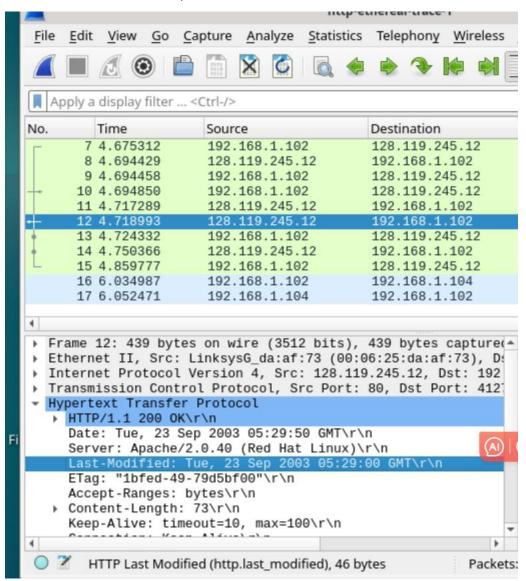# Lab2

Z5382484-LinXing Jia

Exercise 3:

Q1.

The status code is 200 and the phrase is "OK" .

Q2.

The HTML file that the browser is retrieving was last modified on Tue, 23 Sep 2003 05:29:00 GMT.
This can be seen in the "Last-Modified" header on the graph.

Yes, this response also contains the DATE Header, the Date header indicates the time when the response was generated, while the Last-Modified header indicates the time when the HTML file was last modified.

Q3.

The connection header in the response clearly indicates "keep-alive", which represents a persistent connection. After the client sends a request, it can continue to use the same TCP connection to send the next request without closing the connection.

```
◄
▶ Transmission Control Protocol, Src Port: 80, Dst Port: 4127, Seq: 1, Ack: 502◄
▼ 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]
```

Q4.
According to content-length header, the length of the content being returned to the client is 73 bytes.

```
▶ Transmission Control Protocol, Src Port: 80, Dst Port: 4127, Seq: 1, Ack: 502
▼ 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
```
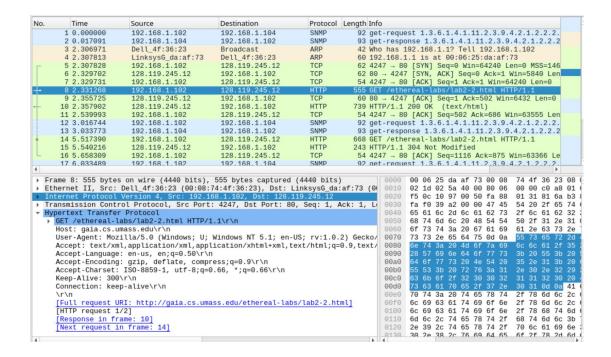
Q5.
According to Content-Type header, the data contained inside the HTTP response packet is HTML text file.

```
▼ 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]
```

Exercise 4:

Q1.
Not seeing "IF-MODIFIED-SINCE" line in HTTP GET.

Q2.

Yes, the HTTP response from the server indicates the last time the requested file was modified, which was on Tue, 23 Sep 2003 05:35:00 GMT.
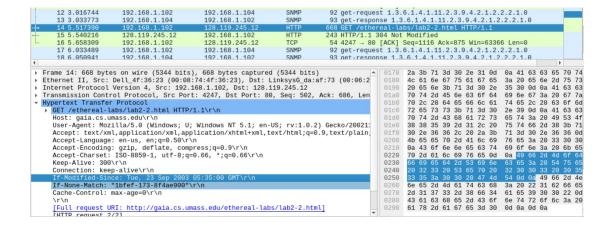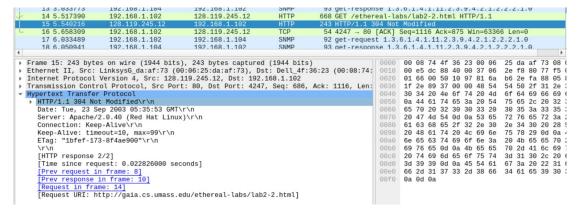

Q3.

"IF-MODIFIED-SINCE:" and "IF-NONE-MATCH" can be seen in the response. If-Modified-Since: This header field indicates the time when the client obtained the resource. The server will check whether the last modification time of the resource is later than this time. If the resource is not updated, the server will return a 304 Not Modified response. If-None-Match: This header field contains an entity tag (ETag) that identifies the resource.

Q4.

The HTTP status code and phrase returned from the server in response to the second HTTP GET are "304" and "Not Modified".

The server does not return the contents of the file because "304 Not Modified" means that the resource the client last fetched has not been updated, which means that the version of the file stored on the proxy server can be sent to the client without losing any modifications. The client can use its local cached copy.

Q5.

The value of the Etag field in the second response message is 1bfef-173-8f4ae900. Etag is a field in the HTTP response header. It is a unique identifier generated by the server and is used to identify a specific version of the resource. It can guarantee the uniqueness of resources to a large extent, thereby effectively performing cache control. The second Etag value is the same as the first response.

```
     9 2.355725      128.119.245.12     192.168.1.102      TCP     60 80 → 4247 [ACK] Seq=1 Ack=502 Win=
    10 2.357902      128.119.245.12     192.168.1.102      HTTP   739 HTTP/1.1 200 OK  (text/html)
    11 2.539993      192.168.1.102      128.119.245.12     TCP     54 4247 → 80 [ACK] Seq=502 Ack=686 W:
    12 3.016744      192.168.1.102      192.168.1.104      SNMP    92 get-request 1.3.6.1.4.1.11.2.3.9.4
    13 3.033773      192.168.1.104      192.168.1.102      SNMP    93 get-response 1.3.6.1.4.1.11.2.3.9.
    14 5.517390      192.168.1.102      128.119.245.12     HTTP   668 GET /ethereal-labs/lab2-2.html HT
    15 5.540216      128.119.245.12     192.168.1.102      HTTP   243 HTTP/1.1 304 Not Modified
    16 5.658309      192.168.1.102      128.119.245.12     TCP     54 4247 → 80 [ACK] Seq=1116 Ack=875 \
    17 6.033489      192.168.1.102      192.168.1.104      SNMP    92 get-request 1.3.6.1.4.1.11.2.3.9.4
    18 6.050941      192.168.1.104      192.168.1.102      SNMP    93 get-response 1.3.6.1.4.1.11.2.3.9.
    19 9.051213      192.168.1.102      192.168.1.104      SNMP    92 get-request 1.3.6.1.4.1.11.2.3.9.4
    20 9.068351      192.168.1.104      192.168.1.102      SNMP    93 get-response 1.3.6.1.4.1.11.2.3.9.
```

```
 ▶ Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102        00c0  0a 45 54 61 67 3
 ▶ Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 1, Ack: 502, Len:   00d0  33 2d 38 66 34 6
 ▼ Hypertext Transfer Protocol                                                  00e0  65 70 74 2d 52 6
   ▶ HTTP/1.1 200 OK\r\n                                                        00f0  73 0d 0a 43 6f 6
     Date: Tue, 23 Sep 2003 05:35:50 GMT\r\n                                    0100  68 3a 20 33 37 3
     Server: Apache/2.0.40 (Red Hat Linux)\r\n                                  0110  76 65 3a 20 74 6
     Last-Modified: Tue, 23 Sep 2003 05:35:00 GMT\r\n                           0120  6d 61 78 3d 31 3
     ETag: "1bfef-173-8f4ae900"\r\n                                             0130  69 6f 6e 3a 20 4
     Accept-Ranges: bytes\r\n                                                   0140  0a 43 6f 6e 74 6
   ▶ Content-Length: 371\r\n                                                    0150  65 78 74 2f 68 7
```

```
    14 5.517390      192.168.1.102      128.119.245.12     HTTP   668 GET /ethereal-labs/lab2-2.
    15 5.540216      128.119.245.12     192.168.1.102      HTTP   243 HTTP/1.1 304 Not Modified
    16 5.658309      192.168.1.102      128.119.245.12     TCP     54 4247 → 80 [ACK] Seq=1116 A
    17 6.033489      192.168.1.102      192.168.1.104      SNMP    92 get-request 1.3.6.1.4.1.11
    18 6.050941      192.168.1.104      192.168.1.102      SNMP    93 get-response 1.3.6.1.4.1.1
    19 9.051213      192.168.1.102      192.168.1.104      SNMP    92 get-request 1.3.6.1.4.1.11
    20 9.068351      192.168.1.104      192.168.1.102      SNMP    93 get-response 1.3.6.1.4.1.1
```

```
 ▶ Frame 15: 243 bytes on wire (1944 bits), 243 bytes captured (1944 bits)     0000  00 08 74
 ▶ Ethernet II, Src: LinksysG_da:af:73 (00:06:25:da:af:73), Dst: Dell_4f:36:23 (00:08:74:   0010  00 e5 dc
 ▶ Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.1.102        0020  01 66 00
 ▶ Transmission Control Protocol, Src Port: 80, Dst Port: 4247, Seq: 686, Ack: 1116, Len:   0030  1f 2e 89
 ▼ Hypertext Transfer Protocol                                                  0040  30 34 20
   ▶ HTTP/1.1 304 Not Modified\r\n                                              0050  0a 44 61
     Date: Tue, 23 Sep 2003 05:35:53 GMT\r\n                                    0060  65 70 20
     Server: Apache/2.0.40 (Red Hat Linux)\r\n                                  0070  20 47 4d
     Connection: Keep-Alive\r\n                                                 0080  61 63 68
     Keep-Alive: timeout=10, max=99\r\n                                         0090  20 48 61
     ETag: "1bfef-173-8f4ae900"\r\n                                             00a0  6e 65 63
     \r\n                                                                       00b0  69 76 65
     [HTTP response 2/2]                                                        00c0  20 74 69
     [Time since request: 0.022826000 seconds]                                  00d0  3d 39 39
```

Exercise 5:

The output is as follows:


```
File  Edit  Tabs  Help
z5382484@vx05: $ java PingServer 50013
Received from 127.0.0.1: PING 50014 2024-03-05 02:05:41.405
  Reply not sent.
Received from 127.0.0.1: PING 50015 2024-03-05 02:05:42.408
  Reply not sent.
Received from 127.0.0.1: PING 50016 2024-03-05 02:05:43.409
  Reply sent.
Received from 127.0.0.1: PING 50017 2024-03-05 02:05:43.520
  Reply sent.
Received from 127.0.0.1: PING 50018 2024-03-05 02:05:43.532
  Reply sent.
Received from 127.0.0.1: PING 50019 2024-03-05 02:05:43.644
  Reply not sent.
Received from 127.0.0.1: PING 50020 2024-03-05 02:05:44.645
  Reply sent.
Received from 127.0.0.1: PING 50021 2024-03-05 02:05:44.792
  Reply sent.
Received from 127.0.0.1: PING 50022 2024-03-05 02:05:44.986
  Reply sent.
Received from 127.0.0.1: PING 50023 2024-03-05 02:05:45.147
  Reply sent.
Received from 127.0.0.1: PING 50024 2024-03-05 02:05:45.213
  Reply not sent.
Received from 127.0.0.1: PING 50025 2024-03-05 02:05:46.215
  Reply sent.
Received from 127.0.0.1: PING 50026 2024-03-05 02:05:46.368
  Reply sent.
Received from 127.0.0.1: PING 50027 2024-03-05 02:05:46.529
  Reply sent.
Received from 127.0.0.1: PING 50028 2024-03-05 02:05:46.656
  Reply sent.
Received from 127.0.0.1: PING 50029 2024-03-05 02:05:46.664
  Reply sent.
Received from 127.0.0.1: PING 50030 2024-03-05 02:05:46.848
  Reply sent.
Received from 127.0.0.1: PING 50031 2024-03-05 02:05:46.926
  Reply not sent.
Received from 127.0.0.1: PING 50032 2024-03-05 02:05:47.927
  Reply not sent.
Received from 127.0.0.1: PING 50033 2024-03-05 02:05:48.928
  Reply sent.
Received from 127.0.0.1: PING 50034 2024-03-05 02:05:49.073
```

```
File  Edit  Tabs  Help
z5382484@vx05: $ python3 PingClient.py 127.0.0.1 50013
ping to 127.0.0.1, seq = 50014, time out
ping to 127.0.0.1, seq = 50015, time out
ping to 127.0.0.1, seq = 50016, rtt = 111 ms
ping to 127.0.0.1, seq = 50017, rtt = 12 ms
ping to 127.0.0.1, seq = 50018, rtt = 112 ms
ping to 127.0.0.1, seq = 50019, time out
ping to 127.0.0.1, seq = 50020, rtt = 147 ms
ping to 127.0.0.1, seq = 50021, rtt = 194 ms
ping to 127.0.0.1, seq = 50022, rtt = 161 ms
ping to 127.0.0.1, seq = 50023, rtt = 66 ms
ping to 127.0.0.1, seq = 50024, time out
ping to 127.0.0.1, seq = 50025, rtt = 153 ms
ping to 127.0.0.1, seq = 50026, rtt = 161 ms
ping to 127.0.0.1, seq = 50027, rtt = 127 ms
ping to 127.0.0.1, seq = 50028, rtt = 7 ms
ping to 127.0.0.1, seq = 50029, rtt = 184 ms
ping to 127.0.0.1, seq = 50030, rtt = 78 ms
ping to 127.0.0.1, seq = 50031, time out
ping to 127.0.0.1, seq = 50032, time out
ping to 127.0.0.1, seq = 50033, rtt = 145 ms
ping to 127.0.0.1, seq = 50034, rtt = 51 ms
Minimum RTT: 7 ms, Maximum RTT: 194 ms, Average RTT: 113.93 ms
z5382484@vx05: $
```

```
Received from 127.0.0.1: PING 50034 2024-03-05 02:05:49.073
    Reply sent.
^Cz5382484@vx05:~$ ^C
```