Due: 10/25/19 at 11:59 PM

Instructions:

Read Chapter 4 and 5 in your textbook and the relevant lecture slides. Answer the questions below *individually*. The goal is to have you think about the problems, not cover every eventuality. Shoot for short, succinct answers that address the root of the question. Please, submit your **typed** answers as pdf/txt into the Dropbox on D2L into the "HW 4" folder.

CHAPTER 4

1. [1 point] What is the difference between routing and forwarding?
2. Describe how packet loss can occur and be eliminated at:
   (a) [2 points] Router input ports?
   (b) [2 points] Router output ports?
3. Consider a datagram network using 32-bit host addresses. Suppose a router has four links, numbered 0 through 3, and packets are to be forwarded to the link interfaces as follows:

```
Destination address range:                Interface:

11100000 00000000 00000000 00000000       0
   through
11100000 00111111 11111111 11111111

11100000 01000000 00000000 00000000       1
   through
11100000 01000000 11111111 11111111

11100000 01000001 00000000 00000000       2
   through
11100001 01111111 11111111 11111111

otherwise                                 3
```

   (a) [3 points] Translate the above forwarding rules into a forwarding table that uses longest prefix matching to forward packets to the correct interface. Your table should list prefix match and forwarding interface.

CHAPTER 5

4. Discuss:
   (a) [2 points] How a hierarchical organization of the Internet allows it to scale to millions of users?
   (b) [3 points] Why are there different inter-AS and intra-AS routing protocols used in the Internet?
5. [2 points] Describe how loops in paths can be detected in BGP.