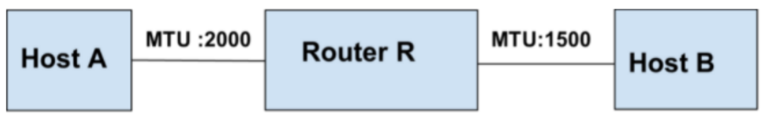
DLL001

MTU

The diagram shown below consists of a single router R (a Layer 3, i.e., Network layer, device) connecting two hosts, A and B, through different Layer 2 (i.e, Data Link layer) technologies such as WLAN, Ethernet. Each of the links in the diagram have certain capacities called the **Maximum Transmission Unit (MTU)**, which is a characteristic of the corresponding link layer technology/protocol being used and is explained as follows.

MTU gives the maximum size of a single IP datagram (in bytes) that can be carried through the underlying link layer. The size of the MTU might be of interest to us in optimizing our transmissions and overhead. If a device attempts to transmit an IP datagram with a size exceeding the MTU of the link layer, it receives an **ICMP Error (Destination unreachable)** message indicating that the transmission has failed.

A related concept is the Don't Fragment (DF) flag in the IP header. When this flag is set to 1 (DF=1), it restricts splitting up of IP datagrams by any Layer 3 device. For this question, assume that DF=1 always.



Answer the following questions with reference to the diagram:

Answer the following questions with reference to the diagram:

Host B attempts to transmit an IP datagram of length 1500 bytes to host A. Which of the following event(s) is/are expected to occur?

- [x] (a) Datagram from Host B is sent to Router R
- [x] (b) Router R forwards the datagram to Host A
- [ ] (c) Router R does not forward the datagram to Host A
- [ ] (d) Router R sends an ICMP Error (Destination unreachable) message to Host B
- [ ] (e) Datagram is dropped at Host B

Select all possible options that apply.

✓ 100%

Host A attempts to transmit an IP datagram of length 2000 bytes to host B. Which of the following event(s) is/are expected to occur?

- [x] (a) Datagram from Host A is sent to Router R
- [x] (b) Router R does not forward the datagram to host B
- [ ] (c) Router R forwards the datagram to host B
- [x] (d) Router R sends an ICMP Error (Destination unreachable) message to Host A
- [ ] (e) Datagram is dropped at Host A

Select all possible options that apply.

✓ 100%

DLL002

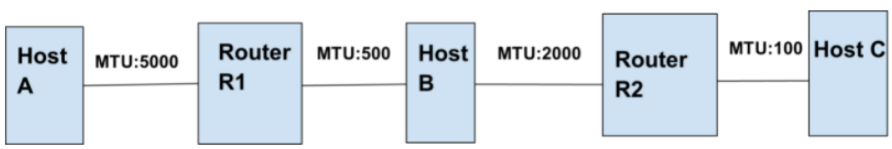
MTU with multiple routers

The diagram shown below consists of routers(Layer 3, i.e., Network layer, device) R1 and R2 connecting hosts A,B and C, through different Layer 2 (i.e, Data Link layer) technologies such as WLAN, Ethernet. Each of the links in the diagram have certain capacities called the **Maximum Transmission Unit (MTU)**, which is a characteristic of the corresponding link layer technology/protocol being used and is explained as follows.

MTU gives the maximum size of a single IP datagram (in bytes) that can be carried through the underlying link layer. The size of the MTU might be of interest to us in optimizing our transmissions and overhead. If a device attempts to transmit an IP datagram with a size exceeding the MTU of the link layer, it receives an **ICMP Error (Destination unreachable)** message indicating that the transmission has failed, along with the MTU value of the next hop.

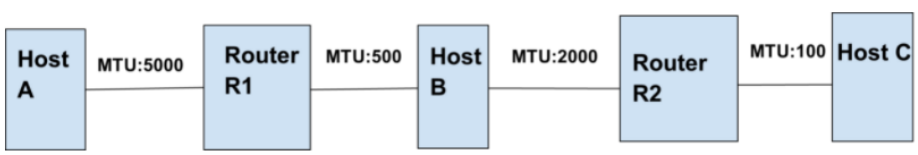
A related concept is the Don't Fragment (DF) flag in the IP header. When this flag is set to 1 (DF=1), it restricts splitting up of IP datagrams by any Layer 3 device. For this question, assume that DF=1 always.

.



If Host A transmits a datagram of length 4000 bytes to host C. How far do we expect the datagram to travel?

.



If Host A transmits a datagram of length 4000 bytes to host C. How far do we expect the datagram to travel?

- (a) Router 1 ✓ (selected)
- (b) Host B
- (c) Router 2
- (d) Host C

✓ 100%

Will we get an ICMP Error (Destination unreachable) message? If yes, from which device?

Yes, R1 ✓ 100%

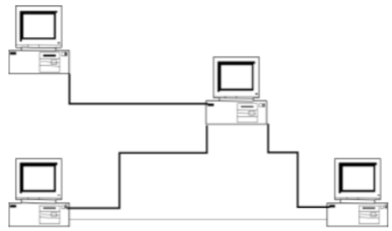
What will be the reported MTU value on the above message? (Enter 0 if you choose no).

500 ✓ 100%

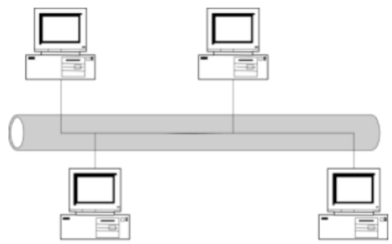
DLL003

Point-Point Vs Broadcast Networks

Consider a Point-to-Point Network



and a Broadcast Network



Match the listed features in the left column to their corresponding network on the right.

Match the listed features in the left column to their corresponding network on the right.

a	Important protocols include Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Ethernet
a	The devices communicate on a common transmission medium.
b	Each link has exactly two end points
b	Important protocols include Point-to-Point protocol (PPP), PPP over Ethernet (PPPoE), Digital Subscriber Line (DSL)
a	A collision is possible due to simultaneous transmissions of different devices
b	N(N-1)/2 links are required to connect N devices

a. Broadcast Network

b. Point to Point Network

✓ 100%

DLL004

Bridge Basics

State whether the following statements are True or False.

Bridges operate at Layer 2, i.e., the Data Link or Medium Access (MAC) Layer.

- (●) (a) True ✓
- ( ) (b) False

✓ 100%

Bridges modify the IP headers of frames while forwarding them.

- ( ) (a) True
- (●) (b) False ✓

✓ 100%

Bridges modify the MAC layer headers of frames while forwarding them.

- ( ) (a) True
- (●) (b) False ✓

✓ 100%

LAY002

Protocol layers and functions

Match the given functions and responsibilites with their corresponding protocol layers.

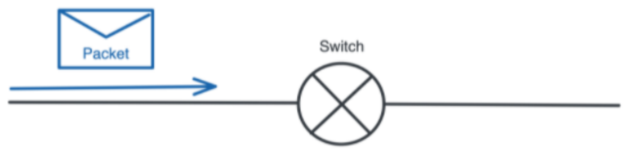
Answer	Function		Layer
c	Handles all the hardware details to provide data transmission for the network layer. Examples protocols: Ethernet, WiFi, PPP.	✓	**a.** Transport Layer
b	Handles routing of packets across the network. Prominent protocols at this layer are IP and ICMP.	✓	**b.** Network Layer
d	Consists of a wide variety of user applications. Prominent examples are HTTP, telnet and DNS.	✓	**c.** Data Link Layer
a	Provides data transport for the application layer. It can provide additional functionalities such as reliable transmission and error detection and correction. Prominent protocols at this layer are TCP and UDP.	✓	**d.** Application Layer

✓ 100%

LAY004

Encapsulation, Decapsulation and Processing

Consider a switch which is configured as a hub, bridge and router respectively in successive experiments. A packet traveling through the switch experiences time delay t_1 in the switch when it is configured as a hub, t_2 when it is configured as a bridge and t_3 when it is configured as a router.



Assuming this delay is proportional to decapsulation, processing and encapsulation time spent in the switch, present these delays (t_1, t_2 or t_3) in increasing order (largest on top).

Correct answer (one possible correct order):

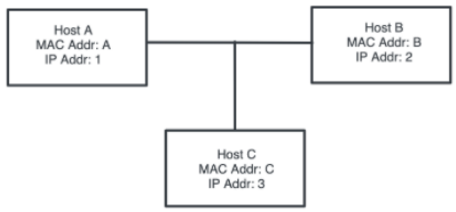
- t_3
- t_2
- t_1

A router is a layer 3 switch, which means it analyzes up to the IP layer header before forwarding a packet. A bridge is layer 2 switch which analyzes only up to the MAC layer header before forwarding a packet. A hub is a layer 1 switch and it forwards a packet without any processing whatsoever. The more decapsulation, processing and decapsulation that needs to be done, the higher the delay. Hence, the largest delay would be experienced in a router and the smallest delay in a hub

LAY005

Processing Received MAC Layer Packets

Suppose nodes A, B, and C each attach to the same broadcast LAN.



If A sends an IP datagram to B with the encapsulating frame addressed to the MAC address of B, will C's adapter process these link layer frames? If so, will C's adapter pass the IP datagrams in these frames to the network layer C?

- ○ (a) C will process the link layer frames and will decide to pass the IP datagram to the higher layer for processing.
- ○ (b) C **will not** process the link layer frames.
- ◉ (c) C will process the link layer frames but **will not** pass the IP datagram to the higher layer.. ✓

✓ 100%

What would happen if instead A sent the frames with the MAC broadcast address rather than B's MAC address?

- ○ (a) C will process the link layer frames but **will not** pass the IP datagram to the higher layer..
- ○ (b) C **will not** process the link layer frames.
- ◉ (c) C will process the link layer frames and will decide to pass the IP datagram to the higher layer for processing. ✓

✓ 100%

MAC003

Throughout the discussion of last week, we started learning about functions of layers of the protocol stack. We for instance emphasized that the Network Layer a.k.a. the IP Layer is in charge of routing, and that the Data Link Layer Protocols are in charge of providing the physical connectivity with the next hop. Let's now assume a scenario where we are given the IP Address of a destination we want to reach but we are not quite sure how to physically reach the host. So we end up relying on the Address Resolution Protocol.

Which of the following is/are correct regarding the ARP **request?**

- [x] (a) ARP query is sent within a broadcast frame
- [ ] (b) The querying host knows which adapter address corresponds to the IP address in question
- [x] (c) The querying host does not know which adapter address corresponds to the IP address in question
- [ ] (d) ARP query is sent within a frame with a specific destination MAC address

Select all possible options that apply.

✓ 100%

Let's now assume that our request is received and we got a response?

Which of the following is/are correct regarding the ARP **response?**

- [ ] (a) ARP response is sent within a broadcast frame
- [x] (b) The sending node knows the adapter address to which the response should be sent
- [ ] (c) The sending node does not know the adapter address to which the response should be sent
- [x] (d) ARP response is sent within a frame with a specific destination MAC address

Select all possible options that apply.

✓ 100%

MAC004

MAC and IP Address Fields on an ARP Exchange

Two hosts are connected by an Ethernet cable:

- `susan` (IP address: 192.168.1.3, MAC address: `f8:0f:41:c3:86:c6`)
- `mary` (IP address: 192.168.1.10, MAC address: `f8:0f:41:c3:86:83`)

(Also remember that the broadcast MAC address is `ff:ff:ff:ff:ff:ff`.)

Suppose that `susan` sends an ARP request (encapsulated in an Ethernet frame) to resolve `mary`'s IP address.

ARP request frame

The Ethernet header of any Ethernet frame includes a "destination MAC address" and a "source MAC address" field. What will be the values of these Ethernet header fields in the ARP request?

ARP request frame

The Ethernet header of any Ethernet frame includes a "destination MAC address" and a "source MAC address" field. What will be the values of these Ethernet header fields in the ARP request?

Source MAC address	f8:0f:41:c3:86:c6	✓ 100%
Destination MAC address	ff:ff:ff:ff:ff:ff	✓ 100%

The payload of the ARP frame includes a "Sender protocol address" field and a "Target protocol address" field. What will be the values of these ARP payload fields in the ARP request?

Sender protocol address	192.168.1.3	✓ 100%
Target protocol address	192.168.1.10	✓ 100%

ARP reply frame

Answer the same questions, but for the ARP *reply* frame that will be sent in response to `susan`'s ARP request.

Source MAC address	f8:0f:41:c3:86:83	✓ 100%
Destination MAC address	f8:0f:41:c3:86:c6	✓ 100%
Sender protocol address	192.168.1.10	✓ 100%
Target protocol address	192.168.1.3	✓ 100%

TREE001

Bridge identifiers and logical numbers

In the following table, fill in the Bridge Identifiers of the four bridges (in hex, e.g. `01:23:45:67:89:ab:cd:ef`). Then, order the four bridges based on their Bridge Identifiers, and assign them logical numbers 1, 2, 3, and 4 in order, with logical number 1 being assigned to the bridge with the lowest Bridge Identifier. Note that now, each bridge has three attributes – the Name, the Bridge Identifier and the Logical Number.

Bridge Name	Identifier	Logical Number
photon	cd:12:02:04:05:03:6d:7e ✓ 100%	4 ✓ 100%
duke	ac:12:04:98:08:78:6f:6a ✓ 100%	2 ✓ 100%
utopia	ac:12:04:11:10:5f:6e:45 ✓ 100%	1 ✓ 100%
catt	bc:15:5e:12:5f:56:6e:45 ✓ 100%	3 ✓ 100%

Initial BPDUs

What are the initial BPDUs that the bridges generate at t = 0? Use the notation for BPDUs used in the example in the slides: `[root id, root path cost, bridge id]`.

Use the bridge Logical Numbers instead of Bridge Identifiers for the root id and bridge id fields of the BPDUs. Note that this is just a short hand to avoid writing the whole Bridge Identifiers all the time. In the actual BPDUs exchanged by the bridges, the whole Bridge Identifiers are used.

Bridge Name	BPDU at t=0
photon	[4,0,4] ✓ 100%
duke	[2,0,2] ✓ 100%
utopia	[1,0,1] ✓ 100%
catt	[3,0,3] ✓ 100%

TREE002

Bridge Name	Root Bridge	Root Port	Root Path Cost	Designated Port(s)	New BPDU (sent at t=1)
photon	1 ✓ 100%	3 ✓ 100%	1 ✓ 100%	1,2 ✓ 100%	[1,1,4] ✓ 100%
duke	1 ✓ 100%	3 ✓ 100%	1 ✓ 100%	1 ✓ 100%	[1,1,2] ✓ 100%
utopia	1 ✓ 100%	0 ✓ 100%	0 ✓ 100%	1,2,3 ✓ 100%	[1,0,1] ✓ 100%
catt	3 ✓ 100%	0 ✓ 100%	0 ✓ 100%	1,2 ✓ 100%	[3,0,3] ✓ 100%

Bridge Name	Root Bridge	Root Port	Root Path Cost	Designated Port(s)	New BPDU (sent at t=2)
photon	1 ✓ 100%	3 ✓ 100%	1 ✓ 100%	2 ✓ 100%	[1,1,4] ✓ 100%
duke	1 ✓ 100%	3 ✓ 100%	1 ✓ 100%	1 ✓ 100%	[1,1,2] ✓ 100%
utopia	1 ✓ 100%	0 ✓ 100%	0 ✓ 100%	1,2,3 ✓ 100%	[1,0,1] ✓ 100%
catt	1 ✓ 100%	1 ✓ 100%	2 ✓ 100%	2 ✓ 100%	[1,2,3] ✓ 100%

Continue iterating until the network reaches a stable point, i.e. there are no further changes in the five parameters reached by each bridge, and the same BPDUs are sent in each interval. When does this network *first* reach a stable point?

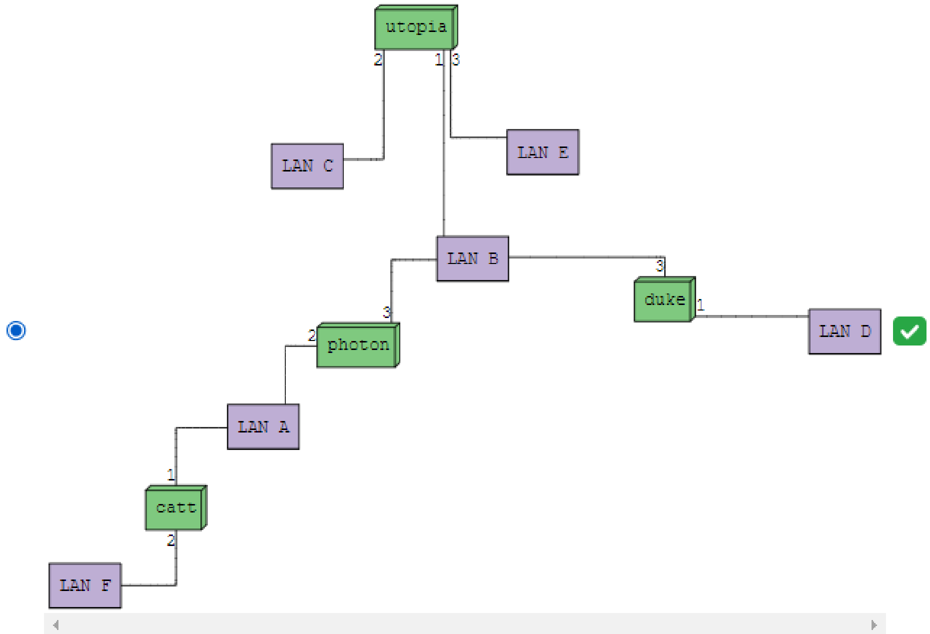
- ○ (a) The "stable" BPDUs are sent for the first time at t=0. After this, the BPDUs do not change.
- ○ (b) The "stable" BPDUs are sent for the first time at t=1. After this, the BPDUs do not change.
- ◉ (c) The "stable" BPDUs are sent for the first time at t=2. After this, the BPDUs do not change. ✓
- ○ (d) The "stable" BPDUs are sent for the first time at t=3. After this, the BPDUs do not change.
- ○ (e) The "stable" BPDUs are sent for the first time at t=4. After this, the BPDUs do not change.

✓ 100%

TREE003

Bridge Name and Port	**Port Role**	**Port State**
photon, port 1	Neither ✓ 100%	Blocked ✓ 100%
photon, port 2	Designated Port ✓ 100%	Forwarding ✓ 100%
photon, port 3	Root Port ✓ 100%	Forwarding ✓ 100%
photon, port 4	Neither ✓ 100%	Blocked ✓ 100%
duke, port 1	Designated Port ✓ 100%	Forwarding ✓ 100%
duke, port 2	Neither ✓ 100%	Blocked ✓ 100%
duke, port 3	Root Port ✓ 100%	Forwarding ✓ 100%
utopia, port 1	Designated Port ✓ 100%	Forwarding ✓ 100%
utopia, port 2	Designated Port ✓ 100%	Forwarding ✓ 100%
utopia, port 3	Designated Port ✓ 100%	Forwarding ✓ 100%
catt, port 1	Root Port ✓ 100%	Forwarding ✓ 100%
catt, port 2	Designated Port ✓ 100%	Forwarding ✓ 100%

TREE004


utopia
2
1
3
LAN C
LAN E
LAN B
3
duke
1
LAN D
3
2
photon
LAN A
1
catt
2
LAN F

✓ 100%

TREE005

Forwarding frames

Assume that the forwarding tables on the bridges are initially empty. Suppose H1 sends a MAC frame to H2. Use the blocks below to indicate which bridge ports will receive or forward the frame, and in what order. (Note: not all blocks will be used. There are multiple valid orders; any possible order will be accepted)

Correct answer (one possible correct order):

- H1 sends frame
- Frame received on photon port 2
- Frame forwarded on photon port 3
- Frame received on duke port 3
- Frame forwarded on duke port 1
- Frame received on utopia port 1
- Frame forwarded on utopia port 2
- Frame forwarded on utopia port 3
- Frame received on catt port 1
- Frame forwarded on catt port 2
- H2 receives frame

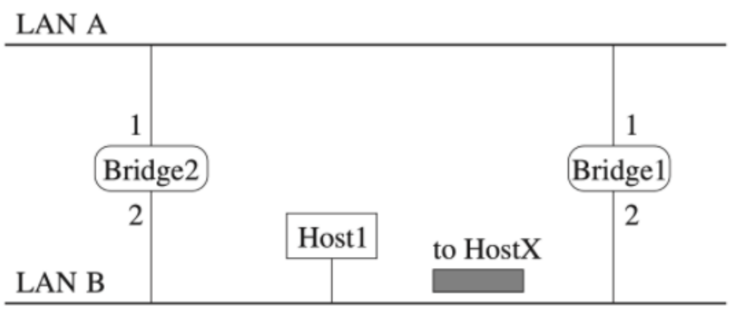
Correct answer (one possible correct order):

H2 sends frame
Frame received on photon port 3
Frame forwarded on photon port 2
Frame received on duke port 3
Frame received on utopia port 2
Frame forwarded on utopia port 1
Frame received on catt port 1
H1 receives frame

TREE006

Bridges, loops and spanning tree

In the figure, Host 1 sends an Ethernet frame to some Host X, that is not on the network, through LAN B. **Assume the spanning tree protocol (STP) is disabled.**



When both bridges receive the frame for the first time, how would they update their filtering database for Host 1?

- ○ (a) Only Bridge 1 records Host 1 on its 2nd port (LAN B).
- ○ (b) Only Bridge 1 records Host 1 on its 1st port (LAN A).
- ○ (c) Only Bridge 2 records Host 1 on its 2nd port (LAN B).
- ○ (d) Only Bridge 2 records Host 1 on its 1st port (LAN A).
- ◉ (e) Both bridges will record Host 1 to be on their 2nd port (LAN B). ✅

✓ 100%

For the next step, note that **both bridges do not have an entry for Host X**. Where should they forward the frame received from Host 1?

For the next step, note that **both bridges do not have an entry for Host X**. Where should they forward the frame received from Host 1?

- ○ (a) Both bridges forward to their 2nd port (LAN B).
- ○ (b) Both bridges discard the packet.
- ◉ (c) Both bridges forward to their 1st port (LAN A.) ✓
- ○ (d) Both bridges forward to both the ports, Port1 and Port2, i.e., to both LAN A and LAN B.

✓ 100%

Which of the following event(s) happen(s) after the step mentioned in the above question? (remember that **STP is disabled**)

- [ ] (a) An ICMP Error (Destination unreachable) message is sent to Host 1.
- [x] (b) Both the bridges update their filtering databases indefinitely.
- [x] (c) Eventually, this leads to a broadcast storm.
- [ ] (d) Port 2 of Bridge 1 is switched to a blocking state.
- [ ] (e) Port 1 of Bridge 2 is switched to blocking state.

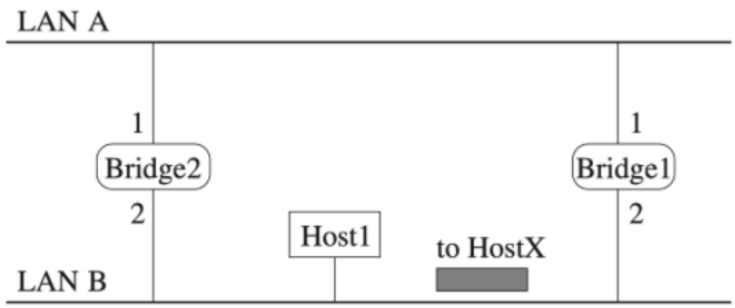
Select all possible options that apply.

✓ 100%

TREE007

Bridges, Avoiding loops with spanning tree

In the figure given below, Host 1 sends an Ethernet frame to some Host X, that is not on the network, through LAN B. Assume now that **the spanning tree protocol is enabled**.



Assume that the port IDs are the same as the port numbers shown in the figure above. Therefore, Bridge 1 has Bridge ID 1.1 and Bridge 2 has Bridge ID 2.1. Which port will be switched to the blocking state?

- (a) Port1 of Bridge1
- (b) Port2 of Bridge1
- (c) Port1 of Bridge2
- (d) Port2 of Bridge2 ✓

✓ 100%

RTR014

(b)

Subnet A - 214.97.254.0/25

Subnet B - 214.97.255.0/26

Subnet C - 214.97.254.128/27

Subnet D - 214.97.255.192/30

Subnet E - 214.97.255.224/30

Subnet F - 214.97.254.192/30

(c)

Subnet A - 214.97.255.0/25

Subnet B - 214.97.254.0/26

Subnet C - 214.97.255.128/27

Subnet D - 214.97.254.192/30

Subnet E - 214.97.254.224/30

Subnet F - 214.97.255.192/30

✓ 100%

RTR016

Longest Prefix Match	**Smallest address**	**Largest address**	**Number of addresses**
010 -> mapped to Int 1	01000000 ✓ 100%	01011111 ✓ 100%	32 ✓ 100%
011 -> mapped to Int 2	01100000 ✓ 100%	01111111 ✓ 100%	32 ✓ 100%
10 -> mapped to Int 2	10000000 ✓ 100%	10111111 ✓ 100%	64 ✓ 100%
11 -> mapped to Int 3	11000000 ✓ 100%	11111111 ✓ 100%	64 ✓ 100%
0 -> mapped to Int 0	00000000 ✓ 100%	00111111 ✓ 100%	64 ✓ 100%

RTR010

State "True" or "False" regarding the actions of **bridge B1** (Questions a-c)

a. Bridge B1 will broadcast the Ethernet frame via its interfaces (other than the source interface) as the destination address is a broadcast address.

- (x) True ✓
- ( ) False

✓ 100%

b. Bridge B1 learns that Host A resides on LAN 1.

- (x) True ✓
- ( ) False

✓ 100%

c. Bridge B1 does not update its forwarding table to include an entry for Host A.

- ( ) True
- (x) False ✓

✓ 100%

Subsequently, what happens to the ARP request in the **Router R1**?

- ( ) R1 does not receive this ARP request message
- ( ) R1 receives this ARP request message and forwards the message to LAN 3
- (x) R1 receives this ARP request message and does not forward the message to LAN 3 ✓

✓ 100%

RTR012

Suppose Host A would like to send an IP datagram to Host B, and neither A's ARP cache contains B's MAC address nor does B's ARP cache contain A's MAC address. Further suppose that the bridge B1's forwarding table contains entries for Host B and bridge B2 only. **Thus, Host A will broadcast an ARP request message**. Bridge B1 broadcasts the frame and learns the MAC address of Host A.

What happens in bridge B2 ?

- ○ Bridge B2 does not receive this ARP request message
- ○ Bridge B2 receives this ARP request message and does not forward the message
- ◉ Bridge B2 receives this ARP request message and broadcasts to all its interfaces (other than the source interface). ✓

✓ 100%

Once Host B receives this ARP request message, it will send Host A an ARP response message. Before sending the ARP response: Will it need to send a new ARP request message to ask for A's MAC address?

- ◉ No, because Host B knows Host A's address from the ARP request it received. ✓
- ○ Yes, because Host B will not know Host A's address and it is the first message from Host B to Host A.

✓ 100%

What does bridge B1 do once it receives an ARP response message from Host B?

- ☐ Learns Host A and Host B are on same LAN segment and forwards the frame to Host B
- ☑ Learns Host A and Host B are on same LAN segment and drops the frame
- ☑ Updates the entry for Host B in its forwarding table

Select all possible options that apply.

✓ 100%

Once Host B receives this ARP request message, it will send Host A an **ARP response message**.

Before sending the ARP response: Will it need to send a new ARP request message to ask for A's MAC address?

- ○ Yes, because Host B will not know Host A's address as it is the first message from Host B to Host A.
- ◉ No, because Host B knows Host A's address from the ARP request it received. ✓

✓ 100%

What does bridge B1 do once it receives an ARP response message from Host B?

- ☑ Drops the received frame as destination Host A is on the same interface as Host B
- ☑ Updates the entry for Host B in its forwarding table
- ☐ Forwards the received frame to Host B

Select all possible options that apply.

✓ 100%

PSARP001

Event 1. Host I sends an IP datagram to Host II

How many ARP Request-Reply pairs are exchanged?

- ○ (a) 0
- ◉ (b) 1 ✓
- ○ (c) 2
- ○ (d) 3
- ○ (e) 4

✓ 100%

Answer the following questions about the *first* ARP Request-Reply pair that is exchanged (or, if there is only one, answer about this pair.).

1. On which network does the exchange take place?
   - ◉ (a) Ethernet A ✓
   - ○ (b) Ethernet B
   - ○ (c) PPP
   - ○ (d) No ARP Request-Reply pairs are exchanged

   ✓ 100%
2. What is the IP Address being resolved in the ARP Request?
   - ○ (a) 131.12.16.1
   - ○ (b) 131.12.16.3
   - ◉ (c) 131.12.16.50 ✓
   - ○ (d) 140.160.91.1
   - ○ (e) 140.160.91.4
   - ○ (f) No ARP Request-Reply pairs are exchanged

   ✓ 100%

3. What is the resolved MAC Address?

- (a) 00:00:06:0f:ef:3d ✔
- (b) 00:23:06:ff:12:21
- (c) 03:2f:6e:5f:4d:1a
- (d) 00:21:61:d1:1a:01
- (e) No ARP Request-Reply pairs are exchanged

✔ 100%

4. Who sends the ARP Request?

- (a) Host I ✔
- (b) Host II
- (c) Host III
- (d) Router
- (e) No ARP Request-Reply pairs are exchanged

✔ 100%

5. Who sends the ARP Reply?

- (a) Host I
- (b) Host II
- (c) Host III
- (d) Router ✔
- (e) No ARP Request-Reply pairs are exchanged

✔ 100%

	Network	Source MAC address	Destination MAC address
IP Frame 1	Ethernet A ✓ 100%	00:23:06:ff:12:21 ✓ 100%	00:00:06:0f:ef:3d ✓ 100%
IP Frame 2	PPP ✓ 100%	✓ 100%	✓ 100%

What is the order in which the ARP Requests, Replies, and the frames carrying the actual datagram are sent? (Note: some blocks may not be used.)

Your answer: ✓ 100%

- ARP Request
- ARP Reply
- IP Frame 1
- IP Frame 2

PSARP002

How many ARP Request-Reply pairs are exchanged?

(b) 1 ✓ 100%

Answer the following questions about the *first* ARP Request-Reply pair that is exchanged (or, if there is only one, answer about this pair.).

1. On which network does the exchange take place? (b) Ethernet B ✓ 100%
2. What is the IP Address being resolved in the ARP Request? (e) 140.160.91.4 ✓ 100%
3. What is the resolved MAC Address? (d) 00:21:61:d1:1a:01 ✓ 100%
4. Who sends the ARP Request? (d) Router ✓ 100%
5. Who sends the ARP Reply? (c) Host III ✓ 100%

When the actual IP datagram is transferred, two frames are sent. For each of these frames, indicate: On which networks are the frames sent? What are the source and destination MAC addresses in each of these frames (if applicable; otherwise, leave blank)?

	Network	**Source MAC address**	**Destination MAC address**
IP Frame 1	PPP ✓ 100%	✓ 100%	✓ 100%
IP Frame 2	`Ethernet B` ✓ 100%	`03:2f:6e:5f:4d:1a` ✓ 100%	`00:21:61:d1:1a:01` ✓ 100%

What is the order in which the ARP Requests, Replies, and the frames carrying the actual datagram are sent? (Note: some blocks may not be used.)

Your answer: ✓ 100%

- IP Frame 1
- ARP Request
- ARP Reply
- IP Frame 2

PSARP003

How many ARP Request-Reply pairs are exchanged?

(a) 0 ✓ 100%

Answer the following questions about the *first* ARP Request-Reply pair that is exchanged (or, if there is only one, answer about this pair.).

1. On which network does the exchange take place?
   (d) No ARP Request-Reply pairs are exchanged ✓ 100%
2. What is the IP Address being resolved in the ARP Request?
   (f) No ARP Request-Reply pairs are exchanged ✓ 100%
3. What is the resolved MAC Address? (e) No ARP Request-Reply pairs are exchanged ✓ 100%
4. Who sends the ARP Request? (e) No ARP Request-Reply pairs are exchanged ✓ 100%
5. Who sends the ARP Reply? (e) No ARP Request-Reply pairs are exchanged ✓ 100%

When the actual IP datagram is transferred, two frames are sent. For each of these frames, indicate: On which networks are the frames sent? What are the source and destination MAC addresses in each of these frames (if applicable; otherwise, leave blank)?

	Network	**Source MAC address**	**Destination MAC address**
IP Frame 1	`Ethernet B` ✓ 100%	`00:21:61:d1:1a:01` ✓ 100%	`03:2f:6e:5f:4d:1a` ✓ 100%
IP Frame 2	`Ethernet A` ✓ 100%	`00:00:06:0f:ef:3d` ✓ 100%	`00:23:06:ff:12:21` ✓ 100%

What is the order in which the ARP Requests, Replies, and the frames carrying the actual datagram are sent? (Note: some blocks may not be used.)

Your answer: ✓ 100%

IP Frame 1

IP Frame 2