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CS 118

Dis 1A

Homework 8

14. a. Subnet 1 router: 192.168.1.000

A: 192.168.1.001

B: 192.168.1.002

Subnet 2 left router: 192.168.2.000

Subnet 2 right router: 192.168.2.001

C: 192.168.2.002

D: 192.168.2.003

Subnet 3 router: 192.168.3.000

E: 192.168.3.001

F: 192.168.3.002

b. Subnet 1 router: 00-00-00-00-00-00

A: 00-00-00-00-00-01

B: 00-00-00-00-00-02

Subnet 2 left router: 11-11-11-11-11-00

Subnet 2 right router: 11-11-11-11-11-01

C: 11-11-11-11-11-02

D: 11-11-11-11-11-03

Subnet 3 router: 22-22-22-22-22-00

E: 22-22-22-22-22-01

F: 22-22-22-22-22-02

c. 1. E looks up router IP in table: 192.168.3.000

2. E creates and sends frame containing the datagram to 22-22-22-22-22-00

3. Router looks at table and determines to forward to 192.168.2.002

4. Router creates and sends frame to 11-11-11-11-11-00

5. Next router receives datagram and determines to route to 192.168.1.002

d. E will create an ARP packet and broadcast it to query for MAC address of the router at IP 192.168.3.000. Once router gets this packet, it will respond to E with an ARP response packet to 22-22-22-22-22-01. Now the steps in part c can be done.

15. a. When E checks the prefix of IP address of F, it will know it’s in the same subnet and skip sending to router. Source IP is E’s IP and destination IP is F’s IP. Source MAC is E’s MAC and destination MAC is F’s MAC.

b. E doesn’t use an ARP query since B isn’t in the subnet. Instead, E will find the MAC address by looking at the IP of B. Source IP is E’s IP and destination IP is B’s IP. Source MAC is E’s MAC and destination MAC is R1’s MAC in subnet 3 interface.

c. When S1 receives the ARP query, it will broadcast the frame and add A to its table. Router R1 will receive the query message but will not send to subnet 3. Once B gets the message, it doesn’t need to query for A’s MAC since that is in the ARP message. Once S1 gets B’s response, it will add B to its table and ignore the response.

22. i. Source MAC: A

Dest MAC: left interface of router

Source IP: A

Dest IP: F

ii. Source MAC: A

Dest MAC: left interface of router

Source IP: A

Dest IP: F

iii. Source MAC: right interface of router

Dest MAC: F

Source IP: A

Dest IP: F

26. i. When B sends a frame to E, the switch records the interface to B’s MAC in table and sends packets to all links since the table is initially empty.

ii. When E replies to B, the switch records the interface to E’s MAC in table and forwards packet to link to B since it already recorded that.

iii. When A sends a frame to B, switch records the interface to A’s MAC in table and sends packet to link to B since it already recorded it

iv. When B replies to A, the switch table doesn’t change and sends the packet to link to A since it already recorded it.

31. Computer uses DHCP to get IP. It creates frame and broadcasts it in Ethernet and gets an IP in return. The computer also gets gateway router IP from the DHCP server. Then it gets the MAC of the gateway router by sending a ARP query. It also gets the MAC of the DNS server with ARP query.

Next, the computer gets the IP of the web page by checking the DNS server. If it is not there, use DNS query to find IP. Then computer sends HTTP request using TCP. The TCP packets will be framed with IP packet and Ethernet packet. Then the packet will go to the gateway router and go to wherever the routing table indicates.

Once the packets reach the web server, the server will send the computer the web pages with HTTP response using TCP. The packets will be framed by IP packet and sent back to gateway router. The gateway router will frame the packet in Ethernet packet and send to computer.

6. This design allows the transmitting of frames to be fair if there are more than 1 stations sharing the same channel. If a station transmits the second frame immediately after the first, this doesn’t allow other stations a chance to use the channel until the transmitting station is completely done.