

## Computer Networks and Distributed Systems Exercise Sheet 6

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### Quiz questions

1. True or false? `rwnd` remains constant during a connection.
2. Suppose host  $A$  sends two TCP segments to host  $B$ . The sequence number of the first segment is 90, the sequence number of the second segment is 110. How much data does the first segment contain?
3. True or false? In the case of a timeout at the sender side, `ssthresh` will be set to half its previous value.
4. True or false? If a host is only receiving data in a TCP connection, it cannot send ACKs, because it has nothing to transmit.

### Exercise 6.1

An application may use UDP instead of TCP to have better control over the transmitted data.

- (a) Why does an application have better control over the actual data that is transmitted in this case?
- (b) Why does an application have better control over the time when data is sent in this case?

### Exercise 6.2

We consider the Go-back- $n$  protocol with a sender window of 4 and sequence numbers  $\{1, \dots, 1024\}$ . At time  $t$  let  $k$  be the next expected sequence number of a packet; suppose additionally that the medium is not reordering the packets.

- (a) What are the possible sequence numbers in the sender's window?
- (b) What are the possible values of the ACK field in all possible messages on the way to the sender at time  $t$ ?

### Exercise 6.3

A. Nonymous is watching a HD unicorn video of size  $L$  bytes. The MSS is 536 bytes, and the bandwidth of his data link is 155 Mbit/s.

- (a) What is the maximal value of  $L$  until the set of sequence numbers is exhausted?
- (b) How long will it take until the file of this size will be transmitted? Suppose the headers for the lower layers are 66 bytes long, and the data is pumped at the maximal rate (i. e. disregard flow control).

**Hint:** The sequence number field is 4 bytes long.