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)

> 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
v Hypertext Transfer Protocol
  > GET /ethereal-labs/lab2-1.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,*/*;
    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
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-1.html]
    [HTTP request 1/2]
    [Response in frame: 12]
    [Next request in frame: 13]

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/favicon.ico]
    File Data: 73 bytes

Q1:status code = 200   phrase = OK

Q2:   Last modified at the server: Tue, 23 Sep 2003 05:29:00 GMT

No DATE header; DATE header indicates when the server generates and sends response messages

Q3: The connection is persistent because the header line showed that the connection is "Keep-Alive".

Q4: 73 bytes

Q5: text/html

Exercise 4:

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 8: 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: 4247, Dst Port: 80, Seq: 1, Ack: 1, Len: 501
v Hypertext Transfer Protocol
  > GET /ethereal-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,*/*;
    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
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]
    [HTTP request 1/2]
    [Response in frame: 10]
    [Next request in frame: 14]

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]

Hypertext Transfer Protocol
  GET /ethereal-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
    Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text
    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
    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/ethereal-labs/lab2-2.html]
    [HTTP request 2/2]

Hypertext Transfer Protocol
  HTTP/1.1 304 Not Modified\r\n
    Date: Tue, 23 Sep 2003 05:35:53 GMT\r\n
    Server: Apache/2.0.40 (Red Hat Linux)\r\n
    Connection: Keep-Alive\r\n
    Keep-Alive: timeout=10, max=99\r\n
    ETag: "1bfef-173-8f4ae900"\r\n
    \r\n
    [HTTP response 2/2]
    [Time since request: 0.022826000 seconds]
    [Prev request in frame: 8]
    [Prev response in frame: 10]
    [Request in frame: 14]
    [Request URI: http://gaia.cs.umass.edu/ethereal-labs/lab2-2.html]

Q1: No.

Q2: Yes.

Q3: Yes.

IF-MODIFIED-SINCE: Tue, 23 Sep 2003 05:35:00 GMT

IF-NONE-MATCH: "1bfef-173-8f4ae900"

Q4: 304 Not Modified.

The server didn't return the contents of the file explicitly because the server determines that the resources cached by the client are up to date.

Q5: "1bfef-173-8f4ae900" It acts as a cached copy of the original object. It hasn't changed.

Exercise 5:

```
z5379852@vx2:/tmp_amd/reed/export/reed/4/z5379852/Desktop$ java PingServer
Required arguments: port
z5379852@vx2:/tmp_amd/reed/export/reed/4/z5379852/Desktop$ java PingServer 6789
Received from 127.0.0.1: PING33312022-03-06 20:40:51.699387
  Reply sent.
Received from 127.0.0.1: PING33322022-03-06 20:40:51.907730
  Reply sent.
Received from 127.0.0.1: PING33332022-03-06 20:40:52.057632
  Reply sent.
Received from 127.0.0.1: PING33342022-03-06 20:40:52.074437
  Reply sent.
Received from 127.0.0.1: PING33352022-03-06 20:40:52.123017
  Reply sent.
Received from 127.0.0.1: PING33362022-03-06 20:40:52.206805
  Reply sent.
Received from 127.0.0.1: PING33372022-03-06 20:40:52.352787
  Reply sent.
Received from 127.0.0.1: PING33382022-03-06 20:40:52.386408
  Reply sent.
Received from 127.0.0.1: PING33392022-03-06 20:40:52.530358
  Reply sent.
Received from 127.0.0.1: PING33402022-03-06 20:40:52.580944
  Reply sent.
Received from 127.0.0.1: PING33412022-03-06 20:40:52.774864
  Reply not sent.
Received from 127.0.0.1: PING33422022-03-06 20:40:53.375673
  Reply not sent.
Received from 127.0.0.1: PING33432022-03-06 20:40:53.976462
  Reply sent.
Received from 127.0.0.1: PING33442022-03-06 20:40:54.018227
  Reply not sent.
Received from 127.0.0.1: PING33452022-03-06 20:40:54.619027
  Reply sent.
```

```
z5379852@vx2:/tmp_amd/reed/export/reed/4/z5379852/Desktop$ python3 PingClient.py
port:6789
PING to  127.0.0.1  seq =  3331  rtt =  208   ms
PING to  127.0.0.1  seq =  3332  rtt =  149   ms
PING to  127.0.0.1  seq =  3333  rtt =  16    ms
PING to  127.0.0.1  seq =  3334  rtt =  48    ms
PING to  127.0.0.1  seq =  3335  rtt =  83    ms
PING to  127.0.0.1  seq =  3336  rtt =  145   ms
PING to  127.0.0.1  seq =  3337  rtt =  33    ms
PING to  127.0.0.1  seq =  3338  rtt =  143   ms
PING to  127.0.0.1  seq =  3339  rtt =  50    ms
PING to  127.0.0.1  seq =  3340  rtt =  193   ms
PING to  127.0.0.1  seq =  3341  time out
PING to  127.0.0.1  seq =  3342  time out
PING to  127.0.0.1  seq =  3343  rtt =  41    ms
PING to  127.0.0.1  seq =  3344  time out
PING to  127.0.0.1  seq =  3345  rtt =  145   ms

Max rtt =  208 ms Min rtt =  16 ms Avg rtt =  104.5 ms
z5379852@vx2:/tmp_amd/reed/export/reed/4/z5379852/Desktop$
```