Module 8 Summary Exercises

Due Mar 2 at 1:59am **Points** 60 **Questions** 29 **Time Limit** None
Allowed Attempts 2

Instructions

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	1,787 minutes	56.17 out of 60

Answers will be shown after your last attempt

Score for this attempt: **56.17** out of 60
Submitted Mar 1 at 7:54pm
This attempt took 1,787 minutes.

Question 1 1 / 1 pts

Where do network-layer protocols run?

- [x] Routers
- [x] PCs
- [x] Laptops
- [x] Mobile devices

Question 2 1 / 1 pts

A router's routing table is output by a routing algorithm .

Answer 1:

routing algorithm

Partial

Question 3

0.5 / 1 pts

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

- [ ] Faster delivery.
- [ ] Guaranteed timing.
- [x] Less overhead than a VC network.
- [ ] Guaranteed bandwidth.
- [ ] Connection states are preserved.

Question 4

1 / 1 pts

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

Answer 1:

routing algorithm

Question 5

1 / 1 pts

What can cause queueing at a router's input ports? (Check all that apply)

- [ ] Slow inbound link transmission rate.
- [x] Slow outbound link transmission rate.
- [x] Head of Line blocking.

- [x] Output port contention.

Question 6

2 / 2 pts

Upon encountering a router with the following routing table:

Routing Table

Prefix Match	Port
10011110 00011110 10001111	0
10011110 00011110 10001111 000	1
10011110 00011110 10001111 01	2
10011110 00011110 10001110 0001	3
Default	4

A datagram with the destination IP address 158.30.143.30 would be routed to Port 1 .

Answer 1:

Port 1

Question 7

2 / 2 pts

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

- [ ] Sending Size
- [x] Maximum Transmission Unit (MTU)
- [ ] Maximum Segment Size (MSS)

Question 8

2 / 2 pts

In a fragmented IP datagram, the "offset" IP header field value is exactly equal to the number of bytes of fragmented data preceding this fragment.

- ○ True
- ◉ False

Question 9

2 / 2 pts

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

- ◉ True
- ○ False

Question 10

2 / 2 pts

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

- ○ the router in the datagram's path
- ○ the next router with a large-enough MTU.
- ○ the sending host.
- ◉ the destination host.

Partial

Question 11

0.67 / 2 pts

If hosting a server inside a NATed network, how do clients outside the NAPT router connect to the server? (Check all that apply)

- ☐ By using the server's local IP address.

- [x] Using Universal Plug and Play (UPnP)
- [ ] Through a connection relay service
- [ ] By using the NAPT devices IP address, and a port number pre-configured to correspond to the server.

Question 12

2 / 2 pts

IP datagrams fragments can not be fragmented again.

- ( ) True
- (•) False

Question 13

2 / 2 pts

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

- ( ) True
- (•) False

Question 14

2 / 2 pts

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

- (•) True
- ( ) False

Question 15

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.

- True
- False

Question 16

2 / 2 pts

The IP header is encapsulated in IP datagram fragments.

- True
- False

Question 17

2 / 2 pts

The largest amount of data, in bytes, which can be accomodated throughout a datagram's route from sender to receiver is called the [a].

- Maximum Path Size
- Path Maximum Segment Size (Path MSS)
- Path Maximum Transmission Unit (Path MTU)

Question 18

2 / 2 pts

It is the responsibility of a routing algorithm to forward packets to the appropriate output link.

- True
- False

Question 19

2 / 2 pts

The "time to live" field in a modern IPv4 datagram header specifies...

- the number of remaining hops before the datagram is dropped.
- the milliseconds remaining before the datagram is dropped.
- the seconds to wait for the remaining fragments of a datagram that has been fragmented.
- the seconds remaining before data in the datagram is considered obsolete.

Question 20

2 / 2 pts

NAPT devices translate IP address *and* port numbers.

- True
- False

Question 21

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

Question 22

2 / 2 pts

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

- [x] Header Checksum
- [ ] Upper Layer Protocol
- [ ] Destination IP address
- [x] Source IP Address
- [ ] Identification
- [x] Source Port
- [ ] Destination Port

Incorrect

Question 23

0 / 2 pts

In network graph terminology, a [a] from A to B is the set of edges to traverse to reach B from A for the lowest total cost.

- ( ) Shortest Path
- ( ) Node
- ( ) Weight
- (•) Edge

Question 24

2 / 2 pts

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

- ( ) True

- (•) False

Question 25

2 / 2 pts

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

- (•) True
- ( ) False

Question 26

2 / 2 pts

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

- [x] Destination Port
- [ ] Source Port
- [ ] Source IP Address
- [x] Header Checksum
- [x] Destination IP address
- [ ] Identification
- [ ] Upper Layer Protocol

Question 27

1 / 1 pts

A private network uses a NAPT 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 NAPT 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:

10.0.0.4

Answer 2:

932

Answer 3:

108.155.105.30

Answer 4:

22

Answer 5:

128.100.116.1

Answer 6:

12000

Answer 7:

108.155.105.30

Answer 8:

22

Answer 9:

108.155.105.30

Answer 10:

22

Answer 11:

128.100.116.1

Answer 12:

12000

Answer 13:

108.155.105.30

Answer 14:

22

Answer 15:

10.0.0.4

Answer 16:

932

Question 28

6 / 6 pts

Suppose that a 2200-byte datagram (identification #40) must transit a network which has a 660-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? 260 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:

4

Answer 2:

620

Answer 3:

640

Answer 4:

260

Answer 5:

40

Answer 6:

240

Question 29

6 / 6 pts

Using the version of *Dijkstra's Algorithm* shown below, and the network configuration in the graph 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 node with the name with the lowest value (when sorted alphabetically).

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

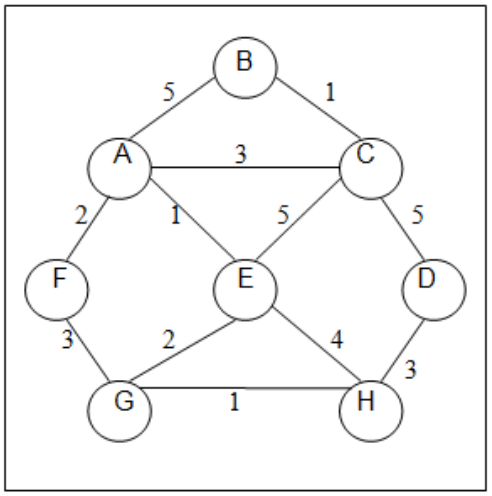
E

- 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) H-G-E-A-C-B
- What is the cost of the shortest path from node H to node B? 8

- 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.)

Routing Table

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



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:

E

Answer 2:

H-G-E-A-C-B

Answer 3:

8

Answer 4:

G

Answer 5:

G

Answer 6:

G

Answer 7:

D

Answer 8:

G

Answer 9:

G

Answer 10:

G

Quiz Score: **56.17** out of 60