

Exercise 3:

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)

[Checksum Status: Unverified] Urgent Pointer: 0 [Timestamps] [SEQ/ACK analysis] TCP payload (385 bytes) 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\nLast-Modified: Tue, 23 Sep 2003 05:29:00 GMT\r\nETag: "1bfed-49-79d5bf09"\r\nAccept-Ranges: bytes\r\nContent-Length: 73\r\nKeep-Alive: timeout=10, max=100\r\nConnection: Keep-Alive\r\nContent-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 Congratulations. You've downloaded the file lab2-1.html!\r\n</html>\r\n	0000 00 08 74 4f 36 23 00 06 25 da af 73 08 00 45 00 ..t06#...%-s-E 0010 01 09 b6 fa 40 00 37 06 53 c2 80 77 f5 0c c0 a8 00 07 5-w... 0020 01 06 00 50 10 1f 6b a6 54 92 f5 32 66 a7 50 18 00 07 5-w... 0030 19 20 7a 1c 00 00 48 54 54 50 2f 31 2e 31 20 32 00 07 5-w... 0040 30 30 20 4f 4b 0d 0a 44 61 74 65 3a 20 54 75 65 00 07 5-w... 0050 2c 20 32 33 20 53 65 70 20 32 30 30 33 20 30 35 00 07 5-w... 0060 3a 32 39 3a 35 30 20 47 40 54 0d 0a 53 65 72 76 :29:50 GMT 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 40 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 32 39 3a 30 30 20 47 4d 54 0d 03 05:29 :00 GMT 00c0 0a 45 54 61 67 3a 20 22 31 62 66 65 64 2d 34 39 ETag: " 1bfed-49 00d0 2d 37 39 64 35 62 66 30 39 22 0d 0a 41 63 63 65 -79d5bf09" Acce 00e0 70 74 2d 52 61 6e 67 65 73 3a 20 62 79 74 65 73 pt-Range s: bytes 00f0 0d 0a 43 6f 6e 74 65 6e 74 2d 4c 65 6e 67 74 68 -Content-L length 0100 3a 20 37 33 0d 0a 4b 65 65 70 2d 41 6c 69 76 65 : 73 Ke ep-Alive 0110 3a 20 74 69 6d 65 6f 75 74 3d 31 30 2c 20 60 61 : timeout=10, ma 0120 78 3d 31 30 30 0d 0a 43 6f 6e 6e 65 63 74 69 6f x=100 -C onnectio 0130 6e 3a 20 4b 65 65 70 2d 41 6c 69 76 65 6d 0a 43 n: Keep-Alive: C 0140 6f 6e 74 65 6e 74 2d 54 79 70 65 3a 20 74 65 78 onent-T ype: tex 0150 74 2f 68 74 6d 6c 3b 20 63 68 61 72 73 65 74 3d t/html; charset= 0160 49 53 4f 2d 38 38 35 39 2d 31 0d 0a 0d 0a 3c 68 ISO-8859 -1 ...<h 0170 74 6d 6c 3e 0a 43 6f 6e 67 72 61 74 75 6c 61 74 tml> Cong ratulat 0180 69 6f 6e 73 20 20 20 59 6f 75 27 76 65 20 64 6f ions. Y ou've do 0190 77 6e 6c 6f 61 64 65 64 20 74 68 65 20 66 69 6c wnloaded the fil 01a0 65 20 6c 61 62 32 2d 31 2e 68 74 6d 6c 21 0a 3c e lab2-1 .html! < 01b0 2f 68 74 6d 6c 3e 0a
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Q1: The status code is 200, The phrase is HTTP/1.1 200 OK

Q2: Last modified on: Tue, 23 Sep 2003 05:29:00 GMT

Under DATE header: Tue, 23 Sep 2003 05:29:50 GMT

Where the last modified date is the last modified date of the Website/server, but the date under DATE header is the time the client received the information sent back from the server.

Q3: The connection established between the browser and the server is persistent, it can be found under KEEP-ALIVE header and CONNECTION header, it was said the connection status is "keep alive" which means the connection is persistent.

Q4: We can find there are 73 bytes content was sent back to the client from the server.

Q5: The data contained inside the HTTP response packet is a text/html object, whose contents are:

"Congratulations. You've downloaded the file lab2-1.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 /etherreal-labs/lab2-2.html HTTP/1.1
9	2.357909	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
14	5.517396	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

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
9	2.357902	128.119.245.12	192.168.1.102	HTTP	739	HTTP/1.1 200 OK (text/html)
10	5.5115302	192.168.1.102	128.119.245.12	HTTP	668	GET /etherreal-labs/lab2-2.html HTTP/1.1
11	5.540210	128.119.245.12	192.168.1.102	HTTP	243	HTTP/1.1 404 Not Modified

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	5.372109	192.168.1.102	128.119.245.12	HTTP	608	GET /etherreal-labs/lab2-2.html HTTP/1.1
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

<div> <div>Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 1, Ack: 502, Len: 685</div> <div> <div>Source Port: 80</div> <div>Destination Port: 4247</div> <div>[Stream index: 0]</div> <div>[Conversation completeness: Incomplete, DATA (15)]</div> <div>[TCP Segment Len: 685]</div> <div>Sequence Number: 1 (relative sequence number)</div> <div>Sequence Number (raw): 2171253633</div> <div>[Next Sequence Number: 686 (relative sequence number)]</div> <div>Acknowledgment Number: 502 (relative ack number)</div> <div>Acknowledgment number (raw): 4203217702</div> <div>0101 ... = Header Length: 20 bytes (5)</div> <div>Flags: 0x018 (PSH, ACK)</div> <div>Window: 6432</div> <div>[Calculated window size: 6432]</div> <div>[Window size scaling factor: -2 (no window scaling used)]</div> <div>Checksum: 0x5895 [unverified]</div> <div>[Checksum Status: Unverified]</div> <div>Urgent Pointer: 0</div> <div>[Timestamps]</div> <div>[SEQ/ACK analysis]</div> <div>TCP payload (685 bytes)</div> </div> </div> <div> <div>HyperText Transfer Protocol</div> <div> <div>HTTP/1.1 200 OK\r\n</div> <div>Date: Tue, 23 Sep 2003 05:35:50 GMT\r\n</div> <div>Server: Apache/2.0.40 (Red Hat Linux)\r\n</div> <div>Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n</div> <div>ETag: "1bfef-173-8fae900"\r\n</div> <div>Accept-Ranges: bytes\r\n</div> <div>Content-Length: 371\r\n</div> <div>Keep-Alive: timeout=10, max=100\r\n</div> <div>Connection: Keep-Alive\r\n</div> <div>Content-Type: text/html; charset=ISO-8859-1\r\n</div> <div>\r\n</div> <div>[HTTP response 1/2]</div> <div>[Time since request: 0.026634000 seconds]</div> <div>[Request in frame: 0]</div> <div>[Next request in frame: 14]</div> <div>[Next response in frame: 15]</div> <div>[Request URI: http://gaia.cs.umass.edu/etherreal-labs/lab2-2.html]</div> <div>File Data: 371 bytes</div> <div>Line-based text data: text/html (10 lines)</div> <div> <div>\n</div> <div><html>\n</div> <div>\n</div> <div>Congratulations again! Now you've downloaded the file lab2-2.html.
\n</div> <div>This file's last modification date will not change. <p>\n</div> <div>Thus if you download this multiple times on your browser, a complete copy
\n</div> <div>will only be sent once by the server due to the inclusion of the IN-MODIFIED-SINCE
\n</div> <div>field in your browser's HTTP GET request to the server.\n</div> <div>\n</div> <div></html>\n</div> </div> </div> </div>
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Q1: There is no “IF-MODIFIED-SINCE” line in the HTTP GET, this is because the local cache is not deleted yet.

Q2: Yes, it was shown under Last-Modified header which is: Tue,23 Sep 2003 05:35:00

Time	Source	Destination	Protocol	Info
8.213508	192.168.1.182	128.128.245.12	HTTP	555 GET /etherwall-labs/lab2-2.html HTTP/1.1
8.21357862	128.128.245.12	192.168.1.182	HTTP	730 HTTP/1.1 200 OK (text/html)
14.5.537700	192.168.1.182	128.128.245.12	HTTP	868 GET /etherwall-labs/lab2-2.html HTTP/1.1
15.5.540516	128.128.245.12	192.168.1.182	HTTP	243 HTTP/1.1 304 Not Modified
<hr/>				
[TCP Segment Len: 614]				
Sequence Number: 582 (relative sequence number)				
Sequence Number (raw): 426127282				
[Next Sequence Number: 1116 (relative sequence number)]				
Acknowledgment Number: 686 (relative ack number)				
Acknowledgment Number (raw): 217254318				
EWS n window length 20 bytes (5)				
> Flags: RST (Rst_Ack)				
Window: 65535				
[Calculated window size: 65535]				
[window size scaling factor: -1 (no window scaling used)]				
Checksum: 0x00 [unverified]				
[Checksum Status: Unverified]				
Urgent Pointer: 0				
[Timestamps]				
> [SQACK analysis]				
TCP payload (614 bytes)				
⚠ Hypertext Transfer Protocol				
GET /etherwall-labs/lab2-2.html HTTP/1.1\r\n				
Host: gais.cs.umass.edu\r\n				
User-Agent: Mozilla/5.0 (Windows; U; Windows NT 5.1; en-US; rv:1.8.2) Gecko/20011218 Netscape/7.0.1\r\n				
Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,image/png,image/jpeg,image/gif;q=0.2;text/css;q=0.6\r\n				
Accept-Language: en-us,en-gb,en;q=0.9\r\n				
Accept-Encoding: gzip,deflate,compress\r\n				
Accept-Charset: ISO-8859-1,utf-8,q=0.6,*q=0\r\n				
Keep-alive: 300\r\n				
Connection: keep-alive\r\n				
[X-MSSigned-Slice: Tue, 20 Sep 2005 05:35:06 GMT\r\n]				
X-Header-Slice: "http://ef.usm.net"\r\n				
\r\n				
[Full request URL: http://gais.cs.umass.edu/etherwall-labs/lab2-2.html]				
[HTTP request 2/2]				
[Request was from JS]				
[Response is from .js]				

Under the If-None-Match header contains the same value of Etag, It is a unique identifier assigned by a web server to a specific version of a resource.

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> Ethernet II, Src: LinksysGroup_d8:af:73 (00:0c:29:d8:af:73), Dst: Dell_4f:36:23 (00:08:74:4f:36:23)
> Internet Protocol Version 4, Src: 192.169.240.12, Dst: 192.168.1.162
v Transmission Control Protocol, Src Port: 808, Dst Port: 8087, Seq: 886, Ack: 1116, Len: 189
Source Port: 80
Destination Port: 8087
[Stream index: 0]
> [Conversation completeness: Incomplete, DATA (15)]
TCP Segment Len: 189
Sequence Number: 686 (relative sequence number)
Sequence Number (raw): 2172134316
[Next Sequence Number: 875 (relative sequence number)]
Acknowledgment Number: 1116 (relative ack number)
Acknowledgment Number (raw): 420712316
RST: .... = Header Length: 20 bytes (5)
> Flags: RST (RST, ACK)
Window: 7982
[Calculated window size: 7982]
[Window size scaling factor: -2 (no window scaling used)]
Checksum: 0xB937 [unverified]
[Checksum Status: Unverified]
Urgent Pointer: 0
> [Timestamps]
> [SQACK analysis]
TCP length (189 bytes)
v Hypertext Transfer Protocol
HTTP/1.1 304 Not Modified\r\n
Date: Tue, 22 Sep 2009 05:15:53 GMT\r\n
Server: Apache/2.0.40 (Red Hat Linux)\r\n
Connection: keep-alive\r\n
Keep-Alive: timeout=18, max=50\r\n
Etag: "1a9ef-175-8fae000"\r\n
\r\n
[HTTP response 2/2]
[Time since request: 0.82326000 seconds]
[raw_request in frame 1]
[raw_response in frame 1]
Inspected Transfer Protocol Packets: 2 (Displayed: 4/10/20)
```

Q4: The HTTP code is 304 not modified. The server didn't return the contents, it means that the file doesn't change since the last modified date, which means the version of the file will be stored on the proxy server and the last version of file will

be sent by the proxy server. Therefore, there is no need to send it again since the whole version is already stored in proxy server.

Q5: The Etag value is “1bfef-173-8f4ae900”. It is a unique identifier assigned by a web server to a specific version of a resource, not changed since the first response.

Exercise 5:

ping to 127.0.0.1, seq = 32334, rtt = 74 ms

ping to 127.0.0.1, seq = 32335, rtt = time out

ping to 127.0.0.1, seq = 32336, rtt = 163 ms

ping to 127.0.0.1, seq = 32337, rtt = 189 ms

ping to 127.0.0.1, seq = 32338, rtt = 27 ms

ping to 127.0.0.1, seq = 32339, rtt = 107 ms

ping to 127.0.0.1, seq = 32340, rtt = 92 ms

ping to 127.0.0.1, seq = 32341, rtt = 189 ms

ping to 127.0.0.1, seq = 32342, rtt = time out

ping to 127.0.0.1, seq = 32343, rtt = 70 ms

ping to 127.0.0.1, seq = 32344, rtt = 8 ms

ping to 127.0.0.1, seq = 32345, rtt = 196 ms

ping to 127.0.0.1, seq = 32346, rtt = 25 ms

ping to 127.0.0.1, seq = 32347, rtt = 150 ms

ping to 127.0.0.1, seq = 32348, rtt = 58 ms

minimum = 8 ms, maximum = 196 ms, average = 103.69 ms

```
z5542052@vx16: ~/Downloads
File Edit Tabs Help

Reply sent.
Received from 127.0.0.1: PING 32338 2024-06-17 20:57:06
Reply sent.
Received from 127.0.0.1: PING 32339 2024-06-17 20:57:06
Reply sent.
Received from 127.0.0.1: PING 32340 2024-06-17 20:57:06
Reply sent.
Received from 127.0.0.1: PING 32341 2024-06-17 20:57:06
Reply sent.
Received from 127.0.0.1: PING 32342 2024-06-17 20:57:06
Reply not sent.
Received from 127.0.0.1: PING 32343 2024-06-17 20:57:07
Reply sent.
Received from 127.0.0.1: PING 32344 2024-06-17 20:57:07
Reply sent.
Received from 127.0.0.1: PING 32345 2024-06-17 20:57:07
Reply sent.
Received from 127.0.0.1: PING 32346 2024-06-17 20:57:07
Reply sent.
Received from 127.0.0.1: PING 32347 2024-06-17 20:57:07
Reply sent.
Received from 127.0.0.1: PING 32348 2024-06-17 20:57:08
Reply sent.
```

```
z5542052@vx16: ~/Documents/Lab2
File Edit Tabs Help

bash: ./Lab2/: Is a directory
z5542052@vx16: ~/Documents$ cd ./Lab2/
z5542052@vx16: ~/Documents/Lab2$ ls
PingClient.py
z5542052@vx16: ~/Documents/Lab2$ python3 PingClient.py 127.0.0.1 1234
ping to 127.0.0.1, seq = 32334, rtt = 74 ms
ping to 127.0.0.1, seq = 32335, rtt = time out
ping to 127.0.0.1, seq = 32336, rtt = 163 ms
ping to 127.0.0.1, seq = 32337, rtt = 189 ms
ping to 127.0.0.1, seq = 32338, rtt = 27 ms
ping to 127.0.0.1, seq = 32339, rtt = 107 ms
ping to 127.0.0.1, seq = 32340, rtt = 92 ms
ping to 127.0.0.1, seq = 32341, rtt = 189 ms
ping to 127.0.0.1, seq = 32342, rtt = time out
ping to 127.0.0.1, seq = 32343, rtt = 70 ms
ping to 127.0.0.1, seq = 32344, rtt = 8 ms
ping to 127.0.0.1, seq = 32345, rtt = 196 ms
ping to 127.0.0.1, seq = 32346, rtt = 25 ms
ping to 127.0.0.1, seq = 32347, rtt = 150 ms
ping to 127.0.0.1, seq = 32348, rtt = 58 ms

minimum = 8 ms, maximum = 196 ms, average = 103.69 ms
z5542052@vx16: ~/Documents/Lab2$
```