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HW4

P13. 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 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.

Subnet 1: 60 -> /26 64 bit

2: 90 -> /25 128 bit

3: 12 -> /28 16 bit

223.1.17.0 – 223.1.17.63

223.1.17.64 – 223.1.191

223.1.17.192 – 223.1.17.207

IF1 223.1.17.0 /26

IF2 223.17.64 /25

IF3 223.17.192 /28

IF4 other

P14 (the forwarding table is on page 317)

P14. In Section 4.2.2 an example forwarding table (using longest prefix matching)

is given. Rewrite this forwarding table using the a.b.c.d/x notation instead of the binary string notation.

11111111 = 8 \* 256 = 2048 = 211

200.23.16.0 – 200.23.23.255 -> 200.23.16.0 /21

200.23.24.0 – 200.23.24.255 -> 200.23.24.0 /24

200.23.24.0 – 200.23.31.255 -> 200.23.24.0 /21

P16. Consider a subnet with prefix 128.119.40.128/26. Give an example of one IP address (of form xxx.xxx.xxx.xxx) that can be assigned to this network. Suppose an ISP owns the block of addresses of the form 128.119.40.64/26. Suppose it wants to create four subnets from this block, with each block having the same number of IP addresses. What are the prefixes (of form a.b.c.d/x) for the four subnets?

128.119.40.128 /26 (64bit) -> range is 128.119.40.128 – 128.119.40.191

An example is 128.119.40.129

128.119.40.64 /26

64 /4 = 16 bit increments

Subnet 1: 128.119.40.64 /28

2: 128.119.40.80 /28

3: 128.119.40.96 /28

4: 128.119.40.112 /28

P20 (remember that each datagram will have both an IP and a TCP header (20 bytes each)

P20. Suppose datagrams are limited to 1,500 bytes (including header) between source Host A and destination Host B. Assuming a 20-byte IP header, how many datagrams would be required to send an MP3 consisting of 5 million bytes? Explain how you computed your answer.

1500 byte – 20 byte = 1480 bytes of mp3

Diagrams required = (5\*106)/1480 = 3,379

We need to subtract the IP header from the datagram limit since it doesn’t account for it. We then divide the mp3 size by the size of the diagram limit.