Computer Network

Assignment 7

Name: Abhinav Choukse

Admn No: U22CS086

Division: B

SOCKET PROGRAMMING

Implement echo client-server message passing application. Messages sent from the client should be displayed on the server and then the program should terminate.

1. Python Client Program that opens a listening socket and waits to serve clients.

```
from socket import *
serverName = 'localhost'
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input('Input lowercase sentence:')
clientSocket.send(sentence.encode())
modifiedSentence = clientSocket.recv(1024)
print ('From Server:', modifiedSentence.decode())
clientSocket.close()
```

2. Python Server Program that connects with the server program knowing IP address and port number.

```python
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind(('',serverPort))
serverSocket.listen(1)
print('The server is ready to receive')
while True:
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()
    capitalizedSentence = sentence.upper()
    connectionSocket.send(capitalizedSentence.encode())
    connectionSocket.close()
```

3. Get the input string from console on client and send it to server, server displays the same string.

```
PS C:\Users\kkchouksey\Desktop\4th_Sem\CN> python -u "c:\Users\kkchouksey\Desktop\4th_Sem\CN\server.py"
The server is ready to receive
```

```
PS C:\Users\kkchouksey\Desktop\4th_Sem\CN> python -u "c:\Users\kkchouksey\Desktop\4th_Sem\CN\t
e.py"
Input lowercase sentence:hello svnit
From Server: HELLO SVNIT
PS C:\Users\kkchouksey\Desktop\4th_Sem\CN>
```

HTTP

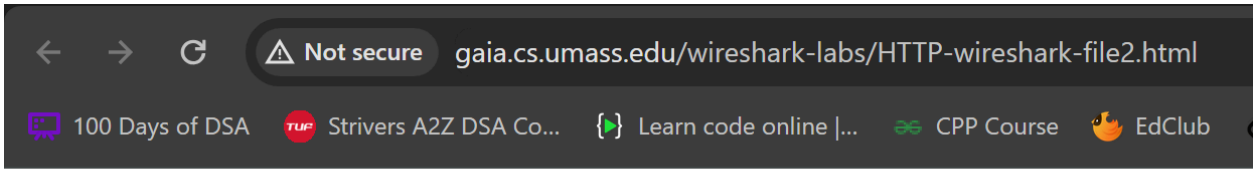
1. Give brief details about HTTP. What is the difference between HTTP and HTTPS?

HTTP, or Hypertext Transfer Protocol, is an application layer protocol used for the transfer of data on the World Wide Web. It defines the rules for how messages are formatted and transmitted between a client (typically a web browser) and a server, enabling the retrieval and display of web content.

2. Write down the steps to capture HTTP request packets for the following URL.

URL:
http://gaia.cs.umass.edu/wireshark-labs/HTTP-wireshark-file2.html

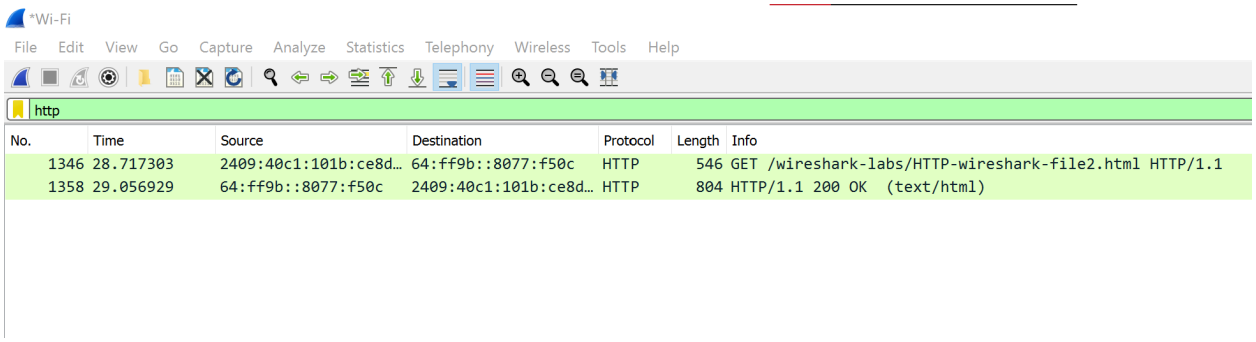
Step 1: Open Wireshark and start capturing packets.
Step 2: Open the above link given in browser.



Congratulations again! Now you've downloaded the file lab2-2.html.
This file's last modification date will not change.

Thus if you download this multiple times on your browser, a complete copy
will only be sent once by the server due to the inclusion of the IN-MODIFIED-SINCE
field in your browser's HTTP GET request to the server.

Step 3: Stop capturing packets and type in filter: http
The packets from above link will be displayed.




```
Hypertext Transfer Protocol
  HTTP/1.1 200 OK\r\n
    [Expert Info (Chat/Sequence): HTTP/1.1 200 OK\r\n]
        [HTTP/1.1 200 OK\r\n]
        [Severity level: Chat]
        [Group: Sequence]
      Response Version: HTTP/1.1
      Status Code: 200
      [Status Code Description: OK]
      Response Phrase: OK
    Date: Mon, 04 Mar 2024 13:29:10 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: Mon, 04 Mar 2024 06:59:02 GMT\r\n
    ETag: "173-612d042b811fd"\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: 0.339626000 seconds]
    [Request in frame: 1346]
    [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)
```

```
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]
    [GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1\r\n]
    [Severity level: Chat]
    [Group: Sequence]
  Request Method: GET
  Request URI: /wireshark-labs/HTTP-wireshark-file2.html
  Request Version: HTTP/1.1
Host: gaia.cs.umass.edu\r\n
Connection: keep-alive\r\n
Upgrade-Insecure-Requests: 1\r\n
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/122.0.0.0 Safari/537.36\r\n
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.7\r\n
Accept-Encoding: gzip, deflate\r\n
Accept-Language: en-US,en;q=0.9\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: 1358]
```

```
Transmission Control Protocol, Src Port: 63027, Dst Port: 80, Seq: 1, Ack: 1, Len: 472
  Source Port: 63027
  Destination Port: 80
  [Stream index: 104]
  [Conversation completeness: Complete, WITH_DATA (31)]
  [TCP Segment Len: 472]
  Sequence Number: 1    (relative sequence number)
  Sequence Number (raw): 3298753417
  [Next Sequence Number: 473    (relative sequence number)]
  Acknowledgment Number: 1    (relative ack number)
  Acknowledgment number (raw): 2016405080
  0101 .... = Header Length: 20 bytes (5)
> Flags: 0x018 (PSH, ACK)
  Window: 257
  [Calculated window size: 65792]
  [Window size scaling factor: 256]
  Checksum: 0xb338 [unverified]
  [Checksum Status: Unverified]
  Urgent Pointer: 0
> [Timestamps]
> [SEQ/ACK analysis]
  TCP payload (472 bytes)
Hypertext Transfer Protocol
```

3. Answer the following questions for the above URL request.

a) Which version your browser and server are running on?

```
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
```

b) What is the IP address of your host machine and server?

Source	Destination	Protocol	Length	Info
2409:40c1:10dc:fa3a...	64:ff9b::8077:f50c	HTTP	546	GET /wireshark-labs/HTTP-wireshark-file2.html HTTP/1.1

c) List out the languages accepted by your browsers.

- english

d) What is the status code returned from the server to your browser?

- 200 (OK)

e) What is the size of the content received from the server?

```
Content-Length: 371\r\n
```

f) Check the last modification date of the retrieved HTML file.

- Mon, 04 March 2024 , 06:59:02

g) Did you receive the content of the file as a response?

- Yes

```
[Next request in frame: 281]
[Next response in frame: 284]
[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
```

```
00c0  5f 70 65 72 6c 2f 32 2e  30 2e 31 31 20 50 65 72   _perl/2. 0.11 Per
```

DNS

Apply nslookup on the following URL and answer the following questions related to the DNS. URL: www.mit.edu

```
C:\Users\kkchouksey>nslookup www.mit.edu
Server:  UnKnown
Address:  192.168.204.176

Non-authoritative answer:
Name:    e9566.dscb.akamaiedge.net
Addresses:  2405:200:1630:984::255e
          2405:200:1630:9ad::255e
          104.85.135.135
Aliases:  www.mit.edu
          www.mit.edu.edgekey.net
```

1. Are DNS queries sent and received using TCP or UDP?

- Dns queries are sent and received using UDP

2. **What is the destination port of the DNS query and source port of the DNS response?**

- Destination Port no. is 53.

3. **What is the IP address of the DNS query message? Verify the IP address of the local DNS server using ipconfig.**

```
C:\Users\kkchouksey>ipconfig /all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : KAMLESHCHOUKSEY
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Mixed
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Wireless LAN adapter Local Area Connection* 9:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : F2-1D-BC-96-AD-BF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 11:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : 02-1D-BC-96-AD-BF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Mobile Broadband adapter Cellular:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Snapdragon(TM) X24 LTE Modem Mobile Broadband Device
   Physical Address. . . . . . . . . : 00-A0-C6-00-00-00
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Qualcomm(R) Wi-Fi B/G/N/AC (2x2) Svc
   Physical Address. . . . . . . . . : F0-1D-BC-96-AD-BF
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   IPv6 Address. . . . . . . . . . . : 2409:40c1:10dc:fa3a:67ac:218c:40f9:99a1(Preferred)
   Temporary IPv6 Address. . . . . . : 2409:40c1:10dc:fa3a:c811:abdb:229e:925(Preferred)
   Link-local IPv6 Address . . . . . : fe80::82f6:45ba:fc28:78e3%9(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.204.203(Preferred)
```

4. What is the “Type” of the DNS query sent?

Type: A