UCLM
UNIVERSIDAD DE CASTILLA-LA MANCHA

Computer Networks II

Course 2017/18 :: Test 1

Escuela Superior de Informática

calificación

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: SOLUCIÓN Nombre: _____ Grupo: _____

1. (1p) What value of reception 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
   ☐ **b**) swnd = [46,145], NC=46, NS=76
   ☐ **c**) swnd = [76,175], NC=76, 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.
   ☐ **b**) When the flag FIN is active.
   ■ **c**) When the flag ACK 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
   - ☐ **b**) 1460
   - ■ **c**) 960
   - ☐ **d**) 1960

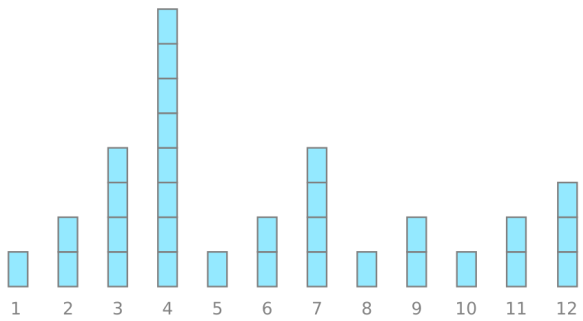
10. (1p) Which flag of the TCP header would activate in the sender if you want to send a segment of data without waiting to complete its window?
    - ☐ **a**) Urgent data (URG)
    - ■ **b**) Immediate delivery (PUSH)
    - ☐ **c**) Acknowledgment (ACK)
    - ☐ **d**) End (END)

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.



- round 5: to slow start: ssthresh=1/2 swnd = 4 MSS = 2000B, cwnd = 1 MSS
- round 8: to slow start: ssthresh=1/2 swnd = 2 MSS = 1000B, cwnd = 1 MSS
- round 10: to congestion avoidance: ssthresh=1/2 swnd = 1 MSS = 1000B, cwnd = ssthresh

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.