

Midterm AY2223SEM2 - Confidential

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Question #: 1

Which of the following is the most appropriate description of the service provided by UDP?

- A. Connection-oriented multiplexing and de-multiplexing
 - B. Guarantee on minimal throughput
 - ✓C. Process-to-process communication
 - D. Host-to-host communication
 - E. End-to-end reliable data delivery
-

Question #: 2

Go-back-N uses _____ ACK, Selective Repeat uses _____ ACK and TCP uses _____ ACK. Upon receiving an out-of-order packet, Go-back-N _____ buffer the packet, Selective Repeat _____ buffer the packet and TCP _____ buffer the packet.

- A. cumulative, individual, cumulative; must, does not, may
 - B. individual, cumulative, cumulative; does not, may, must
 - C. cumulative, individual, cumulative; may, does not, must
 - ✓D. cumulative, individual, cumulative; does not, must, may
 - E. individual, cumulative, cumulative; may, must, does not
-

Question #: 3

Suppose a TCP connection is transferring a file of 1000 bytes. The first byte is numbered 10001. What is the sequence number of the segment if all data is sent in only one segment? What is the ACK number the receiver will put in the acknowledgement if it successfully receives the segment?

- A. 10000 and 11001
- ✓B. 10001 and 11001
- C. 11001 and 11000
- D. 10000 and 11002
- E. 10001 and 11002

Question #: 4

A web cookie is a small piece of data that is originated and sent from a _____ and is stored at the _____.

- A. user; client side
- B. website; server side
- ✓C. website; client side
- D. user; server side
- E. user; server and client sides

Question #: 5

Which of the following field is present in both UDP header and TCP header?

- A. Acknowledgement number
- B. Sequence number
- C. Destination IP address
- D. Length
- ✓E. Checksum

Question #: 6

The behavior of a TCP sender can be influenced by a feedback packet received from a TCP receiver. Which of the following statement is FALSE?

- A. It is possible that a TCP receiver's feedback packet triggers the TCP sender to transmit a new data packet.
- B. It is possible that a TCP receiver's feedback packet triggers the TCP sender to re-transmit an old data packet.

- C. It is possible that a TCP receiver's feedback packet triggers the TCP sender to transmit multiple new data packets.
- ✓D. It is possible that a TCP receiver's feedback packet triggers the TCP sender to re-transmit multiple old data packets.
- E. It is possible that a TCP receiver's feedback packet does not trigger any action taken by the TCP sender.

Question #: 7

Which of the following is a wrong implementation of the TCP?

- A. The receiver does not buffer or acknowledge out-of-order packets.
- ✓B. The receiver buffers and acknowledges individual out-of-order packets.
- C. The receiver buffers out-of-order packets and sends cumulative acknowledgements.
- D. The sender only uses a single timer for the oldest un-acknowledged packet.
- E. Upon timeout event, the sender only retransmits the oldest un-acknowledged packet.

Question #: 8

Which of the following is TRUE, if a duplicate ACK is received by a TCP sender?

- A. The TCP sender will always ignore the duplicate ACK silently.
- B. The TCP sender will always retransmit a packet.
- C. The TCP receiver must have received the same segment more than once.
- D. The TCP receiver must have buffered an out-of-order segment.
- ✓E. None of the rest.

Question #: 9

Consider the sequence of events recorded by a host in a TCP connection:

```
--> SEND PKT(seq=10, size=28)
--> SEND PKT(seq=38, size=12)
--> SEND PKT(seq=10, size=28)
<-- RECV PKT(ack=50)
<-- RECV PKT(ack=50)
```

What are the possible events that could have happened?

- A. Lost Message and Premature Timeout
- B. Lost Message and Fast Retransmission
- C. Lost Message and Lost ACK
- D. Premature Timeout and Fast Retransmission
- ✓E. Premature Timeout and Lost ACK

Question #: 10

Suppose we want to design a stop-and-wait, reliable protocol for communication between a sender and a receiver over a channel with the following characteristics: data packets may be lost or corrupted, but will not be reordered. Feedback packets are always going to be received uncorrupted and in order. Furthermore, the maximum RTT between the sender and the receiver is known.

Which of the following statement about the reliable protocol is TRUE?

- A. Sender must attach a sequence number to every data packet.
- ✓B. If the sender sets the timer properly, the receiver will not receive duplicate packets for sure.
- C. The receiver should discard any corrupted data packet but must acknowledge the sender about it.
- D. In a feedback packet, the receiver must explicitly include the sequence number of the data packet being acknowledged.
- E. None of the other options is TRUE.

Question #: 11

In the layered hierarchy, as the data packet moves from the upper to the lower layers, headers are _____. The application layer is implemented in _____; the transport layer is implemented in _____.

- A. added; end system; network core
- ✓B. added; end system; end system
- C. removed; network core; end system

- D. removed; network core; network core
 - E. removed; end system; network core
-

Question #: 12

Go-back-N uses _____ timer(s), Selective Repeat uses _____ timer(s) and TCP uses _____ timer(s). Upon a time-out event, Go-back-N re-transmits _____ packet(s), Selective Repeat re-transmits _____ packet(s) and TCP re-transmits _____ packet(s).

- A. a single, multiple, multiple; multiple, a single, multiple
 - B. multiple, a single, multiple; a single, multiple, a single
 - C. a single, multiple, a single; multiple, a single, multiple
 - D. multiple, a single, a single; a single, multiple, multiple
 - ✓E. a single, multiple, a single; multiple, a single, a single
-

Question #: 13

Which of the following are network core devices?

- i) PC
- ii) Router
- iii) Servers
- iv) Switch
- v) Smartphones

- A. ii) and iii) only.
 - B. ii), iii) and iv) only.
 - ✓C. ii) and iv) only.
 - D. i), iii) and v) only.
 - E. iii) and iv) only.
-

Question #: 14

Which mechanism enables the rdt2.2 protocol to be NAK-free?

- A. sequence numbers added at the sender-side
- ✓B. sequence numbers added at the receiver-side
- C. checksums added at the receiver-side
- D. checksums added at the sender-side

E. timer implemented at the sender-side

Question #: 15

Which of the following descriptions are true for local DNS servers?

- i) Local DNS servers store hostname-to-IP-address mappings as part of the global distributed database.
- ii) Local DNS servers cache hostname-to-IP-address mappings.
- iii) Local DNS servers serve DNS queries in an iterative manner.
- iv) Local DNS servers may provide out-of-date hostname-to-IP-address mappings.

- A. i) and iii) only.
 - ✓B. ii) and iv) only.
 - C. i) and iv) only.
 - D. ii) and iii) only.
 - E. i), ii), and iii).
-

Question #: 16

The Internet has a layered protocol stack. Protocols implemented in one layer may stop working if _____.

- A. New interfaces are added in the lower layer
 - B. New interfaces are added in the upper layer
 - ✓C. Some existing interfaces are removed in the lower layer
 - D. Some existing interfaces are removed in the upper layer
-

Question #: 17

_____ DNS servers typically process DNS queries in a recursive manner;
_____ DNS servers do not belong to the global hierarchy of distributed database.

- ✓A. Local; local
- B. Root; local
- C. Local; authoritative

- D. Authoritative; TLD
- E. Authoritative; authoritative

Question #: 18

What allows TCP to detect lost segments and in turn recover from that loss?

- i) Sequence number
- ii) Acknowledgment number
- iii) Checksum
- iv) Timer out event

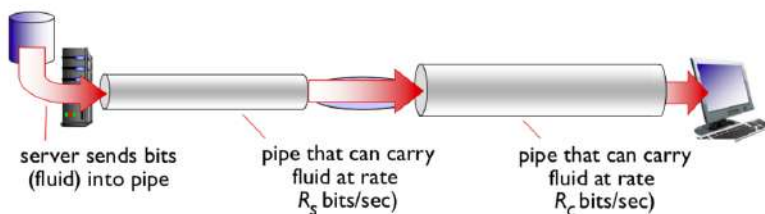
- A. i) and ii) only.
- B. i) and iii) only.
- ✓C. ii) and iv) only.
- D. i), ii) and iv) only.
- E. i), ii), iii) and iv).

Question #: 19

Consider the two related concepts of throughput and the example introduced in the following lecture slide:

Throughput

- **throughput**: rate (bits/time unit) at which bits transferred between sender/receiver
 - **average**: rate over longer period of time
 - **instantaneous**: rate at given point in time



Lecture 1-31

If the server sends a file of size S to the client, which of the following statement is TRUE?

- A. The average throughput depends on the file size S , but the instantaneous throughput does not depend on the file size S .
- B. The average throughput does not depend on the file size S , but the instantaneous throughput depends on the file size S .
- C. Both the average throughput and the instantaneous throughput depend on the file size S .
- ✓D. Neither the average throughput nor the instantaneous throughput depends on the file size S .

Question #: 20

Which of the following statement about Client/Server paradigm is TRUE?

- A. Only server can transmit data to client.
- B. Only client can transmit data to server.
- C. Client must always be alive.
- ✓D. Server offers service while client requests for service from server.
- E. Server must run either DNS or HTTP protocol.

Question #: 21

If you want to associate a client-side socket with a particular port number, what should you do?

- ✓A. use the **bind()** method
- B. use the **connect()** method
- C. use the **listen()** method
- D. use the **accept()** method
- E. let the OS do the job for you

Question #: 22

Which of the following protocols run at the application layer?

- i) TCP
- ii) UDP
- iii) DNS

iv) HTTP

- A. i) and ii) only.
- B. ii) and iii) only.
- C. iii) only.
- D. iv) only.
- ✓E. iii) and iv) only.

Question #: 23

Which of the following statement regarding rdt 3.0 is FALSE?

- A. Sender can simply ignore duplicate ACKs.
- B. Sender can simply ignore corrupted ACKs.
- C. Receiver may discard corrupted packet and does not send feedback.
- ✓D. Receiver may ignore duplicate packet and does not send feedback.

Question #: 24

Under the triple duplicate ACKs mechanism for TCP fast retransmission, the sender will retransmit a segment when it receives the same ACK for the _____ time.

- A. second
- B. third
- ✓C. fourth
- D. fifth

Question #: 25

A minimum of _____ packets need to be communicated in order to establish a TCP connection. _____ of them need(s) to set the SYN flag, and _____ of them can carry data content.

- A. 4; 3; 2
- B. 3; 3; 2

C. 3; 3; 1

✓D. 3; 2; 1

E. 2; 1; 1