HOME WORK ASSIGNMENT#3

Due Date March 20, 2008 (10x100=1000 points)
CS 4/55201 COMPUTER NETWORKS
Spring 2008, Department of Computer Science, Kent State University

1. (Chapter 4, Problem 4) Ten thousand airline reservation stations are competing for the use of a single slotted ALOHA channel. The average station makes 18 requests/hour. A slot is 125 μsec. What is the approximate total channel load?

2. (Chapter 4, Problem 8) How long does a station, s, have to wait in the worst case before it can start transmitting its frame over a LAN that uses
   (a) the basic bit-map protocol?
   (b) Mok and Ward's protocol with permuting virtual station numbers?

3. (Chapter 4, Problem 14) Six stations, A through F, communicate using the MACA protocol. Is it possible that two transmissions take place simultaneously? Explain your answer.

4. (Chapter 4, Problem 18) Sketch the differential Manchester encoding for the bit stream for the bit stream: 0001110101. Assume the line is initially in the low state.

5. (Chapter 4, Problem 21) Consider building a CSMA/CD network running at 1 Gbps over a 1-km cable with no repeaters. The signal speed in the cable is 200,000 km/sec. What is the minimum frame size?

6. (Chapter 4, Problem 24) Some books quote the maximum size of an Ethernet frame as 1518 bytes instead of 1500 bytes. Are they wrong? Explain your answer.

7. (Chapter 4, Problem 29) Suppose that an 11-Mbps 802.11b LAN is transmitting 64-byte frames back-to-back over a radio channel with a bit error rate of 10^{-7}. How many frames per second will be damaged on average?

8. (Chapter 4, Problem 31) IEEE 802.16 supports four service classes. Which service class is the best choice for sending uncompressed video? Why?

9. (Chapter 4, Problem 36) Beacon frames in the frequency hopping spread spectrum variant of 802.11 contain the dwell time. Do you think the analogous beacon frames in Bluetooth also contain the dwell time? Discuss your answer.

10. (Chapter 4, Problem 40) A switch designed for use with fast Ethernet has a backplane that can move 10 Gbps. How many frames/sec can it handle in the worst case?

All problems are from Computer Networks, Andrew S Tanenbaum, Fourth Edition. If there is any inconsistency please email TA (ydrabu@cs.kent.edu)