Computer Networks II

Curso 17/18 :: Test 1

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This test has 14 questions totalling 20 points. Every three wrong test answers 1 point will be substracted. Only one option is correct. Calculators are not allowed.

Apellidos: _____ Nombre: _____ Grupo: _____

1. [1p] What value of receiving window (rwnd) should a receiver announce if it has a 5000 bytes of storage space, but 1000 bytes are occupied with data received that have not been processed yet?

   ☐ **a**) 5000   ☐ **b**) 4000   ☐ **c**) 1000   ☐ **d**) 6000

2. [1p] Suppose that a TCP process has a sending window (swnd) of 100 bytes, and the first not confirmed byte at position 25. At this time, the data [50:75] is sent and immediately afterwards an ACK=45 is received. What would be the content of the window, and what would be the sequence number of the first Not Confirmed (NC) byte and the first Not Sent (NS) byte?

   ☐ **a**) swnd = [45,144], NC=45, NS=76   ☐ **c**) swnd = [76,175], NC=76, NS=76
   ☐ **b**) swnd = [46,145], NC=46, NS=76   ☐ **d**) swnd = [25,125], NC=45, NS=75

3. [1p] Which of the following is NOT a reason for TCP to modify the value of the field *sequence number* of a header?

   ☐ **a**) When the flag SYN is active.   ☐ **c**) When the flag ACK is active.
   ☐ **b**) When the flag FIN is active.   ☐ **d**) When the segments contains a payload.

4. [1p] Why does productivity decrease when the load reaches the network capacity?

   ☐ **a**) Routers begin to discard packages.
   ☐ **b**) The delays due to the input and output queues of the routers.
   ☐ **c**) The sending window size is 0.
   ☐ **d**) The receiving window size is 0.

5. [1p] What is the purpose of the TCP *Keep Alive* timer?

   ☐ **a**) To distinguish what connection a delayed segment belongs vs.. when it closes a connection and it is reopened using the same sockets.
   ☐ **b**) To prevent connections from being opened indefinitely.
   ☐ **c**) To know when to retransmit data segments.
   ☐ **d**) To avoid the deadlock between transmitter and receiver after the loss of the ACK that confirms the opening of the window.

6. [1p] What action can the receiver take to avoid the *silly window* syndrome?

   ☐ **a**) Activate the Nagle's algorithm.
   ☐ **b**) Deactivate Nagle's algorithm.
   ☐ **c**) Do not *rwnd* sizes below a certain threshold.
   ☐ **d**) Send any *rwnd* size greater than 0.

7. [1p] In a connection-less protocol:

   ☐ **a**) A virtual circuit is established between sender and receiver before sending data.
   ☐ **b**) There is no relationship between the datagrams that are sent between sender and receiver.
   ☐ **c**) Each datagram is numbered with a sequence number (SEQ).
   ☐ **d**) It is possible to know what datagrams have been lost.

8. [1p] What is the meaning of the argument that accepts the `listen(arg)`method?

   ☐ **a**) The socket where the server listens.
   ☐ **b**) The maximum number of connection requests that can be queued.
   ☐ **c**) The maximum size of data that can be sent through that connection.
   ☐ **d**) The maximum segment size (MSS).

9. [1p] A TCP segment pass through three networks with MTUs=1500, 2000 and 1000 bytes, respectively, until reaching its destination. What would be the MSS value of the segment TCP if you want to avoid fragmentation?

   ☐ **a**) 1500   ☐ **c**) 960
   ☐ **b**) 1460   ☐ **d**) 1960

10. [1p] Which flag of the TCP header would activate in the sender if you want to send a segment of data without waiting to complete its window?

- ☐ **a)** Urgent data (URG)
- ☐ **b)** Immediate delivery (PUSH)
- ☐ **c)** Acknowledgment (ACK)
- ☐ **d)** End (END)

11. [1p] A web client running on a computer with IP address 161.67.27.94 sends a message to a web server running on a computer with IP address 161.65.21.21. Which pair of sockets are most likely to be used in the communication?

- ☐ **a)** Client=(161.67.27.94, 10), Server=(161.65.21.21, 80).
- ☐ **b)** Client=(161.67.27.94, 42345), Server=(161.65.21.21, 80).
- ☐ **c)** Client=(127.0.0.1, 42345), Server=(127.0.0.1, 80).
- ☐ **d)** Client=(161.67.27.94, 12345), Server=(161.65.21.21, 53).

12. [1p] In the time interval t=[1,300], an application sends at t=1 a message of size 1 MB, during t=[2,299] it does not send anything and at t=300 it sends 2 MB. What is the traffic profile that best fits this scenario?

- ☐ **a)** Constant rate
- ☐ **b)** Variable rate
- ☐ **c)** Burst data
- ☐ **d)** Peak rate

13. [1p] Draw the TCP congestion window graph assuming the following:

- During connection establishment, both agree MSS=500 bytes and threshold (*ssthresh*)=10,000 bytes.
- The timer for segment 9th and 21th expires (sending order).
- 3 duplicate ACKs are received after sending segment 25th (sending order).
- It is assumed that *rwnd* is always bigger than *cwnd*.
- 31 segments must be sent.

Indicate the algorithm that applies at all times, and the value of *ssthresh* whenever it changes.

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14. [7p] The following figure shows a TCP flow, including connection and disconnection. Note that:
    - It is not using Slow Start.
    - The retransmission timer is set to 4 clock ticks.
    - Both use a fixed segment size of 100 bytes.
    - Both will send 300 bytes, but A will wait until B ends.

    Put the relevant data for the segments represented by blank boxes.

A sends 300 bytes
when B finishes

B sends 300 bytes

#	A	B
0	seq: 2000, flags: SYN, window: 100B	
1		seq: 8000, flags: SYN, ACK, ack: 2001, window: 300B
2	seq: 2001, flags: ACK, ack: 8001	
3		seq: 8001, flags: ACK, ack: 2001, data: 100B
4	seq: 2001, flags: ACK, ack: 8101, window: 200B	
5	■	(blank box)
6		(blank box)
7	(blank box)	
8		
9		(blank box)
10	seq: 2001, flags: ACK, ack: 8302, data: 100 B	(blank box)
11	seq: 2101, flags: ACK, ack: 8302, data: 100 B	
12	(blank box)	
13	seq: 2301, flags: FIN, ACK, ack: 8302	
14	seq: 2001, flags: ACK [RTX], ack: 8302, data: 100 B	(blank box)