

CS265 Computer Networking: Homework 3

Due: November 19, 2019 at 11:59PM.

Instructions: Complete each of the following problems. There are 100 total points. Each problem has its own point value. If a problem has multiple parts, they are equi-valued. Written solutions may be submitted via blackboard, in class, or slipped under Prof. Skalka's office door.

Problem 1 (20 points). To complete the following problems, you will need to be sitting at an Internet-connected computer. You should use online resources and standard networking tools available on your computing platform. Google can provide a plethora of information on this sort of thing with obvious search criteria, but a one starting point is to consider `ipconfig` or `ifconfig` for Windows or Unix-based (including OSX and Linux) platforms, respectively.

- a. What is the IP address of the machine you're currently on?
- b. Is the IP address of the machine you're currently on a "real" IP address, or a NAT address?
- c. What is the MTU assumed for your TCP/IP connection?

Problem 2 (20 points). Assume that in some TCP communication, the sending window is at 500. Specify resulting values of the congestion window and the slow-start threshold in each of the following scenarios:

- a. A triple-duplicate ACK is detected using TCP Reno.
- b. A triple-duplicate ACK is detected using TCP Tahoe.
- c. A timeout is detected using TCP Reno.
- d. A timeout is detected using TCP Tahoe.

Problem 3 (20 points). In the textbook, beginning on page 295, complete problems P31 and P40 a-g only.

Problem 4 (20 points). Answer each of the following questions about CIDR addressing.

- a. Write the netmask 255.255.0.0 in equivalent "slash" notation.
- b. What addresses are in the block 198.228.12.20/24?
- c. Suppose a corporation was allocated an IP address block 198.226.12.20/12, and they wanted to maintain /24 subnets. How many subnets could they define, given this address block?
- d. Given the same assumptions as in the previous problem, how many host IP addresses are available for each subnet?

Problem 5 (20 points). Suppose your Internet host is running on a system using NAT addressing, and is assigned IP address 10.0.0.1. An Internet application you're running on port 100 sends a TCP message to a server listening at IP address 192.168.1.3, port 80. Assuming that your LAN's NAT router maps IP 10.0.0.1, port 100 to IP 192.168.7.1, port 333:

- a. What destination port number will be in the segment header of the server's original response, and what destination IP address will be in the datagram header? That is, *before* it reaches your LAN's NAT router.

- b. What destination port number will be in the segment header of the server's response to your application, and what destination IP address will be in the datagram header, *after* it reaches your LAN's NAT router?