UCLM
UNIVERSIDAD DE CASTILLA-LA MANCHA

Computer Networks II

Test 1 (retake)

Escuela Superior de Informática

calificación

This exam consists of 15 question totalling 20 points. The maximum duration is 40 minutes. Three wrong answers substract a point. Only an answer if correct if otherwise not stated. Calculator use is forbidden. Write legibly using only the reserved area.

Apellidos: SOLUCIÓN Nombre: _____ Grupo: _____

1. (1p) Which of the following code fragments is the most similar to a basic web client?

```
// a)
s = socket(AF_INET, SOCK_STREAM)
s.sendto('GET /index.html HTTP/1.0\n\n', ('www.example.net', 80))
s.recvfrom(32)
```

```
// b)
s = socket(AF_INET, SOCK_DGRAM)
s.connect('http://www.google.com')
s.recvfrom('GET /index.html HTTP/1.0\n\n', 80)
```

```
// c)
s = socket()
s.connect(('1.2.3.4', 2000))
s.send('GET / HTTP/1.0\n\n')
s.recv(32)
```

☐ **a)** .
☐ **b)** .
■ **c)** .

2. (1p) The following listing, corresponding to a basic TCP server, contains an error. In what line?

```
sock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
sock.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
sock.bind(('', int(sys.argv[1])))
sock.listen(30)

while 1:
    child_sock, client = sock.recv()
    start_new_process(handle, (child_sock, client))
```

☐ **a)** line 1
☐ **b)** line 3
☐ **c)** line 4
■ **d)** line 7

3. (1p) What does this listing do?

```
server = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
server.bind(('', 3000))

while 1:
    message, endpoint = server.recvfrom(1024)
    client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    client.connect(endpoint)
    client.send(message)
    client.close()
```

☐ **a)** It's a TCP server that sends itself the same requests that it receives from a remote client.
☐ **b)** It's a TCP client that creates a new server each time it receives a response.
■ **c)** It's a kind of proxy that returns the message to the client, but using a different protocol.
☐ **d)** It's an HTTP proxy that allows the client to decide the remote port to send the subsequent requests.

4. (1p) Which of the following applications is best suited to be implemented with a CL-mode service?
   - ☐ **a)** A documentary database for a corporate intranet.
   - ■ **b)** A FPS (First Person Shooter) multiplayer video game.
   - ☐ **c)** A cloud storage service with automatic synchronization.
   - ☐ **d)** An instant messaging application for groups.

5. (1p) Choose the correct statement regarding *packet switching*:
   - ☐ **a)** All packages with the same identifier follow the same path.
   - ☐ **b)** All packets belonging to the same flow are routed through the same virtual circuit.
   - ■ **c)** Each packet is routed independently to its destination.
   - ☐ **d)** The end-to-end transfer rate is guaranteed.

6. (1p) The "silly window"syndrome can be avoided...
   - ■ **a)** With the Nagle algorithm.
   - ☐ **b)** With dynamic routing algorithms.
   - ☐ **c)** Sliding the window.
   - ☐ **d)** Can not be avoided.

7. (1p) TCP assumes that congestion exists when a segment is lost or duplicated ACKs are received. This open-loop technique may fail, that is, it may detect congestion erroneously. In which case?
   - ☐ **a)** TCP uses a closed loop technique, not open.
   - ■ **b)** When the physical medium has a significant failure rate.
   - ☐ **c)** When the network protocol needs source packet fragmentation.
   - ☐ **d)** Segment loss is due to a flow control problem, not congestion.

8. (1p) The re-transmission timer...
   - ■ **a)** is recalculated continuously.
   - ☐ **b)** depends on sequence number.
   - ☐ **c)** is negotiated during connection establishment.
   - ☐ **d)** is specified in the TCP header.

9. (1p) What are the usual traffic profiles?
   - ☐ **a)** Slow traffic and fast traffic.
   - ☐ **b)** Only one traffic profile exists.
   - ☐ **c)** Constant bit rate and variable bit rate.
   - ■ **d)** Constant bit rate, variable bit rate and burst

10. (1p) Half-duplex is characterized by...
    - ☐ **a)** Data can flow only in one direction.
    - ☐ **b)** It's possible to transmit and receive simultaneously.
    - ■ **c)** It's possible to transmit and receive, but not simultaneously.
    - ☐ **d)** The data is temporarily stored in the queue of the router.

11. (1p) Which of the following fields do **NOT** appear in the TCP header?
    - ☐ **a)** Destination port.
    - ☐ **b)** Urgent pointer.
    - ■ **c)** Destination IP address.
    - ☐ **d)** Header size.

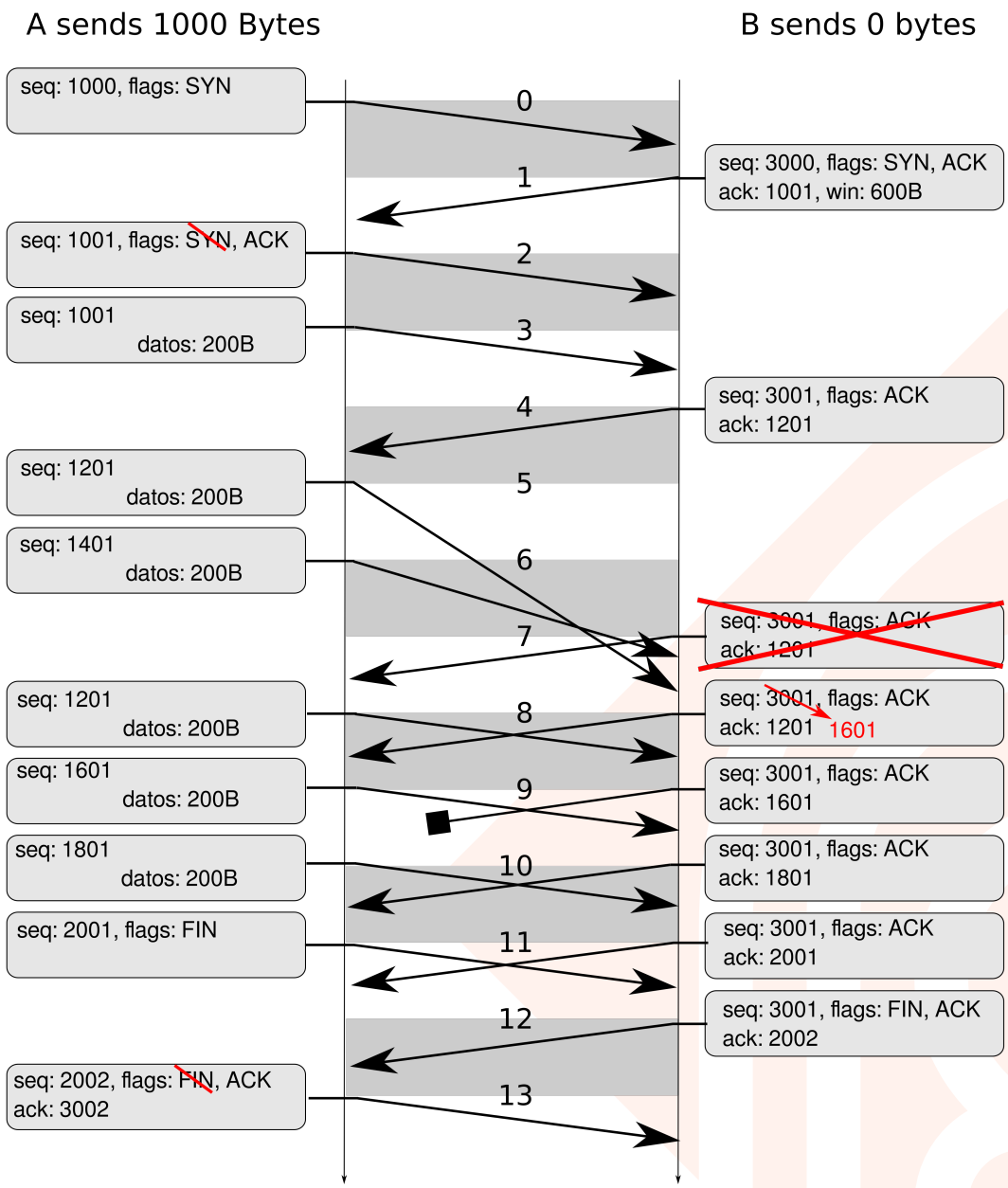
12. (1p) With TCP, if host A sends a segment to host B with a value of window=0. What happens next?
    - ☐ **a)** A sends a connection close segment.
    - ■ **b)** B is waiting before sending new data.
    - ☐ **c)** A notifies the end of the disconnect or keep-alive timeout.
    - ☐ **d)** B sets its cwnd to half the threshold value at that time.

13. (1p) What does the "window size"field mean in the TCP header?

- ☐ **a)** TCP header size in bytes.
- ☐ **b)** Received segment size in bytes.
- ☐ **c)** Amount of data that the sender may send.
- ■ **d)** Number of data the sender may receive.

14. (4p) The following figure shows a TCP flow, including connection and disconnection. Note that:
    - A is using Slow Start to prevent congestion.
    - The retransmission timer for segments in A is set to 3 clock ticks.
    - A uses a fixed segment size of 200 bytes.
    - A will send segments with data whenever possible.

    Correct (on the figure) the 4 existing errors: 1 segment left over, 3 segments contain wrong values in the header. Errors marked incorrectly will result in 1 point penalty (in this exercise).



15. (3p) During a TCP connection, the following events have occurred:
    - During the connection, client and server negotiated a MSS=200 btes and a threshold=60000 bytes in both directions.
    - Timeouts for segments 7 and 13 sent by the server expired before the corresponding ACKs arrive.
    - Just after the server sent the segment 23, it received an ACK identical to the previous 3.

    Continue the graph of the server congestion window until the round 12 assuming (rwnd >cwnd) was fulfilled throughout the connection
    Write the the value of the server threshold whenever it changes.