

# Task1

## Q1

The source is the MIT address and the IP address and port no. of the source is

IP Address : 192.168.1.102

Port No : 1161

## Q2

The destination is the gaia.cs.umass.edu and the IP address and port no. of the destination is

IP Address : 128.119.245.12

Port No : 80

## Q3

The "Seq=0" also tells that the connection is being established. The SYN Flag in the segment identifies that the segment is a SYN Segment.

```
Source IP: 192.168.1.102
Destination Port: 80
[Stream index: 0]
► [Conversation completeness: Incomplete, DATA]
[TCP Segment Len: 0]
Sequence Number: 0 (relative sequence number)
Sequence Number (raw): 232129012
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 0
Acknowledgment number (raw): 0
0111 .... = Header Length: 28 bytes (7)
```

#### Q4

The seq no. is still 0. It will be 1 when the connection is established.

The value of the acknowledgement is the same as the sequence number of the previous packet ( i.e the syn packet in Q3 ) - 232129013

```
Destination Port: 1161
[Stream index: 0]
▶ [Conversation completeness: Incomplete, DATA]
[TCP Segment Len: 0]
Sequence Number: 0 (relative sequence number)
Sequence Number (raw): 883061785
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 1 (relative acknowledgment number)
Acknowledgment number (raw): 232129013
0111 .... = Header Length: 28 bytes (7)
```

The Flag 0x012 (SYN,ACK) tells us that this is a segment that

```
Sequence Number (raw): 883061785
[Next Sequence Number: 1 (relative sequence number)]
Acknowledgment Number: 1 (relative acknowledgment number)
Acknowledgment number (raw): 232129013
0111 .... = Header Length: 28 bytes (7)
▶ Flags: 0x012 (SYN, ACK)
Window: 5840
[Calculated window size: 5840]
Checksum: 0x774d [unverified]
[Checksum Status: Unverified]
Urgent Pointer: 0
```

#### Q5

#### Q6

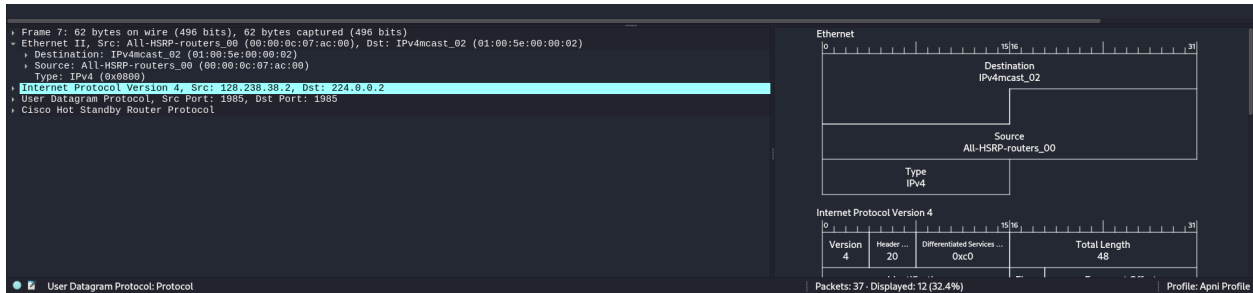
In both these questions the seq=1 indicates that the client is sending more data and isn't done sending the data yet. Meaning that this packet from the client is part of the ongoing data flow in the established connection. And the ACK tells the number of bytes to be expected by the client.

#### Q7

Wireshark uses relative sequence and acknowledgment numbers to make it easier to track data flow by starting counts from zero, rather than showing large, random numbers. The TCP sequence numbers are usually very large numbers for security reasons. Relative seq and ack simplifies analysis and helps spot issues in TCP connections quickly.

# Task2

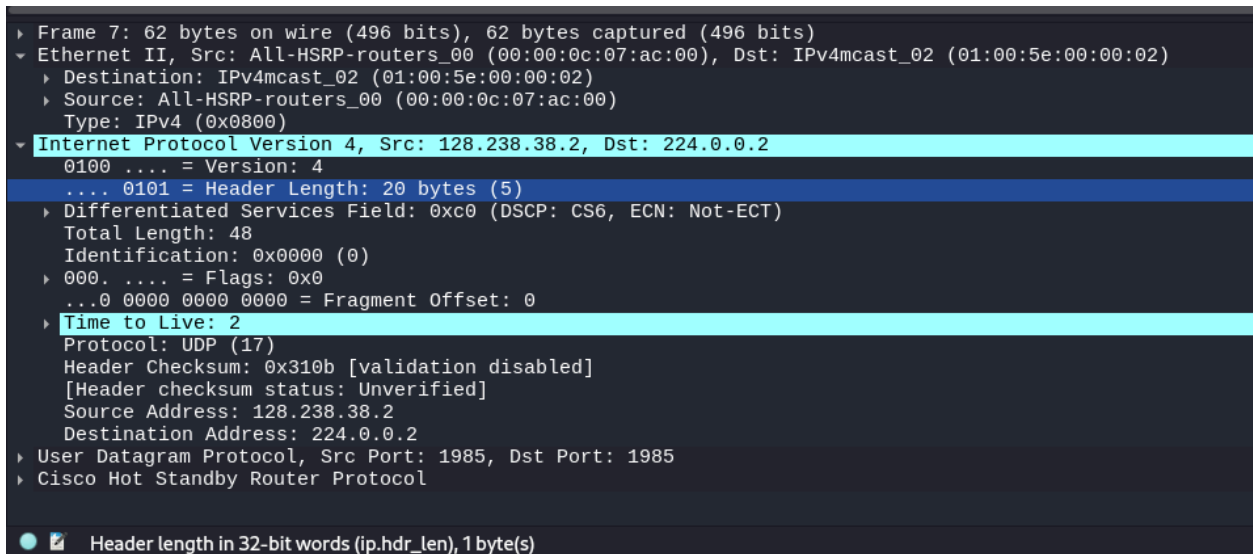
## Q1



There are 3 i think

The destination, the source and the type

The header length is 20 bytes



## Q2

As already answered in Q1. The length of the header is 20 bytes for the 1st packet. All the other packets also have a header length of 20 bytes.

### Q3

The length of the header is 20 bytes for all packets. All the other packets also have a header length of 20 bytes. The length however keeps varying because it tells you this

Length = header length + payload/data

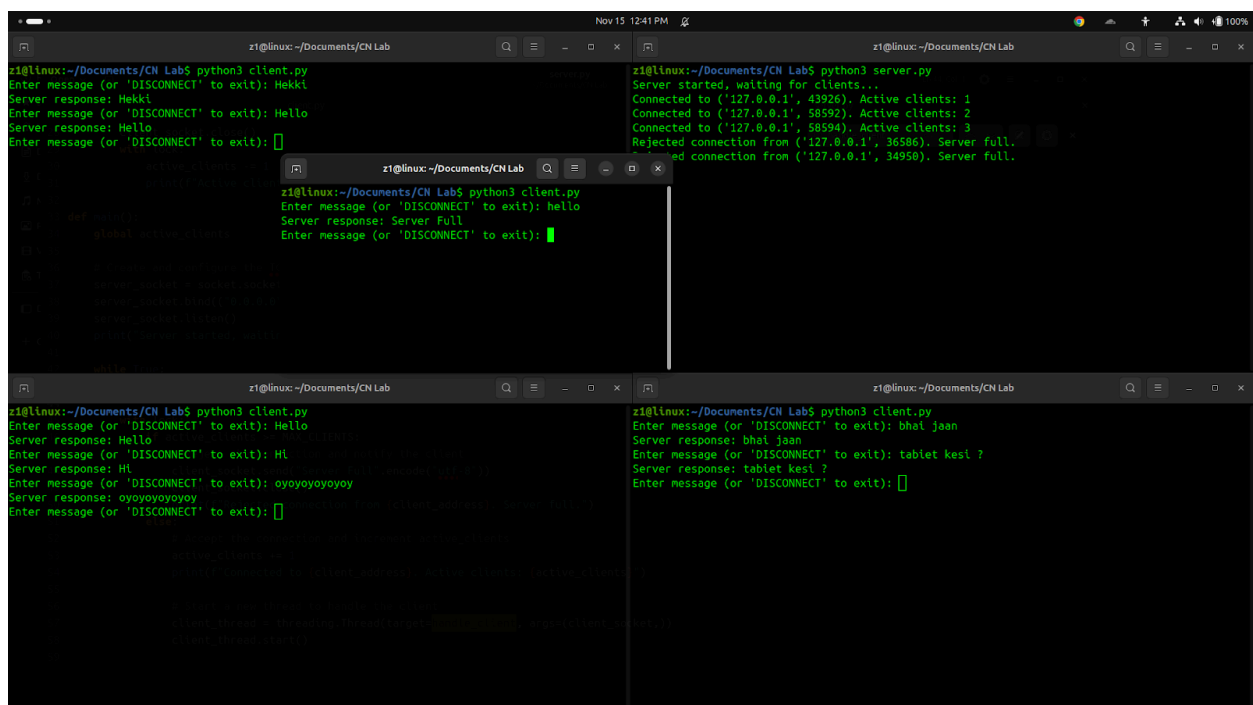
Since the data being sent is different in each packet hence the length for each packet keeps changing.

### Q4

I think the port number to query the DNS server is 53.

But another possible thing is that it's 3740 because in the next packet the port changes to 3741 and then 3742. That means that the port is increasing one by one but the other port remains the same. That makes me think that port 53 is the client's port. Just a thought.

## Task3



```
z1@linux:~/Documents/CN Lab
z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): Hekkt
Server response: Hekkt
Enter message (or 'DISCONNECT' to exit): Hello
Server response: Hello
Enter message (or 'DISCONNECT' to exit):

z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): hello
Server response: Server Full
Enter message (or 'DISCONNECT' to exit):

z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): HL
Server response: HL
Enter message (or 'DISCONNECT' to exit): oyoyoyoyoyoy
Server response: oyoyoyoyoyoy
Enter message (or 'DISCONNECT' to exit):

z1@linux:~/Documents/CN Lab$ python3 server.py
Server started, waiting for clients...
Connected to ('127.0.0.1', 43926). Active clients: 1
Connected to ('127.0.0.1', 58592). Active clients: 2
Connected to ('127.0.0.1', 58594). Active clients: 3
Rejected connection from ('127.0.0.1', 36586). Server full.
Rejected connection from ('127.0.0.1', 34958). Server full.
```

The top right is the server. The rest are clients. The smaller terminal in the middle is trying to connect when 3 users are already connected. This gives the error to the 4th client trying to connect.

```
z1@linux:~/Documents/CN Lab$ python3 server.py
Server started, waiting for clients...
Connected to ('127.0.0.1', 43926). Active clients: 1
Connected to ('127.0.0.1', 58592). Active clients: 2
Connected to ('127.0.0.1', 58594). Active clients: 3
Rejected connection from ('127.0.0.1', 36586). Server full.
Rejected connection from ('127.0.0.1', 34958). Server full.
disconnected
Active clients: 2
Connected to ('127.0.0.1', 48484). Active clients: 3

z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): Hekkl
Server response: Hekkl
Enter message (or 'DISCONNECT' to exit): Hello
Server response: Hello
Enter message (or 'DISCONNECT' to exit):

z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): Hello
Server response: Hello
Enter message (or 'DISCONNECT' to exit): Yoyoyoy
Server response: Yoyoyoy
Enter message (or 'DISCONNECT' to exit):

z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): Hello
Server response: Hello
Enter message (or 'DISCONNECT' to exit): Hl
Server response: Hl
Enter message (or 'DISCONNECT' to exit): oyoyoyoyoyoy
Server response: oyoyoyoyoyoy
Enter message (or 'DISCONNECT' to exit):

z1@linux:~/Documents/CN Lab$ python3 client.py
Enter message (or 'DISCONNECT' to exit): bhai jaan
Server response: bhai jaan
Enter message (or 'DISCONNECT' to exit): tablet kesi ?
Server response: tablet kesi ?
Enter message (or 'DISCONNECT' to exit): DISCONNECT
Disconnected from server
z1@linux:~/Documents/CN Lab$
```

The bottom right client i.e the 3rd client disconnects and the total active users in the server are decreased. So now the client that was denied access before can connect (i.e the box in the middle )