Ethernet Lab

1. The 48-bit ethernet address of my computer is (00:d0:59:a9:3d:68).

```
▾ Ethernet II, Src: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68), Dst: LinksysGroup_da:af:73 (00:06:25
  ▸ Destination: LinksysGroup_da:af:73 (00:06:25:da:af:73)
  ▸ Source: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68)
    Type: IPv4 (0x0800)
    [Stream index: 1]
```

2. This is not the same ethernet address as gaia.cs.umass.edu. The device this address belongs to is some other router through the way.

```
▾ Ethernet II, Src: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68), Dst: LinksysGroup_da:af:73 (00:06:25
  ▸ Destination: LinksysGroup_da:af:73 (00:06:25:da:af:73)
  ▸ Source: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68)
    Type: IPv4 (0x0800)
    [Stream index: 1]
```

3. The hexadecimal value for the two-byte frame type field is 0800. This corresponds to an IP protocol.

```
Type: IPv4 (0x0800)
```

4. 54 Bytes.

```
00 06 25 da af 73 00 d0  59 a9 3d 68 08 00 45 00   ··%··s·· Y·=h··E·
02 a0 00 fa 40 00 80 06  bf c8 c0 a8 01 69 80 77   ····@··· ·····i·w
f5 0c 04 22 00 50 65 14  99 a7 ac a5 3f b4 50 18   ···"·Pe· ····?·P·
fa f0 7e 4f 00 00 47 45  54 20 2f 65 74 68 65 72   ··~O··GE T /ether
65 61 6c 2d 6c 61 62 73  2f 48 54 54 50 2d 65 74   eal-labs /HTTP-et
68 65 72 65 61 6c 2d 6c  61 62 2d 66 69 6c 65 33   hereal-l ab-file3
2e 68 74 6d 6c 20 48 54  54 50 2f 31 2e 31 0d 0a   .html HT TP/1.1··
48 6f 73 74 3a 20 67 61  69 61 2e 63 73 2e 75 6d   Host: ga ia.cs.um
61 73 73 2e 65 64 75 0d  0a 55 73 65 72 2d 41 67   ass.edu· ·User-Ag
```

5. This is the same as question 2.

```
Ethernet II, Src: LinksysGroup_da:af:73 (00:06:25:da:af:73), Dst: AmbitMicrosy_a9:3d:68 (00:d0:59
  ▸ Destination: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68)
  ▸ Source: LinksysGroup_da:af:73 (00:06:25:da:af:73)
    Type: IPv4 (0x0800)
    [Stream index: 1]
```

6. No, this is not the same one as my computer, this one is (00:06:25:da:af:73).

```
Ethernet II, Src: LinksysGroup_da:af:73 (00:06:25:da:af:73), Dst: AmbitMicrosy_a9:3d:68 (00:d0:59
  ▸ Destination: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68)
  ▸ Source: LinksysGroup_da:af:73 (00:06:25:da:af:73)
    Type: IPv4 (0x0800)
    [Stream index: 1]
```

7. The hex value is 0800. This corresponds to the IP protocol.

```
Source: LinksysGroup_
Type: IPv4 (0x0800)
[Stream index: 1]
```

8. It is 14 bytes from the start.

```
48 54 54 50 2f 31 2e 31  20 32 30 30 20 4f 4b 0d   HTTP/1.1  200 OK·
0a 44 61 74 65 3a 20 53  61 74 2c 20 32 38 20 41   ·Date: S at, 28 A
75 67 20 32 30 30 34 20  31 37 3a 31 39 3a 33 37   ug 2004  17:19:37
20 47 4d 54 0d 0a 53 65  72 76 65 72 3a 20 41 70    GMT··Se rver: Ap
61 63 68 65 2f 32 2e 30  2e 34 30 20 28 52 65 64   ache/2.0 .40 (Red
20 48 61 74 20 4c 69 6e  75 78 29 0d 0a 4c 61 73    Hat Lin ux)··Las
```

9. The first column is my IP address, the second column is my MAC address and the third column is the type of address.

```
Interface: 192.168.137.1 --- 0x7
  Internet Address      Physical Address      Type
  192.168.137.247       c6-9d-ed-ed-82-a2     static
  192.168.137.255       ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.56.1 --- 0x9
  Internet Address      Physical Address      Type
  192.168.56.255        ff-ff-ff-ff-ff-ff     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
  239.255.255.177       01-00-5e-7f-ff-b1     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 129.8.206.193 --- 0xb
  Internet Address      Physical Address      Type
  129.8.204.1           78-24-59-2c-86-e9     dynamic
  129.8.207.255         ff-ff-ff-ff-ff-ff     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
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

10. The hex values for the source and destination addresses are (00:d0:59:a9:3d:68) for source and (ff:ff:ff:ff:ff:ff).

```
▾ Ethernet II, Src: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  ▸ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  ▸ Source: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68)
    Type: ARP (0x0806)
    [Stream index: 0]
```

11. The hex value is 0806. This corresponds to the ARP protocol.

```
Type: ARP (0x0806)
```

12. a) It is the 20th byte.

```
ff ff ff ff ff ff 00 80  ad 73 8d ce 08 06 00 01    ........ .s......
08 00 06 04 00 01 00 80  ad 73 8d ce c0 a8 01 68    ........ .s.....h
00 00 00 00 00 00 c0 a8  01 75 00 00 00 00 00 00    ........ .u......
00 00 00 00 00 00 00 00  00 00 00 00                ........ ....
```

b) It has a value 0001.

c) Yes.

d) It appears in the last 4 bytes.

```
▸ Frame 6: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)
▾ Ethernet II, Src: CnetTechnolo_73:8d:ce (00:80:ad:73:8d:ce), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
  ▸ Destination: Broadcast (ff:ff:ff:ff:ff:ff)
  ▸ Source: CnetTechnolo_73:8d:ce (00:80:ad:73:8d:ce)
    Type: ARP (0x0806)
    [Stream index: 2]
    Padding: 00000000000000000000000000000000000000
▾ Address Resolution Protocol (request)
    Hardware type: Ethernet (1)
    Protocol type: IPv4 (0x0800)
    Hardware size: 6
    Protocol size: 4
    Opcode: request (1)
    Sender MAC address: CnetTechnolo_73:8d:ce (00:80:ad:73:8d:ce)
    Sender IP address: 192.168.1.104
    Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)
    Target IP address: 192.168.1.117

0000  ff ff ff ff ff ff 00 80  ad 73 8d ce 08 06 00 01   ........ .s......
0010  08 00 06 04 00 01 00 80  ad 73 8d ce c0 a8 01 68   ........ .s.....h
0020  00 00 00 00 00 00 c0 a8  01 75 00 00 00 00 00 00   ........ .u......
0030  00 00 00 00 00 00 00 00  00 00 00 00               ........ ....
```

13. a) It is the 14th byte.

```
00 d0 59 a9 3d 68 00 06  25 da af 73 08 06 00 01    ..Y.=h.. %..s....
08 00 06 04 00 02 00 06  25 da af 73 c0 a8 01 01    ........ %..s....
00 d0 59 a9 3d 68 c0 a8  01 69 00 00 00 00 00 00    ..Y.=h.. .i......
00 00 00 00 00 00 00 00  00 00 00 00                ........ ....
```

b) it is 2.

```
Opcode: reply (2)
```

c) It is at the 16th byte.

```
60 192.168.1.1 is at 00:06:25:da:af:73
```

```
000  00 d0 59 a9 3d 68 00 06  25 da af 73 08 06 00 01   ··Y·=h·· %··s····
010  08 00 06 04 00 02 00 06  25 da af 73 c0 a8 01 01   ········ %··s····
020  00 d0 59 a9 3d 68 c0 a8  01 69 00 00 00 00 00 00   ··Y·=h·· ·i······
030  00 00 00 00 00 00 00 00  00 00 00 00               ········ ····
```

14. The source address is (00:06:25:da:af:73) and the destination address is (00:d0:59:a9:3d:68).

```
▸ Destination: AmbitMicrosy_a9:3d:68 (00:d0:59:a9:3d:68)
▸ Source: LinksysGroup_da:af:73 (00:06:25:da:af:73)
```

15. The reason is the destination is broadcast, so it does not know the intended IP address.

No.	Time	Source	Destination	Protocol	Length	Info
3	0.001028	192.168.1.105	199.2.53.206	TCP	62	1057 → 631 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM
9	17.465927	192.168.1.105	128.119.245.12	TCP	54	1058 → 80 [ACK] Seq=1 Ack=1 Win=64240 Len=0
14	17.500069	192.168.1.105	128.119.245.12	TCP	54	1058 → 80 [ACK] Seq=633 Ack=2921 Win=64240 Len=0
17	17.527457	192.168.1.105	128.119.245.12	TCP	54	1058 → 80 [ACK] Seq=633 Ack=4816 Win=64240 Len=0
7	17.444423	192.168.1.105	128.119.245.12	TCP	62	1058 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM
2	0.001018	LinksysGroup_da:af:…	AmbitMicrosy_a9:3d:…	ARP	60	192.168.1.1 is at 00:06:25:da:af:73
11	17.494766	128.119.245.12	192.168.1.105	TCP	60	80 → 1058 [ACK] Seq=1 Ack=633 Win=6952 Len=0
12	17.498935	128.119.245.12	192.168.1.105	TCP	1514	80 → 1058 [ACK] Seq=1 Ack=633 Win=6952 Len=1460 [TCP PDU reassembled in 16]
13	17.500025	128.119.245.12	192.168.1.105	TCP	1514	80 → 1058 [ACK] Seq=1461 Ack=633 Win=6952 Len=1460 [TCP PDU reassembled in 16]
15	17.527057	128.119.245.12	192.168.1.105	TCP	1514	80 → 1058 [ACK] Seq=2921 Ack=633 Win=6952 Len=1460 [TCP PDU reassembled in 16]
8	17.465902	128.119.245.12	192.168.1.105	TCP	62	80 → 1058 [SYN, ACK] Seq=0 Ack=1 Win=5840 Len=0 MSS=1460 SACK_PERM
10	17.466468	192.168.1.105	128.119.245.12	HTTP	686	GET /ethereal-labs/HTTP-ethereal-lab-file3.html HTTP/1.1
16	17.527422	128.119.245.12	192.168.1.105	HTTP	489	HTTP/1.1 200 OK (text/html)
6	13.542974	CnetTechnolo_73:8d:…	Broadcast	ARP	60	Who has 192.168.1.11? Tell 192.168.1.104
1	0.000000	AmbitMicrosy_a9:3d:…	Broadcast	ARP	42	Who has 192.168.1.1? Tell 192.168.1.105
4	2.962850	192.168.1.105	199.2.53.206	TCP	62	[TCP Retransmission] 1057 → 631 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM
5	8.971488	192.168.1.105	199.2.53.206	TCP	62	[TCP Retransmission] 1057 → 631 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM