

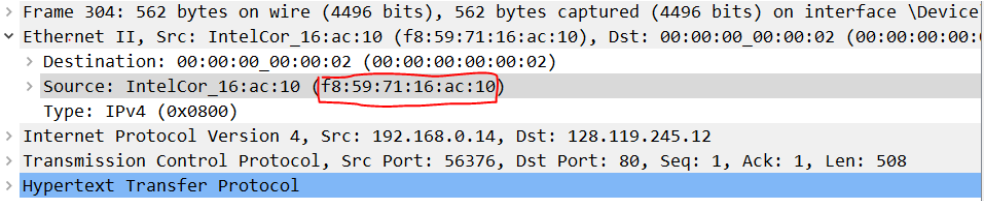
## Wireshark Lab 5: Ethernet and ARP

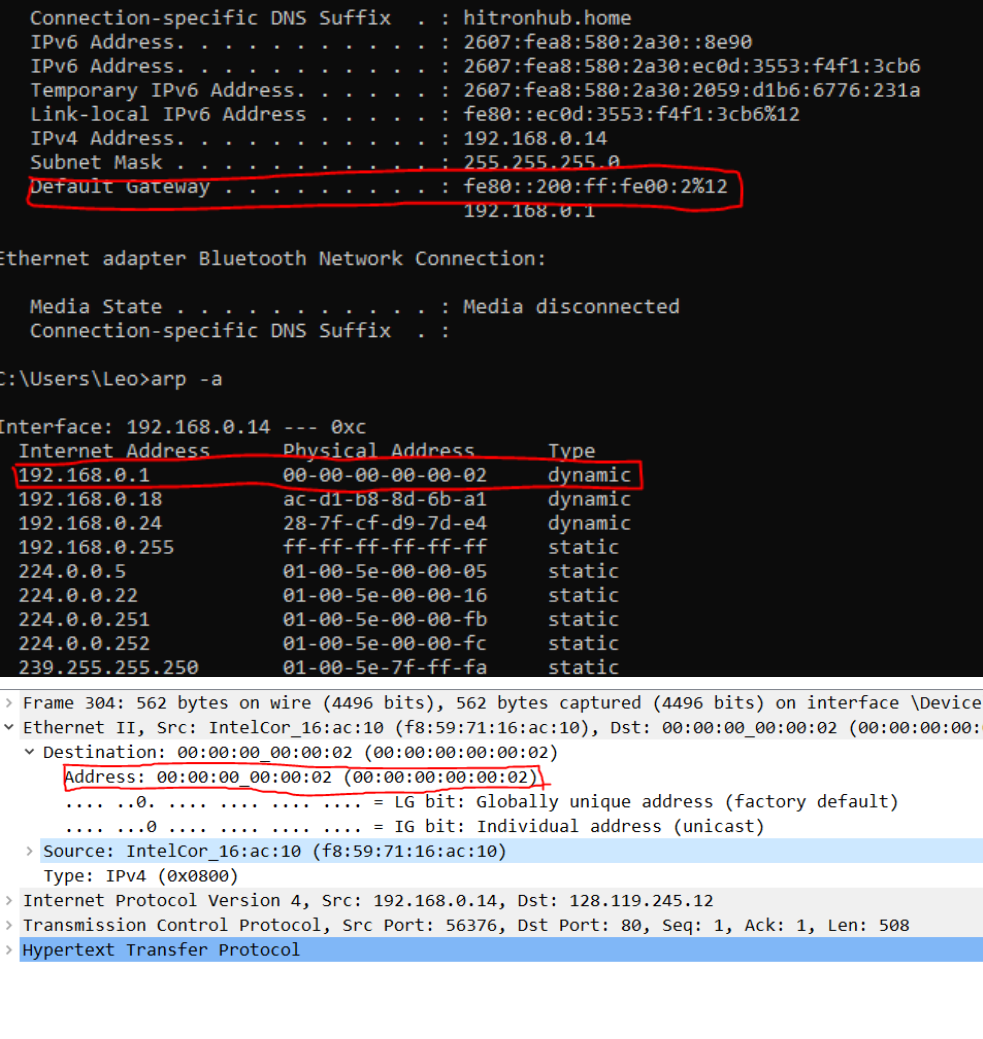
### Group Details:

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### Mark:

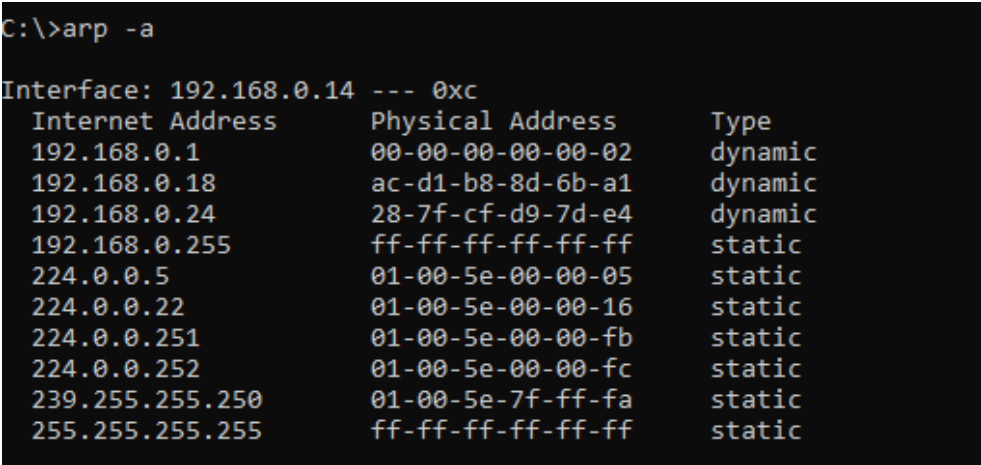
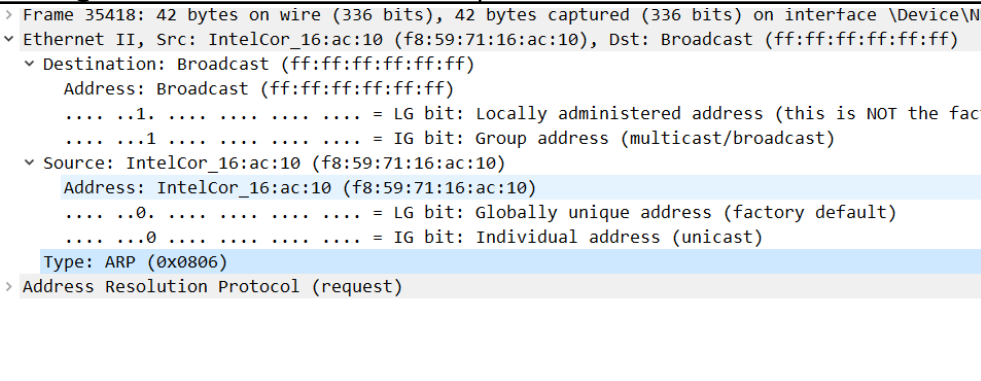
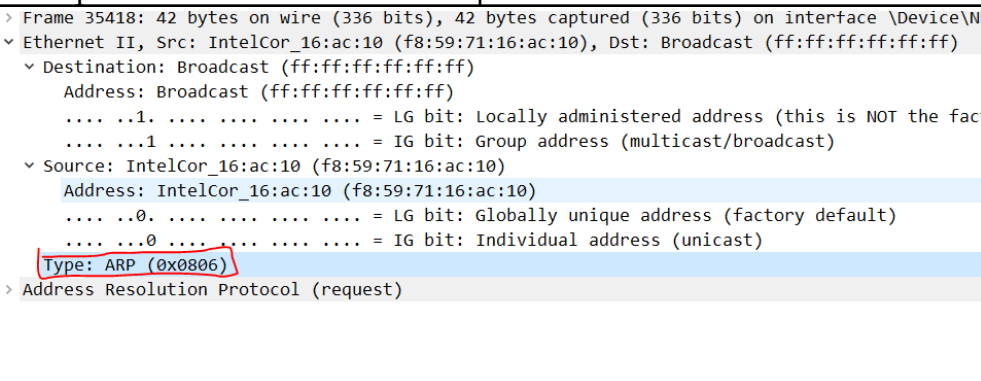
	Question	Answer
1	What is the 48-bit Ethernet address of your computer?	f8:59:71:16:ac:10
Annotated Screenshot (if needed)	 <p>&gt; Frame 304: 562 bytes on wire (4496 bits), 562 bytes captured (4496 bits) on interface \Device\NPF{...}</p> <p>▼ Ethernet II, Src: IntelCor_16:ac:10 (f8:59:71:16:ac:10), Dst: 00:00:00_00:00:02 (00:00:00:00:00:02)</p> <p>&gt; Destination: 00:00:00_00:00:02 (00:00:00:00:00:02)</p> <p>&gt; Source: IntelCor_16:ac:10 (f8:59:71:16:ac:10)</p> <p>Type: IPv4 (0x0800)</p> <p>&gt; Internet Protocol Version 4, Src: 192.168.0.14, Dst: 128.119.245.12</p> <p>&gt; Transmission Control Protocol, Src Port: 56376, Dst Port: 80, Seq: 1, Ack: 1, Len: 508</p> <p>&gt; Hypertext Transfer Protocol</p>	
2	<p>What is the 48-bit destination address in the Ethernet frame?</p> <p>What device has this as its Ethernet address?</p>	<p>00:00:00:00:00:02</p> <p>But it is different from the actual gateway mac address as shown in the command prompt. Our guess the reason it is different is it is a different type of MAC address.</p> <p>This is not the Ethernet address of the destination, it is Ethernet is the gateway address which is the address of the router</p>

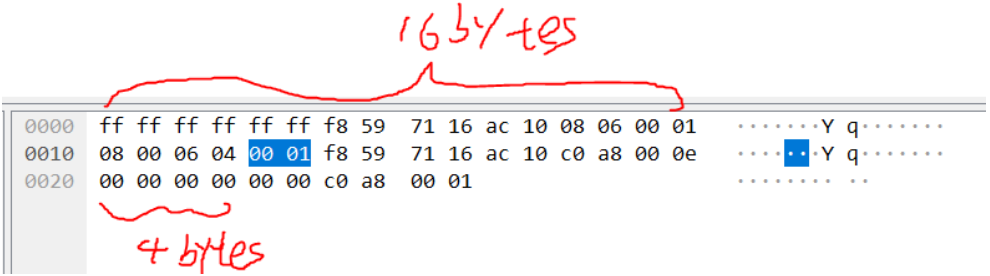
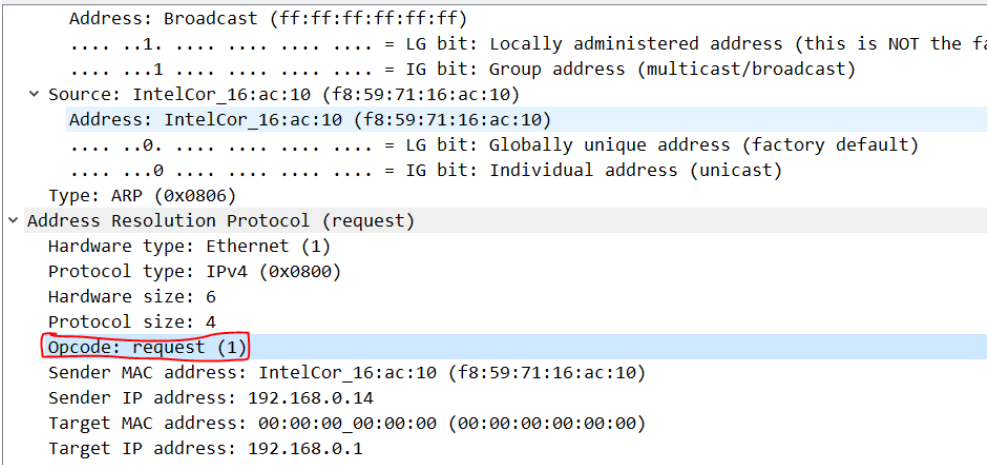
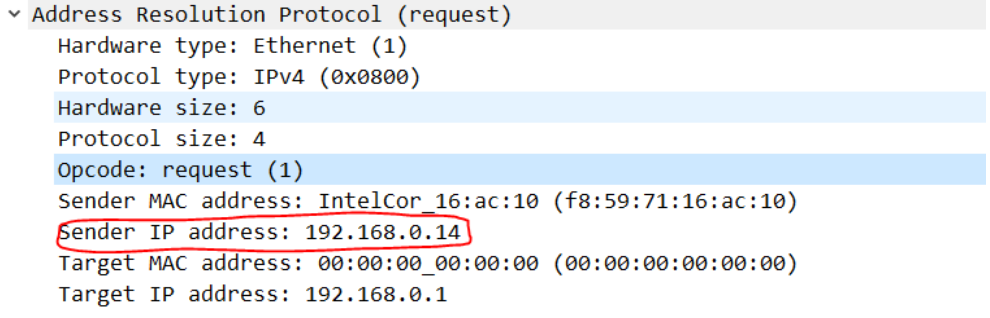
<p>Annotated Screenshot (if needed)</p>	 <pre> Connection-specific DNS Suffix  . : hitronhub.home IPv6 Address. . . . . : 2607:fea8:580:2a30::8e90 IPv6 Address. . . . . : 2607:fea8:580:2a30:ec0d:3553:f4f1:3cb6 Temporary IPv6 Address. . . . . : 2607:fea8:580:2a30:2059:d1b6:6776:231a Link-local IPv6 Address . . . . . : fe80::ec0d:3553:f4f1:3cb6%12 IPv4 Address. . . . . : 192.168.0.14 Subnet Mask . . . . . : 255.255.255.0 Default Gateway . . . . . : fe80::200:ff:fe00:2%12                              192.168.0.1  Ethernet adapter Bluetooth Network Connection:     Media State . . . . . : Media disconnected    Connection-specific DNS Suffix  . :  C:\Users\Leo&gt;arp -a  Interface: 192.168.0.14 --- 0xc  Internet Address      Physical Address      Type 192.168.0.1           00-00-00-00-00-02    dynamic 192.168.0.18          ac-d1-b8-8d-6b-a1    dynamic 192.168.0.24          28-7f-cf-d9-7d-e4    dynamic 192.168.0.255         ff-ff-ff-ff-ff-ff    static 224.0.0.5             01-00-5e-00-00-05    static 224.0.0.22            01-00-5e-00-00-16    static 224.0.0.251           01-00-5e-00-00-fb    static 224.0.0.252           01-00-5e-00-00-fc    static 239.255.255.250       01-00-5e-7f-ff-fa    static  &gt; Frame 304: 562 bytes on wire (4496 bits), 562 bytes captured (4496 bits) on interface \Device\NPF{...}   &gt; Ethernet II, Src: IntelCor_16:ac:10 (f8:59:71:16:ac:10), Dst: 00:00:00_00:00:02 (00:00:00:00:00:02)     &gt; Destination: 00:00:00_00:00:02 (00:00:00:00:00:02)       Address: 00:00:00_00:00:02 (00:00:00:00:00:02)         ....0. .... = LG bit: Globally unique address (factory default)         ....0. .... = IG bit: Individual address (unicast)       &gt; Source: IntelCor_16:ac:10 (f8:59:71:16:ac:10)         Type: IPv4 (0x0800)     &gt; Internet Protocol Version 4, Src: 192.168.0.14, Dst: 128.119.245.12     &gt; Transmission Control Protocol, Src Port: 56376, Dst Port: 80, Seq: 1, Ack: 1, Len: 508     &gt; Hypertext Transfer Protocol   </pre>	
<p>3</p>	<p>Give the hexadecimal value for the two-byte Frame type field.</p> <p>What upper layer protocol does this correspond to?</p>	<p>0x0800</p> <p>It corresponds to IPv4</p>

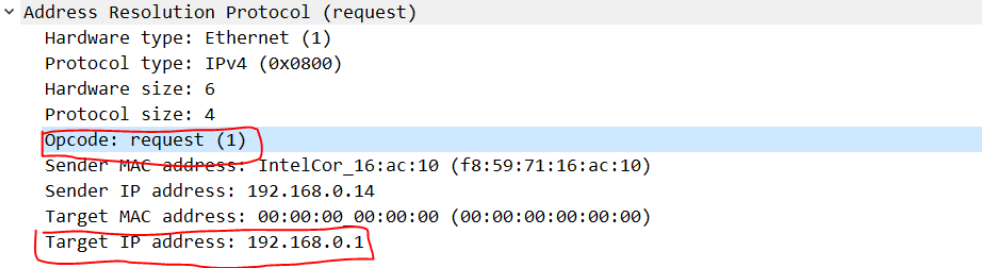
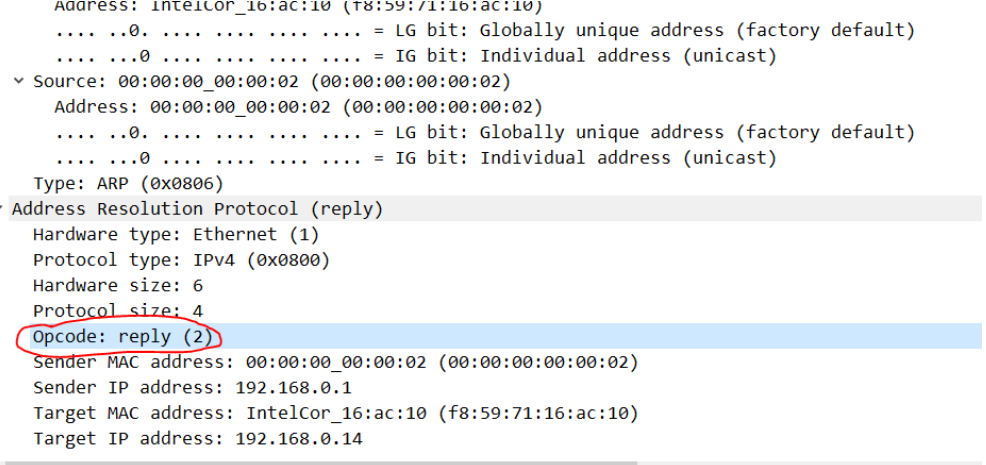
Annotated Screenshot (if needed)	<pre> &gt; Frame 304: 562 bytes on wire (4496 bits), 562 bytes captured (4496 bits) on interface \Device\NPF{...} v Ethernet II, Src: IntelCor_16:ac:10 (f8:59:71:16:ac:10), Dst: 00:00:00_00:00:02 (00:00:00:00:00:02)   v Destination: 00:00:00_00:00:02 (00:00:00:00:00:02)     Address: 00:00:00_00:00:02 (00:00:00:00:00:02)       .... ..0. .... = LG bit: Globally unique address (factory default)       .... ..0. .... = IG bit: Individual address (unicast)   &gt; Source: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     type: IPv4 (0x0800)   &gt; Internet Protocol Version 4, Src: 192.168.0.14, Dst: 128.119.245.12   &gt; Transmission Control Protocol, Src Port: 56376, Dst Port: 80, Seq: 1, Ack: 1, Len: 508   &gt; Hypertext Transfer Protocol </pre>	
4	How many bytes from the very start of the Ethernet frame does the ASCII “G” in “GET” appear in the Ethernet frame?	54 bytes
Annotated Screenshot (if needed)	<pre> 0000 00 00 00 00 00 02 f8 59 71 16 ac 10 08 00 45 00 .....Y q.....E. 0010 02 24 14 84 40 00 80 06 ae 15 c0 a8 00 0e 80 77 .\$.@... ..w 0020 f5 0c dc 38 00 50 c5 21 73 fd ad d1 90 1c 50 18 ...8.P.! s.....P. 0030 02 01 10 26 00 00 47 45 54 20 2f 77 69 72 65 73 ...&amp;..GET /wires 0040 68 61 72 6b 2d 6c 61 62 73 2f 48 54 54 50 2d 65 hark-lab s/HTTP-e 0050 74 68 65 72 65 61 6c 2d 6c 61 62 2d 66 69 6c 65 thereal- lab-file 0060 33 2e 68 74 6d 6c 20 48 54 54 50 2f 31 2e 31 0d 3.html H TTP/1.1. 0070 0a 48 6f 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 .Host: g aia.cs.u 0080 6d 61 73 73 2e 65 64 75 0d 0a 43 6f 6e 6e 65 63 mass.edu ..Connec 0090 74 69 6f 6e 3a 20 6b 65 65 70 2d 61 6c 69 76 65 tion: ke ep-alive 00a0 0d 0a 55 70 67 72 61 64 65 2d 49 6e 73 65 63 75 ..Upgrad e-Insecu 00b0 72 65 2d 52 65 71 75 65 73 74 73 3a 20 31 0d 0a re-Request: 1.. 00c0 55 73 65 72 2d 41 67 65 6e 74 3a 20 4d 6f 7a 69 User-Age nt: Mozi 00d0 6c 6c 61 2f 35 2e 30 20 28 57 69 6e 64 6f 77 73 lla/5.0 (Windows 00e0 20 4e 54 20 31 30 2e 30 3b 20 57 69 6e 36 34 3b NT 10.0 ; Win64; 00f0 20 78 36 34 29 20 41 70 70 6c 65 57 65 62 4b 69 x64) Ap pleWebKi 0100 74 2f 35 33 37 2e 33 36 20 28 4b 48 54 4d 4c 2c t/537.36 (KHTML, 0110 20 6c 69 6b 65 20 47 65 63 6b 6f 29 20 43 68 72 like Ge cko) Chr 0120 6f 6d 65 2f 39 36 2e 30 2e 34 36 36 34 2e 34 35 ome/96.0 .4664.45 0130 20 53 61 66 61 72 69 2f 35 33 37 2e 33 36 0d 0a Safari/ 537.36.. </pre>	
5	<p>What is the value of the Ethernet source address?</p> <p>What device has this as its Ethernet address?</p>	<p>00:00:00:00:00:02 same issue as question two</p> <p>it is the address of the router which is the gateway address</p>

Annotated Screenshot (if needed)	<pre> &gt; Frame 320: 535 bytes on wire (4280 bits), 535 bytes captured (4280 bits) on interface \Device NPF{...} &gt; Ethernet II, Src: 00:00:00_00:00:02 (00:00:00:00:00:02), Dst: IntelCor_16:ac:10 (f8:59:71:16:ac:10)   &gt; Destination: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     Address: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     .... ..0. .... = LG bit: Globally unique address (factory default)     .... ..0. .... = IG bit: Individual address (unicast)   &gt; Source: 00:00:00_00:00:02 (00:00:00:00:00:02)     Address: 00:00:00_00:00:02 (00:00:00:00:00:02)     .... ..0. .... = LG bit: Globally unique address (factory default)     .... ..0. .... = IG bit: Individual address (unicast)   Type: IPv4 (0x0800) &gt; Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.0.14 &gt; Transmission Control Protocol, Src Port: 80, Dst Port: 56376, Seq: 4381, Ack: 509, Len: 481 &gt; [2 Reassembled TCP Segments (4861 bytes): #314(4380), #320(481)] &gt; Hypertext Transfer Protocol &gt; Line-based text data: text/html (98 lines) </pre>
6	<div> <div>What is the destination address in the Ethernet frame?</div> <div>f8:59:71:16:ac:10</div> </div> <div> <div>Is this the Ethernet address of your computer?</div> <div>it the Ethernet address of my computer</div> </div>
Annotated Screenshot (if needed)	<pre> &gt; Frame 320: 535 bytes on wire (4280 bits), 535 bytes captured (4280 bits) on interface \Device NPF{...} &gt; Ethernet II, Src: 00:00:00_00:00:02 (00:00:00:00:00:02), Dst: IntelCor_16:ac:10 (f8:59:71:16:ac:10)   &gt; Destination: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     Address: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     .... ..0. .... = LG bit: Globally unique address (factory default)     .... ..0. .... = IG bit: Individual address (unicast)   &gt; Source: 00:00:00_00:00:02 (00:00:00:00:00:02)     Address: 00:00:00_00:00:02 (00:00:00:00:00:02)     .... ..0. .... = LG bit: Globally unique address (factory default)     .... ..0. .... = IG bit: Individual address (unicast)   Type: IPv4 (0x0800) &gt; Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.0.14 &gt; Transmission Control Protocol, Src Port: 80, Dst Port: 56376, Seq: 4381, Ack: 509, Len: 481 &gt; [2 Reassembled TCP Segments (4861 bytes): #314(4380), #320(481)] &gt; Hypertext Transfer Protocol &gt; Line-based text data: text/html (98 lines) </pre>
7	<div> <div>Give the hexadecimal value for the two-byte Frame type field.</div> <div>0x0800</div> </div> <div> <div>What upper layer protocol does this correspond to?</div> <div>IPv4</div> </div>

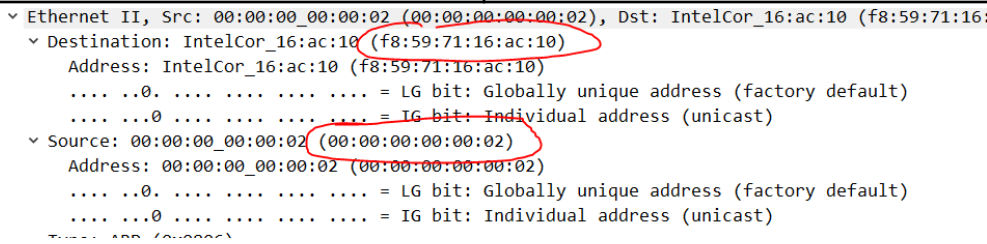
Annotated Screenshot (if needed)	<pre> &gt; Frame 320: 535 bytes on wire (4280 bits), 535 bytes captured (4280 bits) on interface \Device NPF{...} &gt; Ethernet II, Src: 00:00:00_00:00:02 (00:00:00:00:00:02), Dst: IntelCor_16:ac:10 (f8:59:71:16:ac:10)   &gt; Destination: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     Address: IntelCor_16:ac:10 (f8:59:71:16:ac:10)     .... 0. .... = LG bit: Globally unique address (factory default)     .... 0. .... = IG bit: Individual address (unicast)   &gt; Source: 00:00:00_00:00:02 (00:00:00:00:00:02)     Address: 00:00:00_00:00:02 (00:00:00:00:00:02)     .... 0. .... = LG bit: Globally unique address (factory default)     .... 0. .... = IG bit: Individual address (unicast)   Type: IPv4 (0x0800) &gt; Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.0.14 &gt; Transmission Control Protocol, Src Port: 80, Dst Port: 56376, Seq: 4381, Ack: 509, Len: 481 &gt; [2 Reassembled TCP Segments (4861 bytes): #314(4380), #320(481)] &gt; Hypertext Transfer Protocol &gt; Line-based text data: text/html (98 lines) </pre>
8	<div>How many bytes from the very start of the Ethernet frame does the ASCII “O” in “OK” (i.e., the HTTP response code) appear in the Ethernet frame?</div> <div>13+535 = 548 bytes</div>
Annotated Screenshot (if needed)	<p>The screenshot shows a Wireshark packet capture. The packet list pane on the left shows a single packet, 'Frame 535 bytes' (highlighted with a red box), which is a 'Reassembled TCP (4861 bytes)'. The packet details pane on the right shows the 'Hypertext Transfer Protocol' section, where the 'Status Line' is 'HTTP/1.1 200 OK' (the 'OK' is highlighted with a red box). The packet bytes pane on the right shows the raw data of the packet, with the first 120 bytes displayed in hexadecimal and ASCII. The ASCII column shows the text 'HTTP/1.1 200 OK'.</p>
9	<div>Write down the contents of your computer’s ARP cache.</div> <div>What is the meaning of each column value?</div> <div>The first column and the second column correspond to the mapping between the IP address and the MAC address that is known in the local network. The third column corresponds to the type of IP address whether it is dynamic or static.</div>

Annotated Screenshot (if needed)	 <pre> C:\&gt;arp -a  Interface: 192.168.0.14 --- 0xc Internet Address      Physical Address      Type 192.168.0.1          00-00-00-00-00-02     dynamic 192.168.0.18         ac-d1-b8-8d-6b-a1     dynamic 192.168.0.24         28-7f-cf-d9-7d-e4     dynamic 192.168.0.255        ff-ff-ff-ff-ff-ff     static 224.0.0.5            01-00-5e-00-00-05     static 224.0.0.22           01-00-5e-00-00-16     static 224.0.0.251          01-00-5e-00-00-fb     static 224.0.0.252          01-00-5e-00-00-fc     static 239.255.255.250      01-00-5e-7f-ff-fa     static 255.255.255.255      ff-ff-ff-ff-ff-ff     static </pre>	
10	What are the hexadecimal values for the source and destination addresses in the Ethernet frame containing the ARP request message?	Destination: ff:ff:ff:ff:ff:ff Source: f8:59:71:16:ac:10
Annotated Screenshot (if needed)	 <pre> &gt; Frame 35418: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF...   Ethernet II, Src: IntelCor_16:ac:10 (f8:59:71:16:ac:10), Dst: Broadcast (ff:ff:ff:ff:ff:ff)     Destination: Broadcast (ff:ff:ff:ff:ff:ff)       Address: Broadcast (ff:ff:ff:ff:ff:ff)         .... 1. .... = LG bit: Locally administered address (this is NOT the factory default)         .... 1. .... = IG bit: Group address (multicast/broadcast)     Source: IntelCor_16:ac:10 (f8:59:71:16:ac:10)       Address: IntelCor_16:ac:10 (f8:59:71:16:ac:10)         .... 0. .... = LG bit: Globally unique address (factory default)         .... 0. .... = IG bit: Individual address (unicast)     Type: ARP (0x0806)   Address Resolution Protocol (request) </pre>	
11	Give the hexadecimal value for the two-byte Ethernet Frame type field.  What upper layer protocol does this correspond to?	0x0806, it corresponds to ARP
Annotated Screenshot (if needed)	 <pre> &gt; Frame 35418: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF...   Ethernet II, Src: IntelCor_16:ac:10 (f8:59:71:16:ac:10), Dst: Broadcast (ff:ff:ff:ff:ff:ff)     Destination: Broadcast (ff:ff:ff:ff:ff:ff)       Address: Broadcast (ff:ff:ff:ff:ff:ff)         .... 1. .... = LG bit: Locally administered address (this is NOT the factory default)         .... 1. .... = IG bit: Group address (multicast/broadcast)     Source: IntelCor_16:ac:10 (f8:59:71:16:ac:10)       Address: IntelCor_16:ac:10 (f8:59:71:16:ac:10)         .... 0. .... = LG bit: Globally unique address (factory default)         .... 0. .... = IG bit: Individual address (unicast)     Type: ARP (0x0806)   Address Resolution Protocol (request) </pre>	

12.a	How many bytes from the very beginning of the Ethernet frame does the ARP opcode field begin?	Excluding the preamble part of the header, the ARP opcode starts at 21 bytes
Annotated Screenshot (if needed)		
12.b	What is the value of the opcode field within the ARP-payload part of the Ethernet frame in which an ARP request is made?	the value is 1
Annotated Screenshot (if needed)		
12.c	Does the ARP message contain the IP address of the sender?	Yes
Annotated Screenshot (if needed)		
12.d	Where in the ARP request does the “question” appear – the Ethernet address of the machine whose corresponding IP address is being	The opcode field is 1 meaning this is the request message. It is asking who has the IP address (shown in the target IP address) 192.168.0.1. If you

	queried?	are that address, respond to the device which has IP address 192.168.0.14(which shown in the send ip address field)
Annotated Screenshot (if needed)		
13.a	How many bytes from the very beginning of the Ethernet frame does the ARP opcode field begin?	Excluding the preamble part of the header, it ARP opcode start at 21 byte
Annotated Screenshot (if needed)	same as 12 a	
13.b	What is the value of the opcode field within the ARP-payload part of the Ethernet frame in which an ARP response is made?	The value is 2 which is a reply message
Annotated Screenshot (if needed)		
13.c	Where in the ARP message does the “answer” to the earlier ARP request appear – the IP address of the machine having the Ethernet address whose corresponding IP address is being queried?	It is answering to the device that has IP address 192.168.0.14 that it has the IP address 192.168.0.1, and also answering that its MAC address is 00:00:00:00:00:02 (appear in sender MAC address field).
Annotated Screenshot (if needed)		
14	What are the hexadecimal values for the source and destination	Destination: f8:59:71:16:ac:10 Source: 00:00:00:00:00:02



	addresses in the Ethernet frame containing the ARP reply message?	
Annotated Screenshot (if needed)	 <pre>       0  Ethernet II, Src: 00:00:00_00:00:02 (00:00:00:00:00:02), Dst: IntelCor_16:ac:10 (f8:59:71:16:ac:10)       1  Destination: IntelCor_16:ac:10 (f8:59:71:16:ac:10)       2  Address: IntelCor_16:ac:10 (f8:59:71:16:ac:10)       3  .... ..0. .... = LG bit: Globally unique address (factory default)       4  .... ..0. .... = IG bit: Individual address (unicast)       5  Source: 00:00:00_00:00:02 (00:00:00:00:00:02)       6  Address: 00:00:00_00:00:02 (00:00:00:00:00:02)       7  .... ..0. .... = LG bit: Globally unique address (factory default)       8  .... ..0. .... = IG bit: Individual address (unicast)       9  Type: ARP (0x0806)           </pre>	
15	Why is there no ARP reply (sent in response to the ARP request in packet 6) in the packet trace?	It does not respond because its IP address is not 192.168.1.117
Annotated Screenshot (if needed)		

EX1:

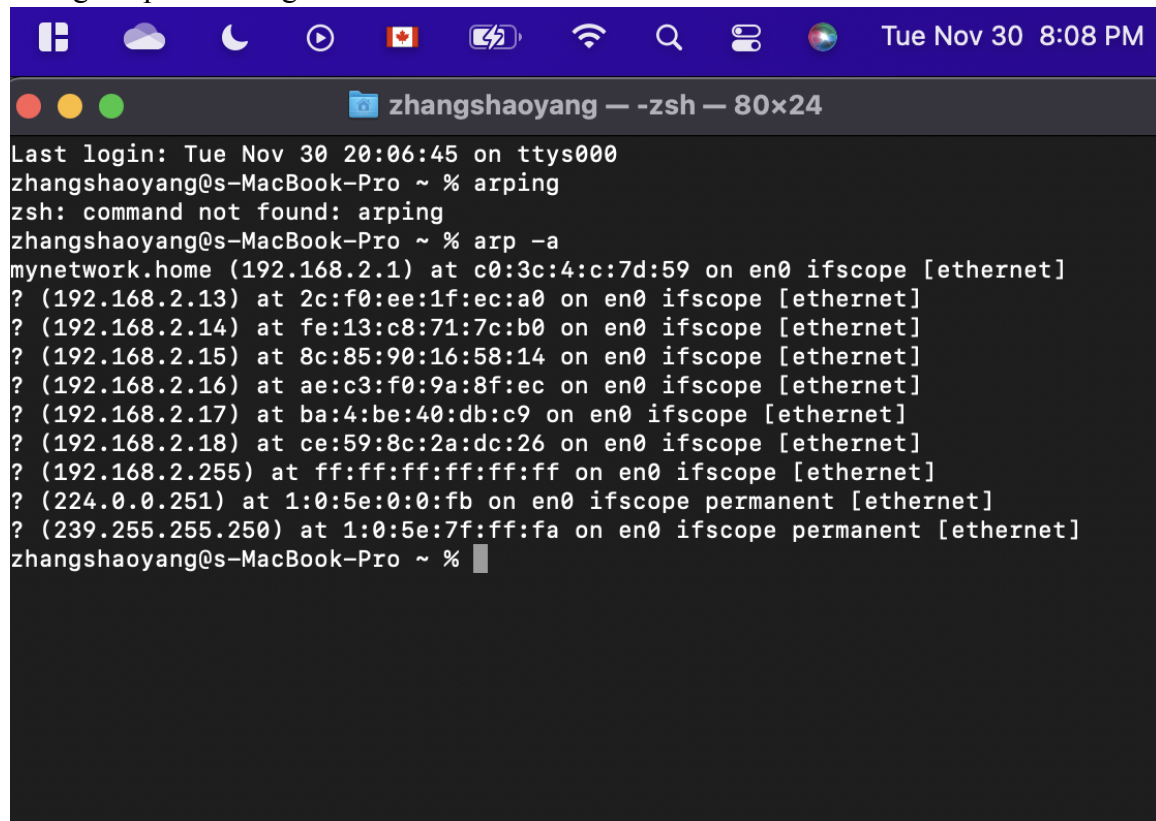
if not using root access, the writing to routing socket operation is not permitted, but if using root access the operation can be done manually. However, usually after 20 minutes the table will refresh so the incorrect entry will be discarded.

```
zhangshaoyang — bash — 80x38
Last login: Tue Nov 30 18:56:42 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
zhangshaoyangdeMacBook-Pro:~ zhangshaoyang$ arp -a
? (192.168.2.1) at c0:3c:4:c:7d:59 on en0 ifscope [ethernet]
? (192.168.2.13) at 2c:f0:ee:1f:ec:a0 on en0 ifscope [ethernet]
? (192.168.2.14) at fe:13:c8:71:7c:b0 on en0 ifscope [ethernet]
? (192.168.2.16) at ae:c3:f0:9a:8f:ec on en0 ifscope [ethernet]
? (192.168.2.23) at f8:4d:89:66:86:80 on en0 ifscope [ethernet]
? (192.168.2.255) at ff:ff:ff:ff:ff:ff on en0 ifscope [ethernet]
? (224.0.0.251) at 1:0:5e:0:0:fb on en0 ifscope permanent [ethernet]
? (239.255.255.250) at 1:0:5e:7f:ff:fa on en0 ifscope permanent [ethernet]
zhangshaoyangdeMacBook-Pro:~ zhangshaoyang$ arp -s 192.168.2.1 00:00:00:00:00:02
arp: writing to routing socket: Operation not permitted
zhangshaoyangdeMacBook-Pro:~ zhangshaoyang$ sudo su
>Password:
sh-3.2# arp -s 192.168.2.1 00:00:00:00:00:02
sh-3.2# arp -a
? (192.168.2.1) at 0:0:0:0:0:2 on en0 permanent [ethernet]
? (192.168.2.1) at c0:3c:4:c:7d:59 on en0 ifscope [ethernet]
? (192.168.2.14) at fe:13:c8:71:7c:b0 on en0 ifscope [ethernet]
? (192.168.2.16) at ae:c3:f0:9a:8f:ec on en0 ifscope [ethernet]
? (192.168.2.23) at f8:4d:89:66:86:80 on en0 ifscope [ethernet]
? (192.168.2.255) at ff:ff:ff:ff:ff:ff on en0 ifscope [ethernet]
? (224.0.0.251) at 1:0:5e:0:0:fb on en0 ifscope permanent [ethernet]
? (239.255.255.250) at 1:0:5e:7f:ff:fa on en0 ifscope permanent [ethernet]
sh-3.2#
```

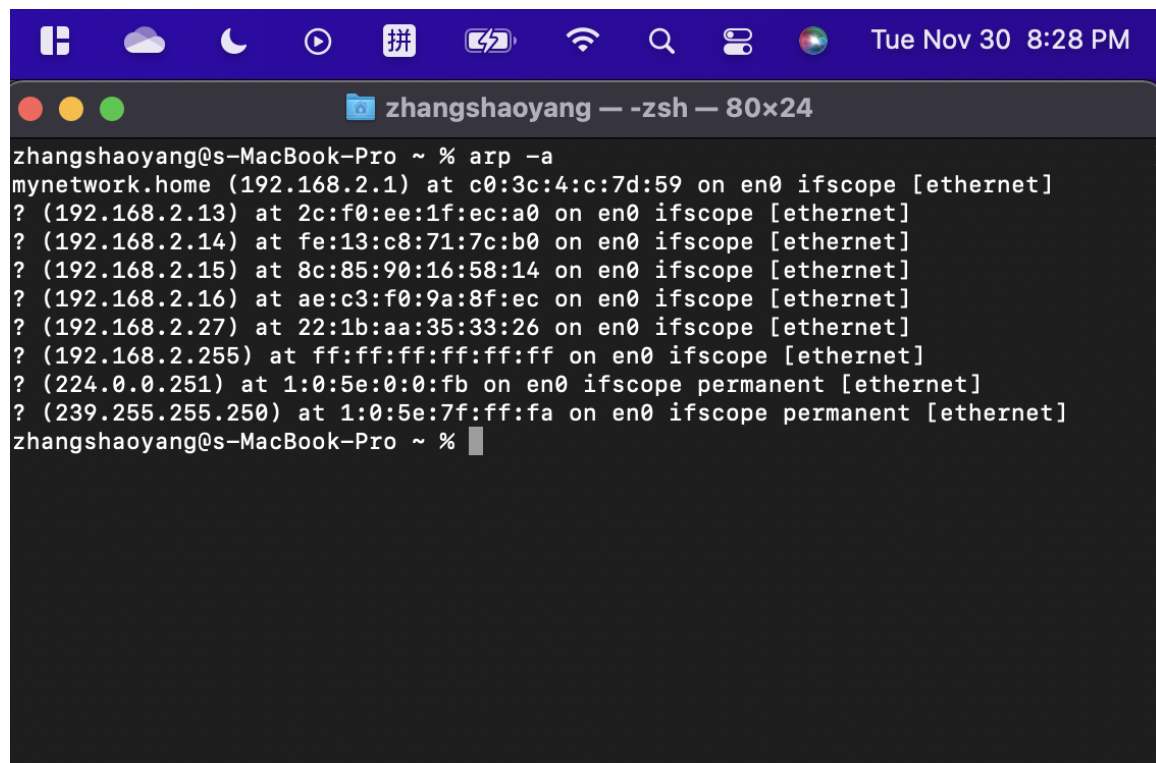
EX2:

through experimenting on Mac the default timeout is 20 minutes



A screenshot of a macOS terminal window titled "zhangshaoyang — -zsh — 80x24". The window shows the output of the 'arp' command. The top of the window displays the macOS menu bar with the date and time "Tue Nov 30 8:08 PM". The terminal text is as follows:

```
Last login: Tue Nov 30 20:06:45 on ttys000
zhangshaoyang@s-MacBook-Pro ~ % arp
zsh: command not found: arp
zhangshaoyang@s-MacBook-Pro ~ % arp -a
mynetwork.home (192.168.2.1) at c0:3c:4:c:7d:59 on en0 ifscope [ethernet]
? (192.168.2.13) at 2c:f0:ee:1f:ec:a0 on en0 ifscope [ethernet]
? (192.168.2.14) at fe:13:c8:71:7c:b0 on en0 ifscope [ethernet]
? (192.168.2.15) at 8c:85:90:16:58:14 on en0 ifscope [ethernet]
? (192.168.2.16) at ae:c3:f0:9a:8f:ec on en0 ifscope [ethernet]
? (192.168.2.17) at ba:4:be:40:db:c9 on en0 ifscope [ethernet]
? (192.168.2.18) at ce:59:8c:2a:dc:26 on en0 ifscope [ethernet]
? (192.168.2.255) at ff:ff:ff:ff:ff:ff on en0 ifscope [ethernet]
? (224.0.0.251) at 1:0:5e:0:0:fb on en0 ifscope permanent [ethernet]
? (239.255.255.250) at 1:0:5e:7f:ff:fa on en0 ifscope permanent [ethernet]
zhangshaoyang@s-MacBook-Pro ~ %
```



A screenshot of a macOS terminal window titled "zhangshaoyang — -zsh — 80x24". The window shows the output of the 'arp -a' command. The top of the window displays the macOS menu bar with the date and time "Tue Nov 30 8:28 PM". The terminal text is as follows:

```
zhangshaoyang@s-MacBook-Pro ~ % arp -a
mynetwork.home (192.168.2.1) at c0:3c:4:c:7d:59 on en0 ifscope [ethernet]
? (192.168.2.13) at 2c:f0:ee:1f:ec:a0 on en0 ifscope [ethernet]
? (192.168.2.14) at fe:13:c8:71:7c:b0 on en0 ifscope [ethernet]
? (192.168.2.15) at 8c:85:90:16:58:14 on en0 ifscope [ethernet]
? (192.168.2.16) at ae:c3:f0:9a:8f:ec on en0 ifscope [ethernet]
? (192.168.2.27) at 22:1b:aa:35:33:26 on en0 ifscope [ethernet]
? (192.168.2.255) at ff:ff:ff:ff:ff:ff on en0 ifscope [ethernet]
? (224.0.0.251) at 1:0:5e:0:0:fb on en0 ifscope permanent [ethernet]
? (239.255.255.250) at 1:0:5e:7f:ff:fa on en0 ifscope permanent [ethernet]
zhangshaoyang@s-MacBook-Pro ~ %
```