

CS 4316/5313: Computer Networks

Homework 3 (20 pts)

1. Suppose you purchase a wireless router and connect it to your cable modem. Also suppose that your ISP dynamically assigns your connected device (that is, your wireless router) one IP address. Also suppose that you have five PCs at home that use 802.11 to wirelessly connect to your wireless router. How are IP addresses assigned to the five PCs? Does the wireless router use NAT? Why or why not?
2. We studied FIFO, Priority, RoundRobin (RR), and Weighted Fair Queueing (WFQ) packet scheduling disciplines? Which of these queueing disciplines ensure that all packets depart in the order in which they arrived? Is there a case (Hint: Consider the WFQ weights) where RR and WFQ will behave exactly the same?
3. Suppose Host A sends Host B a TCP segment encapsulated in an IP datagram. When Host B receives the datagram, how does the network layer in Host B know it should pass the segment (that is, the payload of the datagram) to TCP rather than to UDP or to some other upper-layer protocol?
4. Switching in a router forwards data from an input port to an output port. What is the advantage of switching via an interconnection network over switching via memory and switching via bus?
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 00000000 11111111 11111111	0
11100000 00000001 00000000 00000000 through 11100000 00000001 11111111 11111111	1
11100000 00000010 00000000 00000000 through 11100001 11111111 11111111 11111111	2

otherwise	3
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- a) Provide a forwarding table that has five entries, uses longest prefix matching, and forwards packets to the correct link interfaces.
- b) Describe how your forwarding table determines the appropriate link interface for datagrams with destination addresses:

11111000 10010001 01010001 01010101

11100000 00000000 11000011 00111100

11100001 10000000 00010001 01110111