CSE3020 Network Technology
Semester 2, 2003

Tutorial 10 - Week 11

Question T10.1 - Briefly discuss the differences between a BSS and ESS?

From Stallings 7th Edition, pages 553-555, or lecture slides no 15 and 16.

Question T10.2 - Briefly discuss the differences between IEEE 802.11a and IEEE 802.11b wireless LAN standards.

From Stallings 7th Edition, pages 559, 566, or lecture slide no 12.

Question T10.3 - Briefly describe the two spread spectrum techniques used in wireless LANs.

- *From Forouzan 3rd edition, pages 363-364. Note, I did not use Stallings as Forouzan has a better explanation and more suitable for CS students.*

- *Frequency-hopping spread spectrum (FHSS): the sender sends on one carrier frequency for a short amount of time, then hops to another carrier frequency for the same amount of time, hops again to still another for the same amount of time, and so on. After N hopings, the cycle is repeated. If the bandwidth of the original signal is B, the allocated spread spectrum bandwidth is $N \times B$.*

- *Direct sequence spread spectrum (DSSS): each bit sent by the sender is replaced by a sequence of bits called a chip code. To avoid buffering, however, the time needed to send one chip code must be the same as the time needed to send one original bit. If N is the number of bits in each chip code, then the data rate for sending chip codes is N times the data rate of the original bit stream.*

Question T10.4 - How is OFDM different from FDM?

- *From Forouzan 3rd edition, page 365.*

- *Orthogonal frequency-division multiplexing (OFDM): is the same as FDM, with one major difference: All the subbands are used by one source at a given time.*

- *Additional info: The scheme is similar to ADSL. The 5GHz ISM band is divided into subbands. OFDM uses PSK and QAM for modulation. The common data rates are 18 Mbps (PSK) and 54 Mbps (QAM).*

Question T10.5 - Briefly describe the basic data transfer mechanism in IEEE 802.11.

From Stallings pages 560 - 562, Figure 17.6 and Figure 17.7(a).

Question T10.6 - Briefly explain the four-way handshake mechanism in IEEE 802.11.

From Forouzan pages 366 - 367, or lecture slides 23 and 24.

Question T10.7 - What is the purpose of the network allocation vector (NAV)?

- *From Forouzan page 367.*

- *collision avoidance.*

- *When a station sends an RTS frame, it includes the duration of the time that it needs to occupy the channel. The stations that are affected by this transmission create a timer called a network allocation vector (NAV) that shows how much time must pass before these stations are allowed to check the channel for idleness. In other words, each station, before sensing the physical medium to see if it is idle, first checks its NAV to see if it has expired.*

Question T10.8 - Briefly explain why the CSMA/CD MAC technique (used in Ethernet) cannot be implemented in wireless LANs.

From Forouzan page 366, or lecture slide 18.