

EE450 Introduction to Computer Networks

Homework #9, Fall 2019

Due Thursday, November 14th, 2019 in class

Reading Assignment:

Chapter 4

Problems to be solved:

1. Chapter 4, Page 362: R10 (15 points)

Three types of switching fabrics are discussed in Section 4.2. List and briefly describe each type. Which, if any, can send multiple packets across the fabric in parallel?

2. Chapter 4, Page 362: R11 (15 points)

Describe how packet loss can occur at input ports. Describe how packet loss at input ports can be eliminated without using infinite buffers).

3. Chapter 4, Page 363: R25 (15 points)

Suppose an application generates chunks of 40 bytes of data every 20 msec, and each chunk gets encapsulated in a TCP segment and then an IP datagram. What percentage of each datagram will be overhead, and what percentage will be application data.

4. Chapter 4, Page 363: R27 (15 points)

What is meant by the term “route aggregation”? Why is it useful for a router to perform route aggregation?

5. Chapter 4, Page 367: P8 (20 points)

Consider a router that interconnects three subnets: Subnet 1, Subnet 2, and Subnet 3. Suppose all of the interfaces in each of three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support at least 60 interfaces, Subnet 2 is to support at least 90 interfaces, and Subnet 3 is to support at least 12

interfaces. Provide three network addresses of the form a.b.c.d/x that satisfy these constraints.

6. Chapter 4, Page 366: P14 (20 points)

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?