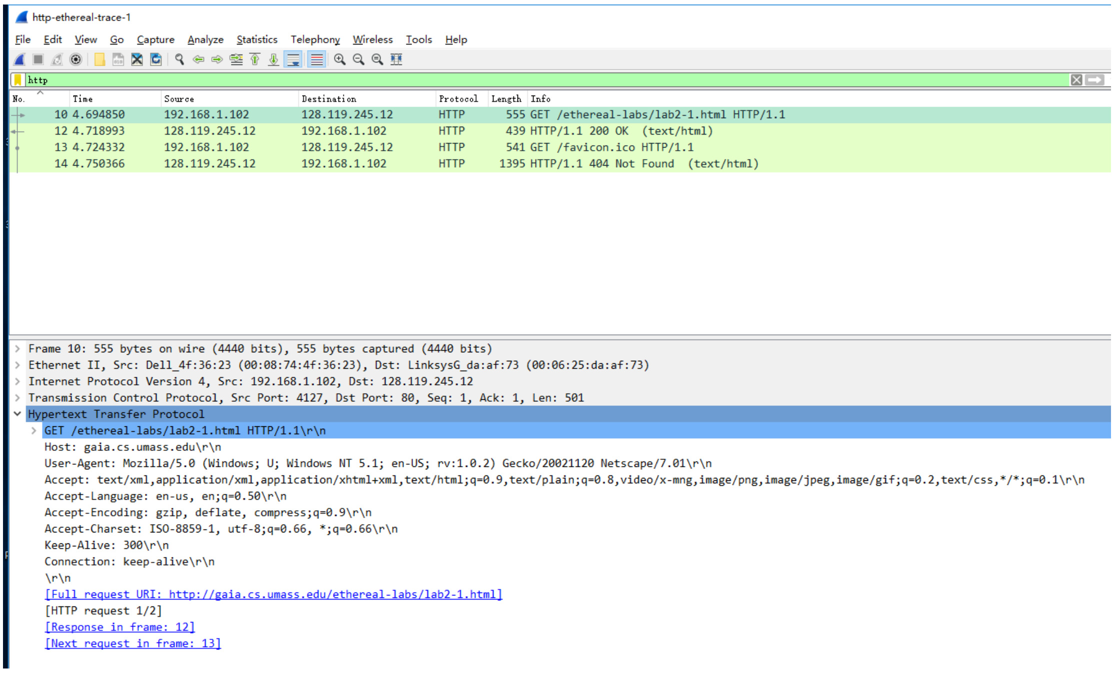
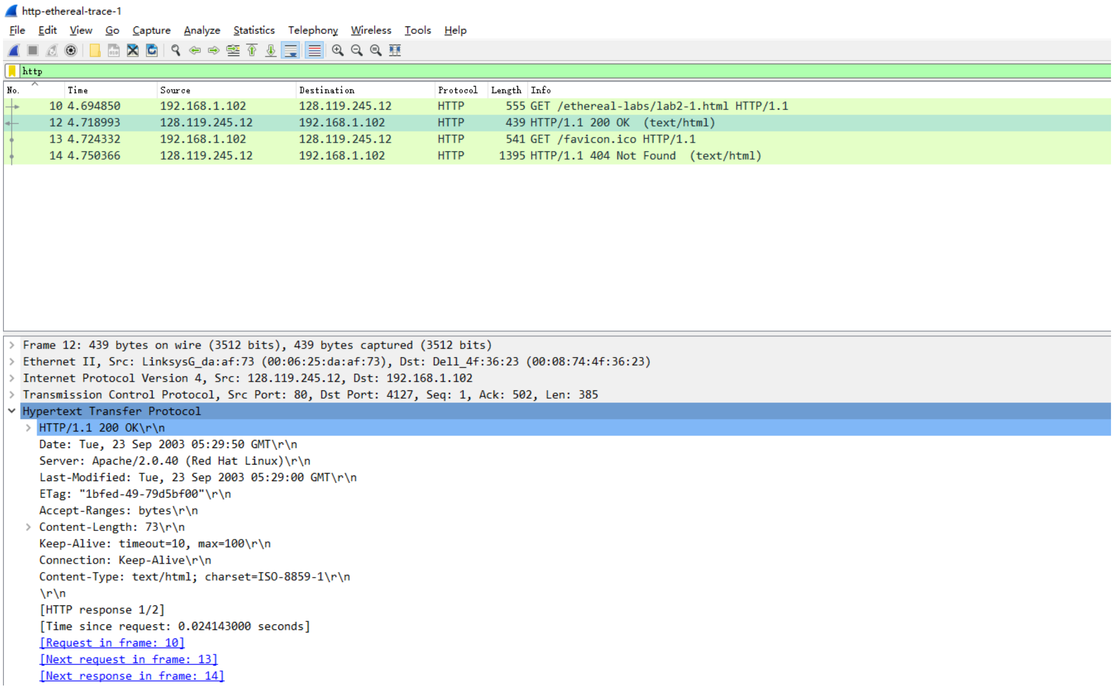
Exercise 3:

Q1



```
No.   Time        Source          Destination     Protocol Length Info
   10 4.694850    192.168.1.102   128.119.245.12  HTTP      555 GET /ethereal-labs/lab2-1.html HTTP/1.1
   12 4.718993    128.119.245.12  192.168.1.102   HTTP      439 HTTP/1.1 200 OK  (text/html)
   13 4.724332    192.168.1.102   128.119.245.12  HTTP      541 GET /favicon.ico HTTP/1.1
   14 4.750366    128.119.245.12  192.168.1.102   HTTP     1395 HTTP/1.1 404 Not Found  (text/html)
```

```
> Frame 10: 555 bytes on wire (4440 bits), 555 bytes captured (4440 bits)
> Ethernet II, Src: Dell_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, Dst: 128.119.245.12
> Transmission Control Protocol, Src Port: 4127, Dst Port: 80, Seq: 1, Ack: 1, Len: 501
v 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\r\n
    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]
```



```
No.   Time        Source          Destination     Protocol Length Info
   10 4.694850    192.168.1.102   128.119.245.12  HTTP      555 GET /ethereal-labs/lab2-1.html HTTP/1.1
   12 4.718993    128.119.245.12  192.168.1.102   HTTP      439 HTTP/1.1 200 OK  (text/html)
   13 4.724332    192.168.1.102   128.119.245.12  HTTP      541 GET /favicon.ico HTTP/1.1
   14 4.750366    128.119.245.12  192.168.1.102   HTTP     1395 HTTP/1.1 404 Not Found  (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: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
> Transmission Control Protocol, Src Port: 80, Dst Port: 4127, Seq: 1, Ack: 502, Len: 385
v 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]
```

The status code is 200 and the phrase is OK.

Q2

1)The HTML file that the browser is retrieving was last modified on Tue, 23 Sep 2003 05:29:50 GMT, it was indicated from the Last-Modified header.

2)Yes, there is a DATE header. The DATE header indicates the date and time when this response message is generated by the server and sent to the client. The Last-Modified header stores the latest date and time when HTML file was changed.

Q3

The connection is persistent because the Connection header is “Keep-Alive”. The Connection general header controls whether or not the network connection stays open after the current transaction finishes. If the value sent is keep-alive, the connection is persistent and not closed, allowing for subsequent requests to the same server to be done.

Q4

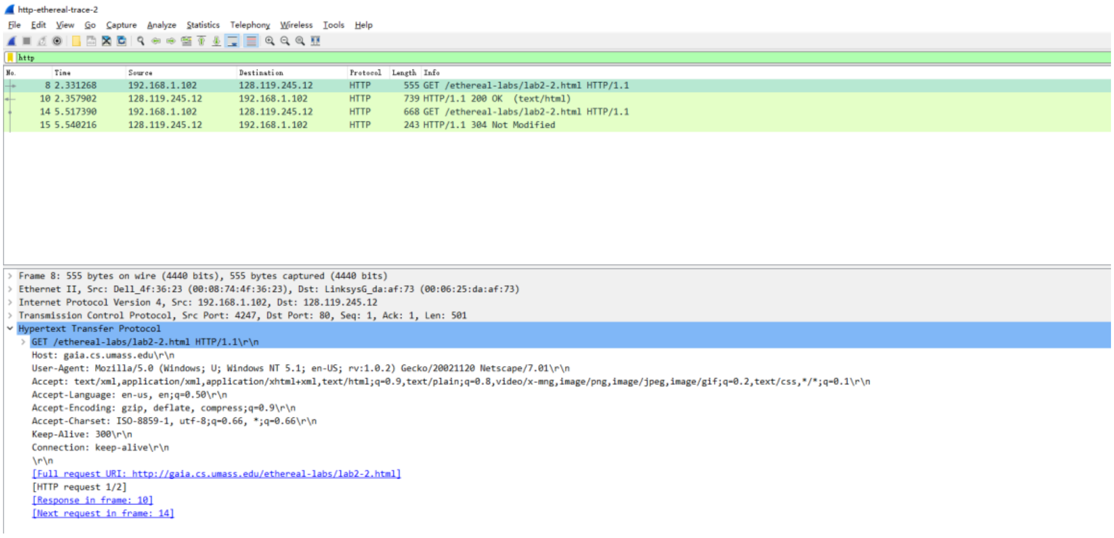
According to content-length header,the length of the content being returned to the client is 73 bytes.

Q5

According to Content-Type header, the data contained inside the HTTP response packet is HTML text file.

Exercise 4

Q1



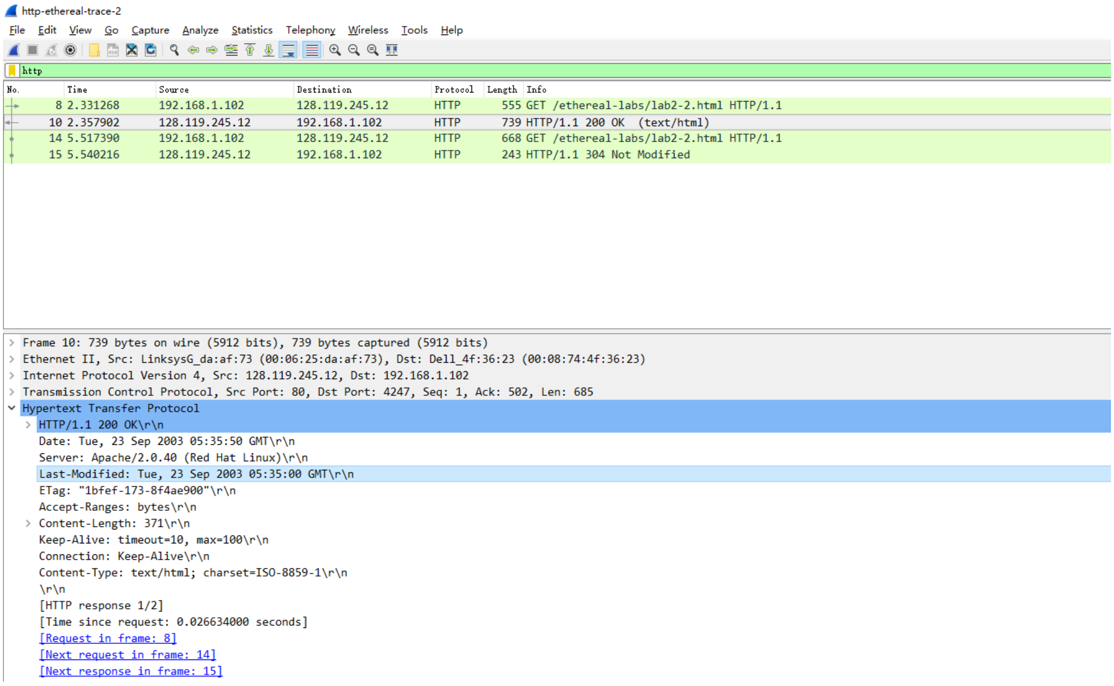
http-ethereal-trace-2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
http

```
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
```

```
> Frame 8: 555 bytes on wire (4440 bits), 555 bytes captured (4440 bits)
> Ethernet II, Src: Dell_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, Dst: 128.119.245.12
> Transmission Control Protocol, Src Port: 4247, Dst Port: 80, Seq: 1, Ack: 1, Len: 501
v 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=0.1\r\n
    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 not a line called “IF-MODIFIED-SINCE”.

Q2



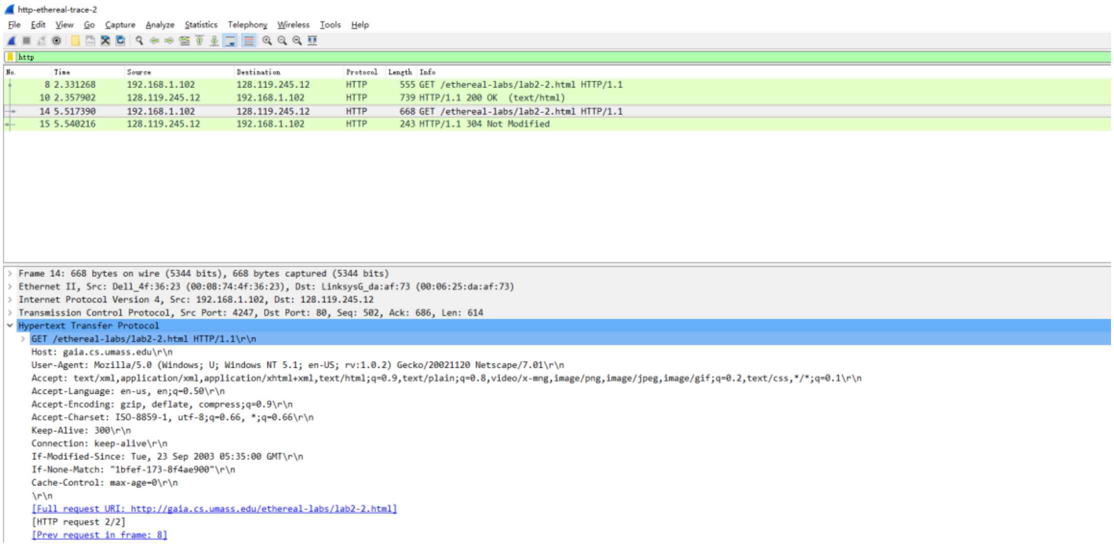
http-ethereal-trace-2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
http

```
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
```

```
> 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: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
> Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 1, Ack: 502, Len: 685
v 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]
```

Yes, the response message indicates the last time that the requested file was modified.

Q3


http-ethereal-trace-2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
http

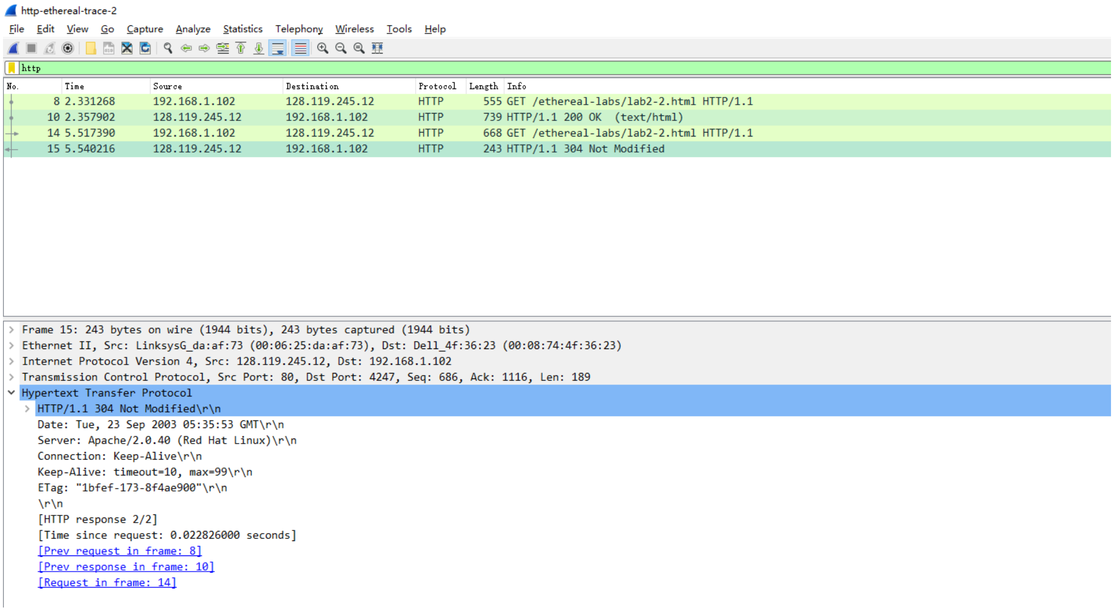
```
No.    Time        Source          Destination     Protocol  Length  Info
     8 2.331268    192.168.1.102   128.119.245.12  HTTP      555 GET /ethereal-labs/lab2-2.html HTTP/1.1
    10 2.357902    128.119.245.12  192.168.1.102   HTTP      739 HTTP/1.1 200 OK  (text/html)
    14 5.517390    192.168.1.102   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
```

```
> Frame 14: 668 bytes on wire (5344 bits), 668 bytes captured (5344 bits)
> Ethernet II, Src: Dell_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, Dst: 128.119.245.12
> Transmission Control Protocol, Src Port: 4247, Dst Port: 80, Seq: 502, Ack: 686, Len: 614
v 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=0.1\r\n
    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]
```

Yes, there is a “If-Modified-Since” header and a “If-None-Match” header. The information in “If-Modified-Since” header indicates the date and time of the modification of the object being requested, the value in this line is stored on a proxy server when a previous request is sent to a server through this proxy server.

The “If-None-Match” header contains an Etag. The ETag HTTP response header is an identifier for a specific version of a resource.

Q4



http-ethereal-trace-2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
http
```

```
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
```

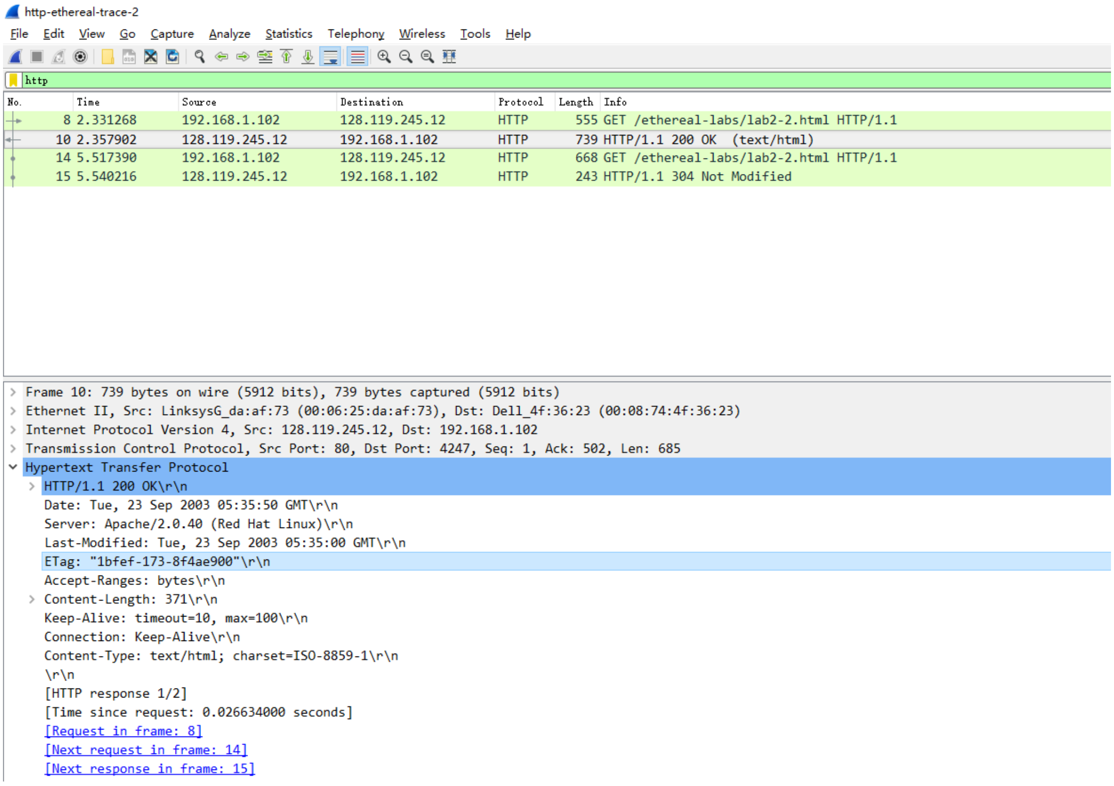
```
> Frame 15: 243 bytes on wire (1944 bits), 243 bytes captured (1944 bits)
> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
> Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 686, Ack: 1116, Len: 189
v Hypertext Transfer Protocol
  > HTTP/1.1 304 Not Modified\r\n
    Date: Tue, 23 Sep 2003 05:35:53 GMT\r\n
    Server: Apache/2.0.40 (Red Hat Linux)\r\n
    Connection: Keep-Alive\r\n
    Keep-Alive: timeout=10, max=99\r\n
    ETag: "1bfef-173-8f4ae900"\r\n
    \r\n
    [HTTP response 2/2]
    [Time since request: 0.022826000 seconds]
    [Prev request in frame: 8]
    [Prev response in frame: 10]
    [Request in frame: 14]
```

The status code is 304 and phrase is Not Modified. The server did not return the content of the file, because “304 Not Modified” indicates that the file being requested has not been changed since Tue, 23 Sep 2003 05:35:00 GMT, and that means the version of the file stored on the proxy server is able to be sent to the client without any loss of modifications. So there is no need for the server to send the whole file again, which may cause waste of bandwidth.

Q5

The value of the Etag field in the 2nd response message is 1bfef-173-8f4ae900. Etags are used to identify a specific version of a resource and similar to fingerprints and might also be used for tracking purposes by some servers.

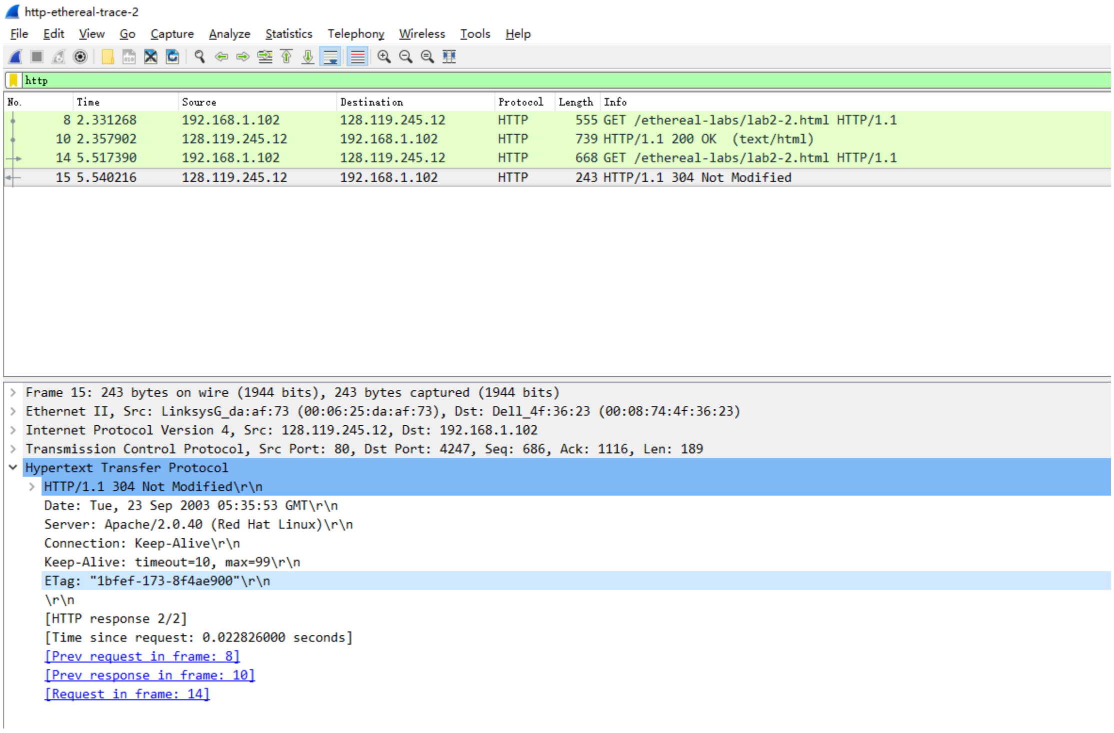
It has not changed since the 1st response message was received.


http-ethereal-trace-2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
http
```

```
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
```

```
> 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: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
> Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 1, Ack: 502, Len: 685
v 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]
```


http-ethereal-trace-2
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

```
http
```

```
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
```

```
> Frame 15: 243 bytes on wire (1944 bits), 243 bytes captured (1944 bits)
> Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102
> Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 686, Ack: 1116, Len: 189
v Hypertext Transfer Protocol
  > HTTP/1.1 304 Not Modified\r\n
    Date: Tue, 23 Sep 2003 05:35:53 GMT\r\n
    Server: Apache/2.0.40 (Red Hat Linux)\r\n
    Connection: Keep-Alive\r\n
    Keep-Alive: timeout=10, max=99\r\n
    ETag: "1bfef-173-8f4ae900"\r\n
    \r\n
    [HTTP response 2/2]
    [Time since request: 0.022826000 seconds]
    [Prev request in frame: 8]
    [Prev response in frame: 10]
    [Request in frame: 14]
```

Exercise 5