

CISC450/CPEG419 Homework-5

DUE: May 11th 11:59PM

An electronic version of the textbook has been uploaded to Canvas. However, I have discovered some inconsistencies between the electronic version and the hard copy. To avoid any confusion, below I have provided the problems from the hard copy of the textbook if the two versions are different.

- Chapter 4, Problem 1: Refer to the textbook
- Chapter 4, Problem 5: 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	Link Interface
11100000 00000000 00000000 00000000 through 11100000 00111111 11111111 11111111	0
11100000 01000000 00000000 00000000 through 11100000 01000000 11111111 11111111	1
11100000 01000001 00000000 00000000 through 11100000 01111111 11111111 11111111	2
Otherwise	3

- Provide a forwarding table that has five entries, uses longest prefix matching, and forwards packets to the correct link interfaces.
- Describe how your forwarding table determines the appropriate link interface for datagrams with destination addresses:

11001000100100010101000101010101
11100001010000001100001100111100
11100001100000000001000101110111

- Chapter 4, Problem 6: Consider a datagram network using 8-bit host addresses. Suppose that a router uses longest prefix matching and has the following forwarding table

Prefix Match	Interface
00	0
010	1
011	2
10	2
11	3

For each of the four interfaces, give the associated range of destination host addresses and the number of addresses in the range.

- Chapter 4, Problem 8: Consider a router that interconnects three subnets: Subnet 1, Subnet 2, and Subnet 3. Suppose all of the interfaces in each of these three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support up to 60 interfaces, Subnet 2 is to support up to 90 interfaces, and Subnet 3 is to support up to 12 interfaces. Provide three network addresses (of the form $a.b.c.d/x$) that satisfy these constraints.

5. Chapter 4, Problem 10: In Problem P5 you are asked to provide a forwarding table (using longest prefix matching). Rewrite this forwarding table using the $a.b.c.d/x$ notation instead of the binary string notation.
6. Chapter 4, Problem 12: Refer to the textbook
7. Chapter 4, Problem 14: Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation?
8. Chapter 4, Problem 16: Refer to the textbook
9. Chapter 4, Problem 19: Refer to the textbook
10. Chapter 4, Problem 20: Refer to the textbook