Electrical, Computer, and Systems Engineering
356961: Internet Protocols
Spring 1998

Problem Set 1- Due Tuesday, February 2nd 1999

Your Name	

Notes:

1. Be brief.
2. A significant part of the homework credit is given to reading. Reading assignments will be quizzed in both informal and formal quizzes
3. Please write your answers on separate sheets and staple it along with the questions to facilitate easy grading.

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1	2	3	Total
40	40	20	100

TA Signature :_____

1. *Reading assignment*:
   - If you have not already done so, send an email to Mohammed Abdel-aal (abdelm2@rpi.edu) to get an account on a machine in the networks lab testbed. {Note: you can only use "ssh" (secure shell) to login to these machines. Ssh is available on rcs machines}.
   - Read the man pages for the commands tcpdump, ifconfig(8), netstat(1) commands, and appendix A (tcpdump) in the text. Summarize the central points in a bulletized format.
   - Read RFC 791 (IP) in conjunction with chapter 3. Summarize the central points in the RFC in a bulletized format within a page.
2. Addressing:
   - Analyze and comment on the structure of the following two MAC addresses:
     80:01:43:00:04:00
     40:01:44:00:00:01
   - What are the network number, subnet number and host number for addresses 135.104.192.100, mask 255.255.128.0 ? Which class does this address belong to?
   - Why does the telephone network not require ARP ? (hint: all telephone links are point-to-point)
   - An organization has been assigned the network number 140.25.0.0 and it needs to create a set of subnets that supports upto 25 hosts on each subnet.
     A) What is a subnet mask you would use to do this ?
     B) How many such subnets are possible ?
     C) Given that you have 25 hosts on each subnet, how much of the address space is being wasted ?
3. Design/Performance:
   - Code-division multiplexing (CDMA) design for wireless multiple access involves a mobile unit using an entire frequency spectrum but hopping from one frequency to another in a predefined/arranged sequence. The alternatives are frequency division (FDMA) and time division (TDMA) where the frequency band is split up statically or time slots are assigned statically for the entire duration of the call. Broadly, what are the tradeoffs made in each of these three designs in terms of the basic resource constraints (space, time, computation, money, labor) ?
   - My program runs on a machine in 100s. Multiplication instructions are = 75% of the program. Designer M can improve speedup of multiply operations. I would like my program to run four times faster? How much speedup of multiply instructions should M achieve to allow me to reach my overall speedup goal?