

Solutions to Assignment 6 Questions

1) Problem P11, Chapter 6

- a) 1 message/2 slots
- b) 2 messages/slot
- c) 1 message/slot
- d)
 - i) 1 message/slot
 - ii) 2 messages/slot
 - iii) 2 messages/slot
- e)
 - i) 1 message/4 slots
 - ii) Slot 1: message A → B, message D → C
 Slot 2: ack B → A
 Slot 3: ack C → D
 This gives 2 messages/3 slots
 - iii) Slot 1: message C → D
 Slot 2: ack D → C, message A → B
 Slot 3: ack B → A
 This gives 2 messages/3 slots

2) Problem P13, Chapter 6

- a) No. All the routers might not be able to route the datagram immediately. This is because the Distance Vector algorithm (as well as the inter-AS routing protocols like BGP) is decentralized and takes some time to terminate. So, during the time when the algorithm is still running as a result of advertisements from the new foreign network, some of the routers may not be able to route datagrams destined to the mobile node.
- b) Yes. This might happen when one of the nodes has just left a foreign network and joined a new foreign network. In this situation, the routing entries from the old foreign network might not have been completely withdrawn when the entries from the new network are being propagated.

3) Problem P6, Chapter 6

- a) A frame without data is 32 bytes long. Assuming a transmission rate of 11 Mbps, the time to transmit a control frame (such as an RTS frame, a CTS frame, or an ACK frame) is $\frac{256 \text{ bits}}{11 \text{ Mbps}} = 23 \mu\text{s}$. The time required to transmit the data frame is $\frac{2000 \times 8 \text{ bits} + 256 \text{ bits}}{11 \text{ Mbps}} = 1478 \mu\text{s}$. The total time is then:

$$\begin{aligned}
 & DIFS + RTS + SIFS + CTS + SIFS + FRAME + SIFS + ACK \\
 &= DIFS + 3SIFS + (3 \times 23 + 1478) \mu\text{s} = DIFS + 3SIFS + 1547 \mu\text{s}
 \end{aligned}$$