Assignment 8

Due Dec 28 at 10:59am **Points** 15 **Questions** 17 **Time Limit** None

Instructions

While working on this assignment, you certify that you have neither given help to nor received help from any other person.

Submission Details:

Time:	24 minutes
Current Score:	11.5 out of 15
Kept Score:	11.5 out of 15

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	24 minutes	11.5 out of 15

Correct answers are hidden.

Score for this quiz: **11.5** out of 15
Submitted Dec 19 at 10:28pm
This attempt took 24 minutes.

Question 1 — 1 / 1 pts

Which of the following services may be implemented in a link-layer protocol? Select one or more statements.

- [ ] End-end path determination through multiple IP routers.
- [x] Bit-level error detection and correction.
- [x] Reliable data transfer between directly connected nodes.
- [ ] Lookup and forwarding on the basis of an IP destination address.
- [ ] TLS security (including authentication) between directly connected nodes.
- [x] Flow control between directly connected nodes.
- [x] Multiplexing down from / multiplexing up to a network-layer protocol.
- [x] Coordinated access to a shared physical medium.

Nice! This answer is correct.

Question 2 — 1 / 1 pts

Suppose that a packet's payload consists of 10 eight-bit values (e.g., representing ten ASCII-encoded characters) shown below. (Here, we have arranged the ten eight-bit values as five sixteen-bit values). The received data (including parity) bits are shown. Even parity is used. One received data bit has been flipped. Which one is it? (row and column numbering start at 1).

received data and 2D parity bits

01001010	00011011	1
00001110	01000001	1
00111110	00010001	0
11101100	00001111	1
10011111	00011001	1
00001001	11011101	0

In which row has the bit flip occurred? 3

In which column has the bit flip occurred?

9

Nice! This answer is correct

Incorrect

Question 3

0 / 1 pts

Consider the Cyclic Redundancy Check (CRC) algorithm. Suppose that the 4-bit generator (G) is 1001, that the data payload (D) is 10011101 and that r = 3. What are the values of the 3 CRC bits?

- 101
- 010
- 011
- 100

Not quite. This answer is incorrect.

Question 4

0.5 / 0.5 pts

Consider the figure below, which shows the arrival of 6 messages for transmission at different multiple access wireless nodes at times t = 0.3, 1.7, 1.8, 2.5, 4.2, 4.6. Each transmission requires exactly one time unit.

For the **pure ALOHA** protocol, indicate which packets are successfully transmitted. You can assume that if a packet experiences *a collision*, a node will not attempt a retransmission of that packet until sometime after *t=5*.

- 1

Nice! This answer is correct.

- 4
- 3
- 5
- 2
- 6

Nice! This answer is correct.

Incorrect

Question 5

0 / 1 pts

Which of the following statements is true about **both** Pure Aloha, and CSMA (both with and without collision detection?

- [x] Pure Aloha and CSMA can achieve 100% channel utilization, in the case that all nodes always have frames to send.
- [ ] There can be times when the channel is idle, when a node has a frame to send, but is prevented from doing so by the medium access protocol.
- [ ] Pure Aloha and CSMA can achieve 100% utilization, in the case that there is only one node that always has frames to send
- [x] There can be simultaneous transmissions resulting in collisions.

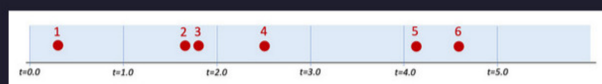
Not quite. This answer is incorrect.

Incorrect

Question 6

0 / 1 pts

Consider the figure below, which shows the arrival of 6 messages for transmission at different multiple access wireless nodes at times t = 0.3, 1.7, 1.8, 2.5, 4.2, 4.6. Each transmission requires exactly one time unit.



For the **CSMA protocol (*without* collision detection)**, indicate which packets are successfully transmitted. You should assume that it takes 0.2 time units for a signal to propagate from one node to each of the other nodes. You can assume that if a packet experiences a collision or senses the channel busy and that that node will not attempt a retransmission of that packet until sometime after *t=5*. Hint: consider propagation times carefully here.

- [ ] 6
- [ ] 3
- [x] 4
- [ ] 5
- [x] 1
- [ ] 2

Not quite. This answer is incorrect.

Question 7

1 / 1 pts

Which of the following statements is true about polling and token-passing protocols?

- [ ] There can be simultaneous transmissions resulting in collisions.
- [ ] There can be times when the channel is idle for more than a short period of time, when a node has a frame to send, but is prevented from doing so by the medium access protocol.
- [x] These protocol can achieve close to 100% channel utilization, in the case that all nodes always have frames to send (the fact that the utilization is close to, but not exactly, 100% is due to a small amount of medium access overhead but not due to collisions)
- [x] These protocol can achieve close 100% utilization, in the case that there is

only one node that always has frames to send" (the fact that the utilization is close to, but not exactly, 100% is due to a small amount of medium access overhead but not due to collisions)

Nice! This answer is correct.

Question 8

1 / 1 pts

Consider the figure below, which shows the arrival of 6 messages for transmission at different multiple access wireless nodes at times t = 0.3, 1.7, 1.8, 2.5, 4.2, 4.6. Each transmission requires exactly one time unit.

For the **CSMA/CD protocol (*with* collision detection)**, indicate which packets are successfully transmitted. You should assume that it takes .2 time units for a signal to propagate from one node to each of the other nodes. You can assume that if a packet experiences a collision or senses the channel busy and that that node will not attempt a retransmission of that packet until sometime after *t=5*. If a node senses a collision, it stops transmitting immediately (although it will still take .2 time units for the last transmitted bit to propagate to all other nodes). Hint: consider propagation times carefully here.

- [ ] 3
- [x] 4
- [ ] 2
- [x] 5
- [ ] 6
- [x] 1

Nice! This answer is correct.

Question 9

0.5 / 0.5 pts

Consider the following multiple access protocols: (1) TDMA and FDMA, (2) CSMA, (3) Aloha, and (4) polling. Which of these protocols are **collision-free** (e.g., collisions will never happen)?

- [ ] CSMA and CSMA/CD
- [x] Polling
- [x] TDMA and FDMA
- [ ] Aloha

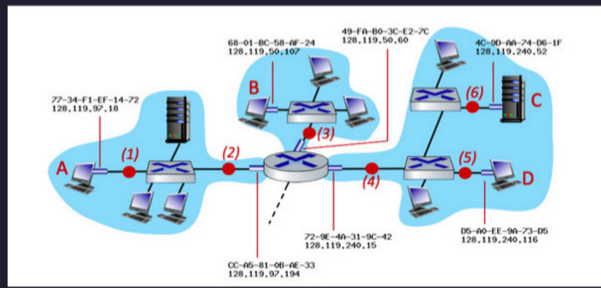
Nice! This answer is correct.

Partial

Question 10

0.5 / 1 pts

Consider the network shown below. The IP and MAC addresses are shown for hosts A, B, C and D, as well as for the router's interfaces. Consider an IP datagram being sent from node B to node D. Match the source/destination network- or link-layer address at the location (3) by choosing a value from the pulldown list.



What is the source MAC address on the frame at point (3)?	68-01-BC-58-AF-24
What is the destination MAC address on the frame at point (3)?	72-9E-4A-31-9C-42
What is the source IP address of the datagram at point (3)?	128.119.50.107
What is the destination IP address of the datagram at point (3)?	128.119.240.15

Question 11

1 / 1 pts

We've now learned about both IPv4 addresses and MAC addresses. Consider the address properties below, and use the pulldown menu to indicate which of these properties is *only* a property of MAC addresses (and therefore is **not** a property of IPv4 addresses - careful!).

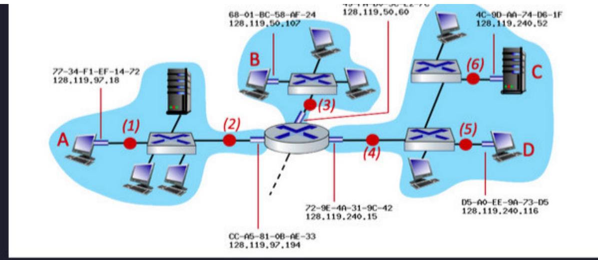
- [ ] This address must be unique among all hosts in a subnet.
- [ ] This is a network-layer address.
- [x] This address remains the same as a host moves from one network to another.
- [x] This is a link-layer address.
- [x] This is a 48-bit address.
- [ ] This is a 128-bit address.
- [ ] This address is allocated by DHCP.
- [ ] This is a 32-bit address.

Nice! This answer is correct.

Question 12

1 / 1 pts

Consider the network shown below. The IP and MAC addresses are shown for hosts A, B, C and D, as well as for the router's interfaces. Consider an IP datagram being sent from node B to node D. Match the source/destination network- or link-layer address at the location (4) by choosing a value from the pulldown list.



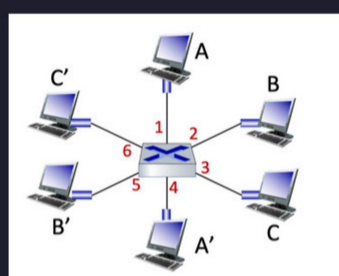
What is the source MAC address on the frame at point (4)?	The MAC address of the sv ⌄
What is the destination MAC address on the frame at point (4)?	D5-A0-EE-9A-73-D5 ⌄
What is the source IP address of the datagram at point (4)?	128.119.50.107 ⌄
What is the destination IP address of the datagram at point (4)?	128.119.240.116 ⌄

Nice! This answer is correct

Question 13

1 / 1 pts

Consider the network below with six nodes, star-connected into an Ethernet switch. Suppose that A sends a frame to A, A' replies to A, then B sends a message to B' and B' replies to B. Enter the values that are present in the switch's forwarding table after B'-to-B frame is sent and received. Assumed that the table is initially empty and that entries are added to the table sequentially. Answer the questions below from the pulldown list. [Note: You can find more examples of problems similar to this here.]



What is the first entry added to the table?	A,1 ⌄
What is the second entry added to the table?	A',4 ⌄
What is the third entry added to the table?	B,2 ⌄
What is the fourth entry added to the table?	B',5 ⌄

Nice! This answer is correct

Question 14

1 / 1 pts

In CSMA/CD, after the fifth collision, how many microseconds on a 10 Mbps Ethernet, a node would wait if it chooses a k value of 10 with probability 1/32?

- 204.8
- 162.1
- 221.3
- 512 (selected)

Question 15

1 / 1 pts

Consider a single switch VLAN, and assume an external router is connected to switch port 1. The EE hosts are assigned IP addresses: 111.111.1.1, 111.111.1.2, 111.111.1.3, then the subnet mask is 111.111.1/24. The CS hosts are assigned IP addresses: 111.111.2.1, 111.111.2.2, 111.111.2.3, then the subnet mask is 111.111.2/24. The router's interface card that connects to port 1 can be configured to contain two sub-interface IP addresses: 111.111.1.0 and 111.111.2.0. The first one is for the subnet of EE department, and the second one is for the subnet of CS department. Each IP address is associated with a VLAN ID. Suppose 111.111.1.0 is associated with VLAN 11, and 111.111.2.0 is associated with VLAN 12. This means that each frame that comes from subnet 111.111.1/24 will be added an 802.1q tag with VLAN ID 11, and each frame that comes from 111.111.2/24 will be added an 802.1q tag with VLAN ID 12. Check which statement that describes the steps taken at both the network layer and the link layer to transfer an IP datagram from an EE host to a CS host.

- (selected) Host A first encapsulates the IP datagram (destined to 111.111.2.1) into a frame with a destination MAC address equal to the MAC address of the router's interface card that connects to port 1 of the switch. Once the router receives the frame, then it passes it up to IP layer, which decides that the IP datagram should be forwarded to subnet 111.111.2/24 via sub-interface 111.111.2.0. Then the router encapsulates the IP datagram into a frame and sends it to port 1.
- Host A knows that the IP datagram is destined to VLAN with ID 12, so the switch will send the datagram to Host B which is in CS department. Once Host B receives this datagram, it will remove the 802.1q tag.

Question 16

0.5 / 0.5 pts

Suppose you walk into a room, connect to Ethernet, and want to download a Web page. What protocols will be used, starting from powering on your PC to getting the Web page? Assume there is nothing in our DNS or browser caches when you power on your PC.

- ARP, DNS, TCP, and HTTP protocols.
- Ethernet, DHCP, ARP, DNS, TCP, and HTTP protocols (selected)

Question 17

0.5 / 0.5 pts

Check whether the following description is true or false when you first connect you computer to the Internet to download a web page. Your computer first uses DHCP to obtain an IP address. You computer first creates a special IP datagram destined to 255.255.255.255 in the DHCP server discovery step, and puts it in a Ethernet frame and broadcast it in the Ethernet. Then following the steps in the DHCP protocol, you computer is able to get an IP address with a given lease time. A DHCP server on the Ethernet also gives your computer a list of IP addresses of first-hop routers, the subnet mask of the subnet where your computer resides, and the addresses of local DNS servers (if they exist). Since your computer's ARP cache is initially empty, your computer will use ARP protocol to get the MAC addresses of the first-hop router and the local DNS server. Your computer first will get the IP address of the Web page you would like to download. If the local DNS server does not have the IP address, then your computer will use DNS protocol to find the IP address of the Web page. Once your computer has the IP address of the Web page, then it will send out the HTTP request via the first-hop router if the Web page does not reside in a local Web server. The HTTP request message will be segmented and encapsulated into TCP packets, and then further encapsulated into IP packets, and finally encapsulated into Ethernet frames. Your computer sends the Ethernet frames destined to the first-hop router. Once the router receives the frames, it passes them up into IP layer, checks its routing table, and then sends the packets to the right interface out of all of its interfaces.Then your IP packets will be routed through the Internet until they reach the Web server.The server hosting the Web page will send back the Web page to your computer via HTTP response messages. Those messages will be encapsulated into TCP packets and then further into IP packets. Those IP packets follow IP routes and finally reach your first-hop router, and then the router will forward those IP packets to your computer by encapsulating them into Ethernet frames.

- (•) True
- ( ) False

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