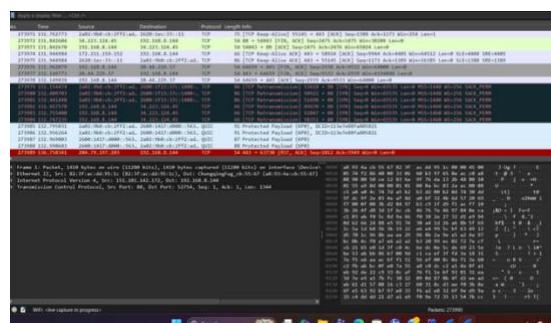


Lap 1

Part 1:

Task 1:



Task 2:

No.	Time	Source	Destination	Protocol	Length Info
748	21.645624	192.168.8.144	34.223.124.45	HTTP	566 GET /online HTTP/1.1
750	21.973247	34.223.124.45	192.168.8.144	HTTP	591 301 Moved Permanently
752	21.978314	192.168.8.144	34.223.124.45	HTTP	567 GET / / HTTP/1.1
755	22.260625	34.223.124.45	192.168.8.144	HTTP	149 200 OK (text/html)
758	22.308653	192.168.8.144	34.223.124.45	HTTP	499 GET /favicon.ico HTTP/1.1
760	22.669663	34.223.124.45	192.168.8.144	HTTP	470 HTTP/1.1 200 OK (PNG)

748	21.645624	192.168.8.144	34.223.124.45	HTTP	566 GET /online HTTP/1.1
750	21.973247	34.223.124.45	192.168.8.144	HTTP	591 HTTP/1.1 301 Moved Permanently (text)
752	21.978314	192.168.8.144	34.223.124.45	HTTP	567 GET / / HTTP/1.1
755	22.260625	34.223.124.45	192.168.8.144	HTTP	149 HTTP/1.1 200 OK (text/html)
758	22.308653	192.168.8.144	34.223.124.45	HTTP	499 GET /favicon.ico HTTP/1.1
760	22.669663	34.223.124.45	192.168.8.144	HTTP	470 HTTP/1.1 200 OK (PNG)

When a user accesses a web page, the web browser sends an HTTP request to the web server. This request typically uses the GET method, which asks the server to retrieve a specific resource identified by a URL. The request includes important header fields such as the Host, User-Agent, and Accept, which describe the client and the type of content it can process.

Upon receiving the request, the server processes it and sends back an HTTP response. The response contains a status code (such as 200 OK indicating success or 301 Moved Permanently indicating redirection), response headers, and optionally the requested content (e.g., HTML). This request-response exchange forms the basis of communication between the client and the server in the HTTP protocol.

Part2:

Task 1:

The TCP stream contained unreadable characters because the transmitted data was not in plain text format. This indicates that TCP transfers raw binary data, while application-layer protocols such as HTTP interpret this data into meaningful information

Task 2

1: TCP Three-Way Handshake

The TCP three-way handshake consists of SYN, SYN-ACK, and ACK packets. The sequence and acknowledgment numbers are used to synchronize communication between the client and server.

```

732 31.645526 152.168.8.144 34.223.124.45 TCP 566.687 - [ACK].Seq1.Ack1.Win=65280.Len=0
732 31.645526 152.168.8.144 34.223.124.45 HTTP 566 GET /online/HTTP/1.1
749 21.973247 34.223.124.45 TCP 54.80 + 60492 [ACK].Seq1.Ack5:533 Win=28052.Len=0
750 21.973247 34.223.124.45 192.168.8.144 HTTP 591 HTTP/1.1 301 Moved Permanently ([text/html])
750 21.973247 34.223.124.45 192.168.8.144 HTTP 591 HTTP/1.1 301 Moved Permanently ([text/html])
751 22.008653 152.168.8.144 34.223.124.45 TCP 54.80 + 60492 [ACK].Seq1.Ack5:533 Win=28052.Len=0
751 22.008653 152.168.8.144 34.223.124.45 HTTP 567 GET /online/HTTP/1.1
753 22.005742 2600.1417 [0000]:5603 . 2002:90b:cf2f[2f2ad..] TCP 74.44 + 62210 [ACK].Seq6:6020.Ack=11004 Win=41228.Len=0
755 22.266025 34.223.124.45 TCP 1478.80 + 60492 [ACK].Seq5:538 Ack=1026 Win=29056 Len=1424 [TCP DU reassembled]
755 22.266025 34.223.124.45 192.168.8.144 HTTP 149 HTTP/1.1 200 OK ([text/html])
755 22.266025 34.223.124.45 192.168.8.144 HTTP 149 HTTP/1.1 200 OK ([text/html])
758 22.308653 152.168.8.144 34.223.124.45 TCP 54.80 + 60492 [ACK].Seq1.Ack5:533 Win=28052.Len=0
758 22.308653 152.168.8.144 34.223.124.45 HTTP 499 GET /favicon.ico HTTP/1.1

# Frame 749: Packet, 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface 'Device:WIFI'
Ethernet II, Src: Svc [00:0c:29:f1:95:61] (02:00:0c:29:f1:95:61), Dst: ChangingConfig [55:67:00:9d:4a:c1] (all:93:4a:c1:b5:56)
Transmission Control Protocol, Src Port: 566 (65280), Dst Port: 80 (80)
Source Port: 80
Destination Port: 60492
[Service Name: http]
[Stream Packet Number: 8]
# Conversation completeness: Complete, WITH_DATA {31}
[TCP Segment Len: 0]
Sequence Number (raw): 3842244777
(Next Sequence Number: 1 ) (relative sequence number)
Acknowledgment Number: 513 (relative ack number)
Acknowledgment Number (raw): 2376071945
0101 ... + Header Length: 20 bytes (5)
# Flags: <no:0>
Window: 219
Checksum: 0x00000000 (calculated: 0x00000000)

```

```

745 21.314868 192.168.8.144 34.223.124.45 TCP 66 [TCP Retransmission] 50423 -> 88 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 Window Scale=128 SACK Perm WS=128
746 21.314894 192.168.8.144 34.223.124.45 TCP 54 0x0492 + 0x80 [ACK] Seq=1 Ack=1 Win=52200 Len=0
747 21.314920 192.168.8.144 34.223.124.45 TCP 566 GET /online HTTP/1.1
748 21.314946 192.168.8.144 34.223.124.45 TCP 591 HTTP/1.1 1024 Win=52200 Seq=1 Ack=533 Win=20932 Len=0
750 21.314972 192.168.8.144 34.223.124.45 TCP 591 HTTP/1.1 1024 Win=52200 Seq=2 Ack=534 Win=20932 Len=0
751 21.314987 2082.368.0.207[27]>::2080 1437 [0000]:563 TCP 76 62210 > 443 [FIN, ACK] Seq=1807 Ack=6202 Win=52200 Len=0
752 21.315014 192.168.8.144 34.223.124.45 TCP 567 GET /online/ HTTP/1.1
753 21.315040 192.168.8.144 34.223.124.45 TCP 1478 0x0492 [ACK] Seq=538 Ack=1026 Win=295956 Len=424
754 22.260625 192.168.8.144 34.223.124.45 TCP 54 0x0492 + 0x80 [ACK] Seq=538 Ack=1026 Win=295956 Len=424
755 22.260628 192.168.8.144 34.223.124.45 HTTP 149 HTTP/1.1 200 OK [text/html]
756 22.260744 192.168.8.144 34.223.124.45 TCP 54 60492 + 0x80 [ACK] Seq=1026 Ack=2057 Win=65280 Len=0
758 22.260853 192.168.8.144 34.223.124.45 HTTP 499 HTTP/1.1 favicon.ico HTTP/1.1

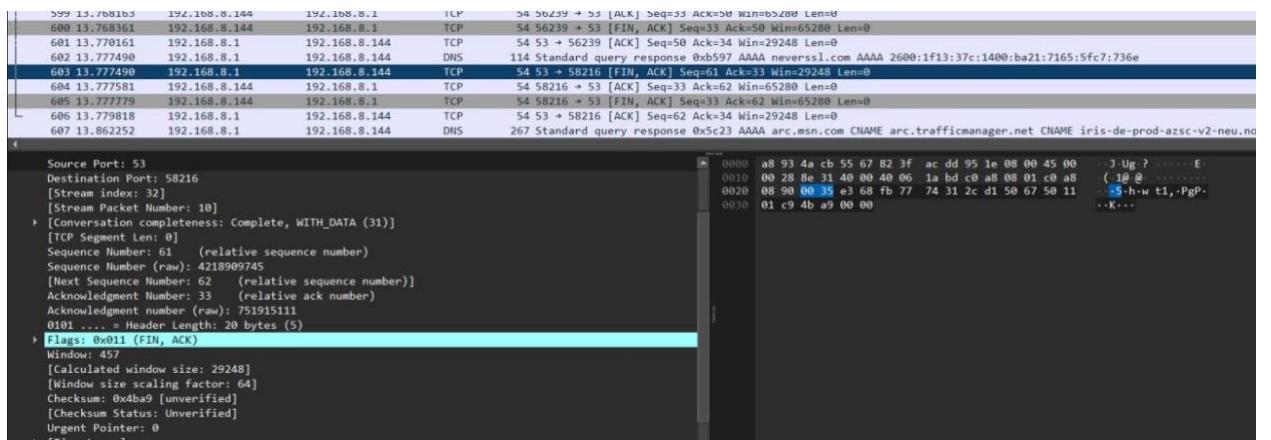
Frame 746: Packet, 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 'bweifw0Pf_8
Ethernet II, Src: RT-37cfae:b0:95:1c (82:ff:fe:b0:d0:95:1c), Dst: Chongmingug_ch:55:67 (ab:91:4a:cb:55:67)
Encapsulation Type: 802.1Q [0x0800|0x0000|0x0000|0x0000]
Transmission Control Protocol: TCP Src Port: 88, Dst Port: 60492, Seq: 8, Ack: 1, Len: 0
Source Port: 88
Destination Port: 60492
[TCP Header]
[Stream Packet Number: 5]
[Conversation completeness: Complete, WITH_DATA (31)]
[ICMP Sequence Number: 0]
Sequence Number: 0 (relative sequence number)
Sequence Number (raw): 3841244716
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 1 (relative ack number)
Acknowledgment Number (raw): 2276271468
1000 ..><..Header length: 32 bytes (8)
[Raw Data]
Window: 26883
```

No.	Time	Source	Destination	Protocol	Length Info
739	20.79757	2a02:98b0:2ff2::2a02:1f13:37::1400	192.168.8.144	TCP	86 [TCP Retransmission] 56202 + 80 [SYN] Seq=0
740	21.01820	2a02:98b0:2ff2::2a02:1f13:37::1400	192.168.8.144	TCP	86 [TCP Retransmission] 53252 + 80 [SYN] Seq=0
741	21.01976	2a02:98b0:2ff2::2a02:1f13:37::1400	192.168.8.144	TCP	86 [TCP Retransmission] 56202 + 80 [SYN] Seq=0
742	21.01976	192.168.8.144	34.223.124.45	TCP	66 [TCP Retransmission] 56540 + 80 [SYN] Seq=0
743	21.29549	192.168.8.144	34.223.124.45	TCP	66 [TCP Retransmission] 56513 + 80 [SYN] Seq=0
744	21.29549	192.168.8.144	34.223.124.45	TCP	66 [TCP Retransmission] 56542 + 80 [SYN] Seq=0
745	21.29549	192.168.8.144	34.223.124.45	TCP	66 [TCP Retransmission] 56543 + 80 [SYN] Seq=0
746	21.645024	34.223.124.45	192.168.8.144	TCP	66 80 + 60492 [SYN, ACK] Seq=0 Ack=1 Win=26883
747	21.645159	192.168.8.144	34.223.124.45	TCP	54 60492 + 80 [ACK] Seq=1 Ack=1 Win=65280 Len=0
748	21.645626	192.168.8.144	34.223.124.45	HTTP	566 GET /online HTTP/1.1
749	21.645626	192.168.8.144	34.223.124.45	HTTP	566 GET /online HTTP/1.1
750	21.973247	192.168.8.144	34.223.124.45	HTTP	591 HTTP/1.1 301 Moved Permanently <test.html>
751	21.978107	2a02:98b0:2ff2::2a02:1f00:3709::56202	192.168.8.144	TCP	74 62220 + 443 [FIN, ACK] Seq=1080 Ack=6202 Win=4212
752	21.978314	192.168.8.144	34.223.124.45	HTTP	567 GET /online HTTP/1.1
753	22.004292	2a02:98b0:2ff2::2a02:1f00:3709::56202	192.168.8.144	TCP	74 62220 + 443 [FIN, ACK] Seq=1080 Ack=6202 Win=4212
754	22.206553	34.223.124.45	192.168.8.144	TCP	54788 0 + 60492 [ACK] Seq=533533 Ack=1026 Win=29596
755	22.206553	34.223.124.45	192.168.8.144	HTTP	149 HTTP/1.1 200 OK <
756	22.206744	192.168.8.144	34.223.124.45	TCP	54 60492 + 80 [ACK] Seq=1026 Ack=2057 Win=65208
<hr/>					
Frame 739: Packet, 80 bytes on wire (608 bits), 86 bytes captured					
Ethernet II, Src: MikroTik (2a02:98b0:2ff2::2a02) [00:0c:29:02:b0:92], Dst: All (ff:ff:ff:ff:ff:ff) [00:00:00:00:00:00]					
Internet Protocol Version 4, Src Port: 56202, Dst Port: 80					
Transmission Control Protocol, Src Port: 56202, Dst Port: 80					
Source Port: 56202					
Destination Port: 80					
[Conversation Sack-Block: 4]					
[Conversation completeness: Incomplete, SYN_SENT (1)]					
[TCP Segment Len: 0]					
Sequence Number: 0 (relative sequence number)					
Sequence Number (raw): 25750510388					
[Next Sequence Number: 1 (relative sequence number)]					
Acknowledgment Number:					
Acknowledgment Number (raw): 0					
Offset/Flags: 0x0002 (SYN)					
<hr/>					
82 3f ec dd 9c a8 a9 93 4a cb 55 67 86 dd 60 0b					
83 4d 5e 24 56 5a 26 00 1f 13 03 1d 14 00 00					
84 4d 5e 24 56 5a 26 00 1f 13 03 1d 14 00 00					
85 73 d5 c7 73 6d 8a 00 59 b9 dd 14 00 00					
86 00 80 02 80 [ACK] Seq=62 00 00 02 04 05 a0 01 03					
87 00 01 01 04 ff					

2: Data Transfer: After the TCP connection is established, data transfer begins between the client and the server. The data is transmitted in segments that are acknowledged to ensure reliable delivery. TCP uses sequence and acknowledgment numbers to maintain correct data ordering and detect any lost packets, guaranteeing accurate and complete transmission.

3: TCP Termination

Once data transfer is completed, the TCP connection is terminated in an orderly manner. This process uses FIN and ACK packets exchanged between the client and the server to confirm that both sides have finished sending data, ensuring a graceful and reliable connection closure.



Part 3:

Task 1:

No.	Time	Source	Destination	Protocol	Length Info
751	21.978107	2a02:9b0:cb:2ff2:ad...	2600:1417:d000::563...	TCP	74 62210 + 443 [FIN, ACK] Seq=1803 Ack=6020 Win=65280 Len=0
752	21.978314	192.168.8.144	34.223.124.45	HTTP	567 GET /online/ HTTP/1.1
753	22.054724	2600:1417:d000::563...	2a02:9b0:cb:2ff2:ad...	TCP	74 443 + 62210 [ACK] Seq=6020 Ack=1804 Win=64128 Len=0
754	22.260625	34.223.124.45	192.168.8.144	TCP	1478 80 + 60492 [ACK] Seq=538 Ack=1026 Win=29056 Len=1424
755	22.260625	34.223.124.45	192.168.8.144	HTTP	149 HTTP/1.1 200 OK (text/html)
756	22.260744	192.168.8.144	34.223.124.45	TCP	54 60492 + 88 [ACK] Seq=1026 Ack=2057 Win=65280 Len=0
757	22.288785	2a02:9b0:cb:2ff2:ad...	2600:1417:d000::563...	QUIC	91 Protected Payload (KPO), DCID=294a5257fa805821
758	22.308653	192.168.8.144	34.223.124.45	HTTP	499 GET /favicon.ico HTTP/1.1
759	22.464320	2600:1417:d000::563...	2a02:9b0:cb:2ff2:ad...	QUIC	80 Protected Payload (KPO)
760	22.669663	34.223.124.45	192.168.8.144	HTTP	470 HTTP/1.1 200 OK (PNG)
761	22.716554	192.168.8.144	34.223.124.45	TCP	54 60492 + 80 [ACK] Seq=1471 Ack=2473 Win=65024 Len=0
762	26.223989	192.168.8.144	20.54.232.160	TCP	54 52903 + 443 [FIN, ACK] Seq=1 Ack=1 Win=254 Len=0
763	26.224518	192.168.8.144	20.54.232.160	TCP	54 52902 + 443 [FIN, ACK] Seq=1 Ack=1 Win=254 Len=0
764	26.460659	20.54.232.160	192.168.8.144	TCP	54 443 + 52902 [FIN, ACK] Seq=1 Ack=2 Win=16387 Len=0
765	26.460659	20.54.232.160	192.168.8.144	TCP	54 443 + 52903 [FIN, ACK] Seq=1 Ack=2 Win=16387 Len=0
766	26.460808	192.168.8.144	20.54.232.160	TCP	54 52902 + 443 [ACK] Seq=2 Ack=2 Win=254 Len=0
767	26.460933	192.168.8.144	20.54.232.160	TCP	54 52903 + 443 [ACK] Seq=2 Ack=2 Win=254 Len=0
768	27.726593	34.223.124.45	192.168.8.144	TCP	54 80 + 60492 [FIN, ACK] Seq=2473 Ack=1471 Win=30208 Len=0
769	27.726713	192.168.8.144	34.223.124.45	TCP	54 60492 + 80 [ACK] Seq=1471 Ack=2474 Win=65024 Len=0

Frame 1: Packet, 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface \Device\NPF_{493}...
 ▶ Ethernet II, Src: ChongqingFug_cb:55:67 (a8:93:4a:cb:55:67), Dst: 82:3f:ac:dd:95:1c (82:3f:ac:dd:95:1c)
 ▶ Internet Protocol Version 4, Src: 192.168.8.144, Dst: 37.252.172.124
 ▶ Transmission Control Protocol, Src Port: 50378, Dst Port: 443, Seq: 1, Ack: 1, Len: 0

Task 2: UDP is a simple transport-layer protocol that provides minimal communication services. It has a small header and does not include mechanisms for reliability, ordering, or error recovery. This simplicity reduces overhead and allows faster data transmission compared to more complex protocols such as TCP.

UDP is a connectionless protocol, meaning it does not establish a connection or perform a handshake before sending data. Packets are transmitted independently without confirming delivery or readiness of the receiver, which makes UDP suitable for time-sensitive applications where speed is more important than reliability.

2 0.030748	2600:1417:d000::563.. 2a02:9b0:cb:2ff2:ad.. UDP	88 443 → 53189 Len=26
7 0.236678	2a02:9b0:cb:2ff2:ad.. 2600:1417:d000::563.. UDP	91 53189 → 443 Len=29
8 0.310229	2a02:9b0:cb:2ff2:ad.. 2600:1417:d000::563.. UDP	91 53189 → 443 Len=29
9 0.325450	2600:1417:d000::563.. 2a02:9b0:cb:2ff2:ad.. UDP	88 443 → 53189 Len=26
10 0.338506	2600:1417:d000::563.. 2a02:9b0:cb:2ff2:ad.. UDP	90 443 → 53189 Len=28
11 0.538582	2a02:9b0:cb:2ff2:ad.. 2a00:1450:4019::5::a UDP	1290 61917 → 443 Len=1228
12 0.538759	2a02:9b0:cb:2ff2:ad.. 2a00:1450:4019:5::a UDP	96 61917 → 443 Len=34
13 0.538899	2a02:9b0:cb:2ff2:ad.. 2600:1417:d000::563.. UDP	91 53189 → 443 Len=29
14 0.571025	2600:1417:d000::563.. 2a02:9b0:cb:2ff2:ad.. UDP	90 443 → 53189 Len=28
15 0.583530	2a00:1450:4019::5::a 2a02:9b0:cb:2ff2:ad.. UDP	188 443 → 61917 Len=126
16 0.583530	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1287 443 → 61917 Len=1225
17 0.583530	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
18 0.583530	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
19 0.583530	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
20 0.583530	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
21 0.588203	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
22 0.588203	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
23 0.588203	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230
24 0.594552	2a00:1450:4019:5::a 2a02:9b0:cb:2ff2:ad.. UDP	1292 443 → 61917 Len=1230


```

Frame 7: Packet, 91 bytes on wire (728 bits), 91 bytes captured (728 bits) on interface \Device\NPF_{49
Ethernet II, Src: ChongqingFug_ch:55:67 (a8:93:4a:cb:55:67), Dst: 82:3f:ac:dd:95:1c (82:3f:ac:dd:95:1c)
Internet Protocol Version 6, Src: 2a02:9b0:cb:2ff2:ad95:a62c:5426:5e5e, Dst: 2600:1417:d000::5633:5eea
User Datagram Protocol, Src Port: 53189, Dst Port: 443
    Source Port: 53189
    Destination Port: 443
    Length: 37
    Checksum: 0xd724 [unverified]
        [Checksum Status: Unverified]
        [Stream index: 0]
        [Stream Packet Number: 2]
        [Timestamps]
    UDP payload (29 bytes)
        Data (29 bytes)
            Data: 5e1c326c0df98058219c26678e6db7eed1fa810da95184896ea58d5003
            [Length: 29]

```