EE3009 Tutorial 7 (Solution)

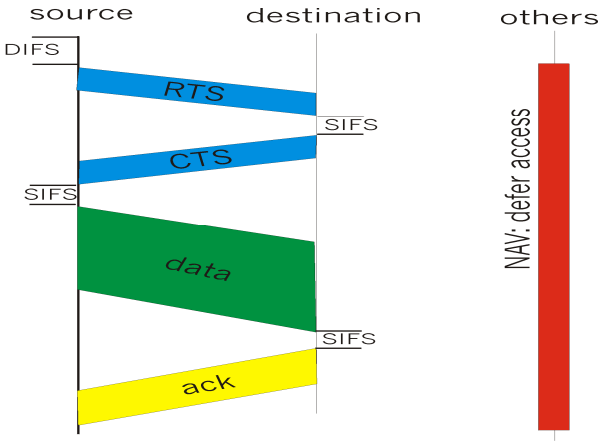
Problem 1

- At $t = 0$, A transmits.
- At $t = 576$, A would finish transmitting. (Note: minimum frame size is 72 bytes.)
- In the worst case, B begins transmitting at $t = 225$.
- At $t = 225 + 225 = 450$, B's first bit arrives at A.
- Because $450 < 576$, A cannot finish transmitting before it detects that B transmitted.

Problem 2

Wait for 51,200 bit times. For 10 Mbps, the waiting time is 51200 bits / 10 Mbps = 5.12 msec. For 100 Mbps, the waiting time is 512 µsec.

Problem 3



We ignore the transmission delay of the RTS, CTS, and ACK.

Time required = DIFS + Transmission delay of the packet + 3 * SIFS

= DIFS + 1000 * 8 bits / 11 Mbps + SIFS

= DIFS + 3 * SIFS + 727 µs

Problem 4

a) Each PC needs to know the MAC address of the PC which it wants to ping. ARP is used to translate the IP address into the corresponding MAC address.

b)

i. FF-FF-FF-FF-FF-FF (i.e., the broadcast address)

ii. It is because the ARP request contains the IP address of the target PC (i.e., PC6). Although all PCs (except PC1) receive the ARP request, only PC6 responds to the request as it knows that it is the target PC after decapsulating the ARP request frame.

iii. In Scenario 2, only one PC transmits at one time. Therefore, there is no collision and the ping request can reach PC6 successfully.