Quiz 2

Due Nov 24 at 11:59pm **Points** 110 **Questions** 32
Available Nov 21 at 12am - Nov 24 at 11:59pm 4 days **Time Limit** 90 Minutes

Instructions

You have 90 minutes to complete this quiz.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	79 minutes	110 out of 110

Score for this quiz: **110** out of 110
Submitted Nov 24 at 11:07pm
This attempt took 79 minutes.

Question 1 — 2 / 2 pts

For the following binary IP address, give the dotted-decimal representation:

10011000 11101110 10011101 11000011

Correct!

152.238.157.195

orrect Answers

152.238.157.195

Question 2 — 3 / 3 pts

Select the proper equation for TCP's calculation of DevRTT.

Correct!

$$DevRTT_n = (1-\beta) \cdot DevRTT_{n-1} + \beta \cdot |SampleRTT_{new} - EstimatedRTT_{n-1}|$$

$DevRTT_n = (1-\beta) \cdot DevRTT_{n-1} + \beta \cdot |SampleRTT_{old} - EstimatedRTT_{n-1}|$

$DevRTT_n = (1-\beta) \cdot DevRTT_{n-1} + \beta \cdot |SampleRTT_{new} - EstimatedRTT_{n}|$

$DevRTT_n = \beta \cdot DevRTT_{n-1} + (1-\beta) \cdot |SampleRTT_{new} - EstimatedRTT_{n-1}|$

Question 3

3 / 3 pts

UDP has a congestion control mechanism.

True

Correct!

False

Question 4

3 / 3 pts

The rate of CongWin size increase (in terms of MSS) while in TCP's Congestion Avoidance phase is Linear .

Answer 1:

Correct!

Linear

Question 5

3 / 3 pts

Select the proper equation for TCP's calculation of the Timeout Interval.

Correct!

- (selected) $TimeoutInterval = EstimatedRTT_n + 4 \cdot DevRTT_n$
- $TimeoutInterval = \alpha \cdot EstimatedRTT_n + (1 - \alpha) \cdot DevRTT_n$
- $TimeoutInterval = (1 - \alpha) \cdot EstimatedRTT_n + \alpha \cdot DevRTT_n$
- $TimeoutInterval = 4 \cdot EstimatedRTT_n + DevRTT_n$

Question 6

5 / 5 pts

Select the appropriate ***new*** CongWin sizes for the following TCP Reno congestion scenario. Assume **ssthresh** is initially set to 8 MSS:

1. Connection Established with new server host. CongWin = [Select]
2. ACK(s) received from first segment set. CongWin = [Select]
3. ACK(s) received from next segment set. CongWin = [Select]
4. ACK(s) received from next segment set. CongWin = [Select]
5. ACK(s) received from next segment set. CongWin = [Select]
6. ACK(s) received from next segment set. CongWin = [Select]
7. Timeout occurs. CongWin = [Select] , ssthresh = [Select]

8. ACK(s) received from next segment set. CongWin =

[Select]

Answer 1:

Correct!

1 MSS

Answer 2:

Correct!

2 MSS

Answer 3:

Correct!

4 MSS

Answer 4:

Correct!

8 MSS

Answer 5:

Correct!

9 MSS

Answer 6:

Correct!

10 MSS

Answer 7:

Correct!

1 MSS

Answer 8:

Correct!

5 MSS

Answer 9:

Correct!

2 MSS

Question 7

5 / 5 pts

A host starts a TCP transmission with an EstimatedRTT of 36.3ms (from the “handshake”). The host then sends 3 packets and records the RTT for each:

SampleRTT1 = 31.2 ms

SampleRTT2 = 17.6 ms

SampleRTT3 = 41.8 ms

(NOTE: SampleRTT1 is the “oldest”; SampleRTT3 is the most recent.)

Using an exponential weighted moving average with a weight of 0.4 given to the most recent sample, what is the EstimatedRTT for packet #4? Give answer in miliseconds, rounded to one decimal place, without units, so for an answer of 0.01146 seconds, you would enter "11.5" without the quotes.

Correct!

33.3

orrect Answer

33.3 margin of error +/- 0.1

Question 8

3 / 3 pts

Which of the following are benefits of a virtual circuit network? (Check all that apply)

Correct!

- [x] Guaranteed bandwidth.

Correct!

- [x] Guaranteed timing.
- [ ] Less overhead than a datagram network.

Correct!

- [x] Connection states are preserved.
- [ ] Faster delivery.

Question 9

3 / 3 pts

The Internet Protocol (IP) header may be 28 bytes long.

Correct!

- (•) True
- ( ) False

Question 10

3 / 3 pts

A group of hosts sharing a common address prefix, behind a router, is called a/an subnet .

Answer 1:

Correct!

subnet

Question 11

3 / 3 pts

In a datagram network, the responsibilities of the network layer include: (check all that apply).

Correct!

- [x] packet routing
- [ ] reliable delivery

Correct!

- [x] host-to-host communication
- [ ] congestion control
- [ ] connection setup/takedown

- [ ] payload error correction
- [ ] flow control

Correct!

- [x] packet forwarding

Question 12

3 / 3 pts

The Internet Protocol (IP) header may be 21 bytes long.

- [ ] True

Correct!

- [x] False

Question 13

3 / 3 pts

The process of moving a datagram from a router's input port to output port is handled by the switching fabric .

Answer 1:

Correct!

switching fabric

Question 14

3 / 3 pts

The process of determining a path through the internet is handled by the routing algorithm .

Answer 1:

Correct!

routing algorithm

Question 15

3 / 3 pts

The IP header is encapsulated in IP datagram fragments.

- True
- False

Correct!

Question 16

3 / 3 pts

The "traceroute" application (on Windows) sends UDP messages by default.

- True
- False

Correct!

Question 17

3 / 3 pts

The "traceroute" application (on Windows) sends ICMP messages by default.

Correct!

- True
- False

Question 18

3 / 3 pts

Network address translation has ameliorated the IP address shortage problem.

Correct!

- (•) True
- ( ) False

Question 19

3 / 3 pts

Re-assembly of fragmented IP datagrams is handled by...

- ( ) the next router with a large-enough MTU.

Correct!

- (•) the destination host.
- ( ) the router in the datagram's path
- ( ) the sending host.

Question 20

3 / 3 pts

The largest amount of data, in bytes, which can be accomodated by a particilar network, link, or physical-layer is called the [a].

Correct!

- (•) Maximum Transmission Unit (MTU)
- ( ) Maximum Segment Size (MSS)
- ( ) Sending Size

Question 21

3 / 3 pts

When a destination host's IP fragment timer expires, it drops all accumulated fragments corresponding to that timer.

Correct!

- (•) True
- ( ) False

Question 22

3 / 3 pts

NAPT devices translate IP address *and* port numbers.

Correct!

- (•) True
- ( ) False

Question 23

3 / 3 pts

It is the responsibility of a routing algorithm to determine a datagram's next hop information.

Correct!

- (•) True
- ( ) False

Question 24

3 / 3 pts

ICMP messages are carried within the payload of IP datagrams.

Correct!

- (•) True
- ( ) False

Question 25

3 / 3 pts

It is the responsibility of a routing algorithm to correlate MAC addresses with IP addresses.

- ( ) True
- (•) False

Correct!

Question 26

3 / 3 pts

The transport-layer header is encapsulated in every IP datagram fragment.

- ( ) True
- (•) False

Correct!

Question 27

3 / 3 pts

In network graph terminology, [a] represent direct connections between routers.

- ( ) Nodes
- (•) Edges

Correct!

- Weights
- Shortest Path

Question 28

4 / 4 pts

What is the longest-common-prefix for the following address range?

```
10011110 10111001 10011101 00000000 -- 10011110 10111001 10011101 10000000
```

Correct!

10011110 10111001 10011101

orrect Answers

10011110101110011001101

10011110 10111001 10011101

Question 29

5 / 5 pts

For the IPv4 CIDR address 146.10.150.116 /24

What is the...

- Netmask: [Select]
- Network Address: [Select]
- Host Mask: [Select]
- Broadcast Address: [Select]
- Number of possible hosts: [Select]
- Host Number: [Select]

Answer 1:

Correct! 255.255.255.0

Answer 2:

Correct! 146.10.150.0

Answer 3:

Correct! 0.0.0.255

Answer 4:

Correct! 146.10.150.255

Answer 5:

Correct! 254

Answer 6:

Correct! 116

Question 30

5 / 5 pts

A private network uses a NAPT device at public IP address 207.96.121.8 The computers in the network use addresses of the form 10.0.0.x/22. Suppose that computer inside the NATed network sends a request with

Source address: 10.0.2.5
Source port: 750

Destination address: 128.193.4.20
Destination port: 60

The next available port number on the NAPT device is 12345.

PART 1:

What source and destination information do the request packet headers contain when the request is sent out by the sending host?

Source address: [Select]

Source port : [Select]

Destination address: [Select]

Destination port : [Select]

PART 2:

What source and destination information do the request packet headers contain when the request is sent out by the NAT box?

Source address: [Select]

Source port : [Select]

Destination address: [Select]

Destination port : [Select]

PART 3:

What source and destination information do the response packet headers contain when the response is received by the NAT box?

Source address: [Select]

Source port : [Select]

Destination address: [Select]

Destination port : [Select]

PART 4:

What source and destination information do the response packet headers contain when the response is received by the original sending host?

Source address: [Select]

Source port : [Select]

Destination address: [Select]

Destination port : [Select]

Answer 1:

Correct!

10.0.2.5

Answer 2:

Correct!

750

Answer 3:

Correct!

128.193.4.20

Answer 4:

Correct!

60

Answer 5:

Correct!

207.96.121.8

Answer 6:

Correct!

12345

Answer 7:

Correct!

128.193.4.20

Answer 8:

Correct!

60

Answer 9:

Correct!

128.193.4.20

Answer 10:

Correct!

60

Answer 11:

Correct!

207.96.121.8

Answer 12:

Correct!

12345

Answer 13:

Correct!

128.193.4.20

Answer 14:

Correct!

60

Answer 15:

Correct!

10.0.2.5

Answer 16:

Correct!

750

Question 31

6 / 6 pts

Suppose that a 2500-byte datagram (identification #23) must transit a network which has a 740-byte MTU. Assume the minimum IP and TCP header sizes, i.e., the IP header is 20 bytes and the TCP header is 20 bytes.

1. How many fragments are created? [Select]

   fragments

2. How many bytes of application data are carried in the first fragment?

   [Select] bytes

3. How many bytes of application data are carried in the second fragment?

   [Select] bytes

4. How many bytes of application data are carried in the last fragment?

   [Select] bytes

5. What is the identification number of the second fragment? # 23
6. What is the fragment offset in the last fragment?

   [Select]

Answer 1:

Correct!

4

Answer 2:

Correct!

700

Answer 3:

Correct!

720

Answer 4:

Correct!

320

Answer 5:

Correct!

23

Answer 6:

Correct!

270

Question 32

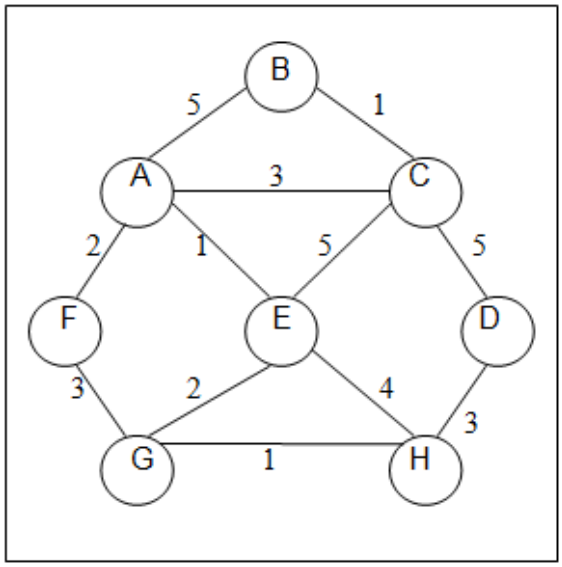
6 / 6 pts

Using the version of *Dijkstra's Algorithm* discussed in the lectures (see below), and the network configuration in the graph (see below), to calculate the shortest path from node *B* to node *G.*

(NOTE#1: A tie goes to the lower node, alphabetically (A before F).

- What is the full shortest path from node B to node G? (e.g. for a path from H to D you would type "H-D" without quotes) B-C-A-E-G
- What is the cost of the shortest path from node B to node G? 7
- Fill in the complete routing table for node B, as it would be calculated by Dijkstra's algorithm and stored inside router B. (It's OK to do this by inspection; you don't have to crank through Dijkstra's algorithm for each destination.)

Destination	First Hop
A	C
C	C
D	C
E	C
F	C
G	C
H	C



Dijkstra's algorithm

```
S = {all nodes except source}
for u in S { /*initialization*/
    D[u] = edge weight (if edge (source, a)
           exists) or ∞ (otherwise)
    R[u] = u (if edge (source, u) exists) or
           * (otherwise)
    P[u] = source ((if edge (source, u) exists)
           or * (otherwise)
}
while (not empty(S)) {
    u = node with smallest value in D
        /* if tie, choose lower (alpha) node */
    if u in S {
        if(D[u] == ∞) {
            error: "no path"; exit;}
        S = S – {u};
        for (each v such that edge (u, v) exists) {
            if(v in S) {
                c = D[u] + weight (u, v);
                if(c < D[v]) {
                    D[v] = c;
                    R[v] = R[u];
                    P[v] = u
                }
            }
        }
    }
}
```

Answer 1:

Correct! B-C-A-E-G

orrect Answer B - C - A - E - G

orrect Answer BCAEG

Answer 2:

Correct! 7

Answer 3:

Correct! C

Answer 4:

Correct! C

Answer 5:

Correct! C

Answer 6:

Correct! C

Answer 7:

Correct! C

Answer 8:

Correct! C

Answer 9:

Correct! C

Quiz Score: **110** out of 110