

Assignment 1

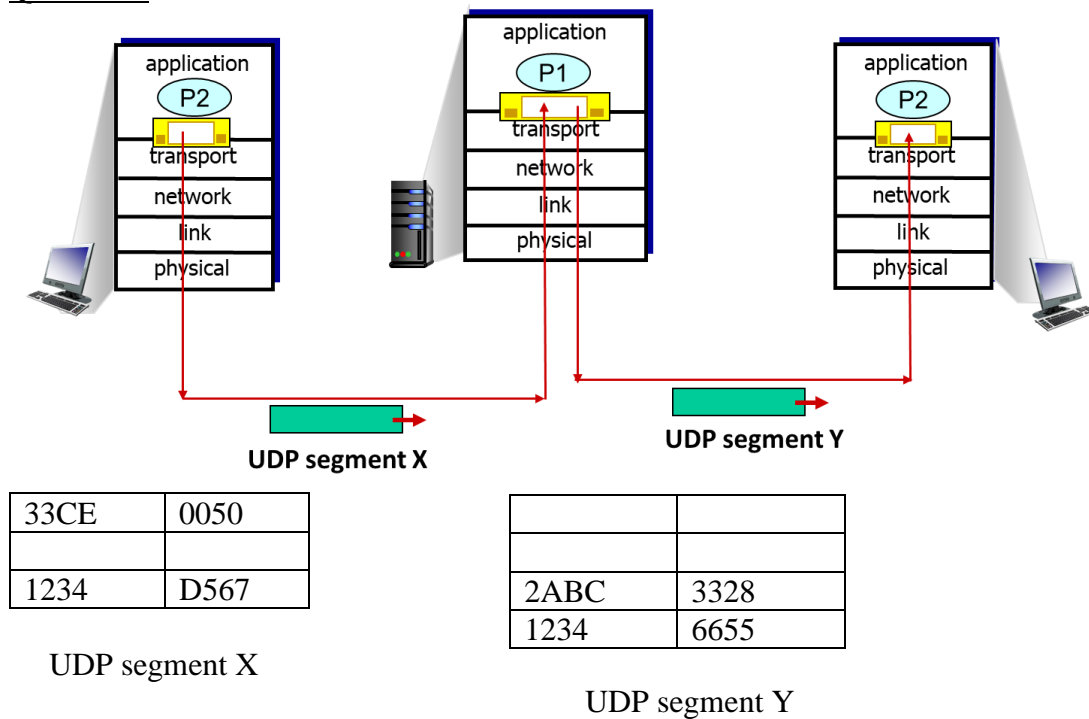
Question 1

Host A sends a packet of 72 bytes to host B via two routers. The distance between host A and the first router is 20 m. The distance between host B and the second router is 25 m. The distance between the two routers is 500 m. The propagation speed is 2×10^8 m/sec. The recommended transmission rates are: 10 Mbps between host A and the first router, and 100 Mbps between the second router and host B. Each router spends 1.2 msec to perform error detection. If there is no congestion in the network, the recommended end-to-end delay for host A to send the packet to host B should not be longer than 3 msec.

- (a) At what time the last bit of the packet leaves host A?
- (b) At what time the last bit of the packet reaches the first router?
- (c) At what time the first bit of the packet reaches the second router?
- (d) Show your analysis and suggest the physical medium for the link between the two routers.

[1 mark]

Question 2



- (a) Determine all the unknown fields of UDP segment X. All numbers are in hexadecimal.
- (b) Similarly, determine all the unknown fields of UDP segment Y.

[1 mark]

Question 3

Host A sends a file of 32,120 bytes to Host B over a TCP connection. Assume the maximum segment size (MSS) is 164 bytes. The segment has no options field. The transport layer, network layer, and data-link layer add headers of a total size of 66 bytes to each segment before the resulting packet is sent out over a 1 Gbps link.

- (a) What is the size of the last packet?
- (b) What is the sequence number of the 102nd segment?
- (c) If the 101st segment is lost but the 102nd segment arrives at Host B, what is the acknowledgment number in the segment that Host B sends to Host A?
- (d) Assume no congestion, calculate the time (in msec, up to 3 decimal places) required to transmit the file.

[1 mark]

Submission:

Answer the questions in a MS Word document file. Name the file with your student ID number, e.g. 12345678.docx. **One mark will be deducted for wrong file name.** Submit the assignment by e-mail on or before **21 February 2021**. **1 mark/day will be deducted for late submission.**