

Code A

Quiz 4 : 10 points (45 min)

April 13, 2012

1. Suppose a IPv4 packet arrives at a destination which contains a UDP segment.
 - (a) Suppose the source and destination IP addresses in the packet are 58.42.169.6 and 204.14.5.11 respectively.
 - (b) Suppose the source and destination ports in the UDP segment are 80 and 123 respectively.
 - (c) Suppose the length of the UDP segment is 576 bytes.
 - (d) Suppose that the data in the UDP segment is all zero bits (for convenience).
 - (e) The UDP protocol number is 17.

Calculate the UDP checksum field in the received IPv4 packet. If the destination responds with another UDP segment of length 120 bytes (with zeros in the data field) contained in a IPv4 packet, calculate the UDP checksum in the outgoing IPv4 packet. Assume that the destination process is sending its reply to the source process. [3 points]

2. Generate subnetwork addresses and subnet masks to divide a single class C address 172.44.9.0/24 among the networks shown in Figure 1. Note that the routers have three interfaces each and network R consists of the pair of interfaces which connect the routers. You need to generate subnetwork addresses and masks for all five networks. [3 points]

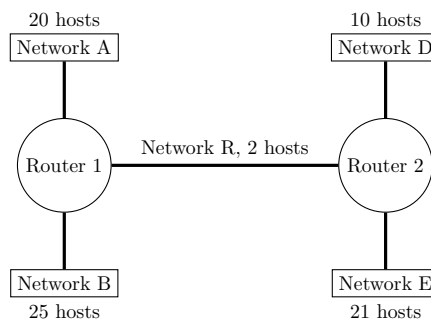


Figure 1: A network which needs to be assigned subnet addresses and masks

3. TCP maintains three pointers into the send buffer to enable flow control by calculating the maximum number of unacknowledged bytes which can be in transit: LastByteWritten, LastByteSent and LastByteAked.
 - (a) Which of the following are valid scenarios if AdvertisedWindow is 1000 bytes and MaxSendBuffer is 2000 bytes? Calculate the value of EffectiveWindow in each valid scenario. [2.5 points]
 - i. LastByteWritten = 8000, LastByteSent = 9000, LastByteAked = 10000
 - ii. LastByteWritten = 8000, LastByteSent = 8000, LastByteAked = 8000
 - iii. LastByteWritten = 10500, LastByteSent = 9000, LastByteAked = 8000
 - iv. LastByteWritten = 8000, LastByteSent = 8001, LastByteAked = 8000
 - v. LastByteWritten = 10000, LastByteSent = 9000, LastByteAked = 8000
 - (b) Which of the above are valid scenarios if AdvertisedWindow is 1000 bytes and MaxSendBuffer is 1500 bytes? Calculate the value of EffectiveWindow in each valid scenario. [1 point]
 - (c) In any of the scenarios above which are valid (both parts (a) and (b)), does the send side TCP block the sending application from writing into the send buffer? [0.5 point]