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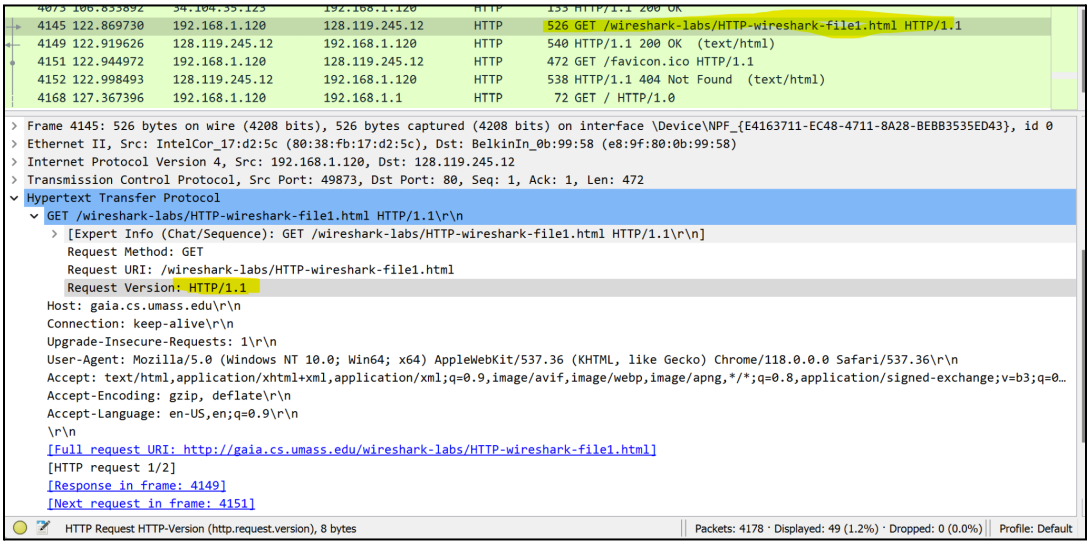
Lab section	COEN366 - FK-X

First part: Wireshark Assignment

1. The Basic HTTP GET/response interaction

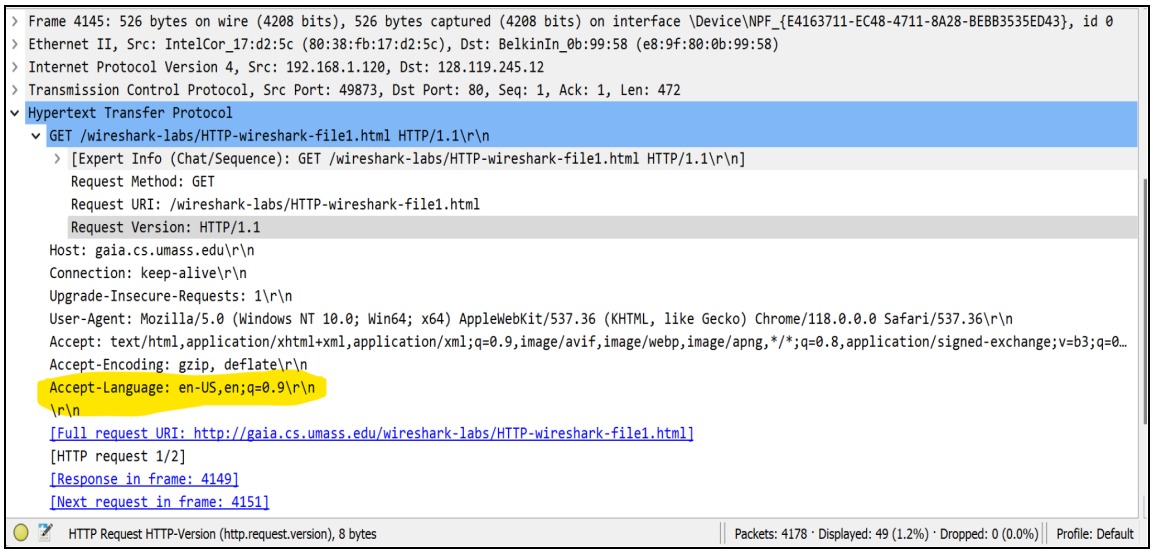
1. Is your browser running HTTP version 1.0 or 1.1? What version of HTTP is the server running?

My browser is running the HTTP Version 1.1 and the server is also running the HTTP Version 1.1 .



2. What languages (if any) does your browser indicate that it can accept to the server?

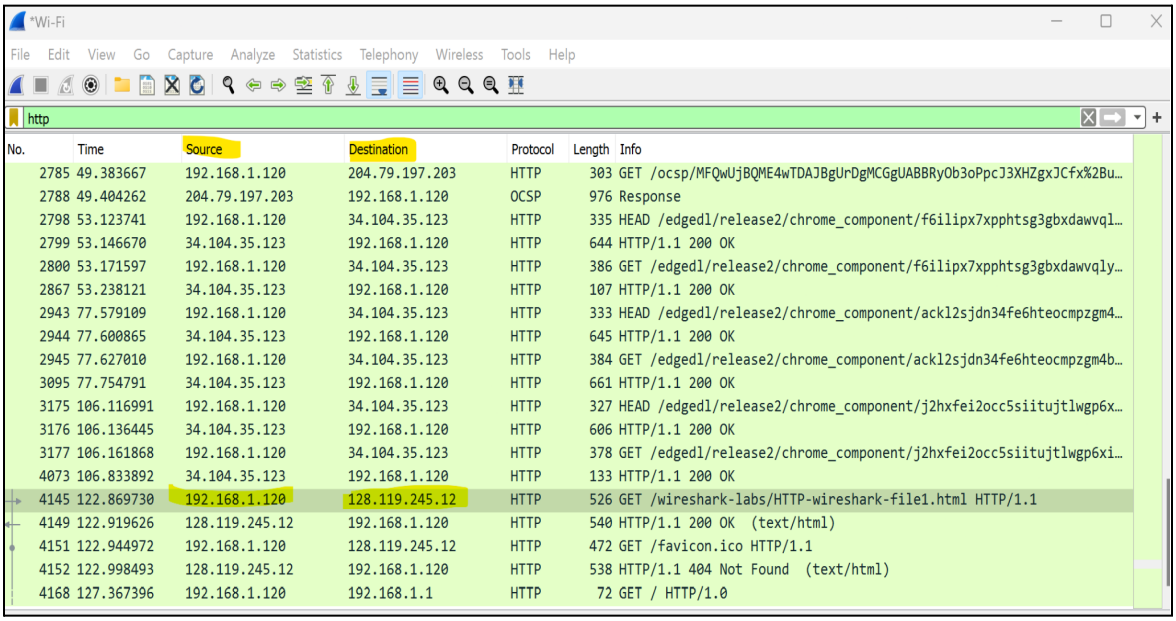
From the Accept-Language line, the accepted languages are: en-US and en.These correspond to English (US) and English.



3. What is the IP address of your computer? Of the gaia.cs.umass.edu server?

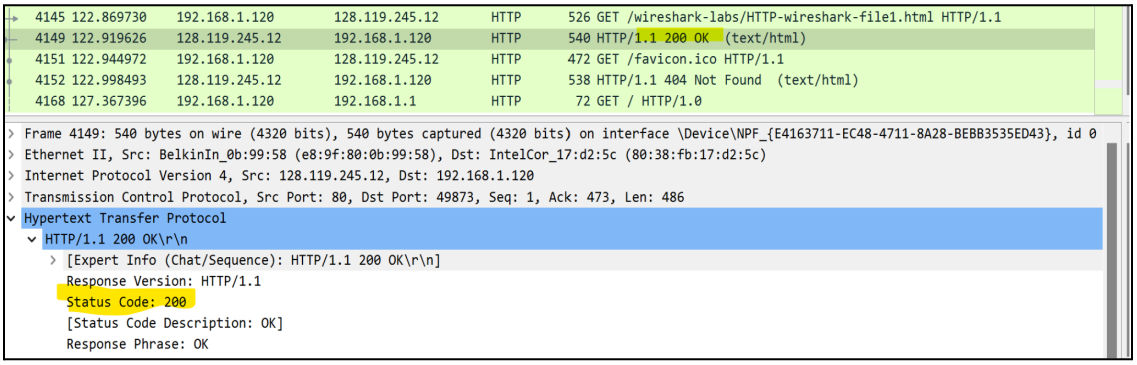
The source IP address corresponding to my machine is *192.168.1.120*

The destination IP address corresponding to the server is *128.119.245.12*



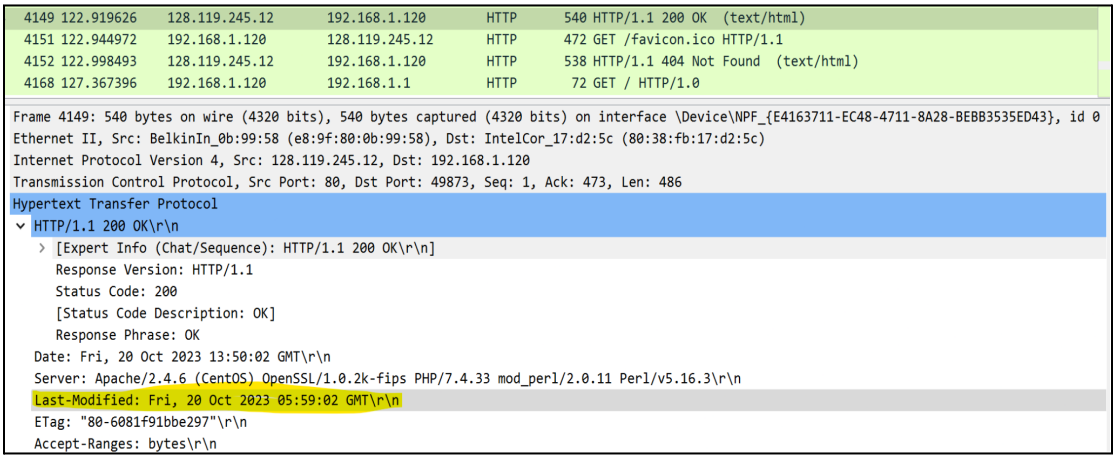
4. What is the status code returned from the server to your browser?

The status code is 200.



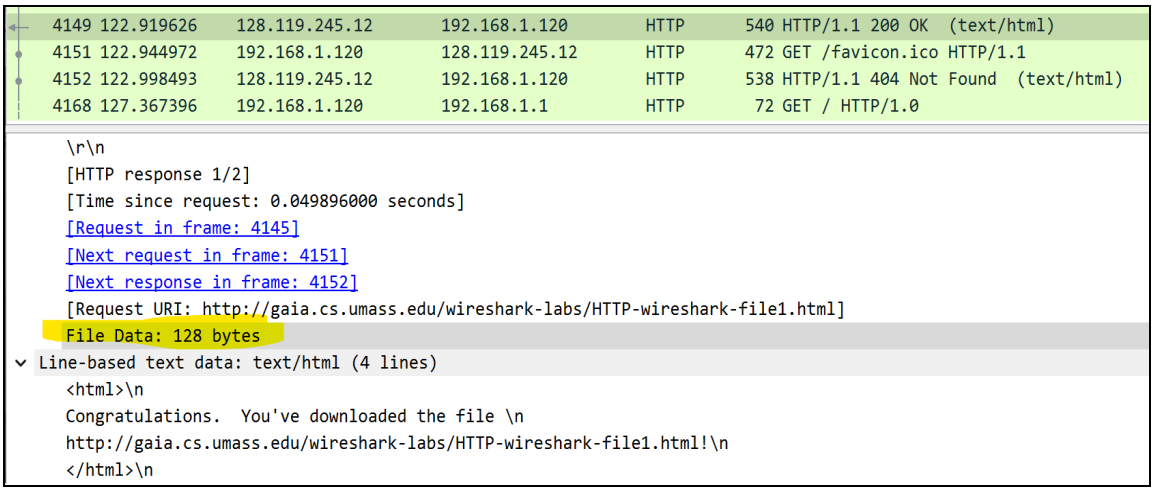
5. When was the HTML file that you are retrieving last modified at the server?

It was last modified on Fri, 20 Oct 2023 05:59:02 GMT.



6. How many bytes of content are being returned to your browser?

128 Bytes.



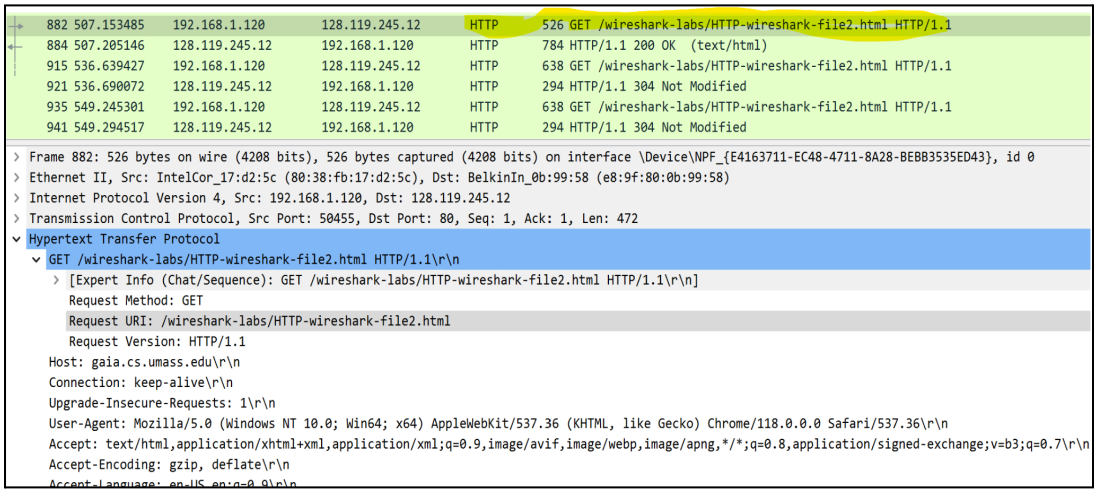
7. By inspecting the raw data in the packet content window, do you see any headers within the data that are not displayed in the packet-listing window? If so, name one.

I see no header in the packet content window that was not in the packet-listing window.

2. The HTTP CONDITIONAL GET/response interaction

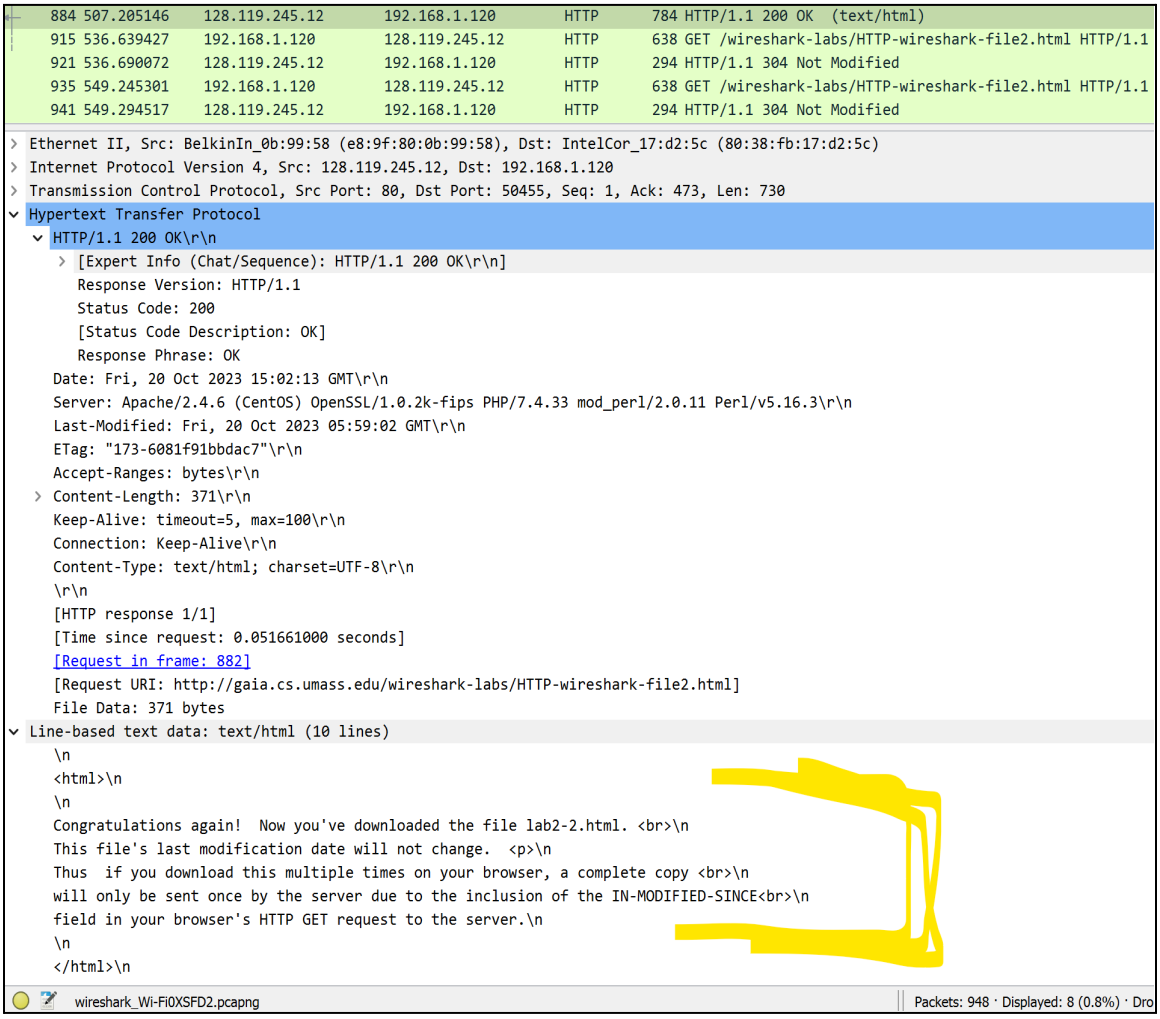
8. Inspect the contents of the first HTTP GET request from your browser to the server. Do you see an "IF-MODIFIED-SINCE" line in the HTTP GET?

I do not see the "IF-MODIFIED-SINCE" line.



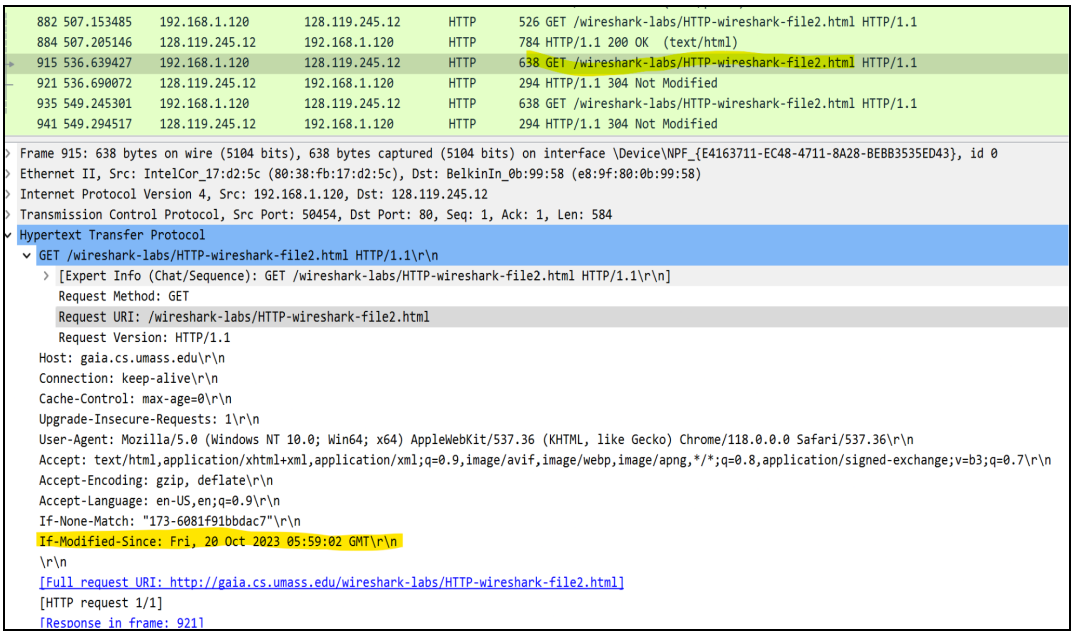
9. Inspect the contents of the server response. Did the server explicitly return the contents of the file? How can you tell?

Yes the server returned the content of the HTML file.



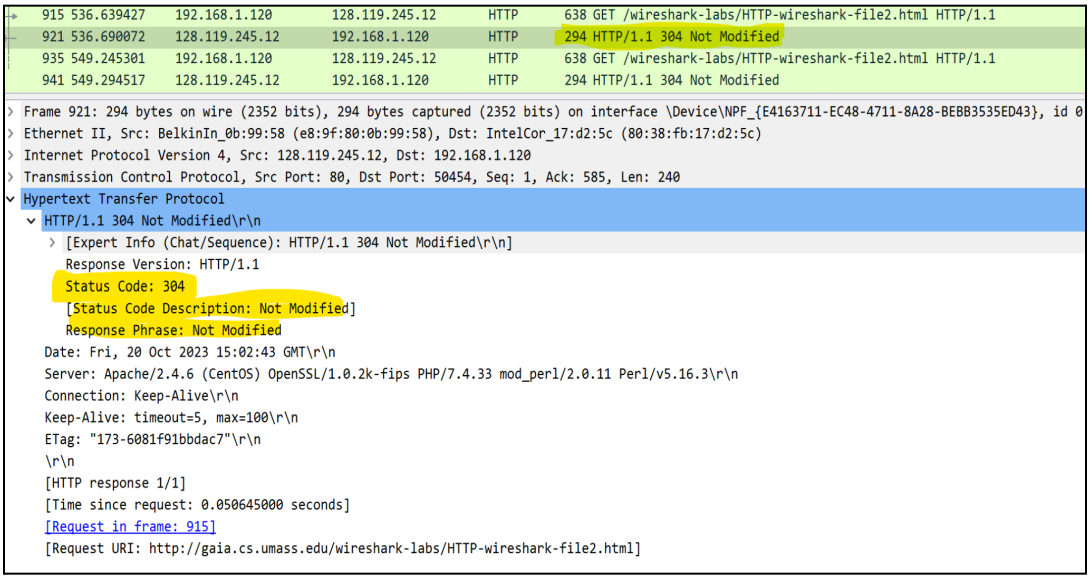
10. Now inspect the contents of the second HTTP GET request from your browser to the server. Do you see an "IF-MODIFIED-SINCE:" line in the HTTP GET? If so, what information follows the "IF-MODIFIED-SINCE:" header?

Yes. I see the "IF-MODIFIED-SINCE:" line. It has the following information: Fri, 20 Oct 2023 05:59:02 GMT.



11. What is the HTTP status code and phrase returned from the server in response to this second HTTP GET? Did the server explicitly return the contents of the file? Explain

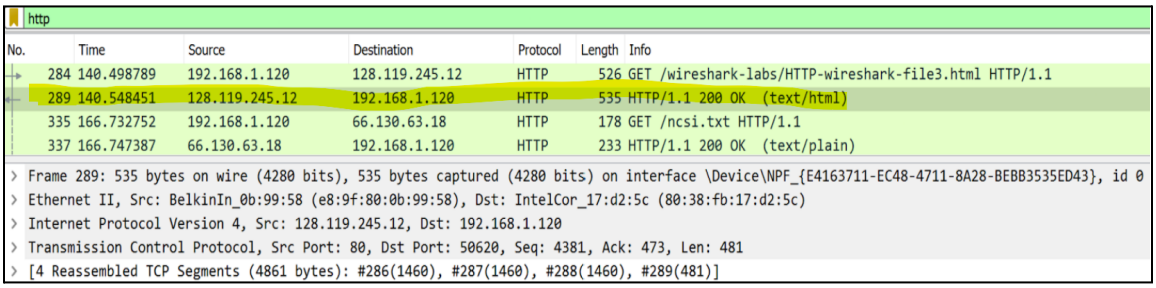
The status code is 304 and the phrase is Not modified. The server did not explicitly return the content of the HTML file because it was not modified so the server kept the previous content of the file.



3. Retrieving Long Documents

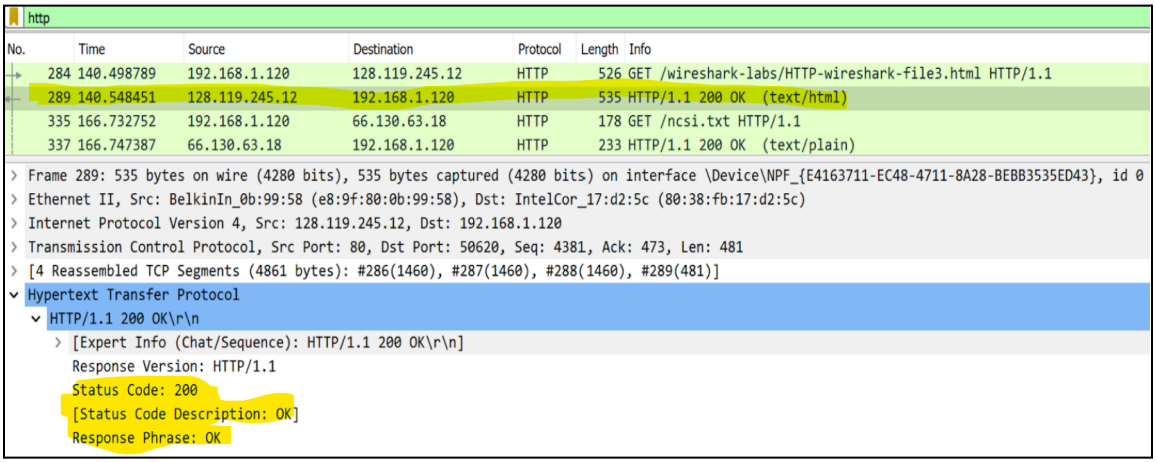
12. How many HTTP GET request messages did your browser send? Which packet number in the trace contains the GET message for the Bill or Rights?

The browser sent 1 HTTP GET request message. The packet number that contains the Bill of Rights is 286.



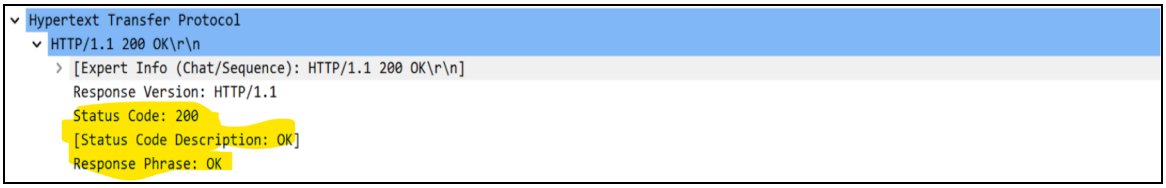
13. Which packet number in the trace contains the status code and phrase associated with the response to the HTTP GET request?

The packet number is 289.



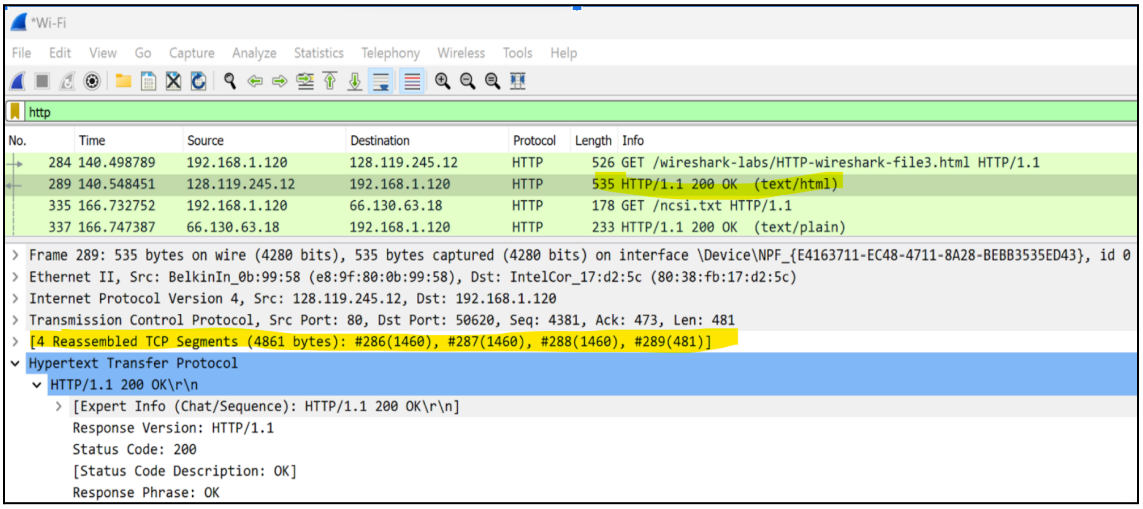
14. What is the status code and phrase in the response?

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



15. How many data-containing TCP segments were needed to carry the single HTTP response and the text of the Bill of Rights?

4 TCP segments were needed to carry the single HTTP response.

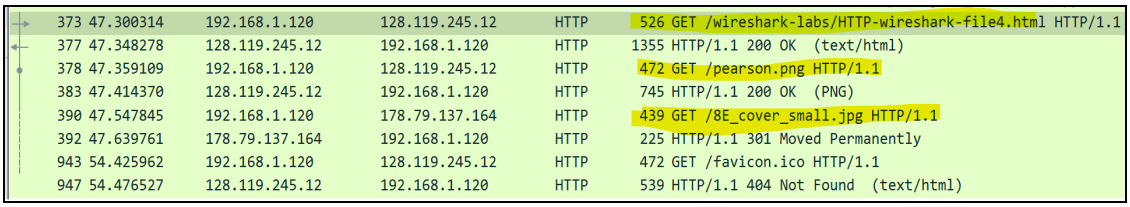


4. HTML Documents with Embedded Object

16. How many HTTP GET request messages did your browser send? To which Internet addresses were these GET requests sent?

The browser sent out 3 HTTP GET requests,

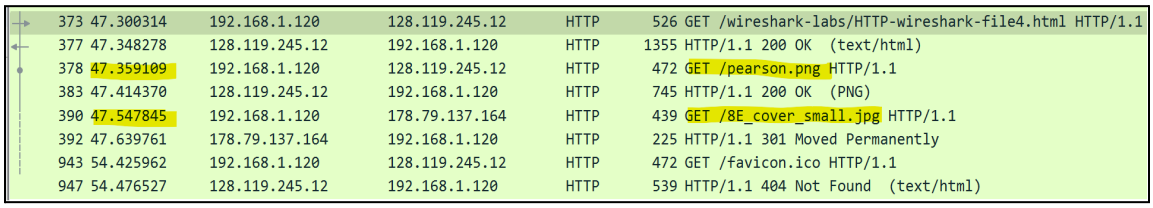
- the first one to '/wireshark-labs/HTTPwireshark-file4.html'
- the second to '/pearson.png'
- the third to '/8E_cover_small.jpg'



373	47.300314	192.168.1.120	128.119.245.12	HTTP	526 GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1
377	47.348278	128.119.245.12	192.168.1.120	HTTP	1355 HTTP/1.1 200 OK (text/html)
378	47.359109	192.168.1.120	128.119.245.12	HTTP	472 GET /pearson.png HTTP/1.1
383	47.414370	128.119.245.12	192.168.1.120	HTTP	745 HTTP/1.1 200 OK (PNG)
390	47.547845	192.168.1.120	178.79.137.164	HTTP	439 GET /8E_cover_small.jpg HTTP/1.1
392	47.639761	178.79.137.164	192.168.1.120	HTTP	225 HTTP/1.1 301 Moved Permanently
943	54.425962	192.168.1.120	128.119.245.12	HTTP	472 GET /favicon.ico HTTP/1.1
947	54.476527	128.119.245.12	192.168.1.120	HTTP	539 HTTP/1.1 404 Not Found (text/html)

17. Can you tell whether your browser downloaded the two images serially, or whether they were downloaded from the two websites in parallel? Explain.

According to the time section of the GET requests and responses, the two images were downloaded *serially*. Because, the first GET request gets a response containing a PNG at time 47.359109 while the next GET request for the JPEG is at 47.547845. There is a difference or delay between the two requests of 0.189



373	47.300314	192.168.1.120	128.119.245.12	HTTP	526 GET /wireshark-labs/HTTP-wireshark-file4.html HTTP/1.1
377	47.348278	128.119.245.12	192.168.1.120	HTTP	1355 HTTP/1.1 200 OK (text/html)
378	47.359109	192.168.1.120	128.119.245.12	HTTP	472 GET /pearson.png HTTP/1.1
383	47.414370	128.119.245.12	192.168.1.120	HTTP	745 HTTP/1.1 200 OK (PNG)
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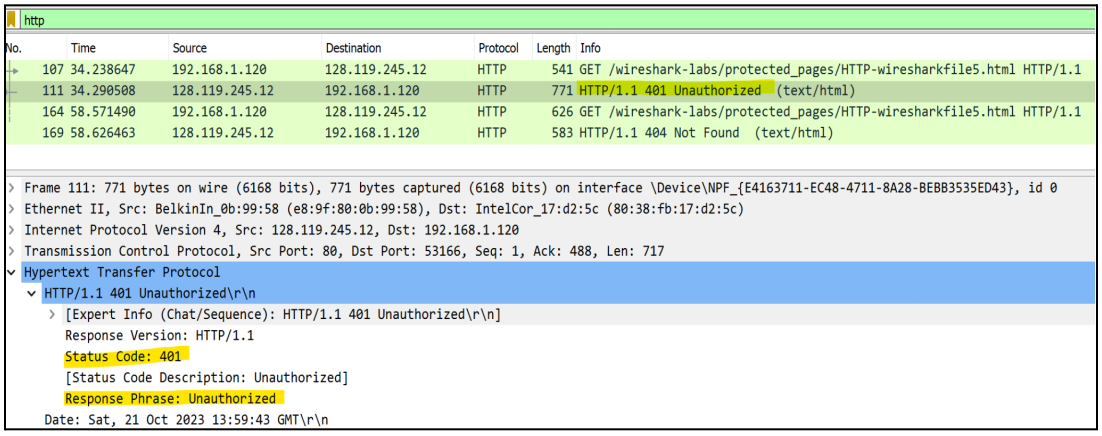
392	47.639761	178.79.137.164	192.168.1.120	HTTP	225 HTTP/1.1 301 Moved Permanently
943	54.425962	192.168.1.120	128.119.245.12	HTTP	472 GET /favicon.ico HTTP/1.1
947	54.476527	128.119.245.12	192.168.1.120	HTTP	539 HTTP/1.1 404 Not Found (text/html)

5. HTTP Authentication

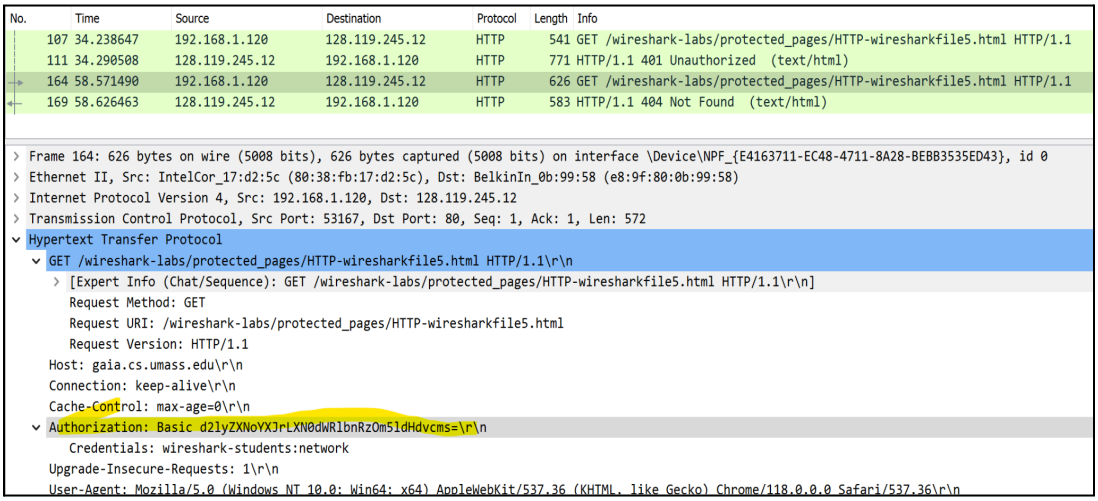
18. What is the server's response (status code and phrase) in response to the initial HTTP GET message from your browser?

The status code is 401 and the phrase is Unauthorized.



19. When your browser sends the HTTP GET message for the second time, what new field is included in the HTTP GET message?

The new included field is Authorization.



What did you learn?

From the Wireshark lab, I have learned how to use Wireshark to capture and analyze network traffic to investigate different aspects of the HTTP protocol. This included understanding the basic GET/response interaction, examining HTTP message formats, retrieving large HTML files, retrieving HTML files with embedded objects, and exploring HTTP authentication.

In particular, the lab has taught me how to use Wireshark to identify the various fields and parameters in HTTP messages and how to interpret the different types of status codes that can be encountered during an HTTP transaction.

Overall, the lab provided a practical introduction to the use of Wireshark as a tool for network analysis, and the insights gained can be valuable for next labs.

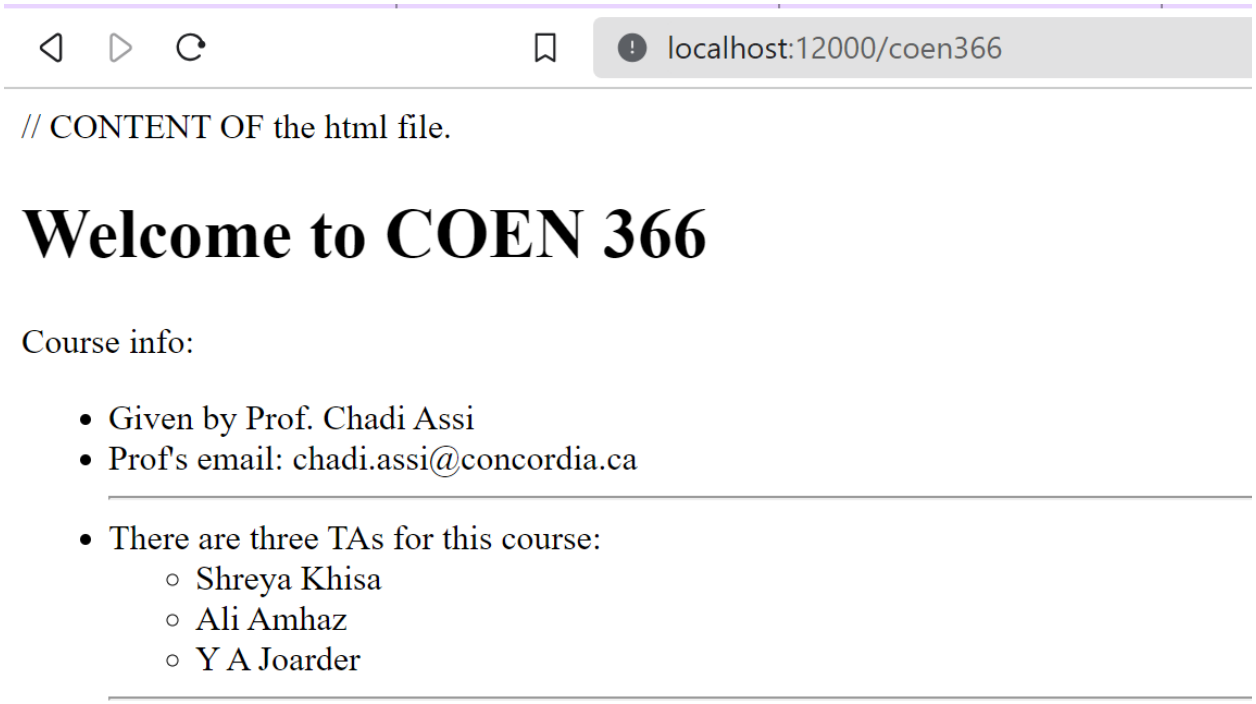
Second part: Socket Programming Assignment

The Python Code

```
from socket import *

def handle_request(request):
    lines = request.split('\n')
    first_line = lines[0]
    words = first_line.split(' ')
    filename = words[1]

    if filename == '/coen366':
        filename = 'coen366.html'
    else:
        filename = 'error.html'

    return filename

def create_http_response(filename):
    try:
        with open(filename, 'r') as file:

            content = file.read()
            response = f"HTTP/1.1 200
OK\nContent-Length: {len(content)}\nContent-Type:
text/html\n\n{content}"

    except FileNotFoundError:

        response = "HTTP/1.1 404 Not Found\n\nFile
Not Found"
```

```
    return response

def main():

    HOST = '127.0.0.1'
    PORT = 12000

    server_socket = socket(AF_INET, SOCK_STREAM)
    server_socket.bind((HOST, PORT))
    server_socket.listen(1)

    print(f"Server is running on the port {PORT}")

    while True:

        client_socket, client_address =
server_socket.accept()
        request = client_socket.recv(PORT).decode()

        filename = handle_request(request)
        response = create_http_response(filename)

        client_socket.send(response.encode())
        client_socket.close()


if __name__ == "__main__":
    main()
```

Screenshot of the HTML File from the browser



What did you learn?

From this assignment, I have learned more about Socket Programming and how to write an http server code in python. Also, how to establish a connection between the client and the server.