University of California at Berkeley
College of Engineering
Department of Electrical Engineering and Computer Science

EECS 61C, Fall 2003

HW 9

Submitting Your Solution

Submit your solution online by 9am on **Wednesday October 29**. Do this by creating a directory named *hw9* that contains a text file named *hw9.txt*. From within that directory, type "submit hw9".

Problems

1. Consider a computer with a 100Mb/s Ethernet NIC card plugged into a PCI bus. The PCI bus has a 32-bit data-width and runs at 33MHz. Experience shows that PCI buses usually run at 50% efficiency, due to arbitration and handshake overheads and inefficiency in device drivers (50% efficiency means that the effective bandwidth of the bus is ½ of its maximum, calculated by the product of the data-width and clock frequency). A stream of Ethernet frames arrives to the NIC from a switch. Assume that each frame is minimum size and that they arrive back-to-back without any gap between them.

    What percentage of the available bus bandwidth on average would be consumed in the process of transporting the payload (only) of the frames from the NIC to main memory?

    Repeat the calculation with a 1000Mb/s Ethernet NIC.

2. What property of TCP makes it unsuitable for real-time applications like Internet Telephony? (In Internet Telephony, two users establish a connection, then talk to one another using a microphone and speaker – just as with traditional telephones, except the connection is over the internet instead of traditional phone lines.)

3. What is the TCP/IP port number for HTTP?

4. Consider an application that chooses to send a stream of 1Kbytes blocks as a set of UDP/IP/Ethernet packets. The packets are sent over a 100Mb/s Ethernet. What is the maximum data-rate delivered to the receiver, assuming no packets are lost and they are sent back-to-back (no gaps in between packets). Assume the IP header includes no options.