COMP 5416 Week 5

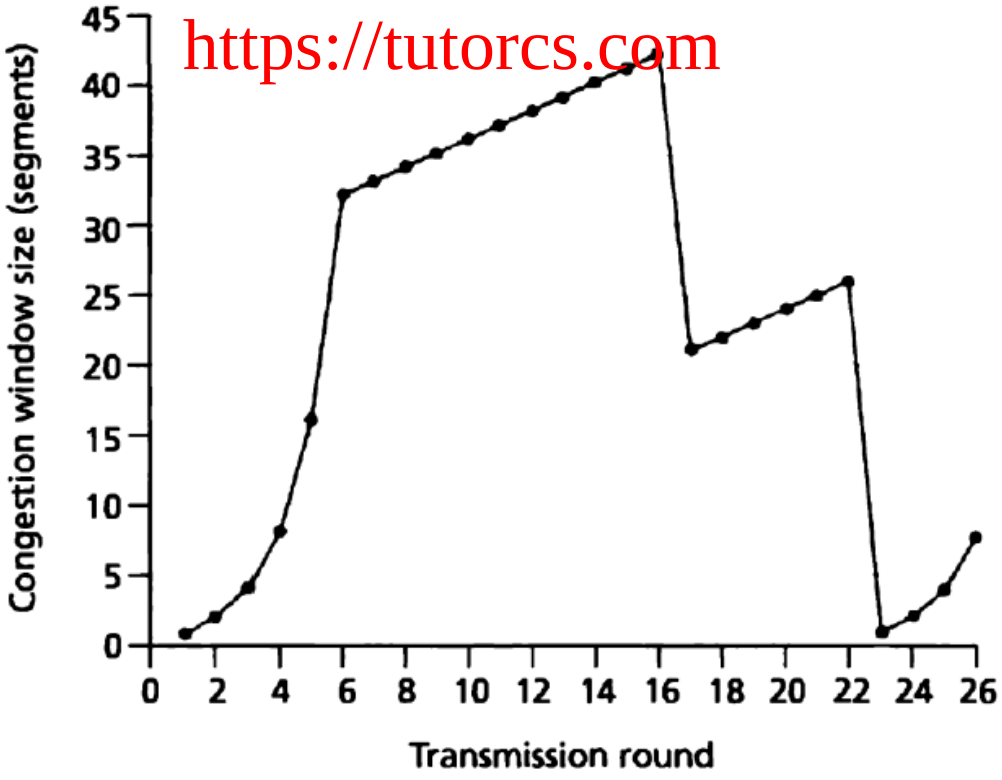
Exercise 1 Stop-and-Wait ARQ vs. Go-Back-N ARQ

In the following net its packets that pass through B and C, and arrive at the destination D. Th is R = 1 Mbit/sec. The maximum packet size in the network is 500 Byte size. The one-way propagation delay on each link is 4msec.

(1) How long does it take to transmit a file of size 40,000 Bytes if A and D use Stop-and-Wait ARQ? Assume that there is no error in transmission in the network, and the size of ACK packets is negligible.

(2) How long does it take to transmit a file of size 40,000 Bytes if A and D use the Go-Back-5 ARQ and B and C are Store-and-Forward? Assume that there is no error in transmission in the network, and the size of ACK packets is negligible

Exercise 2: Congestion Control



Consider the above figure. Assuming TCP **Reno** is the protocol experiencing the behavior shown above, answer the following questions. In all cases, you should provide a short discussion justifying your answer.

a. Identify the intervals of time when TCP slow start is operating.

b. Identify the interv P congestion avoidance is operating.

c. After the 16th tra egment loss detected by a triple duplicate ACK or by a timeout?

d. After the 22nd tra egment loss detected by a triple duplicate ACK or by a timeout?

e. What is the initial the first transmission round?

f. What is the value h transmission round?

g. What is the value of ssthresh at the 24th transmission round?

h. During what transmission round is the 70th segment sent?

i. Assuming a packet loss is detected after the 26th round by the receipt of a triple duplicate ACK, what will be the values of the congestion window?

j. Suppose TCP Tahoe is used (instead of TCP Reno), and assume that triple duplicate ACKs are received at the 16th round. What are the ssthresh and the congestion window size at the 19th round?

k. Again suppose TCP Tahoe is used, and there is a timeout event at 22nd round. How many packets have been sent out from 17th round till 22nd round, inclusive?