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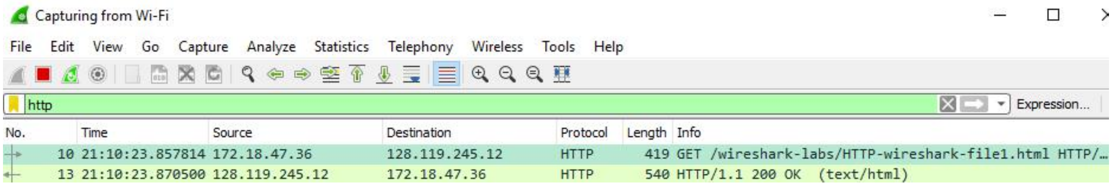
XW1154
02/19/2017
CS4793
Homework 02



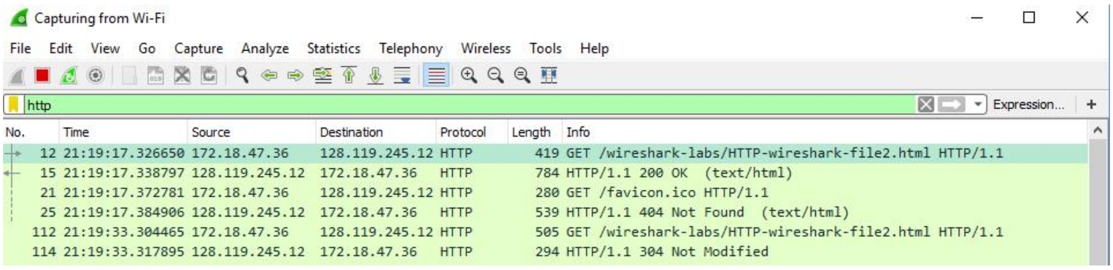
```
No.   Time             Source          Destination     Protocol  Length  Info
   10 21:10:23.857814  172.18.47.36    128.119.245.12  HTTP         419  GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/…
   13 21:10:23.870500  128.119.245.12  172.18.47.36    HTTP         540  HTTP/1.1 200 OK  (text/html)
```

Figure 1. Connection first part

```
No.     Time                Source               Destination          Protocol Length Info
     10 21:10:23.857814     172.18.47.36         128.119.245.12       HTTP     419    GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1

Frame 10: 419 bytes on wire (3352 bits), 419 bytes captured (3352 bits) on interface 0
Ethernet II, Src: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9), Dst: IETF-VRRP-VRID_53 (00:00:5e:00:01:53)
Internet Protocol Version 4, Src: 172.18.47.36, Dst: 128.119.245.12
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
    Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 405
    Identification: 0x6a96 (27286)
    Flags: 0x02 (Don't Fragment)
    Fragment offset: 0
    Time to live: 64
    Protocol: TCP (6)
    Header checksum: 0x7e12 [validation disabled]
    [Header checksum status: Unverified]
    Source: 172.18.47.36
    Destination: 128.119.245.12
    [Source GeoIP: Unknown]
    [Destination GeoIP: Unknown]
Transmission Control Protocol, Src Port: 51141, Dst Port: 80, Seq: 1, Ack: 1, Len: 365
    Source Port: 51141
    Destination Port: 80
    [Stream index: 1]
    [TCP Segment Len: 365]
    Sequence number: 1    (relative sequence number)
    [Next sequence number: 366    (relative sequence number)]
    Acknowledgment number: 1    (relative ack number)
    Header Length: 20 bytes
    Flags: 0x018 (PSH, ACK)
    Window size value: 32768
    [Calculated window size: 262144]
    [Window size scaling factor: 8]
    Checksum: 0x59f0 [unverified]
    [Checksum Status: Unverified]
    Urgent pointer: 0
    [SEQ/ACK analysis]
Hypertext Transfer Protocol
    GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
        [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n]
        Request Method: GET
        Request URI: /wireshark-labs/HTTP-wireshark-file1.html
        Request Version: HTTP/1.1
    Accept: text/html, application/xhtml+xml, image/jxr, */*\r\n
    Accept-Language: en-US,en;q=0.8,zh-Hans-CN;q=0.7,zh-Hans;q=0.5,es-ES;q=0.3,es;q=0.2\r\n
    User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; Trident/7.0; rv:11.0) like Gecko\r\n
    Accept-Encoding: gzip, deflate\r\n
    Host: gaia.cs.umass.edu\r\n
    Connection: Keep-Alive\r\n
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html]
    [HTTP request 1/1]
    [Response in frame: 13]
No.     Time                    Source                  Destination             Protocol Length Info
    13 21:10:23.870500    128.119.245.12        172.18.47.36          HTTP     540    HTTP/1.1 200 OK
(text/html)

Frame 13: 540 bytes on wire (4320 bits), 540 bytes captured (4320 bits) on interface 0
Ethernet II, Src: Cisco_bf:1e:40 (58:bf:ea:bf:1e:40), Dst: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.18.47.36
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
    Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 526
    Identification: 0x6933 (26931)
    Flags: 0x02 (Don't Fragment)
    Fragment offset: 0
    Time to live: 51
    Protocol: TCP (6)
    Header checksum: 0x8bfc [validation disabled]
    [Header checksum status: Unverified]
    Source: 128.119.245.12
    Destination: 172.18.47.36
    [Source GeoIP: Unknown]
    [Destination GeoIP: Unknown]
Transmission Control Protocol, Src Port: 80, Dst Port: 51141, Seq: 1, Ack: 366, Len: 486
    Source Port: 80
    Destination Port: 51141
    [Stream index: 1]
    [TCP Segment Len: 486]
    Sequence number: 1    (relative sequence number)
    [Next sequence number: 487    (relative sequence number)]
    Acknowledgment number: 366    (relative ack number)
    Header Length: 20 bytes
    Flags: 0x018 (PSH, ACK)
    Window size value: 237
    [Calculated window size: 30336]
    [Window size scaling factor: 128]
    Checksum: 0x0952 [unverified]
    [Checksum Status: Unverified]
    Urgent pointer: 0
    [SEQ/ACK analysis]
Hypertext Transfer Protocol
    HTTP/1.1 200 OK\r\n
        [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
        Request Version: HTTP/1.1
        Status Code: 200
        Response Phrase: OK
    Date: Mon, 20 Feb 2017 02:10:24 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/5.4.16 mod_perl/2.0.10 Perl/v5.16.3\r\n
    Last-Modified: Sun, 19 Feb 2017 06:59:01 GMT\r\n
    ETag: "80-548dcae830b68"\r\n
    Accept-Ranges: bytes\r\n
    Content-Length: 128\r\n
        [Content length: 128]
    Keep-Alive: timeout=5, max=100\r\n
    Connection: Keep-Alive\r\n
    Content-Type: text/html; charset=UTF-8\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.012686000 seconds]
    [Request in frame: 10]
    File Data: 128 bytes
Line-based text data: text/html
    <html>\n
    Congratulations.   You've downloaded the file \n
    http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html!\n
    </html>\n
```

1. My browser running HTTP version 1.1, the server is running HTTP version 1.1.
2. The list of languages that my browser accepts includes English.
3. The IP address of my computer is 172.18.47.36; The gaia server is 128.119.245.12.

4. The returned status code is “200”
5. Last-Modified: Sun, 19 Feb 2017 06:59:01 GMT
6. The bytes of content is “128” bytes
7. No, I do not see any in the HTTP Message below



```
http
```

```
No.   Time            Source          Destination     Protocol  Length Info
   12 21:19:17.326650 172.18.47.36    128.119.245.12  HTTP       419 GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
   15 21:19:17.338797 128.119.245.12  172.18.47.36    HTTP       784 HTTP/1.1 200 OK  (text/html)
   21 21:19:17.372781 172.18.47.36    128.119.245.12  HTTP       280 GET /favicon.ico HTTP/1.1
   25 21:19:17.384906 128.119.245.12  172.18.47.36    HTTP       539 HTTP/1.1 404 Not Found  (text/html)
  112 21:19:33.304465 172.18.47.36    128.119.245.12  HTTP       505 GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1
  114 21:19:33.317895 128.119.245.12  172.18.47.36    HTTP       294 HTTP/1.1 304 Not Modified
```

Figure 2. Connection second part

First GET:

```
No.     Time               Source                Destination           Protocol Length Info
     12  21:19:17.326650    172.18.47.36               128.119.245.12          HTTP     419     GET
/wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1

Frame 12: 419 bytes on wire (3352 bits), 419 bytes captured (3352 bits) on interface 0
Ethernet II, Src: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9), Dst: IETF-VRRP-VRID_53 (00:00:5e:00:01:53)
Internet Protocol Version 4, Src: 172.18.47.36, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 51455, Dst Port: 80, Seq: 1, Ack: 1, Len: 365
Hypertext Transfer Protocol
    GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n
        [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n]
        Request Method: GET
        Request URI: /wireshark-labs/HTTP-wireshark-file2.html
        Request Version: HTTP/1.1
    Accept: text/html, application/xhtml+xml, image/jxr, */*\r\n
    Accept-Language: en-US,en;q=0.8,zh-Hans-CN;q=0.7,zh-Hans;q=0.5,es-ES;q=0.3,es;q=0.2\r\n
    User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; Trident/7.0; rv:11.0) like Gecko\r\n
    Accept-Encoding: gzip, deflate\r\n
    Host: gaia.cs.umass.edu\r\n
    Connection: Keep-Alive\r\n
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file2.html]
    [HTTP request 1/1]
    [Response in frame: 15]
```

First RETURN:

```
No.     Time               Source                Destination           Protocol Length Info
     15  21:19:17.338797    128.119.245.12        172.18.47.36           HTTP      784      HTTP/1.1 200 OK
(text/html)

Frame 15: 784 bytes on wire (6272 bits), 784 bytes captured (6272 bits) on interface 0
Ethernet II, Src: Cisco_bf:1e:40 (58:bf:ea:bf:1e:40), Dst: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.18.47.36
Transmission Control Protocol, Src Port: 80, Dst Port: 51455, Seq: 1, Ack: 366, Len: 730
Hypertext Transfer Protocol
    HTTP/1.1 200 OK\r\n
        [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
        Request Version: HTTP/1.1
        Status Code: 200
        Response Phrase: OK
    Date: Mon, 20 Feb 2017 02:19:17 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/5.4.16 mod_perl/2.0.10 Perl/v5.16.3\r\n
    Last-Modified: Sun, 19 Feb 2017 06:59:01 GMT\r\n
    ETag: "173-548dcae830398"\r\n
    Accept-Ranges: bytes\r\n
    Content-Length: 371\r\n
        [Content length: 371]
    Keep-Alive: timeout=5, max=100\r\n
    Connection: Keep-Alive\r\n
    Content-Type: text/html; charset=UTF-8\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.012147000 seconds]
    [Request in frame: 12]
    File Data: 371 bytes
Line-based text data: text/html
    \n
    <html>\n
    \n
    Congratulations again!  Now you've downloaded the file lab2-2.html. <br>\n
    This file's last modification date will not change.  <p>\n
    Thus  if you download this multiple times on your browser, a complete copy <br>\n
    will only be sent once by the server due to the inclusion of the IN-MODIFIED-SINCE<br>\n
    field in your browser's HTTP GET request to the server.\n
    \n
    </html>\n
```

Second GET:

```
No.     Time               Source                Destination           Protocol Length Info
    112 21:19:33.304465    172.18.47.36          128.119.245.12        HTTP     505    GET
/wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1

Frame 112: 505 bytes on wire (4040 bits), 505 bytes captured (4040 bits) on interface 0
Ethernet II, Src: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9), Dst: IETF-VRRP-VRID_53 (00:00:5e:00:01:53)
Internet Protocol Version 4, Src: 172.18.47.36, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 51461, Dst Port: 80, Seq: 1, Ack: 1, Len: 451
Hypertext Transfer Protocol
    GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n
        [Expert Info (Chat/Sequence): GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n]
        Request Method: GET
        Request URI: /wireshark-labs/HTTP-wireshark-file2.html
        Request Version: HTTP/1.1
    Accept: text/html, application/xhtml+xml, image/jxr, */*\r\n
    Accept-Language: en-US,en;q=0.8,zh-Hans-CN;q=0.7,zh-Hans;q=0.5,es-ES;q=0.3,es;q=0.2\r\n
    User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; Trident/7.0; rv:11.0) like Gecko\r\n
    Accept-Encoding: gzip, deflate\r\n
    Host: gaia.cs.umass.edu\r\n
    If-Modified-Since: Sun, 19 Feb 2017 06:59:01 GMT\r\n
    If-None-Match: "173-548dcae830398"\r\n
    Connection: Keep-Alive\r\n
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file2.html]
    [HTTP request 1/1]
    [Response in frame: 114]
```

Second RETURN:

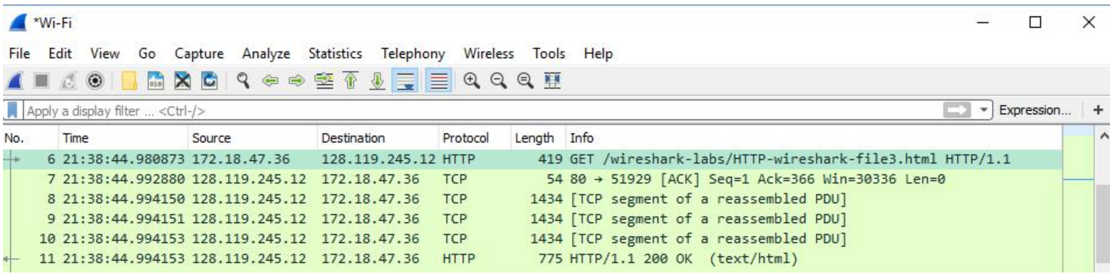
```
No.     Time               Source                Destination           Protocol Length Info
    114 21:19:33.317895    128.119.245.12        172.18.47.36          HTTP     294    HTTP/1.1 304 Not
Modified

Frame 114: 294 bytes on wire (2352 bits), 294 bytes captured (2352 bits) on interface 0
Ethernet II, Src: Cisco_bf:1e:40 (58:bf:ea:bf:1e:40), Dst: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9)
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.18.47.36
Transmission Control Protocol, Src Port: 80, Dst Port: 51461, Seq: 1, Ack: 452, Len: 240
Hypertext Transfer Protocol
    HTTP/1.1 304 Not Modified\r\n
        [Expert Info (Chat/Sequence): HTTP/1.1 304 Not Modified\r\n]
        Request Version: HTTP/1.1
        Status Code: 304
        Response Phrase: Not Modified
    Date: Mon, 20 Feb 2017 02:19:33 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.1e-fips PHP/5.4.16 mod_perl/2.0.10 Perl/v5.16.3\r\n
    Connection: Keep-Alive\r\n
    Keep-Alive: timeout=5, max=100\r\n
    ETag: "173-548dcae830398"\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.013430000 seconds]
    [Request in frame: 112]
```

8. No, there is not “IF-MODIFIED-SINCE” line in the first HTTP GET.

9. Yes, the response explicitly return the contents of the file. The text is printed in the file section.

10. Yes, there is “IF-MODIFIED-SINCE” line in the second HTTP GET. The date since last modified.

11. The returned status code is “304 Not Modified.” The server did not explicitly return the contents of the file because it was not modified, so the text of the file is not returned in the HTTP message.


*Wi-Fi
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
Expression...
+

```
No.  Time               Source          Destination     Protocol Length Info
   6 21:38:44.980873 172.18.47.36    128.119.245.12 HTTP      419 GET /wireshark-labs/HTTP-wireshark-file3.html HTTP/1.1
   7 21:38:44.992880 128.119.245.12 172.18.47.36    TCP        54 80 → 51929 [ACK] Seq=1 Ack=366 Win=30336 Len=0
   8 21:38:44.994150 128.119.245.12 172.18.47.36    TCP      1434 [TCP segment of a reassembled PDU]
   9 21:38:44.994151 128.119.245.12 172.18.47.36    TCP      1434 [TCP segment of a reassembled PDU]
  10 21:38:44.994153 128.119.245.12 172.18.47.36    TCP      1434 [TCP segment of a reassembled PDU]
  11 21:38:44.994153 128.119.245.12 172.18.47.36    HTTP      775 HTTP/1.1 200 OK  (text/html)
```

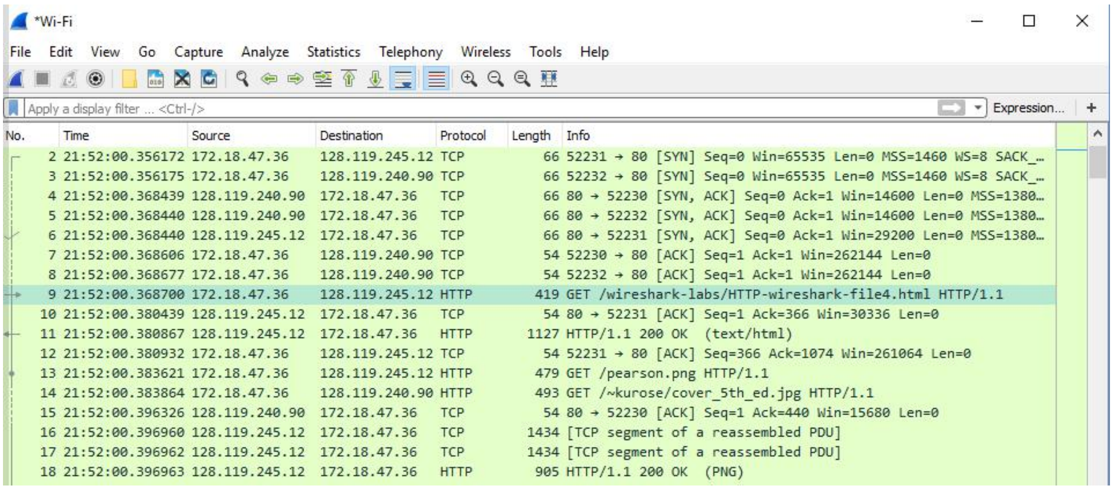
Figure 3. Connection third part

12. There was 1 HTTP GET message. It was packet NO.6.

13. Packet NO.11.

14. The returned state code and Phrase was “200 OK.”

15. 3 packets (8,9,10 in the trace).

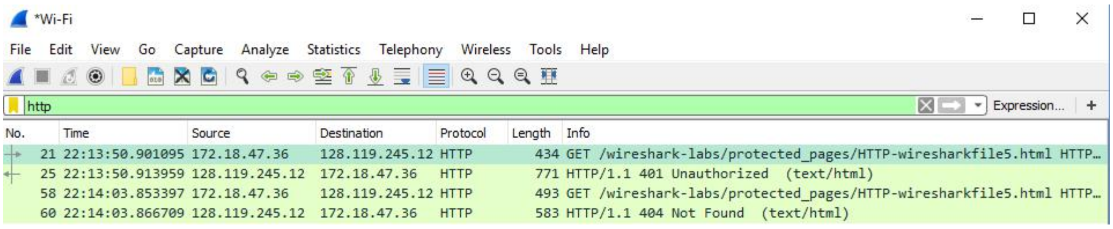

*Wi-Fi
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
Expression...
+

```
No.  Time               Source          Destination     Protocol Length Info
   2 21:52:00.356172 172.18.47.36    128.119.245.12 TCP        66 52231 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 SACK_…
   3 21:52:00.356175 172.18.47.36    128.119.240.90 TCP        66 52232 → 80 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=8 SACK_…
   4 21:52:00.368439 128.119.240.90 172.18.47.36    TCP        66 80 → 52230 [SYN, ACK] Seq=0 Ack=1 Win=14600 Len=0 MSS=1380…
   5 21:52:00.368440 128.119.240.90 172.18.47.36    TCP        66 80 → 52232 [SYN, ACK] Seq=0 Ack=1 Win=14600 Len=0 MSS=1380…
   6 21:52:00.368440 128.119.245.12 172.18.47.36    TCP        66 80 → 52231 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1380…
   7 21:52:00.368606 172.18.47.36    128.119.240.90 TCP        54 52230 → 80 [ACK] Seq=1 Ack=1 Win=262144 Len=0
   8 21:52:00.368677 172.18.47.36    128.119.240.90 TCP        54 52232 → 80 [ACK] Seq=1 Ack=1 Win=262144 Len=0
   9 21:52:00.368700 172.18.47.36    128.119.245.12 HTTP      419 GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1
  10 21:52:00.380439 128.119.245.12 172.18.47.36    TCP        54 80 → 52231 [ACK] Seq=1 Ack=366 Win=30336 Len=0
  11 21:52:00.380867 128.119.245.12 172.18.47.36    HTTP     1127 HTTP/1.1 200 OK  (text/html)
  12 21:52:00.380932 172.18.47.36    128.119.245.12 TCP        54 52231 → 80 [ACK] Seq=366 Ack=1074 Win=261064 Len=0
  13 21:52:00.383621 172.18.47.36    128.119.245.12 HTTP      479 GET /pearson.png HTTP/1.1
  14 21:52:00.383864 172.18.47.36    128.119.240.90 HTTP      493 GET /~kurose/cover_5th_ed.jpg HTTP/1.1
  15 21:52:00.396326 128.119.240.90 172.18.47.36    TCP        54 80 → 52230 [ACK] Seq=1 Ack=440 Win=15680 Len=0
  16 21:52:00.396960 128.119.245.12 172.18.47.36    TCP      1434 [TCP segment of a reassembled PDU]
  17 21:52:00.396962 128.119.245.12 172.18.47.36    TCP      1434 [TCP segment of a reassembled PDU]
  18 21:52:00.396963 128.119.245.12 172.18.47.36    HTTP      905 HTTP/1.1 200 OK  (PNG)
```

Figure 4. Connection forth part

16. There were 3 HTTP GET messages sent: packet 9 (base file), packet 13(pearson.png), and packet 14 (cover_5th_ed.jpg). They were sent to different address: packet 9 was sent to 128.119.245.12; packet 13 was sent to 128.119.235.12; and, packet 14 was sent to 128.119.240.90.

17. The downloads occurred in parallel. The second JPG request (GET message) was sent before completing PNG request(GET message). In the picture, they were actually sent together in parallel.


*Wi-Fi
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Expression...
+

http

```
No.  Time               Source          Destination     Protocol Length Info
  21 22:13:50.901095 172.18.47.36    128.119.245.12 HTTP      434 GET /wireshark-labs/protected_pages/HTTP-wiresharkfile5.html HTTP…
  25 22:13:50.913959 128.119.245.12 172.18.47.36    HTTP      771 HTTP/1.1 401 Unauthorized  (text/html)
  58 22:14:03.853397 172.18.47.36    128.119.245.12 HTTP      493 GET /wireshark-labs/protected_pages/HTTP-wiresharkfile5.html HTTP…
  60 22:14:03.866709 128.119.245.12 172.18.47.36    HTTP      583 HTTP/1.1 404 Not Found  (text/html)
```

Figure 5. Connecticut fifth part

```
No.     Time                    Source                  Destination             Protocol Length Info
     58 22:14:03.853397         172.18.47.36                    128.119.245.12                HTTP          493          GET
/wireshark-labs/protected_pages/HTTP-wiresharkfile5.html HTTP/1.1

Frame 58: 493 bytes on wire (3944 bits), 493 bytes captured (3944 bits) on interface 0
Ethernet II, Src: IntelCor_79:6a:e9 (ac:fd:ce:79:6a:e9), Dst: IETF-VRRP-VRID_53 (00:00:5e:00:01:53)
```

```
Internet Protocol Version 4, Src: 172.18.47.36, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 52944, Dst Port: 80, Seq: 1, Ack: 1, Len: 439
Hypertext Transfer Protocol
    GET /wireshark-labs/protected_pages/HTTP-wiresharkfile5.html HTTP/1.1\r\n
    Accept: text/html, application/xhtml+xml, image/jxr, */*\r\n
    Accept-Language: en-US,en;q=0.8,zh-Hans-CN;q=0.7,zh-Hans;q=0.5,es-ES;q=0.3,es;q=0.2\r\n
    User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64; Trident/7.0; rv:11.0) like Gecko\r\n
    Accept-Encoding: gzip, deflate\r\n
    Host: gaia.cs.umass.edu\r\n
    Connection: Keep-Alive\r\n
    Authorization: Basic d2lyZXNoYXJrLXN0dWRlbnRzOm5ldHdvcms=\r\n
        Credentials: wireshark-students:network
    \r\n
    [Full request URI: http://gaia.cs.umass.edu/wireshark-labs/protected_pages/HTTP-wiresharkfile5.html]
    [HTTP request 1/1]
    [Response in frame: 60]
```

18. The server’s response was “401 Unauthorized”.
19. The new field included is the Authorization field. This provides the user name and password for a secure website.