

EEL4598/5718: Computer Communications

Homework 4

6.1

Why do LANs tend to use broadcast networks? Why not use networks consisting of multiplexers and switches?

6.4

Suppose that the ALOHA protocol is used to share a 56 kbps satellite channel. Suppose that packets are 1000 bits long. Find the maximum throughput of the system in packets/second.

6.5

Let G be the total rate at which packets are transmitted in a slotted ALOHA system. What proportion of slots go empty in this system? What proportion of slots go empty when the system is operating at its maximum throughput? Can observations about channel activity be used to determine when stations should transmit?

6.8

Consider four stations that are attached to two different bus cables. The stations exchange fixed-size packets of length 1 sec. Time is divided into slots of 1 sec. When a station has a packet to transmit, the station chooses either bus with equal probability and transmits at the beginning of the next slot with probability p . Find the value of p that maximizes the rate at which packets are successfully transmitted.

6.9

In a LAN, which MAC protocol has a higher efficiency: ALOHA or CSMA-CD?

6.17

Suppose that a LAN is to carry voice and packet data traffic. Discuss what provisions if any are required to handle the voice traffic in the reservation, polling, token ring, ALOHA, and CSMA-CD environments. What changes if any are required for the packet data traffic?

6.38

Provide a brief explanation for each of the following equations:

- a. Under a light load, which LAN has a smaller delay: Ethernet or token ring?
- b. Under a high load, which LAN has a smaller delay: Ethernet or token ring?

Additional problems:**A1.**

What is the advantage that the pure Aloha gives you over the slotted Aloha in addition to the synchronization requirement?

A2.

Only in certain scenario, the CSMA/CD outperforms slotted Aloha, what is the scenario?