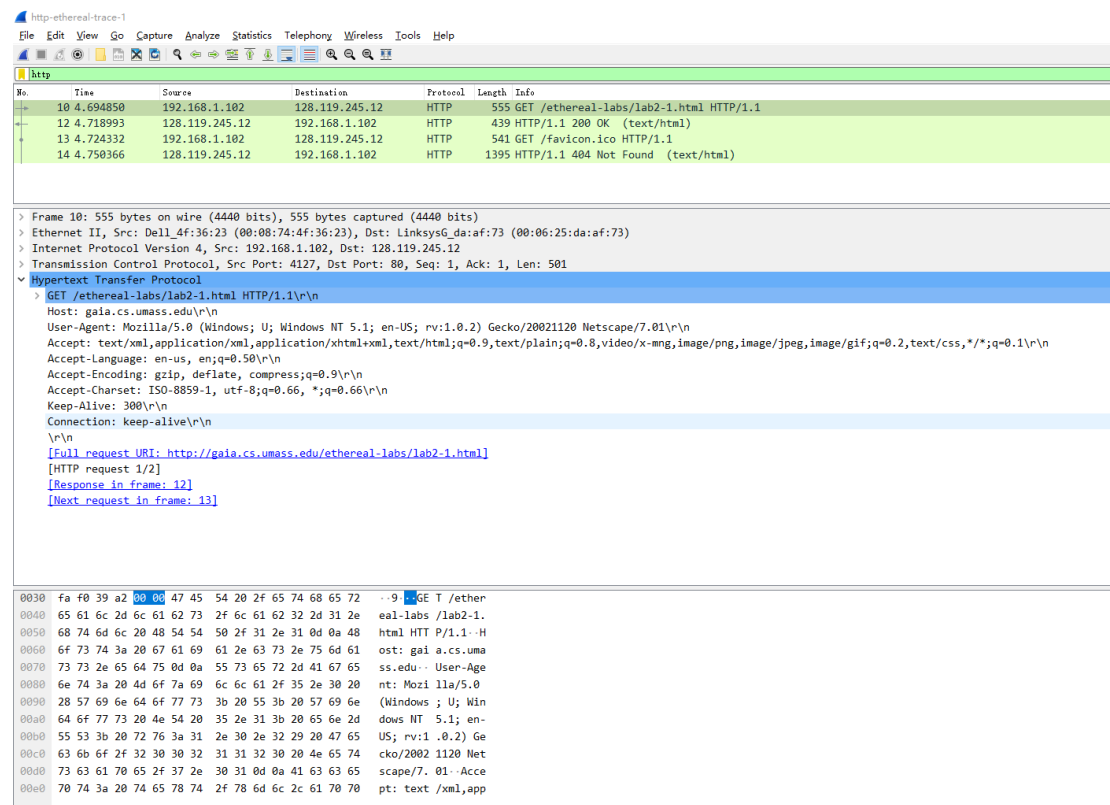


COMP 9331 Lab 2

Yuxuan Huang z5274414

Exercise 3

Request:



The image shows a Wireshark packet capture of an HTTP GET request. The top pane displays a list of packets, with packet 10 selected. The middle pane shows the details of the selected packet, including Ethernet II, Internet Protocol Version 4, Transmission Control Protocol, and Hypertext Transfer Protocol. The bottom pane shows the raw packet data in hexadecimal and ASCII.

Packet List:

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)

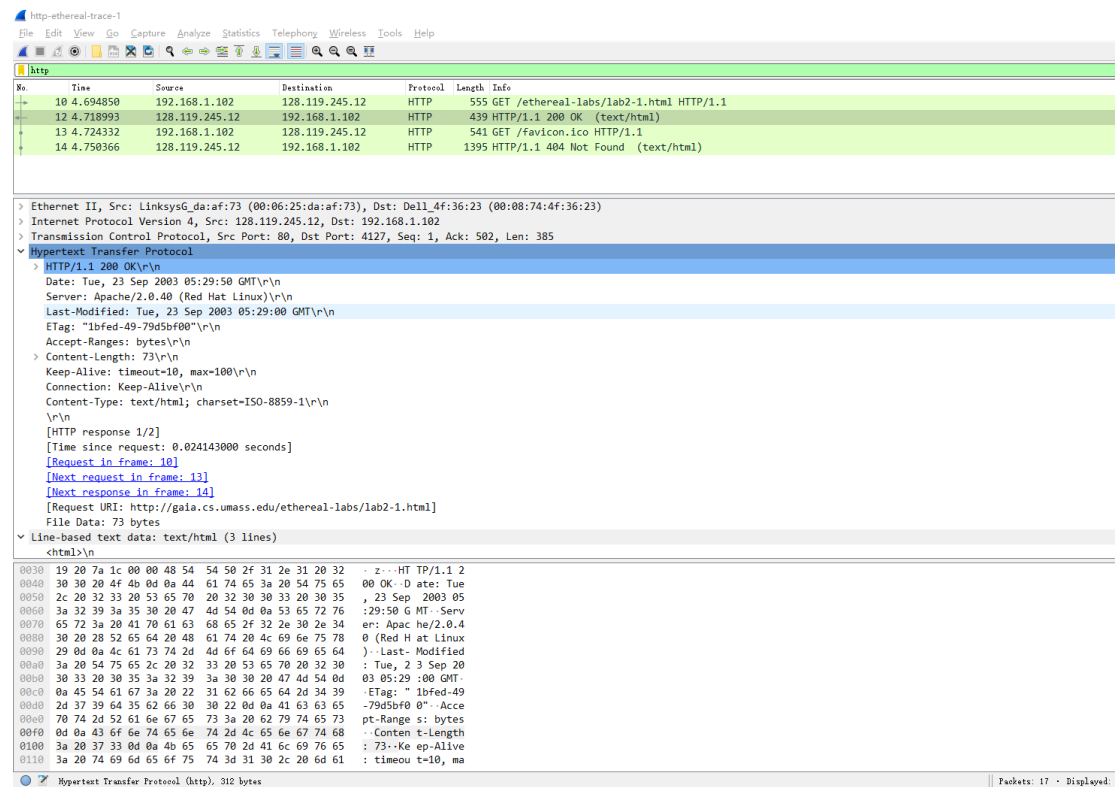
Packet Details:

- 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
- Hypertext Transfer Protocol
 - GET /ethereal-labs/lab2-1.html HTTP/1.1
 - Host: gaia.cs.umass.edu
 - User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.0.2) Gecko/20021120 Netscape/7.01
 - 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
 - Accept-Encoding: gzip, deflate, compress;q=0.9
 - Accept-Charset: ISO-8859-1, utf-8;q=0.66,*;q=0.66
 - Keep-Alive: 300
 - Connection: keep-alive

Raw Data:

```
0030 fa f0 39 a2 00 00 47 45 54 20 2f 65 74 68 65 72 ..9 GET /ether
0040 65 61 6c 2d 6c 61 62 73 2f 6c 61 62 32 2d 31 2e eal-labs /lab2-1.
0050 68 74 6d 6c 20 48 54 54 50 2f 31 2e 31 0d 0a 48 html HTTP/1.1 -H
0060 6f 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 ost: gai a.cs.uma
0070 73 73 2e 65 64 75 0d 0a 55 73 65 72 2d 41 67 65 ss.edu - User-Age
0080 6e 74 3a 20 4d 6f 7a 69 6c 6c 61 2f 35 2e 30 20 nt: Mozi lla/5.0
0090 28 57 69 6e 64 6f 77 73 3b 20 55 3b 20 57 69 6e (Windows ; U; Win
00a0 64 6f 77 73 20 4e 54 20 35 2e 31 3b 20 65 6e 2d dows NT 5.1; en-
00b0 55 53 3b 20 72 76 3a 31 2e 30 2e 32 29 20 47 65 US; rv:1 .0.2) Ge
00c0 63 6b 6f 2f 32 30 30 32 31 31 32 30 20 4e 65 74 cko/2002 1120 Net
00d0 73 63 61 70 65 2f 37 2e 30 31 0d 0a 41 63 63 65 scape/7. 01 -Acce
00e0 70 74 3a 20 74 65 78 74 2f 78 6d 6c 2c 61 70 70 pt: text /xml,app
```

Receive:



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)

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]
	[Request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-1.html]
	File Data: 73 bytes
>	Line-based text data: text/html (3 lines)
	<html>\r\n

Hypertext Transfer Protocol (http), 312 bytes	
0030	19 20 7a 1c 00 00 48 54 54 50 2f 31 2e 31 20 32
0040	30 30 20 4f 4b 0d 0a 44 61 74 65 3a 20 54 75 65
0050	2c 20 32 33 20 53 65 70 20 32 30 30 33 20 30 35
0060	3a 32 39 3a 35 30 20 47 4d 54 0d 0a 53 65 72 76
0070	65 72 3a 20 41 70 61 63 68 65 2f 32 2e 30 2e 34
0080	30 20 28 52 65 64 20 48 61 74 20 4c 69 6e 75 78
0090	29 0d 0a 4c 61 73 74 2d 4d 6f 64 69 66 69 65 64
00a0	3a 20 54 75 65 2c 20 32 33 20 53 65 70 20 32 30
00b0	30 33 20 30 35 3a 32 39 3a 30 30 20 47 4d 54 0d
00c0	0a 45 54 61 67 3a 20 22 31 62 66 65 64 2d 34 39
00d0	2d 37 39 64 35 62 66 30 22 0d 0a 41 63 63 65
00e0	70 74 2d 52 61 6e 67 65 73 3a 20 62 79 74 65 73
00f0	0d 0a 43 6f 6e 74 65 6e 74 2d 4c 65 6e 67 74 68
0100	3a 20 37 33 0d 0a 4b 65 65 70 2d 41 6c 69 76 65
0110	3a 20 74 69 6d 65 6f 75 74 3d 31 30 2c 20 6d 61

Question 1:

The status code is 200 and phrase is ok.

Question 2:

The HTML file that was last modified at the server was on Tuesday, 23rd September 2003 at 05:29:00 GMT.

Yes, the response also contains a DATE header, which indicates the date when the server generates the response message and sends it to the client.

The last modified header is used to store the last modified date when the HTML was changed.

Question 3:

The connection established between the browser and the server is persistent.

```
0030 fa f0 39 a2 00 00 47 45 54 20 2f 65 74 68 65 72 --9--GE | /ether
0040 65 61 6c 2d 6c 61 62 73 2f 6c 61 62 32 2d 32 2e eal-labs /lab2-2.
0050 68 74 6d 6c 20 48 54 54 50 2f 31 2e 31 0d 0a 48 html HTTP/1.1 -H
0060 6f 73 74 3a 20 67 61 69 61 2e 63 73 2e 75 6d 61 ost: gai a.c.suma
0070 73 73 2e 65 64 75 0d 0a 55 73 65 72 2d 41 67 65 ss.edu - User-Age
0080 6e 74 3a 20 4d 6f 74 69 6c 6c 61 2f 35 2e 30 20 nt: Mozilla/5.0
0090 28 57 69 6e 6a 6f 77 73 3b 20 55 3b 20 57 69 6e (Windows ; U; Win
00a0 64 6f 77 73 20 4e 54 20 35 2e 31 3b 20 65 6e 2d dows NT 5.1; en-
00b0 55 53 3b 20 72 76 3a 31 2e 30 2e 32 29 20 47 65 US; rv:1.0.2) Ge
00c0 63 6b 6f 2f 32 30 30 32 31 31 32 30 20 4e 65 74 cko/2002 1120 Net
00d0 73 63 61 70 65 2f 37 2e 30 31 0d 0a 41 63 63 65 scape/7.01 -Acce
00e0 70 74 3a 20 74 65 78 74 2f 78 6d 6c 2c 61 70 70 pt: text/xml,app
```

First receive:

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
▼ 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]
 [Request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]
 File Data: 371 bytes
▼ Line-based text data: text/html (10 lines)
0030 19 20 58 95 00 00 48 54 54 50 2f 31 2e 31 20 32 · · · · · X · · · HT TP/1.1 2
0040 30 30 20 4f 4b 0d 0a 44 61 74 65 3a 20 54 75 65 00 OK · · · Date: Tue
0050 2c 20 32 33 20 53 65 70 20 32 30 30 33 20 30 35 , 23 Sep 2003 05
0060 3a 33 35 3a 35 30 20 47 4d 54 0d 0a 53 65 72 76 :35:50 G MT · · · Serv
0070 65 72 3a 20 41 70 61 63 68 65 2f 32 2e 30 2e 34 er: Apac he/2.0.4
0080 30 20 28 52 65 64 20 48 61 74 20 4c 69 6e 75 78 0 (Red H at Linux
0090 29 0d 0a 4c 61 73 74 2d 4d 6f 64 69 66 69 65 64) · · · Last- Modified
00a0 3a 20 54 75 65 2c 20 32 33 20 53 65 70 20 32 30 : Tue, 2 3 Sep 20
00b0 30 33 20 30 35 3a 33 35 3a 30 30 20 47 4d 54 0d 03 05:35 :00 GMT ·
00c0 0a 45 54 61 67 3a 20 22 31 62 66 65 66 2d 31 37 · ETag: " 1bfef-17
00d0 33 2d 38 66 34 61 65 39 30 30 22 0d 0a 41 63 63 3-8f4ae9 00" · · · Acc
00e0 65 70 74 2d 52 61 6e 67 65 73 3a 20 62 79 74 65 ept-Rang es: byte
00f0 73 0d 0a 43 6f 6e 74 65 6e 74 2d 4c 65 6e 67 74 s · · Conte nt-Lengt
0100 68 3a 20 33 37 31 0d 0a 4b 65 65 70 2d 41 6c 69 h: 371 · · Keep-Ali
0110 76 65 3a 20 74 69 6d 65 6f 75 74 3d 31 30 2c 20 ve: time out=10,

Second request:

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 /etherreal-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 /etherreal-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: Dell4f: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 /etherreal-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\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/etherreal-labs/lab2-2.html]

[HTTP request 2/2]

[Prev request in frame: 8]

[Response in frame: 15]

0030	f8	43	3a	13	00	00	47	45	54	20	2f	65	74	68	65	72	...	GET /ether
0040	65	61	6c	2d	6c	61	62	73	2f	6c	61	62	32	2d	32	2e	...	real-labs /lab2-2,
0050	68	74	6d	6c	20	48	54	54	50	2f	31	2e	31	0d	0a	48	...	html HTT P/1.1..
0060	6f	73	74	3a	20	67	61	69	61	2e	63	72	2e	75	6d	61	...	ost: gai a.cs.uma
0070	73	73	2e	65	64	75	0d	0a	55	73	65	72	2d	41	67	65	...	ss.edu.. User-Age
0080	6e	74	3a	20	4d	6f	7a	69	6c	6c	61	2f	35	2e	30	20	...	nt: Mozl lla/5.0
0090	28	57	69	6e	64	6f	77	73	3b	20	55	3b	20	57	69	6e	...	(Windows ; U; Win
00a0	64	6f	77	73	20	4e	54	20	35	2e	31	3b	20	65	6e	2d	...	ows NT 5.1; en-
00b0	55	53	3b	20	72	76	3a	31	2e	30	2e	32	29	20	47	65	...	US; rv:1.0.2) Ge
00c0	63	6a	6f	2f	32	30	30	32	31	31	32	30	2e	4e	65	74	...	cko/2002 1120 Net
00d0	73	63	61	70	65	2f	37	3e	30	31	0d	0a	41	63	63	65	...	scape/7. 01-Acce
00e0	70	74	3a	20	74	65	78	74	2f	78	6d	6c	2c	61	70	70	...	pt: text /xml_app
00f0	6c	69	63	61	74	69	6f	6e	2f	78	6d	6c	2c	61	70	70	...	lication /xml_app
0100	6c	69	63	61	74	69	6f	6e	2f	78	6d	74	6d	6c	2b	78	...	lication /xhtml+x
0110	6d	6c	2c	74	65	78	74	2f	68	74	6d	6c	3b	71	3d	30	...	ml,text/ html;q=0

Second receive:

The screenshot displays the Wireshark network protocol analyzer interface. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Xpress, Tools, and Help. The toolbar contains icons for common actions like opening files, saving, and zooming.

The packet list pane at the top shows a single captured packet (No. 15) of type HTTP. The columns are No., Time, Source, Destination, Protocol, and Length. The packet is from 128.119.245.12 to 192.168.1.102, with a length of 243 bytes.

The packet details pane shows the structure of the HTTP request. The first line is "GET /ethereal-labs/lab2-2.html HTTP/1.1". Below this, the "Host" header is "128.119.245.12". The "User-Agent" header is "Mozilla/5.0 (Windows NT 6.0; rv:3.0) Gecko/20100101 Firefox/3.0". The "Accept" header is "text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8". The "Connection" header is "Keep-Alive".

The packet bytes pane shows the raw data in hexadecimal and ASCII. The first few bytes are "GET /ethereal-labs/lab2-2.html HTTP/1.1".

Question 1:

No, there's no "IF-MODIFIED-SINCE" line in the HTTP GET.

Question 2:

Yes, the response indicates the last time that the requested file was modified on Tuesday, 23rd September 2003 at 05:35:00 GMT.

Question 3:

Yes, there are "IF-MODIFIED-SINCE:" and "IF-NONE-MATCH" lines in the HTTP GET. "IF-MODIFIED-SINCE:" said "Tuesday, 23rd September 2003 at 05:35:00 GMT" which equals to the date of "Last-Modified" and "IF-NONE-MATCH" said "1bfef-173-8f4ae900".

Question 4:

The HTTP status code is 304 and the phrase is Not Modified which means the sever hasn't modified the page since Tuesday, 23rd September 2003 at 05:35:00 GMT. So, the server doesn't respond back with the requested file.

Question 5:

The value of the Etag field in the 2nd response message is "1bfef-173-8f4ae900". It means entity tag and it's a mechanism used by HTTP for cache validation. This value hasn't changed since the 1st response message was received.

Exercise 5

Server:

```
Terminal
File Edit View Search Terminal Help

Received from 127.0.0.1: PING 3331 2020-10-03 20:12:11.908916
  Reply sent.
Received from 127.0.0.1: PING 3332 2020-10-03 20:12:11.922503
  Reply sent.
Received from 127.0.0.1: PING 3333 2020-10-03 20:12:11.979403
  Reply not sent.
Received from 127.0.0.1: PING 3334 2020-10-03 20:12:12.580436
  Reply sent.
Received from 127.0.0.1: PING 3335 2020-10-03 20:12:12.615202
  Reply not sent.
Received from 127.0.0.1: PING 3336 2020-10-03 20:12:13.216264
  Reply sent.
Received from 127.0.0.1: PING 3337 2020-10-03 20:12:13.231048
  Reply sent.
Received from 127.0.0.1: PING 3338 2020-10-03 20:12:13.347688
  Reply sent.
Received from 127.0.0.1: PING 3339 2020-10-03 20:12:13.349194
  Reply sent.
Received from 127.0.0.1: PING 3340 2020-10-03 20:12:13.378733
  Reply sent.
Received from 127.0.0.1: PING 3341 2020-10-03 20:12:13.459358
  Reply sent.
Received from 127.0.0.1: PING 3342 2020-10-03 20:12:13.589961
  Reply sent.
Received from 127.0.0.1: PING 3343 2020-10-03 20:12:13.595632
  Reply sent.
Received from 127.0.0.1: PING 3344 2020-10-03 20:12:13.786301
  Reply sent.
Received from 127.0.0.1: PING 3345 2020-10-03 20:12:13.815930
  Reply sent.
```

Client

```
Terminal
File Edit View Search Terminal Help

z5274414@vx8:/tmp_amd/adams/export/adams/5/z5274414/Desktop$ python3 PingClient.py 127.0.0.1 5001
ping to 127.0.0.1, seq = 3331, rtt = 14 ms
ping to 127.0.0.1, seq = 3332, rtt = 57 ms
ping to 127.0.0.1, seq = 3333, rtt = time out
ping to 127.0.0.1, seq = 3334, rtt = 35 ms
ping to 127.0.0.1, seq = 3335, rtt = time out
ping to 127.0.0.1, seq = 3336, rtt = 15 ms
ping to 127.0.0.1, seq = 3337, rtt = 117 ms
ping to 127.0.0.1, seq = 3338, rtt = 1 ms
ping to 127.0.0.1, seq = 3339, rtt = 29 ms
ping to 127.0.0.1, seq = 3340, rtt = 81 ms
ping to 127.0.0.1, seq = 3341, rtt = 131 ms
ping to 127.0.0.1, seq = 3342, rtt = 6 ms
ping to 127.0.0.1, seq = 3343, rtt = 191 ms
ping to 127.0.0.1, seq = 3344, rtt = 30 ms
ping to 127.0.0.1, seq = 3345, rtt = 109 ms
min RTT = 1 ms, max RTT = 191 ms, average RTT = 62.76923076923077 ms
z5274414@vx8:/tmp_amd/adams/export/adams/5/z5274414/Desktop$
```