

Week 8 Summary Exercises

Due Nov 24 at 11:59pm**Points** 60**Questions** 29**Available** Nov 17 at 12am - Nov 24 at 11:59pm 8 days**Time Limit** 360 Minutes**Allowed Attempts** 2[Take the Quiz Again](#)

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	279 minutes	56.6 out of 60

Score for this attempt: **56.6** out of 60

Submitted Nov 24 at 5:38pm

This attempt took 279 minutes.

Question 1

1 / 1 pts

A network with a connection-oriented network layer is called a virtual circuit network .

Answer 1:**Correct!**

virtual circuit network

Question 2

1 / 1 pts

Where do network-layer protocols run?

Correct!☒ Routers**Correct!**☒ Laptops

Correct!☒ PCs**Correct!**☒ Mobile devices**Question 3****1 / 1 pts**

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

Correct!☒ Connection states are preserved.**Correct!**☒ Guaranteed timing.☐ Faster delivery.**Correct!**☒ Guaranteed bandwidth.☐ Less overhead than a datagram network.**Question 4****1 / 1 pts**

The Internet Protocol (IP) implements timing controls.

☐ True**Correct!**☒ False**Question 5****1 / 1 pts**

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

Correct!☒ True☐ False**Question 6****2 / 2 pts**

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

10011110 10111001 10011101 00000000 -- 10011110 10111001 10011101 10000000

Correct!

10011110 10111001 10011101

Correct Answers

10011110 10111001 10011101

100111101011100110011101

Question 7**2 / 2 pts**

The "Identification" header field is unchanged by IP datagram fragmentation.

Correct!☒ True☐ False**Question 8****2 / 2 pts**

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

Correct!☒ True

☐ False

Question 9**2 / 2 pts**

Network address translation alters IP to add new IP addresses.

☐ True

☒ False

Correct!**Question 10****2 / 2 pts**

In network graph terminology, [a] represent costs.

☐ Shortest Path

☐ Edges

☒ Weights

☐ Nodes

Correct!**Question 11****2 / 2 pts**

It is the responsibility of a routing algorithm to determine the cost of an output link.

☐ True

Correct!☒ False**Question 12****2 / 2 pts**

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

Correct!☒ True☐ False**Question 13****2 / 2 pts**

The "tracert" application (on Windows) receives ICMP messages.

Correct!☒ True☐ False**Question 14****2 / 2 pts**

The "ping" application (on Windows) uses ICMP echo request/reply.

Correct!☒ True☐ False

Question 15**2 / 2 pts**

Network address translation has ameliorated the IP address shortage problem.

Correct!☒ True☐ False**Question 16****2 / 2 pts**

If an IP datagram is fragmented into 1000-byte fragments, and later encounters a link with an 800-byte MTU, a special procedure (other than standard IP fragmentation) must be used.

Correct!☐ True☒ False**Question 17****2 / 2 pts**

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

Correct!☐ True☒ False**Question 18****2 / 2 pts**

If an IP datagram is fragmented into 1000-byte fragments, and later encounters a link with an 800-byte MTU, it is dropped.

☐ True

☒ False

Correct!

Question 19

2 / 2 pts

In a prefix-matching network, a routing table stores... (Check all that apply)

☐ Complete path information

☐ Path cost information

☒ Next-Hop link information

☒ IP Prefixes

☐ Link state information

Correct!

Correct!

Question 20

2 / 2 pts

The IP header is encapsulated in IP datagram fragments.

☐ True

☒ False

Correct!

Question 21**2 / 2 pts**

The path MTU is the smallest MTU on a path from sender to receiver.

Correct!☒ True☐ False**Question 22****2 / 2 pts**

Network address translation is strictly a Layer-3 protocol.

Correct!☐ True☒ False**Question 23****2 / 2 pts**

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

Correct!☐ Nodes☒ Edges☐ Weights☐ Shortest Path

Question 24**2 / 2 pts**

For a TCP/IP datagram leaving a home network through a NAT device, which of the following header fields (IP and/or TCP) are altered? (Check all that apply)

Correct!☒ Source IP Address☐ Identification**Correct!**☒ Header Checksum☐ Upper Layer Protocol**Correct!**☒ Source Port☐ Destination IP address☐ Destination Port**Question 25****2 / 2 pts**

Given an internet represented as a weighted undirected graph, the shortest path between node X and node Y is the path that...

Correct!☒ has the smallest sum of edge weights.☐ has the smallest number of hops☐ begins with the smallest weight on the first hop edge from node X☐ connects node X to node Y directly

Question 26**2 / 2 pts**

The transport-layer header is encapsulated in the first fragmented IP datagram.

Correct!☒ True☐ False**Question 27****1 / 1 pts**

A private network uses a NAT device at public IP address 128.100.116.1. 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: 10.0.0.4

Source port: 932

Destination address: 108.155.105.30

Destination port: 22

The next available port number on the NAT device is 12000

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!**

10.0.0.4

Answer 2:**Correct!**

932

Answer 3:**Correct!**

108.155.105.30

Answer 4:**Correct!**

22

Answer 5:**Correct!**

128.100.116.1

Answer 6:**Correct!**

12000

Answer 7:**Correct!**

108.155.105.30

Answer 8:**Correct!**

22

Answer 9:**Correct!**

108.155.105.30

Answer 10:**Correct!**

22

Answer 11:**Correct!**

128.100.116.1

Answer 12:**Correct!**

12000

Answer 13:**Correct!**

108.155.105.30

Answer 14:**Correct!**

22

Answer 15:**Correct!**

10.0.0.4

Answer 16:**Correct!**

932

Question 28**5 / 6 pts**

Suppose that a 1600-byte datagram (identification #20) 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?

720 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? #

[Select] ▼

6. What is the fragment offset in the last fragment?

[Select] ▼

Answer 1:

Correct!

3

Answer 2:

Correct!

700

Answer 3:

Correct!

720

Answer 4:

You Answered

160

Correct Answer

140

Answer 5:

Correct!

20

Answer 6:

Correct!

180

Question 29**3.6 / 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 *H* to node *B*.

(NOTE#1: *H* is not in the original set *S*.)

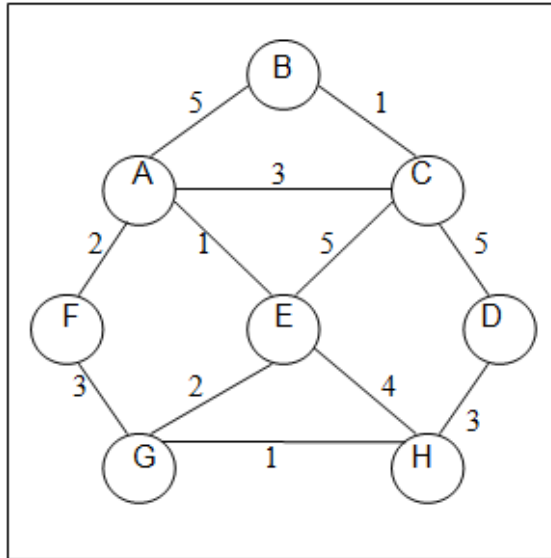
(NOTE#2: A tie goes to the lower node (alphabetically).

(NOTE#3: If you use the textbook version of *Dijkstra's Algorithm*, **find** the 3rd node to be added to set *S'*, where *S* = {A,B,C,D,E,F,G} and *S'* starts as {H}.)

- What is the 3rd node to be eliminated from the set **S** = {A,B,C,D,E,F,G}?

- What is the full shortest path from node H to node B? (e.g. for a path from H to D you would type "H-D" without the quotes)
- What is the cost of the shortest path from node H to node B?
- Fill in the complete routing table for node H, as it would be calculated by Dijkstra's algorithm and stored inside router H. (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	<input type="text" value="G"/>
B	<input type="text" value="G"/>
C	<input type="text" value="D"/>
D	<input type="text" value="D"/>
E	<input type="text" value="G"/>
F	<input type="text" value="G"/>
G	<input type="text" value="G"/>

**Dijkstra's algorithm**

```

S = {all nodes except source}
for u in S { /*initialization*/
    D[u] = edge weight (if edge (source, u)
                      exists) or  $\infty$  (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] ==  $\infty$ ) {
            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:

You Answered

D

Correct Answer

E

Answer 2:

You Answered

H-G-E-A-B

Correct Answer

H-G-E-A-C-B

Correct Answer

H - G - E - A - C - B

Correct Answer

HGEACB

Correct Answer

H G E A C B

Answer 3:

You Answered

9

Correct Answer

8

Answer 4:

Correct!

G

Answer 5:

Correct!

G

Answer 6:

You Answered

D

Correct Answer

G

Answer 7:

Correct!

D

Answer 8:

Correct!

G

Answer 9:

Correct!

G

Answer 10:

Correct!

G

Quiz Score: **56.6** out of 60