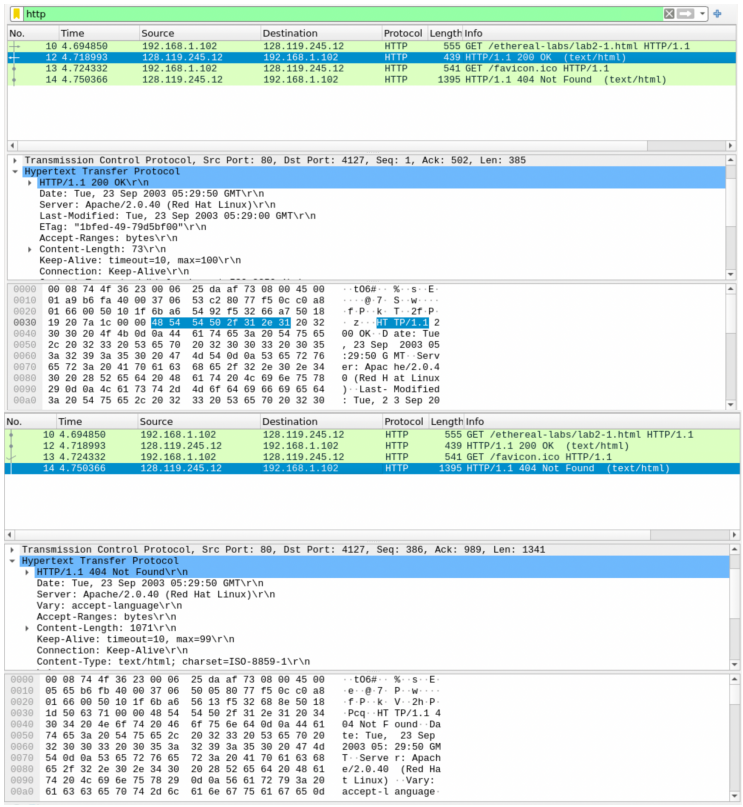
Exercise 3



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

Status code: 200
Phrase: OK

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

The HTML file the browser retrieves was last modified at the server on Tuesday, 23 September 2003 05:29:00 GMT. The response also contains a DATE header, which is different to the last modified because the DATE header refers to the date and time in which the HTML response was sent, while the last modified refers to the date and time in which the HTML file was last modified. The DATE header in this case is different to the last modified, on Tuesday, 23 September 2003 05:29:50 GMT.

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

The connection established between the browser and the server is persistent. This is shown through the connection: keep alive, which keeps open the connection for following requests.

```
Keep-Alive: timeout=10, max=100\r\n
Connection: Keep-Alive\r\n
```

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

There are 73 bytes of content being returned to the browser. This is shown in the content-length section.

```
▸ Content-Length: 73\r\n
```

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

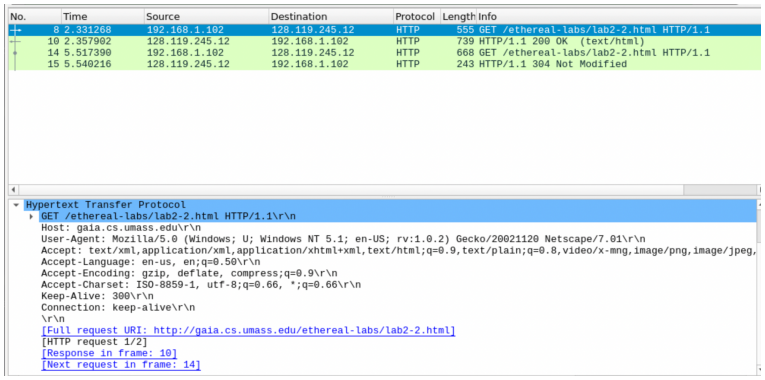
The data contained inside the HTTP response packet is a HTML file. A HTML file is a markdown text file which is used to view digital webpages.

```
▾ Line-based text data: text/html (3 lines)
    <html>\n
    Congratulations.  You've downloaded the file lab2-1.html!\n
    </html>\n
```

Exercise 4

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

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

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

Yes, the last time that the requested file was modified is shown in the last modified. It was last modified on Tuesday, 23 Sep 2003 05:35:00 GMT.

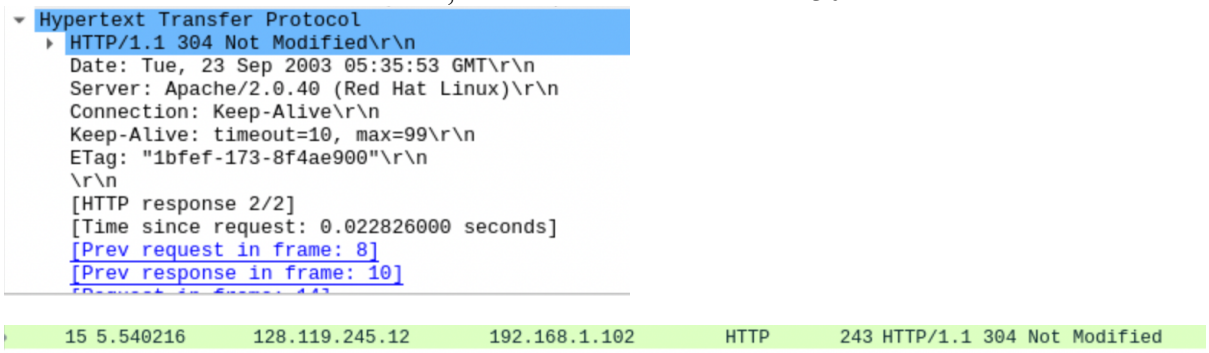
```
Server: Apache/2.0.40 (Red Hat Linux)\r\n
Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n
```

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

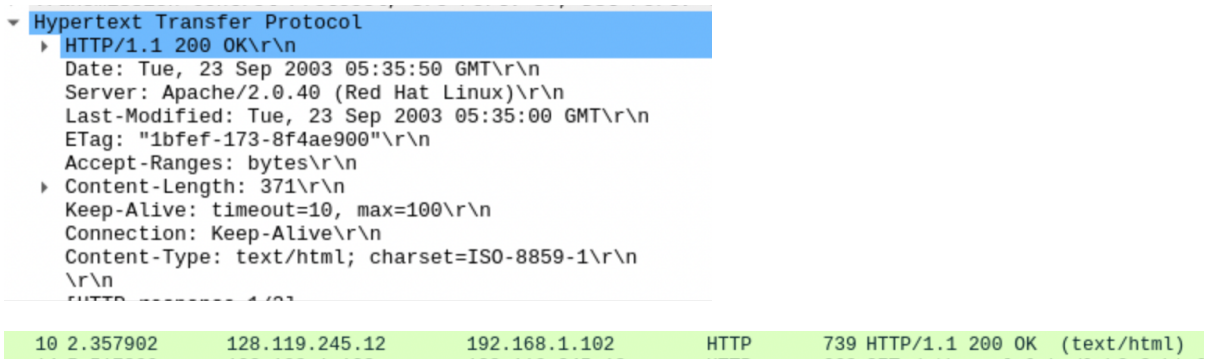
```
Accept-Charset: ISO-8859-1, utf-8;q=0.66, *;q=0.66\r\n
Keep-Alive: 300\r\n
Connection: keep-alive\r\n
If-Modified-Since: Tue, 23 Sep 2003 05:35:00 GMT\r\n
If-None-Match: "1bfef-173-8f4ae900"\r\n
Cache-Control: max-age=0\r\n
\r\n
```

Yes, there are “IF-MODIFIED-SINCE:” and “IF-NONE-MATCH” lines in the HTTP GET. “IF-MODIFIED-SINCE:” contains information about the time which the browser first downloaded the file from the server. If the information has been modified since the last time it was accessed, then the HTTP response would have to download the file again. If the

information has not been modified, then it can be redirected to 304 Not Modified.



"IF-NONE-MATCH" contains a code which will be matched to the request's Etags. If none of the Etags match "IF-NONE-MATCH", then it will return the 200 OK status. If there are Etags that match, then the server will return 304 Not Modified.



"IF-NONE-MATCH" takes precedence over "IF-MODIFIED-SINCE:" if they are used together. Therefore, if there are Etags that match "IF-NONE-MATCH" and it has been modified since the "IF-MODIFIED-SINCE:", the server will still return 304 Not Modified. If there are no Etags that match "IF-NONE-MATCH" and it has not been modified since the "IF-MODIFIED-SINCE:", the server will return 200 OK.

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 file's contents? Explain.

The HTTP status code returned from the server is 304 and phrase is Not Modified in response to the second HTTP GET. The server does not explicitly return the file's content. This is because the 304 Not Modified tells the server that there is no need to resend the requested file. Since the file has not been modified since the last time it was sent, there is no need to reload it again.

Error! Filename not specified. Question 5: What is the value of the Etag field in the 2nd response message, and how is it used? Is the Etag value the same as in the 1st response?

The value of the Etag field in the 2nd response message is the same value as the 1st reponse. This value of the Etag field is used for caching purposes and indicating to the server that there is no need to resend the requested file.

Exercise 5

```
z5359932@vx13:~/COMP3331/w2$ python3 PingClient.py
ping to 127.0.0.1, seq = 19442, time out
ping to 127.0.0.1, seq = 19443, rtt = 125 ms
ping to 127.0.0.1, seq = 19444, time out
ping to 127.0.0.1, seq = 19445, rtt = 138 ms
ping to 127.0.0.1, seq = 19446, rtt = 33 ms
ping to 127.0.0.1, seq = 19447, time out
ping to 127.0.0.1, seq = 19448, rtt = 87 ms
ping to 127.0.0.1, seq = 19449, rtt = 159 ms
ping to 127.0.0.1, seq = 19450, rtt = 105 ms
ping to 127.0.0.1, seq = 19451, rtt = 112 ms
ping to 127.0.0.1, seq = 19452, time out
ping to 127.0.0.1, seq = 19453, rtt = 66 ms
ping to 127.0.0.1, seq = 19454, rtt = 64 ms
ping to 127.0.0.1, seq = 19455, time out
ping to 127.0.0.1, seq = 19456, rtt = 142 ms
ping to 127.0.0.1, seq = 19457, rtt = 77 ms
ping to 127.0.0.1, seq = 19458, rtt = 182 ms
ping to 127.0.0.1, seq = 19459, rtt = 44 ms
ping to 127.0.0.1, seq = 19460, rtt = 63 ms
ping to 127.0.0.1, seq = 19461, time out
minimum RTT: 33 ms, maximum RTT: 182 ms, average RTT: 99 ms
```

```
z5359932@vx13:~/COMP3331/w2$ java PingServer 12000
Received from 127.0.0.1: PING 19442 1696125111468
   Reply not sent.
Received from 127.0.0.1: PING 19443 1696125112070
   Reply sent.
Received from 127.0.0.1: PING 19444 1696125112195
   Reply not sent.
Received from 127.0.0.1: PING 19445 1696125112796
   Reply sent.
Received from 127.0.0.1: PING 19446 1696125112934
   Reply sent.
Received from 127.0.0.1: PING 19447 1696125112967
   Reply not sent.
Received from 127.0.0.1: PING 19448 1696125113568
   Reply sent.
Received from 127.0.0.1: PING 19449 1696125113655
   Reply sent.
Received from 127.0.0.1: PING 19450 1696125113814
   Reply sent.
Received from 127.0.0.1: PING 19451 1696125113919
   Reply sent.
Received from 127.0.0.1: PING 19452 1696125114031
   Reply not sent.
Received from 127.0.0.1: PING 19453 1696125114632
   Reply sent.
Received from 127.0.0.1: PING 19454 1696125114698
   Reply sent.
Received from 127.0.0.1: PING 19455 1696125114763
   Reply not sent.
Received from 127.0.0.1: PING 19456 1696125115363
   Reply sent.
Received from 127.0.0.1: PING 19457 1696125115505
   Reply sent.
Received from 127.0.0.1: PING 19458 1696125115582
   Reply sent.
Received from 127.0.0.1: PING 19459 1696125115764
   Reply sent.
Received from 127.0.0.1: PING 19460 1696125115808
   Reply sent.
Received from 127.0.0.1: PING 19461 1696125115871
   Reply not sent.
```