E3:

Q1:

Status code: 200

Phrase: OK

```
12 4.718993    128.119.245.12       192.168.1.102       HTTP       439 HTTP/1.1 200 OK  (text/html)
```

Q2:

Last modified at Tue, 23 Sep 2003 05:29:00 GMT.

Yes, the response also contain DATE header, the graph shows below.

```
▼ 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
```

The Date indicates the time and date when the HTTP response was created and sent by server. It is the time when the server retrieves the object from its file system, insert the object into the response message, and sends the response message. But the Last-Modified indicates the time and date when the object was created or last modified.

Q3:

As the picture shows the connection established between the browser and the server is persistent.

The connection state is Keep-Alive.

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

Q4:

73 Bytes of content are being returned to the browser.

```
Content-Length: 73\r\n
```

Q5:

As the graph shows:

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

E4:

Q1:

No.

Q2:

Yes, picture shows below:

```
▼ 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
```

Q3:

Yes, there are "IF-MODIFIED-SINCE:" and "IF-NONE-MATCH" lines.

The information shows below:

"IF-MODIFIED-SINCE:" header indicates the date and time of the modification of the object being requested.

"IF-NONE-MATCH" header contains an ETag.

```
If-Modified-Since: Tue, 23 Sep 2003 05:35:00 GMT\r\n
If-None-Match: "1bfef-173-8f4ae900"\r\n
```

Q4:

Status code: 304

Phrase: Not Modified

The sever don't explicitly return the contents of the file because the resource is not modified.

"IF-MODIFIED-SINCE" is a conditional GET, if the requested resource has not been modified since the time specified in this field, a copy of the resource will not be returned from the server; instead, a 304 response will be returned without any contents of the file.

Q5. The value of the ETag field in the 2nd response message shows below:

```
ETag: "1bfef-173-8f4ae900"\r\n
```

For the subsequent request, the sever will compare current ETag with the previous ETag. If match, meaning that the resource has not changed, the sever may send back a very short response with a HTTP 304 Not Modified status, else will send 200 OK.

It is the same as the first one.

E5:

Result graphs show below and PingClient.py is included in Lab2.tar :

```
z5230310@vx3:/tmp_amd/kamen/export/kamen/4/z5230310/Desktop$ python3 PingClient.
py 127.0.0.1 9999
ping to 127.0.0.1, seq = 1, rtt = 116 ms
ping to 127.0.0.1, seq = 2, rtt = 180 ms
ping to 127.0.0.1, seq = 3, rtt = 190 ms
ping to 127.0.0.1, seq = 4, time out
ping to 127.0.0.1, seq = 5, rtt = 166 ms
ping to 127.0.0.1, seq = 6, time out
ping to 127.0.0.1, seq = 7, rtt = 178 ms
ping to 127.0.0.1, seq = 8, rtt = 79 ms
ping to 127.0.0.1, seq = 9, rtt = 27 ms
ping to 127.0.0.1, seq = 10, rtt = 167 ms
Minimum RTT = 27 ms
Maximum RTT = 190 ms
Average RTT = 138 ms
```

```
z5230310@vx3:/tmp_amd/kamen/export/kamen/4/z5230310/Desktop$ java PingServer 999
9
Received from 127.0.0.1: PING 0 2019-06-22 14:56:48
    Reply sent.
Received from 127.0.0.1: PING 1 2019-06-22 14:56:48
    Reply sent.
Received from 127.0.0.1: PING 2 2019-06-22 14:56:48
    Reply sent.
Received from 127.0.0.1: PING 3 2019-06-22 14:56:48
    Reply not sent.
Received from 127.0.0.1: PING 4 2019-06-22 14:56:49
    Reply sent.
Received from 127.0.0.1: PING 5 2019-06-22 14:56:50
    Reply not sent.
Received from 127.0.0.1: PING 6 2019-06-22 14:56:51
    Reply sent.
Received from 127.0.0.1: PING 7 2019-06-22 14:56:51
    Reply sent.
Received from 127.0.0.1: PING 8 2019-06-22 14:56:51
    Reply sent.
Received from 127.0.0.1: PING 9 2019-06-22 14:56:51
    Reply sent.
```