Computer Networks 22/23

Homework 5

Problem 1 (50%)

N stations share a 10Mbps pure ALOHA channel. Each station outputs on average one *new* 20000 b frame every 20 s. In case of maximum utilization by pure ALOHA:

a) What is the maximum N such that the real data rate is sufficient for all the stations?
b) What is the vulnerable time?
c) What is the average total number *G* of all generated frames per frame transmission time? Which frames, apart from the new ones, are included in this number?
d) What would the vulnerable time be if slotted ALOHA was used?

Problem 2 (50%)

Protocol families such as ALOHA, CSMA, etc. allow multiple devices to access a *shared* communication channel. Which of the following data-link protocol families require such access:

a) Wi-Fi,
b) "Classic" Ethernet,
c) "Switched" Ethernet with full duplex transmission?

Shortly justify the answer for each point (descriptions of the two Ethernets can be found in "Computer Networks (5th Edition)" by Tanenbaum).