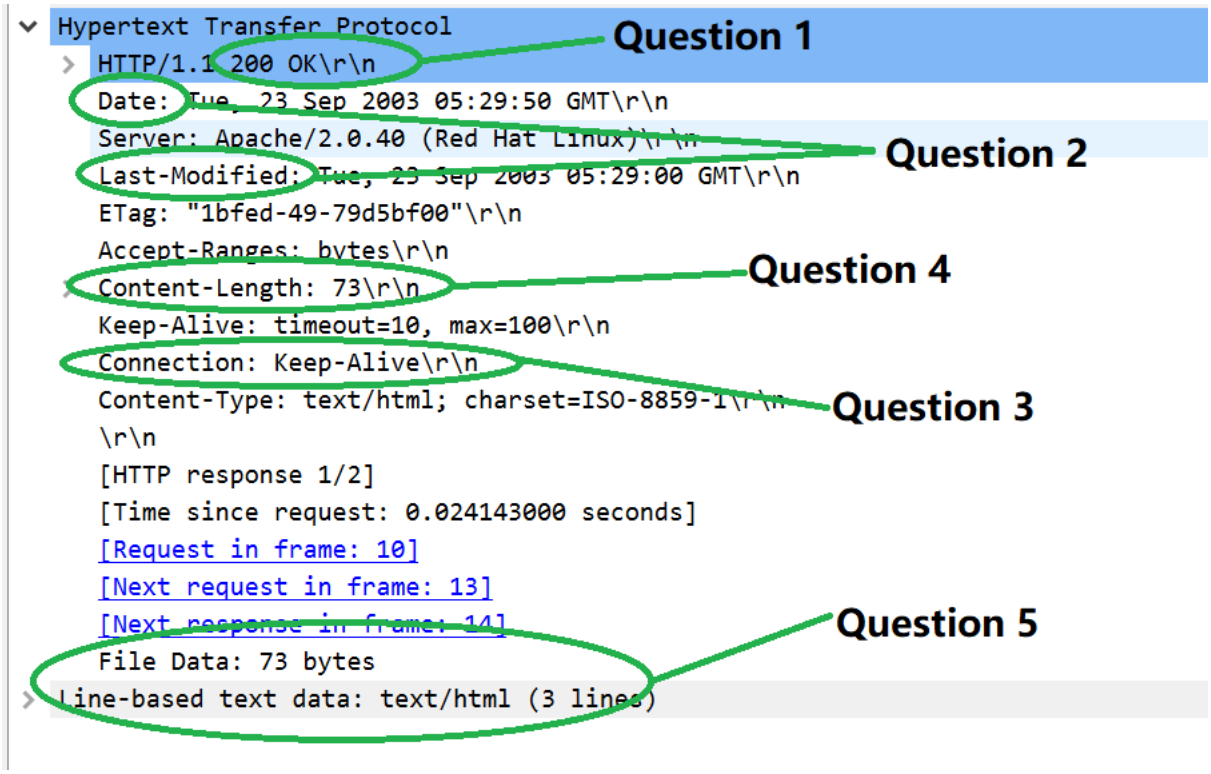
~~~~~~~~~~~~~~~~Lab2~~~~~~~~~~~~~~~~

Exercise 3



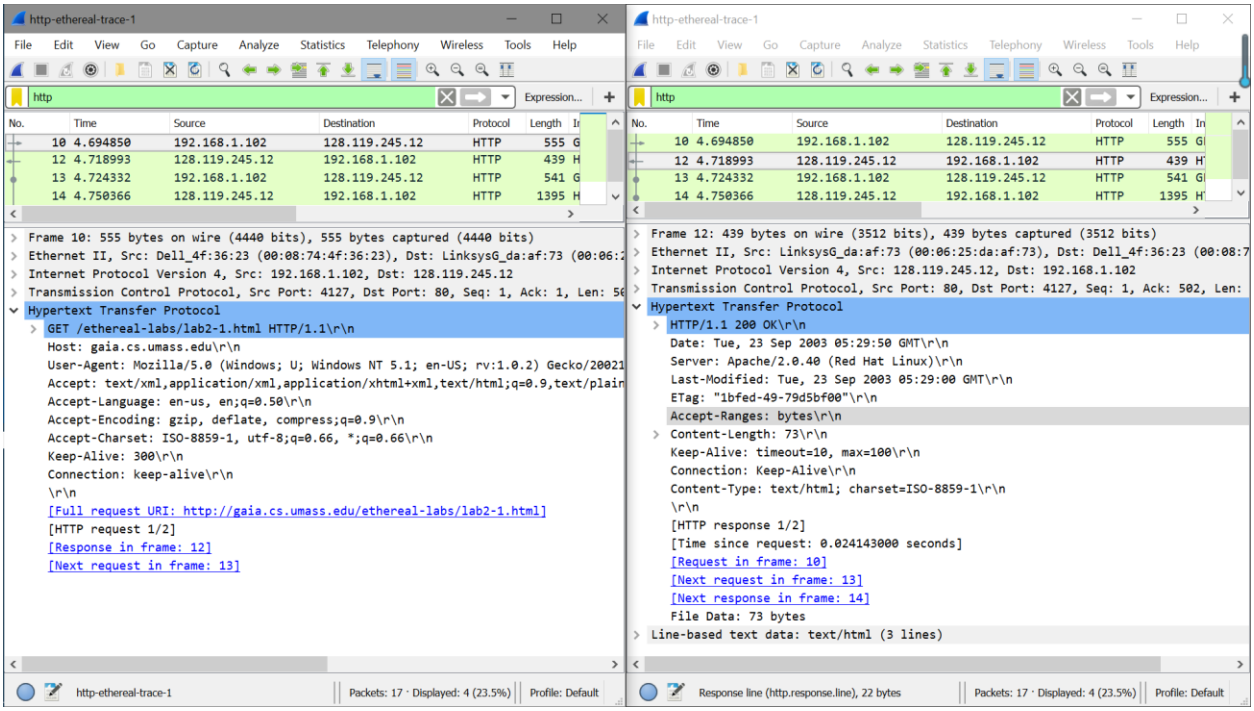
Question 1: What is the status code and phrase returned from the server to the client browser?

It is “200 OK”. Standard response for successful HTTP requests. Due to the GET request, the response contains an entity corresponding to the requested resource.

Question 2: When was the HTML file that the browser is retrieving last modified at the server? Does the response also contain a DATE header? How are these two fields different?

Last modified: Tue, 23 Sep 2003 05:29:00 GMT\r\n

The response contains a DATE header. The DATA: Tue, 23 Sep 2003 05:29:50 GMT\r\n



Different	Request	Response
Frame Number	10	12
Frame Length	555 bytes	439 bytes
Total Length	541	425
Identification	0x01cd	0xb6fa
Source	192.168.1.102	128.119.245.12
Source Port	4127	80
Destination	128.119.245.12	192.168.1.102
Destination Port	80	4127
TCP Payload	501 bytes	385 bytes
Protocol	GET	HTTP/1.1

Question 3: Is the connection established between the browser and the server persistent or non-persistent? How can you infer this?

It contains “Connection: keep-alive” header, which means the connection is persistent. In HTTP/1.1 the connection is persistent by default unless we add the “Connection:

close” header to the http request. In which case the server has to close the connection the requested object has been sent.

Question 4: How many bytes of content are being returned to the browser?

Content length: 73

Question 5: What is the data contained inside the HTTP response packet?

File data: 73 bytes. File(html).

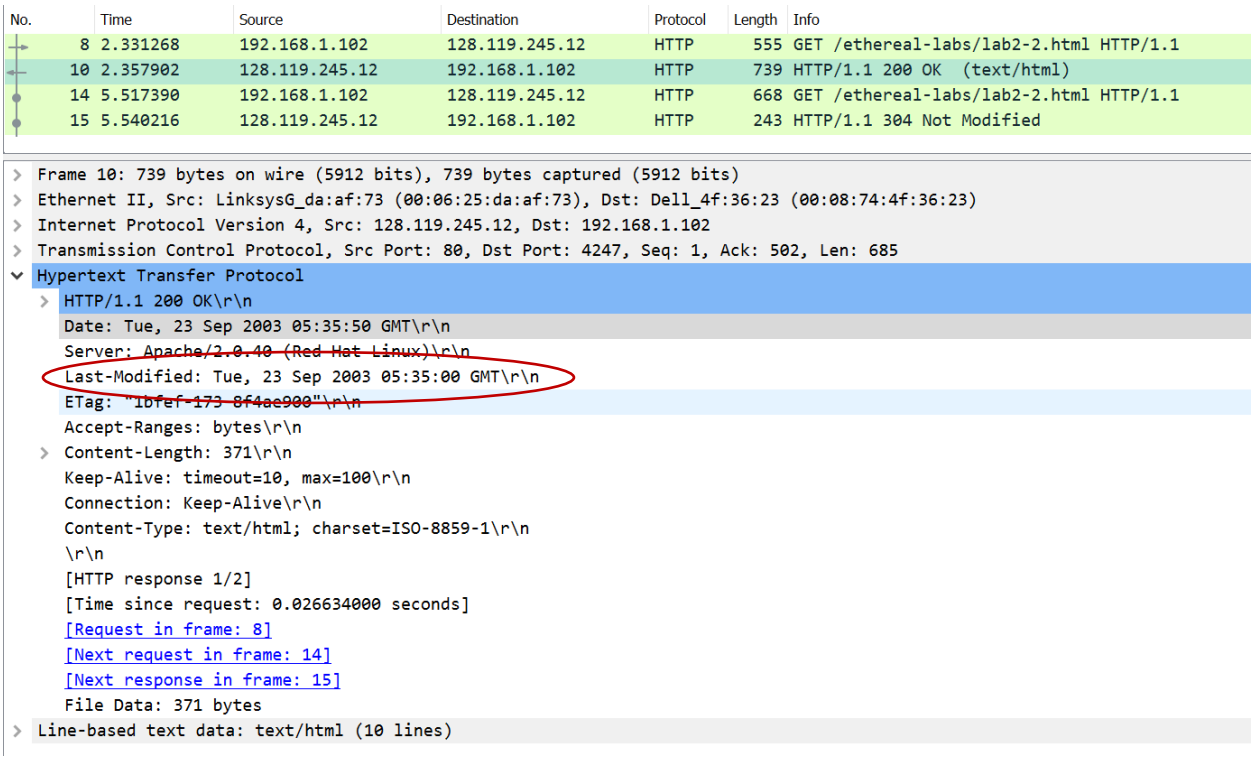
Exercise 4

Question 1: Inspect the contents of the first HTTP GET request from the browser to the server. Do you see an “IF-MODIFIED-SINCE” line in the HTTP GET?

No, I do not see this line.

Question 2: Does the response indicate the last time that the requested file was modified?

Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n



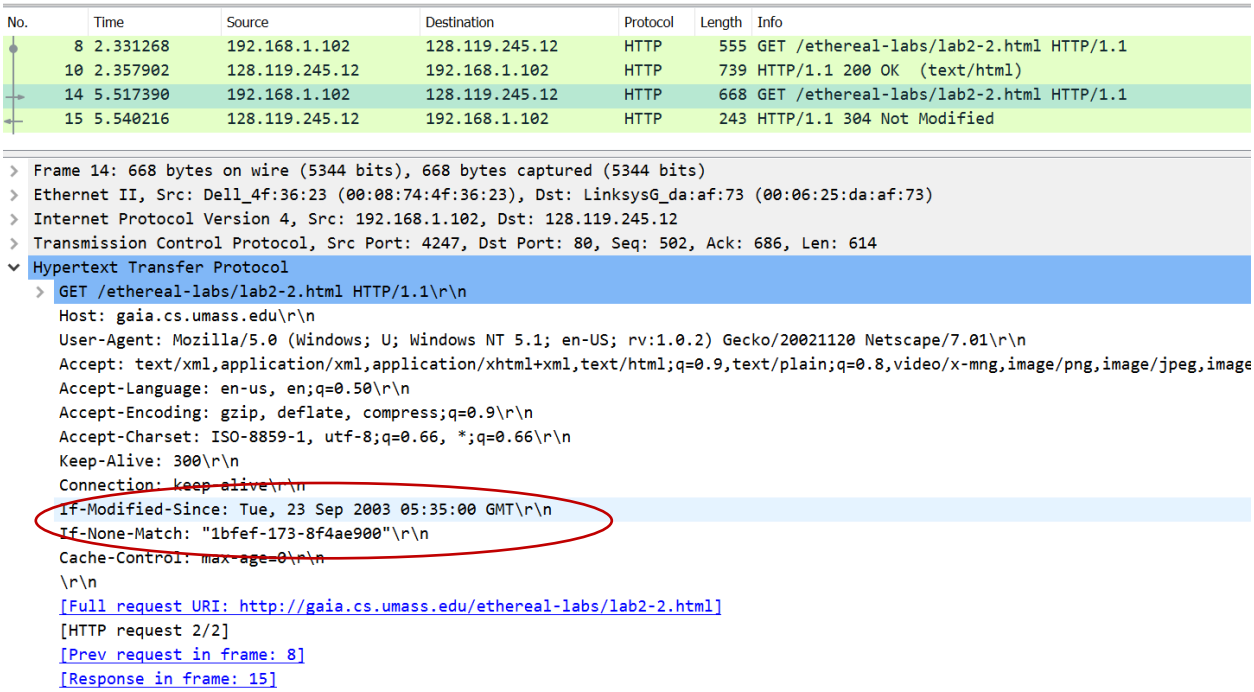
No.	Time	Source	Destination	Protocol	Length	Info
8	2.331268	192.168.1.102	128.119.245.12	HTTP	555	GET /ethereal-labs/lab2-2.html HTTP/1.1
10	2.357902	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
14	5.517390	192.168.1.102	128.119.245.12	HTTP	668	GET /ethereal-labs/lab2-2.html HTTP/1.1
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]
    File Data: 371 bytes
> Line-based text data: text/html (10 lines)
```

Question 3: Now inspect the contents of the second HTTP GET request from the browser to the server. Do you see an “IF-MODIFIED-SINCE:” and “IF-NONE-MATCH” lines in the HTTP GET? If so, what information is contained in these header lines?

IF-MODIFIED-SINCE: Tue, 23 Sep 2003 05:35:00 GMT\r\n

IF-NONE-MATCH: “1bfef-173-8f4ae900”\r\n



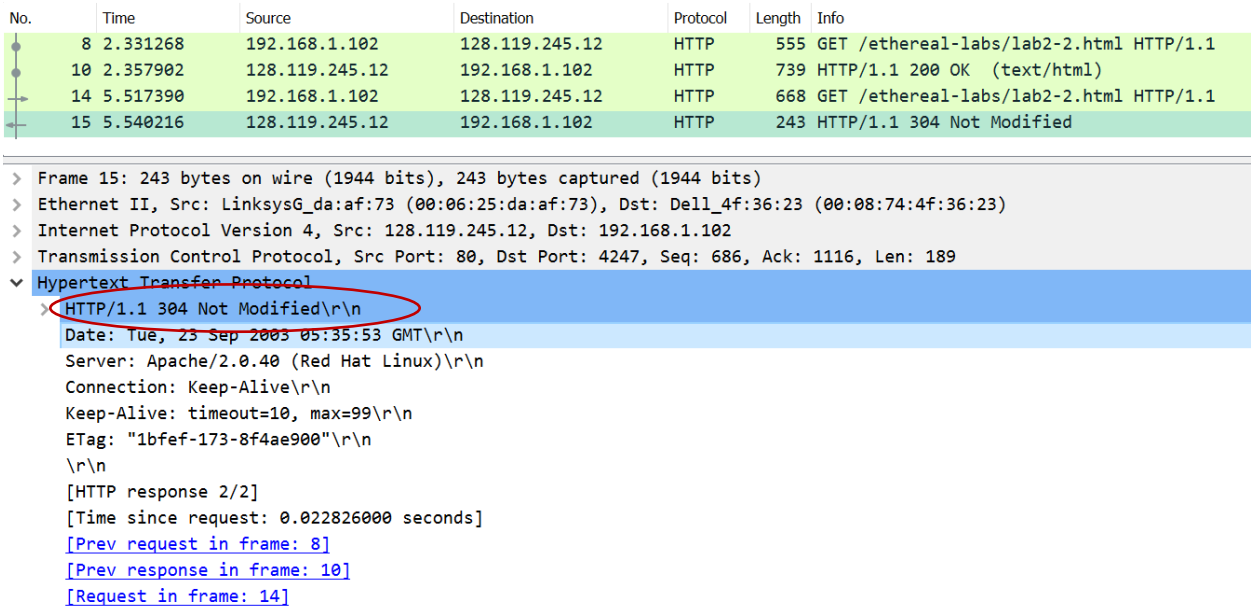
No.	Time	Source	Destination	Protocol	Length	Info
8	2.331268	192.168.1.102	128.119.245.12	HTTP	555	GET /ethereal-labs/lab2-2.html HTTP/1.1
10	2.357902	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
14	5.517390	192.168.1.102	128.119.245.12	HTTP	668	GET /ethereal-labs/lab2-2.html HTTP/1.1
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
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
  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]
```

Question 4: What is the HTTP status code and phrase returned from the server in response to this second HTTP GET? Did the server explicitly return the contents of the file? Explain.

Status code and phrase: 304 Not Modified.

Indicates that the resource has not been modified since the version specified by the request headers IF-MODIFIED-SINCE or IF-NONE-MATCH. In such case, there is no need to retransmit the resource since the client still has a previously-downloaded co



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
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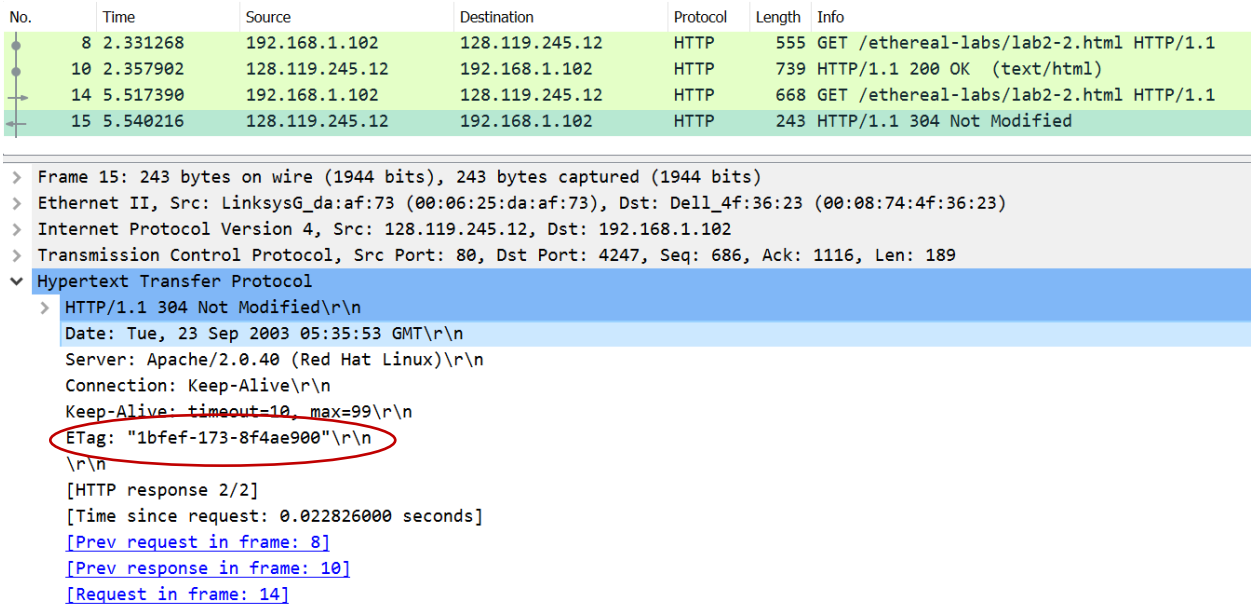
14	5.517390	192.168.1.102	128.119.245.12	HTTP	668	GET /ethereal-labs/lab2-2.html HTTP/1.1
15	5.540216	128.119.245.12	192.168.1.102	HTTP	243	HTTP/1.1 304 Not Modified

```
> 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]
```

Question 5: What is the value of the Etag field in the 2nd response message and how it is used? Has this value changed since the 1st response message was received?

Value: 1bfef-173-8f4ae900



No.	Time	Source	Destination	Protocol	Length	Info
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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

```
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> 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]
```

How it is used:

When a URL is retrieved, the web server will return the resource's current representation along with its corresponding ETag value(ETag: "1bfef-173-8f4ae900"). The client may then decide to cache the representation, along with its ETag.

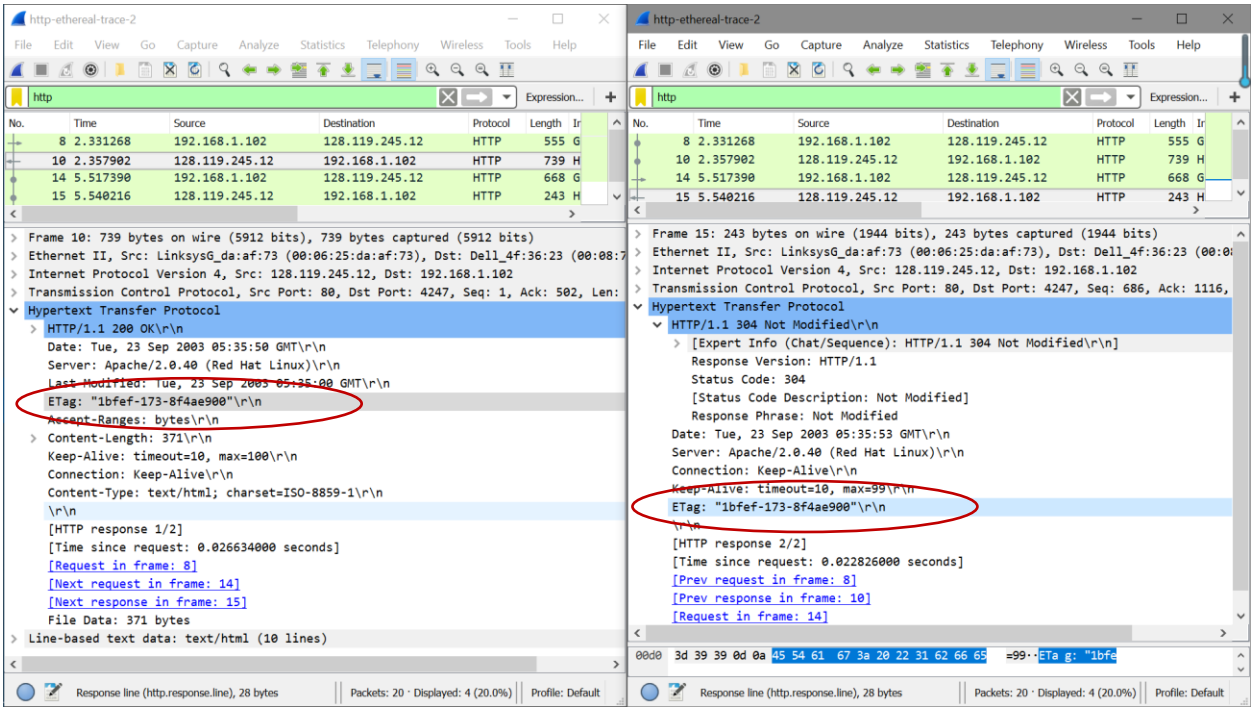
After that, if the client wants to retrieve the same URL resource again, it will first determine whether the local cached version of the URL has expired. If the URL has not expired, it will retrieve the local cached resource. If it is determined that the URL has expired, then the client will contact the server and send its previously saved copy of the ETag along with request in a "IF-NONE-MATCH" field(IF-NONE-MATCH: "1bfef-173-8f4ae900").

On this subsequent request, the server may now compare the client's ETag with the ETag for the current version of the resource. If the ETag values match, meaning the resource has not changed, then the server sends back a very short response with a "304 Not Modified" status. The 304 status tells the client that its cached version is still good and that it should use that.

If the ETag values do not match, meaning the resource has likely changed, the a full response including the resource's content is returned, just as if ETag were not being used.

ETag values can be used in web page monitoring systems.

This value does not change.



Exercise 5

Output: