Network System Capstone
Homework 1

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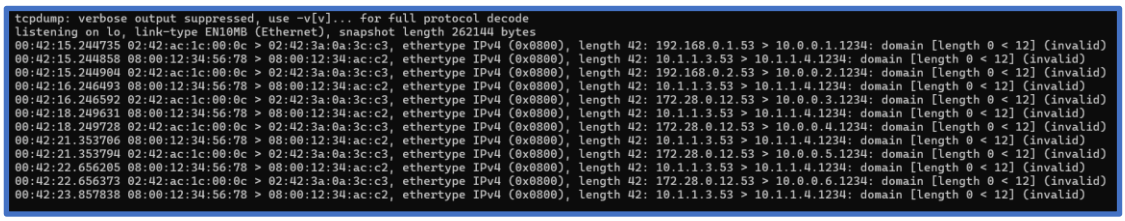
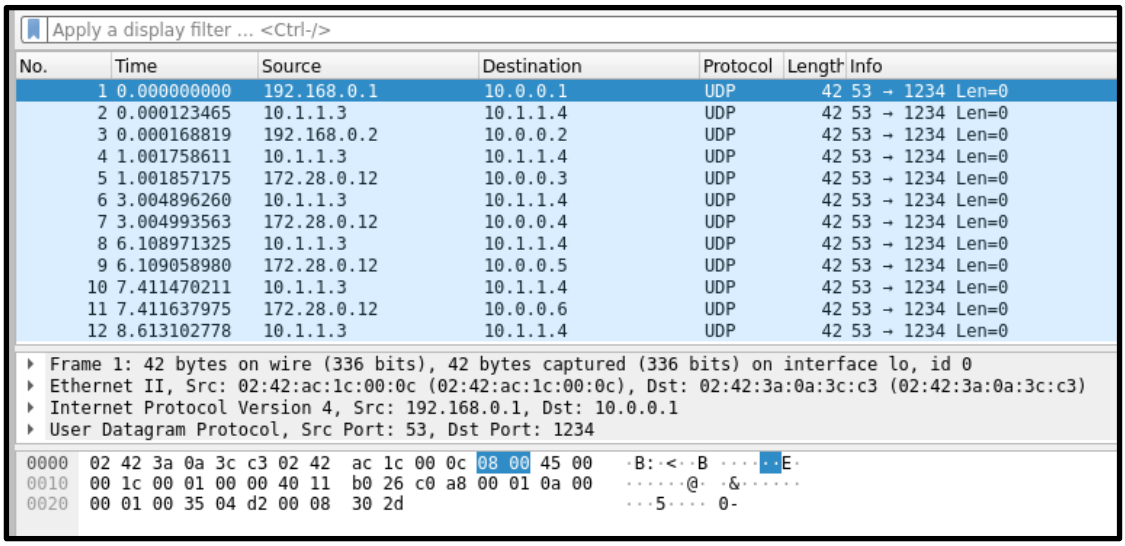
Outcome screenshot:



In Tcpdump, the time stamp(sec) = [15,15,15,16,16,18,18,21,21,22,22,23],
time difference(sec) = [1,2,3,1,1],
actual time difference = [1.001635, 2.003138, 3.104075, 1.302499, 1.201633]



In Wireshark, the time stamp(sec) = [0,0,0,1,1,3,3,6,6,7,7,8],
time difference(sec) = [1,2,3,1,1],
actual time difference = [1.001635146, 2.003137649, 3.104075065, 1.302498886, 1.201632567]

```
struct timeval ts = header->ts;

// Print timestamp in seconds and microseconds
std::cout << "Packet timestamp: " << ts.tv_sec << "." << ts.tv_usec << std::endl;
current_time = ts;
if(count == 0){
    prev_time=current_time;
}
```

The above code shows how I get the real time stamps of the original packets. If count = 0, meaning that the current packet is the first packet to be sent.

```
// TODO 8: Calculate the time difference between the current and the
// previous packet and sleep. (hint: usleep)
int time_diff = (current_time.tv_sec - prev_time.tv_sec) * 1000000 + (current_time.tv_usec - prev_time.tv_usec);
std::cout<<time_diff<<std::endl;
usleep(time_diff);

// TODO 7: Send the modified packet
if (pcap_sendpacket(send_handle, packet, header->len) != 0) {
    fprintf(stderr, "Failed to send modified packet\n");
    continue;  // Skip to the next packet if sending fails
}

// TODO 8: Update the previous packet time
prev_time = current_time;
count++;
```

The above code shows how I calculate the time difference between current packet and previous packet. And the below shows the output result of time stamps of the actual packets in test.pcap and time difference between them.

```
Packet timestamp: 1709105199.815903
0
Packet timestamp: 1709105200.816924
1001021
Packet timestamp: 1709105202.819551
2002627
Packet timestamp: 1709105205.923202
3103651
Packet timestamp: 1709105207.224978
1301776
Packet timestamp: 1709105208.425939
1200961
```

All of the above is the whole report of homework 1. Thank you.