

Homework 1

*Assigned: September 5**Due: September 11 (in class)*

1. Leon-Garcia, problem 8.14.

Suppose a router receives an IP packet containing a payload of 600 bytes and has to forward the packet to a network with a maximum transmission unit of 200 bytes. Assume the IP header is 20 bytes long. Show the fragments that are created and the relevant values in head fragment header (i.e., total length, fragment offset, more bit).

2. Leon-Garcia, problem 8.15.

Design an algorithm for reassembling fragments of an IP packet at the destination IP location. Be explicit about the data structures and processing.

3. Read Request for Comments (RFC) 2663, "IP Network Address Translator (NAT) Terminology and Considerations". I will put a pointer on the class web page, but you should easily be able to find this using a search engine. You may not need to print the entire document to answer these questions.

- (a) Describe the operation of basic NAT, using a diagram. Explain the data structures and processing.
- (b) When does the use of static addresses make sense? When does the use of dynamic addresses make sense?
- (c) Which type of NAT is suitable for a domain that wishes to operate multiple web servers that will be contacted by external clients?

4. Code the Internet checksum (found on page 160 of the textbook). Modify the code to print both the binary and hexadecimal representation of each intermediate result (i.e., each intermediate sum). Compute the checksum on the four 16-bit words: ffff, ff00, f0f0, c0c0. Does this checksum involve a carry?

5. Use the `netstat` command to determine the routing table on two different hosts in the CoC domain. Explain what the entries mean.