

## Задание 1.

Запрос GET от браузера:

```
Frame 1: 474 bytes on wire (3792 bits), 474 bytes captured (3792 bits) on interface any, id 0
Linux cooked capture v1
Internet Protocol Version 4, Src: 192.168.0.115, Dst: 128.119.245.12
Transmission Control Protocol, Src Port: 40166, Dst Port: 80, Seq: 1, Ack: 1, Len: 406
Hypertext Transfer Protocol
  GET /wireshark-labs/HTTP-wireshark-file1.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:135.0) Gecko/20100101 Firefox/135.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: ru-RU,ru;q=0.8,en-US;q=0.5,en;q=0.3\r\n
    Accept-Encoding: gzip, deflate\r\n
    Connection: keep-alive\r\n
    Upgrade-Insecure-Requests: 1\r\n
    Priority: u=0, i\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: 2]
```

Ответ сервера:

```
Frame 2: 554 bytes on wire (4432 bits), 554 bytes captured (4432 bits) on interface any, id 0
Linux cooked capture v1
Internet Protocol Version 4, Src: 128.119.245.12, Dst: 192.168.0.115
Transmission Control Protocol, Src Port: 80, Dst Port: 40166, Seq: 1, Ack: 407, Len: 486
Hypertext Transfer Protocol
  HTTP/1.1 200 OK\r\n
    Date: Thu, 20 Feb 2025 17:11:11 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.33 mod_perl/2.0.11 Perl/v5.16.3\r\n
    Last-Modified: Thu, 20 Feb 2025 06:59:02 GMT\r\n
    ETag: "80-62e8d68b39dcc"\r\n
    Accept-Ranges: bytes\r\n
  Content-Length: 128\r\n
  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: 0.184066632 seconds]
  [Request in frame: 1]
  [Request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file1.html]
  File Data: 128 bytes
Line-based text data: text/html (4 lines)
```

1. Браузер использует HTTP 1.1, так же как и сервер.
2. В Accept-Language указаны языки русский и английский. Кроме того, в поле User-Agent передаётся информация о браузере и об операционной системе.
3. Адрес компьютера — 192.168.0.115, адрес сервера — 128.11.245.12
4. Ответный код состояний — 200 OK
5. Последнее изменение файла на сервере было 20 февраля в 06:59:02
6. Длина контента 128 байт

## Задание 2.

Первый GET от браузера:

```
Hypertext Transfer Protocol
  GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:135.0) Gecko/20100101 Firefox/135.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: ru-RU,ru;q=0.8,en-US;q=0.5,en;q=0.3\r\n
    Accept-Encoding: gzip, deflate\r\n
    Connection: keep-alive\r\n
    Upgrade-Insecure-Requests: 1\r\n
    Priority: u=0, i\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: 4]
```

## Первый ответ сервера:

```
▼ Hypertext Transfer Protocol
  ▶ HTTP/1.1 200 OK\r\n
    Date: Fri, 21 Feb 2025 07:35:01 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.33 mod_perl/2.0.11 Perl/v5.16.3\r\n
    Last-Modified: Fri, 21 Feb 2025 06:59:01 GMT\r\n
    ETag: "173-62ea18688695d"\r\n
    Accept-Ranges: bytes\r\n
  ▶ Content-Length: 371\r\n
    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: 0.116326726 seconds]
  [Request in frame: 3]
  [Request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file2.html]
  File Data: 371 bytes
▼ Line-based text data: text/html (10 lines)
  \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
```

## Второй GET:

```
▼ Hypertext Transfer Protocol
  ▶ GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n
    Host: gaia.cs.umass.edu\r\n
    User-Agent: Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:135.0) Gecko/20100101 Firefox/135.0\r\n
    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8\r\n
    Accept-Language: ru-RU,ru;q=0.8,en-US;q=0.5,en;q=0.3\r\n
    Accept-Encoding: gzip, deflate\r\n
    Connection: keep-alive\r\n
    Upgrade-Insecure-Requests: 1\r\n
    If-Modified-Since: Fri, 21 Feb 2025 06:59:01 GMT\r\n
    If-None-Match: "173-62ea18688695d"\r\n
    Priority: u=0, i\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: 12]
```

## Второй ответ сервера:

```
▼ Hypertext Transfer Protocol
  ▶ HTTP/1.1 304 Not Modified\r\n
    Date: Fri, 21 Feb 2025 07:35:20 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.33 mod_perl/2.0.11 Perl/v5.16.3\r\n
    Connection: Keep-Alive\r\n
    Keep-Alive: timeout=5, max=100\r\n
    ETag: "173-62ea18688695d"\r\n
  \r\n
  [HTTP response 1/1]
  [Time since request: 0.114895679 seconds]
  [Request in frame: 11]
  [Request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file2.html]
```

1. Строки IF-MODIFIEDSINCE нет
2. Да, во вкладке с контентом хранится файл явно.

3. Да, строка IF-MODIFIED-SINCE есть. В ней содержится временная отсечка, необходимая для сверки версий сайта в кеше браузера и на сервере.
4. Ответом на второй запрос стал 304 Not Modified. Сервер явно содержимое файла не вернул.

## Задание 3.

Обмен:

1124	5.033529973	172.30.245.197	128.119.245.12	HTTP	474 GET /wireshark-labs/HTTP-wireshark-file3.html HTTP/1.1
1136	5.148788696	128.119.245.12	172.30.245.197	HTTP	585 HTTP/1.1 200 OK (text/html)
1139	5.168228317	172.30.245.197	128.119.245.12	HTTP	494 GET /favicon.ico HTTP/1.1
1161	5.283316854	128.119.245.12	172.30.245.197	HTTP	553 HTTP/1.1 404 Not Found (text/html)

Первый HTTP ответ:

```

▶ Frame 1136: 585 bytes on wire (4680 bits), 585 bytes captured (4680 bits) on interface any, id 0
▶ Linux cooked capture v1
▶ Internet Protocol Version 4, Src: 128.119.245.12, Dst: 172.30.245.197
▶ Transmission Control Protocol, Src Port: 80, Dst Port: 55938, Seq: 4345, Ack: 407, Len: 517
▶ [4 Reassembled TCP Segments (4861 bytes): #1130(1448), #1132(1448), #1134(1448), #1136(517)]
▶ Hypertext Transfer Protocol
  ▶ HTTP/1.1 200 OK\r\n
    Date: Fri, 21 Feb 2025 07:51:50 GMT\r\n
    Server: Apache/2.4.6 (CentOS) OpenSSL/1.0.2k-fips PHP/7.4.33 mod_perl/2.0.11 Perl/v5.16.3\r\n
    Last-Modified: Fri, 21 Feb 2025 06:59:01 GMT\r\n
    ETag: "1194-62ea1868832ad"\r\n
    Accept-Ranges: bytes\r\n
  ▶ Content-Length: 4500\r\n
    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: 0.115258633 seconds]
    [Request in frame: 1124]
    [Request URI: http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file3.html]
    File Data: 4500 bytes
  ▶ Line-based text data: text/html (98 lines)

```

1. Мой браузер отправил 2 HTTP GET запроса. Пакеты 1124 и 1139
2. Пакет 1136 содержит ответ на запрос из 1124, пакет 1161 содержит ответ на запрос из 1139.
3. Для передачи одного HTTP-ответа потребовалось 4 TCP сегмента.
4. На HTTP слое нет информации, связанной с сегментацией TCP, так как HTTP работает поверх TCP слоя

## Задание 4.

Обмен:

1116	5.407593372	172.30.245.197	128.119.245.12	HTTP	474 GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1
1125	5.526666940	128.119.245.12	172.30.245.197	HTTP	1369 HTTP/1.1 200 OK (text/html)
1129	5.545616441	172.30.245.197	128.119.245.12	HTTP	497 GET /pearson.png HTTP/1.1
1168	5.657200689	128.119.245.12	172.30.245.197	HTTP	784 HTTP/1.1 200 OK (PNG)
1172	5.770120376	172.30.245.197	128.119.245.12	HTTP	494 GET /favicon.ico HTTP/1.1
1191	5.838155648	172.30.245.197	178.79.137.164	HTTP	464 GET /8E_cover_small.jpg HTTP/1.1
1193	5.878319249	178.79.137.164	172.30.245.197	HTTP	239 HTTP/1.1 301 Moved Permanently
1195	5.879764662	128.119.245.12	172.30.245.197	HTTP	552 HTTP/1.1 404 Not Found (text/html)

1. Было отправлено 4 HTTP GET запроса. На адреса `gaia.cs.umass.edu` +:
  - `/wireshark-labs/HTTP-wireshark-file4.html`
  - `/pearson.png`
  - `/favicon.ico`
  - `/8E_cover_small.jpg`
2. Изображения были загружены параллельно. Чтобы это проверить можно для каждого пакета с изображением нажать Статистика → График потока и увидеть, что пакеты с изображениями пришли в разных потоках.

## Задание 5.

Обмен:

1139	8.678094359	172.30.245.197	128.119.245.12	HTTP	490 GET /wireshark-labs/protected_pages/HTTP-wireshark-file5.html HTTP/1.1
1143	8.789197528	128.119.245.12	172.30.245.197	HTTP	785 HTTP/1.1 401 Unauthorized (text/html)
1505	26.334271110	172.30.245.197	128.119.245.12	HTTP	549 GET /wireshark-labs/protected_pages/HTTP-wireshark-file5.html HTTP/1.1
1509	26.452712977	128.119.245.12	172.30.245.197	HTTP	558 HTTP/1.1 200 OK (text/html)
1525	26.485701326	172.30.245.197	128.119.245.12	HTTP	510 GET /favicon.ico HTTP/1.1
1538	26.602923234	128.119.245.12	172.30.245.197	HTTP	552 HTTP/1.1 404 Not Found (text/html)

1. На первый GET запрос сервер ответил 401 Unauthorized
2. Новое поле — это Authorization.