Lab 1

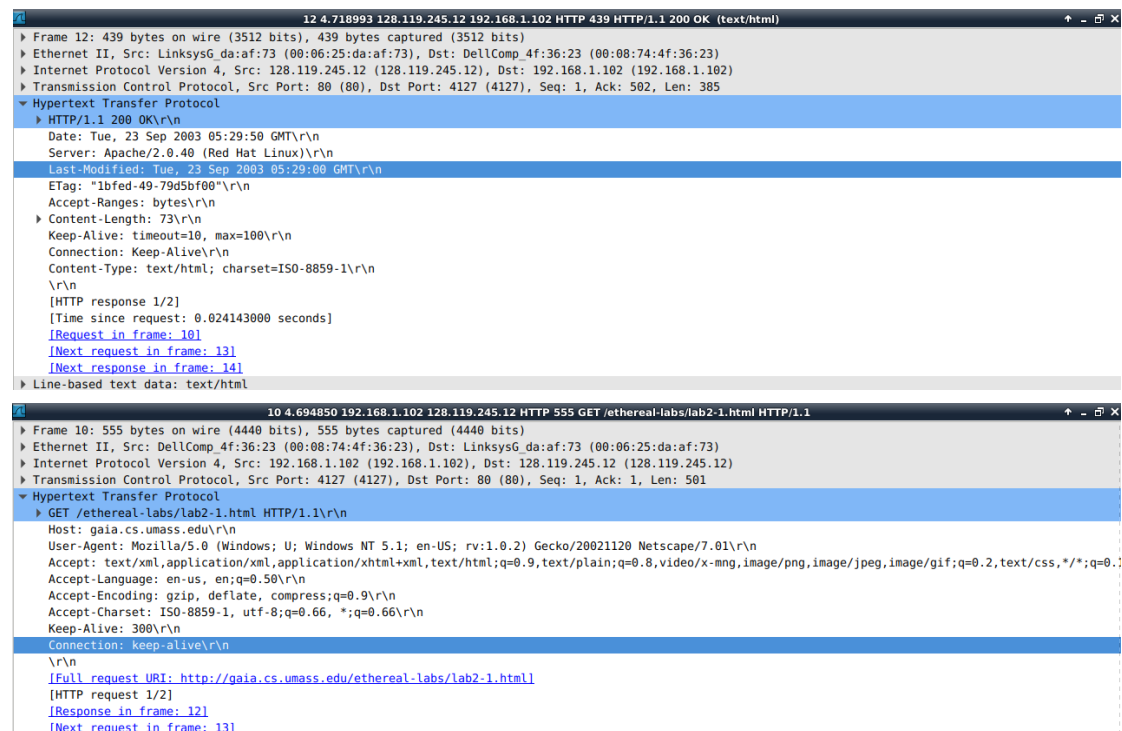*Exercise 3: Using Wireshark to understand basic HTTP request/response*

messages

Question 1:

	Destination	Protocol	Length	Info
102	128.119.245.12	HTTP	555	GET /ethereal-labs/lab2-1.html HTTP/1.1
5.12	192.168.1.102	HTTP	439	HTTP/1.1 200 OK (text/html)
102	128.119.245.12	HTTP	541	GET /favicon.ico HTTP/1.1
5.12	192.168.1.102	HTTP	1395	HTTP/1.1 404 Not Found (text/html)

The status code is 200 and the phrase is OK.

Question 2:

```
12 4.718993 128.119.245.12 192.168.1.102 HTTP 439 HTTP/1.1 200 OK (text/html)          ↑ ─ ⊡ ✕
▶ Frame 12: 439 bytes on wire (3512 bits), 439 bytes captured (3512 bits)
▶ Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: DellComp_4f:36:23 (00:08:74:4f:36:23)
▶ Internet Protocol Version 4, Src: 128.119.245.12 (128.119.245.12), Dst: 192.168.1.102 (192.168.1.102)
▶ Transmission Control Protocol, Src Port: 80 (80), Dst Port: 4127 (4127), Seq: 1, Ack: 502, Len: 385
▼ Hypertext Transfer Protocol
  ▶ HTTP/1.1 200 OK\r\n
    Date: Tue, 23 Sep 2003 05:29:50 GMT\r\n
    Server: Apache/2.0.40 (Red Hat Linux)\r\n
    Last-Modified: Tue, 23 Sep 2003 05:29:00 GMT\r\n
    ETag: "1bfed-49-79d5bf00"\r\n
    Accept-Ranges: bytes\r\n
  ▶ Content-Length: 73\r\n
    Keep-Alive: timeout=10, max=100\r\n
    Connection: Keep-Alive\r\n
    Content-Type: text/html; charset=ISO-8859-1\r\n
    \r\n
    [HTTP response 1/2]
    [Time since request: 0.024143000 seconds]
    [Request in frame: 10]
    [Next request in frame: 13]
    [Next response in frame: 14]
▶ Line-based text data: text/html
```

```
10 4.694850 192.168.1.102 128.119.245.12 HTTP 555 GET /ethereal-labs/lab2-1.html HTTP/1.1    ↑ ─ ⊡ ✕
▶ Frame 10: 555 bytes on wire (4440 bits), 555 bytes captured (4440 bits)
▶ Ethernet II, Src: DellComp_4f:36:23 (00:08:74:4f:36:23), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
▶ Internet Protocol Version 4, Src: 192.168.1.102 (192.168.1.102), Dst: 128.119.245.12 (128.119.245.12)
▶ Transmission Control Protocol, Src Port: 4127 (4127), Dst Port: 80 (80), Seq: 1, Ack: 1, Len: 501
▼ Hypertext Transfer Protocol
  ▶ GET /ethereal-labs/lab2-1.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.0.2) Gecko/20021120 Netscape/7.01\r\n
    Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,video/x-mng,image/png,image/jpeg,image/gif;q=0.2,text/css,*/*;q=0.1
    Accept-Language: en-us, en;q=0.50\r\n
    Accept-Encoding: gzip, deflate, compress;q=0.9\r\n
    Accept-Charset: ISO-8859-1, utf-8;q=0.66, *;q=0.66\r\n
    Keep-Alive: 300\r\n
    Connection: keep-alive\r\n
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-1.html]
    [HTTP request 1/2]
    [Response in frame: 12]
    [Next request in frame: 13]
```

The HTML file was last modified on Tue, 23 Sep 2003 05:29:00 GMT.
Yes, the response also contain a DATE header.
The DATE is Tue, 23 Sep 2003 05:29:50 GMT which incicates the date and time
when this response message is created by the server and sent to the client. And the last
modification to this HTML file was made 50 seconds ago.

Question 3:
The connection established between the browser and the server are both persistent
since the connection header are both "Keep-Alive".

Question4:
73 bytes of content are being returned to the browser.

Question 5:

The data contained inside the HTTP response packet is:

```
▼ Line-based text data: text/html
    <html>\n
    Congratulations.  You've downloaded the file lab2-1.html!\n
    </html>\n
```

Exercise 4: Using Wireshark to understand the HTTP CONDITIONAL

GET/response interaction

Question 1:

No.	Time	Source	Destination	Protocol	Length	Info
8	2.331268	192.168.1.102	128.119.245.12	HTTP	555	GET /ethereal-labs/lab2-2.html HTTP/1.1
10	2.357902	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
14	5.517390	192.168.1.102	128.119.245.12	HTTP	668	GET /ethereal-labs/lab2-2.html HTTP/1.1
15	5.540216	128.119.245.12	192.168.1.102	HTTP	243	HTTP/1.1 304 Not Modified

```
8 2.331268 192.168.1.102 128.119.245.12 HTTP 555 GET /ethereal-labs/lab2-2.html HTTP/1.1
▶ Frame 8: 555 bytes on wire (4440 bits), 555 bytes captured (4440 bits)
▶ Ethernet II, Src: DellComp_4f:36:23 (00:08:74:4f:36:23), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
▶ Internet Protocol Version 4, Src: 192.168.1.102 (192.168.1.102), Dst: 128.119.245.12 (128.119.245.12)
▶ Transmission Control Protocol, Src Port: 4247 (4247), Dst Port: 80 (80), Seq: 1, Ack: 1, Len: 501
▼ Hypertext Transfer Protocol
  ▶ GET /ethereal-labs/lab2-2.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.0.2) Gecko/20021120 Netscape/7.01\r\n
    Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,video/x-mng,image/png,image/jpeg,image/gif;q=0.2,text/css,*/*;q=0.
    Accept-Language: en-us, en;q=0.50\r\n
    Accept-Encoding: gzip, deflate, compress;q=0.9\r\n
    Accept-Charset: ISO-8859-1, utf-8;q=0.66, *;q=0.66\r\n
    Keep-Alive: 300\r\n
    Connection: keep-alive\r\n
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]
    [HTTP request 1/2]
    [Response in frame: 10]
    [Next request in frame: 14]
```

No, there is no "If-Modified-Since" line in the HTTP GET.

Question 2:

```
10 2.357902 128.119.245.12 192.168.1.102 HTTP 739 HTTP/1.1 200 OK  (text/html)
▶ Frame 10: 739 bytes on wire (5912 bits), 739 bytes captured (5912 bits)
▶ Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: DellComp_4f:36:23 (00:08:74:4f:36:23)
▶ Internet Protocol Version 4, Src: 128.119.245.12 (128.119.245.12), Dst: 192.168.1.102 (192.168.1.102)
▶ Transmission Control Protocol, Src Port: 80 (80), Dst Port: 4247 (4247), Seq: 1, Ack: 502, Len: 685
▼ Hypertext Transfer Protocol
  ▶ HTTP/1.1 200 OK\r\n
    Date: Tue, 23 Sep 2003 05:35:50 GMT\r\n
    Server: Apache/2.0.40 (Red Hat Linux)\r\n
    Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n
    ETag: "1bfef-173-8f4ae900"\r\n
    Accept-Ranges: bytes\r\n
  ▶ Content-Length: 371\r\n
    Keep-Alive: timeout=10, max=100\r\n
    Connection: Keep-Alive\r\n
    Content-Type: text/html; charset=ISO-8859-1\r\n
    \r\n
    [HTTP response 1/2]
    [Time since request: 0.026634000 seconds]
    [Request in frame: 8]
    [Next request in frame: 14]
    [Next response in frame: 15]
▶ Line-based text data: text/html
```
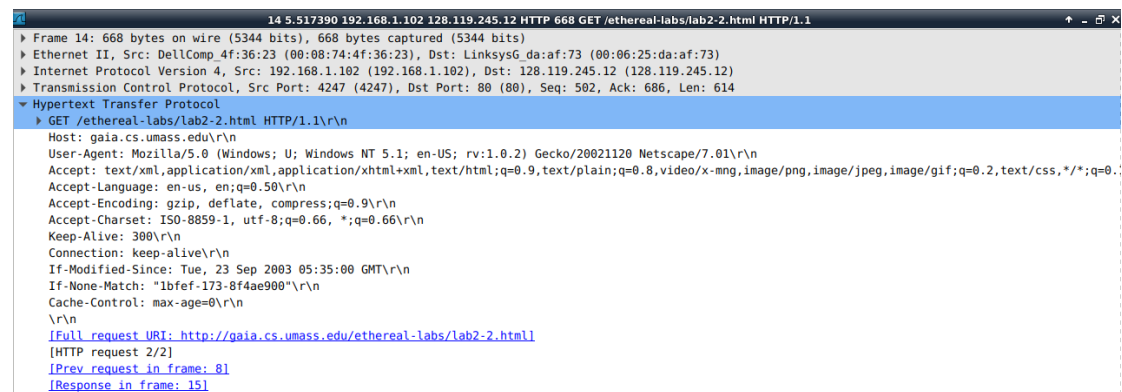
Yes, the response indicates that the HTML file was last modified on Tue, 23 Sep 2003 05:35:00 GMT.

Question 3:


```
                    14 5.517390 192.168.1.102 128.119.245.12 HTTP 668 GET /ethereal-labs/lab2-2.html HTTP/1.1                    ↑ – ☐ ✕
▶ Frame 14: 668 bytes on wire (5344 bits), 668 bytes captured (5344 bits)
▶ Ethernet II, Src: DellComp_4f:36:23 (00:08:74:4f:36:23), Dst: LinksysG_da:af:73 (00:06:25:da:af:73)
▶ Internet Protocol Version 4, Src: 192.168.1.102 (192.168.1.102), Dst: 128.119.245.12 (128.119.245.12)
▶ Transmission Control Protocol, Src Port: 4247 (4247), Dst Port: 80 (80), Seq: 502, Ack: 686, Len: 614
▼ Hypertext Transfer Protocol
  ▶ GET /ethereal-labs/lab2-2.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.0.2) Gecko/20021120 Netscape/7.01\r\n
    Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,video/x-mng,image/png,image/jpeg,image/gif;q=0.2,text/css,*/*;q=0.
    Accept-Language: en-us, en;q=0.50\r\n
    Accept-Encoding: gzip, deflate, compress;q=0.9\r\n
    Accept-Charset: ISO-8859-1, utf-8;q=0.66, *;q=0.66\r\n
    Keep-Alive: 300\r\n
    Connection: keep-alive\r\n
    If-Modified-Since: Tue, 23 Sep 2003 05:35:00 GMT\r\n
    If-None-Match: "1bfef-173-8f4ae900"\r\n
    Cache-Control: max-age=0\r\n
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]
    [HTTP request 2/2]
    [Prev request in frame: 8]
    [Response in frame: 15]
```

Yes, the second HTTP GET request contains the "If-Modified-Since" and "If-None-Match" lines. The information contained in these header lines are "Tue, 23 Sep 2003 05:35:00 GMT" and "1bfef-173-8f4ae900" respectively.
The "If-Modified-Since" header contains the"Last-Modified" time from the previous response message and the "If-None-Match" header contains the Etag value which is an identifier for a specific version of resource.

Question 4:
The status code is 304 and the phrase is Not Modified. The server did not need to return the content of the file because the file being requested has not changed since the lastest previous request. Bascially, the file has been cached and can be sent to the client directly.

Question 5:
The value of the Etag field in the 2nd response message is "1bfef-173-8f4ae900".The Etag value remain unchanged indicates the file has not been modified. It is used by HTTP for cache validation and it has not changed since the 1st response message was received.

Exercise 5: Ping Client

```
                        uxterm              ↑ _ □ ✕
z5190669@vx2:/tmp_amd/kamen/export/kamen/4/z5190669/9331$ java PingServer 1024
Received from 127.0.0.1: PING0 2019-06-18 14:42:27.253
    Reply sent.
Received from 127.0.0.1: PING1 2019-06-18 14:42:27.313
    Reply sent.
Received from 127.0.0.1: PING2 2019-06-18 14:42:27.414
    Reply sent.
Received from 127.0.0.1: PING3 2019-06-18 14:42:27.518
    Reply not sent.
Received from 127.0.0.1: PING4 2019-06-18 14:42:28.519
    Reply not sent.
Received from 127.0.0.1: PING5 2019-06-18 14:42:29.521
    Reply sent.
Received from 127.0.0.1: PING6 2019-06-18 14:42:29.640
    Reply sent.
Received from 127.0.0.1: PING7 2019-06-18 14:42:29.795
    Reply not sent.
Received from 127.0.0.1: PING8 2019-06-18 14:42:30.796
    Reply sent.
Received from 127.0.0.1: PING9 2019-06-18 14:42:30.950
    Reply sent.
█
```

```
                        uxterm              ↑ _ □ ✕
z5190669@vx2:/tmp_amd/kamen/export/kamen/4/z5190669/9331$ python3 PingClient.py
127.0.0.1 1024
ping to 127.0.0.1, seq = 0, rtt = 60 ms
ping to 127.0.0.1, seq = 1, rtt = 101 ms
ping to 127.0.0.1, seq = 2, rtt = 103 ms
ping to 127.0.0.1, seq = 3, rtt = time out
ping to 127.0.0.1, seq = 4, rtt = time out
ping to 127.0.0.1, seq = 5, rtt = 119 ms
ping to 127.0.0.1, seq = 6, rtt = 155 ms
ping to 127.0.0.1, seq = 7, rtt = time out
ping to 127.0.0.1, seq = 8, rtt = 153 ms
ping to 127.0.0.1, seq = 9, rtt = 118 ms


Minimum RTT = 60 ms.
Maximum RTT = 155 ms.
Average RTT = 116 ms.
30.0% of packets have been lost.

z5190669@vx2:/tmp_amd/kamen/export/kamen/4/z5190669/9331$ █
```

PingClient.py is attached in the tar file.
Use python3 PingClient.py to run.