UCLM
UNIVERSIDAD DE CASTILLA-LA MANCHA

Computer Networks II

Curso 17/18 :: 2017/18 :: Test 1 (retake)

Escuela Superior de Informática

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This exam consists of 15 question totalling 20 points. Three wrong answers substract a point. Only an answer if correct if otherwise not stated. Calculator use is forbidden.

Apellidos: _____ Nombre: _____ Grupo: _____

1. [1p] How a communication between a client process and a server process is defined?
   - ☐ **a**) Client's IP address and server's IP address.
   - ☐ **b**) Client TCP/UDP port and server TCP/UDP port.
   - ☐ **c**) Client's MAC address and server's MAC address.
   - ☐ **d**) Client socket and server socket.
2. [1p] What strategy does a client application use when sending numerical data to a server and ensuring the same byte sorting?
   - ☐ **a**) The client uses htons()/htonl() and the server uses ntohs()/ntohl().
   - ☐ **b**) The client uses encode() and the server uses decode().
   - ☐ **c**) The client uses ntohs()/ntohl() and the server uses htons()/htonl().
   - ☐ **d**) No strategy is necessary because the network protocols are in charge of byte sorting.
3. [1p] Which pair of sockets best represents a DNS request from a client to a server?
   - ☐ **a**) Client=(161.67.21.100, 53), Server=(80.80.80.80, 193).
   - ☐ **b**) Client=(161.67.21.100, 53), Server=(10.0.0.1, 193).
   - ☐ **c**) Client=(161.67.21.100, 128310), Server=(80.80.80.80, 53).
   - ☐ **d**) Client=(161.67.21.100, 32543), Server=(80.80.80.80, 53).
4. [1p] Indicate which of the following is false
   - ☐ **a**) Establishes an end-to-end virtual circuit between the hosts that communicate.
   - ☐ **b**) There is a relationship of order between the segments belonging to the same communication that are sent through the virtual circuit.
   - ☐ **c**) All the segments corresponding to a communication go through the same path.
   - ☐ **d**) It is possible to implement error control.
5. [1p] Indicate which of the following is not a function performed by the TCP error handling mechanism:
   - ☐ **a**) Detection of segments out of order and ordering.
   - ☐ **b**) Lost segments detection and retransmission.
   - ☐ **c**) Detection of corrupted or altered segments.
   - ☐ **d**) Fragmentation of very large segments and reassembly at destination.
6. [1p] What is the TCP end-of-connection timer used for?
   - ☐ **a**) To prevent one peer of a connection remains open indefinitely over time.
   - ☐ **b**) To avoid a dead lock situation that occurs when a closed window ACK is lost
   - ☐ **c**) To manage the retransmission of the segments.
   - ☐ **d**) To determine which connection a delayed segment belongs to when the same hosts open a new connection.
7. [1p] Assume a 1000 byte size sliding window with the data[1001.1500], where the first unconfirmed byte is 1001 and the first unsent byte is 1200. Which segment should have been received immediately before this situation could occur?
   - ☐ **a**) SEQ=1001, ACK=2001
   - ☐ **b**) SEQ=3001, ACK=1001
   - ☐ **c**) SEQ=3001, ACK=1000
   - ☐ **d**) SEQ=3001, ACK=1500
8. [1p] Which of the following is not a data traffic descriptor?
   - ☐ **a**) Peak data rate.
   - ☐ **b**) Average data rate.
   - ☐ **c**) Maximum burst size.
   - ☐ **d**) Data transmission time.
9. [1p] What is *network congestion*?
   - ☐ **a**) When the output data rate of the routers is lower than the input rate.
   - ☐ **b**) When the transmitter saturate the receiver because it is not able to receive more data.
   - ☐ **c**) When the network load (number of packets sent) is greater than its capacity (number of packets it can handle).
   - ☐ **d**) When the network delay reaches the maximum possible.

10. [1p] Indicate which of the following is false with respect to the TCP fast relay mechanism:
    - ☐ **a**) Retransmission of the segment after 3 duplicate ACKs, even if its corresponding timeout has not expired.
    - ☐ **b**) It allows to start the congestion avoidance phase and avoid the slow start phase.
    - ☐ **c**) The slow start phase is always started.
    - ☐ **d**) Receive 3 duplicate ACKs does not necessarily mean that any segment has been lost.

11. [1p] If the receiver announces a window size of WINDOW=600 bytes and the transmitter estimates a value of the congestion window CWND=500 bytes, at what value does the transmitter window size start?
    - ☐ **a**) 1100 bytes
    - ☐ **b**) 500 bytes
    - ☐ **c**) 600 bytes
    - ☐ **d**) 550 bytes

12. [1p] An Internet of Things application that measures air quality is deployed over 100 sensor nodes, each sending 50 bytes of data every 10 minutes. The sensors send the data synchronously, without overlapping in time, one after the other. What is the traffic profile that best defines this application?
    - ☐ **a**) Bursts
    - ☐ **b**) Constant
    - ☐ **c**) Variable
    - ☐ **d**) Random

13. [1p] A server receives the data segments S1=[SEQ=3001, ACK=1000, DATA=200 bytes] S2=[SEQ=3201, ACK=1000, DATA=200 bytes] and S3=[SEQ=3401, ACK=1000, DATA=200 bytes] consecutively, what is the minimum window size that it announced?
    - ☐ **a**) window=0
    - ☐ **b**) window=400
    - ☐ **c**) windows=600
    - ☐ **d**) window=200

14. [1p] Suppose that in the previous communication, the segment S2 is lost and does not reach the receiver, what will happen next in the transmitter and receiver?
    - ☐ **a**) The receiver sends an ACK=3401 and the transmitter retransmits the segment S2.
    - ☐ **b**) The receiver sends an ACK=3601 and the transmitter waits to receive a larger window size.
    - ☐ **c**) The receiver sends an ACK=3201 and the transmitter waits for the expiration of the timer to start retransmission.
    - ☐ **d**) The receiver sends an ACK=3001 and the transmitter retransmits the segment S2.

15. [6p] A client application needs to send 5000 bytes to a server process. In the connection establishment they agree on a MSS=500 bytes. The congestion threshold is ssthresh = 2000 bytes. The following events occur during transmission:
    - The timers of the 6 and 8 segments expire.
    - Three duplicate ACKs are received after sending segment 2.

    Assuming that TCP congestion control is used, answer the following questions:

    (a) Number of rounds required for the server to receive all data:
    - ☐ **a**) 6
    - ☐ **b**) 7
    - ☐ **c**) 8
    - ☐ **d**) 9

    (b) What segments are sent in round 5? Choose the order number of the segments.
    - ☐ **a**) 4,5
    - ☐ **b**) 7
    - ☐ **c**) 6,7
    - ☐ **d**) 5,6,7

    (c) What is the value of ssthresh and swnd after round 5?
    - ☐ **a**) ssthresh=1MSS, swnd=2MSS
    - ☐ **b**) ssthresh=2MSS, swnd=1MSS
    - ☐ **c**) ssthresh=2MSS, swnd=2MSS
    - ☐ **d**) ssthresh=1MSS, swnd=1MSS