Homework 4

Due: Friday, November 18 by 11:59pm EST

1 TCP Sliding window (15 pts)

Suppose A and B create a TCP connection with initial sequence numbers 20000 and and 5000, respectively, and an initial window of 8000 bytes. The table on the next page depicts the flow of the connection, which has 3 main events:

a. A sends three 100-byte segments, (Which we will name DataA1, DataA2, and DataA3), and B sends ACKs for each.

b. Between segments DataA2 and DataA3, the application on B calls `read()` on the socket associated with this connection, which returns 200 bytes.

c. B sends a 100-byte segment DataB1 to A and begins the connection termination process with a FIN.

In the table on the next page, fill in the SEQ, ACK, and WIN fields for each packet shown, given the initial sequence numbers and window sizes.

Hint: Try to create a similar connection flow using the TCP reference, while looking at the packets sent in Wireshark—this should allow you to view the changes in sequence numbers, and window sizes. Another reference that may be useful is Section 17.3 of the Dordal textbook[1].

Grading rubric:

- +3pts: Handshake sequence numbers increment correctly
- +3pts: Sequence numbers correct during data transmission
- +3pts: ACK numbers correct during data transmission
- +3pts: Window size decrease before `read()`
- +3pts: Window size updates appropriately after `read()`

For each item: 3/3 if values are correct, 2/3 for a minor issue, 1/3 for multiple issues, 0/3 if major conceptual problem or answer missing.

Note: Since the fields for each packet depend on each other, if a student makes a mistake on one value, continue grading as if their answer were correct—ie, students should not be penalized multiple times for the same mistake.

[1] http://intronetworks.cs.luc.edu/

t	**Packets sent by A**	**Packets sent by B**
0	SYN, seq=20000, win=8000	
1		SYN,ACK, seq=5000, ack=**20001**, win=8000
2	ACK, seq=**20001**, ack=**5001**, win=8000	
3	ACK, seq=**20001**, ack=**5001**, win=**8000**, data=DataA1	
4		ACK, seq=**5001**, ack=**20101**, win=**7900**
5	ACK, seq=**20101**, ack=**5001**, win=**8000**, data=DataA2	
6		ACK, seq=**5001**, ack=**20201**, win=**7800**
7		[*B calls* `read()`*, which returns 200 bytes*]
8	ACK, seq=**20201**, ack=**5001**, win=**8000**, data=DataA3	
9		ACK, seq=**5001**, ack=**20301**, win=**7900**
10		ACK, seq=**5001**, ack=**20301**, win=**7900**, data=DataB1
11	ACK, seq=**20301**, ack=**5101**, win=**7900**	
12		FIN,ACK, seq=**5101**, ack=**20301**, win=**7900**
13	. . .	