552B are kept pending. The next data given by the client appln. is 2000B and since now 1MSS is ready, it will be transmitted at time=45ms. This leaves 1092B in the buffer. At 60ms, the ack for the segment transmitted at 30ms will be received (ack=2485). By this time, another 200B are given by the client to TCP, making the data in the buffer = 1292B. This gets transmitted at time=60ms. When the ack. for the third segment comes at 75ms (ack=3945), the data received from the application (288B) will be transmitted. The acks 5237 and 5525 are received at times 90ms and 105ms respectively.