Part 1.

Packet numbers of Get Request and Response: 221, 279

1.

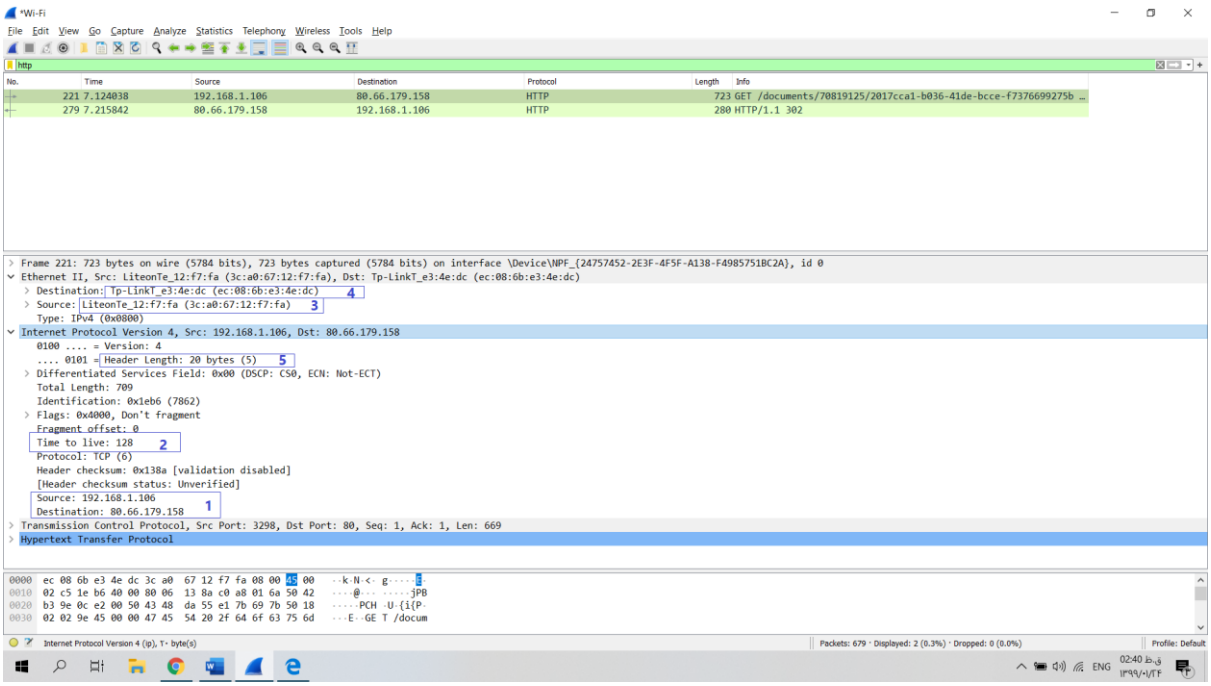

Figure 1

Source IP: 192.168.1.106
Destination IP: 80.66.179.158
2. 128
3. 3c:a0:67:12:f7:fa
4. ec:08:6b:e3:4e:dc . It is the address of my TP-Link router.
5. 20 Bytes
6. 52 Bytes

Part 2.

1. The Internet Address column contains the IP address, the Physical Address column contains the MAC address, and the type indicates the protocol type. Figure 2 shows the contents of my computer's ARP cache.

```
Interface: 192.168.1.106 --- 0x8
  Internet Address      Physical Address      Type
  192.168.1.1           ec-08-6b-e3-4e-dc     dynamic
  192.168.1.255         ff-ff-ff-ff-ff-ff     static
  224.0.0.2             01-00-5e-00-00-02     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.102.18        01-00-5e-7f-66-12     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

Figure 2

2.

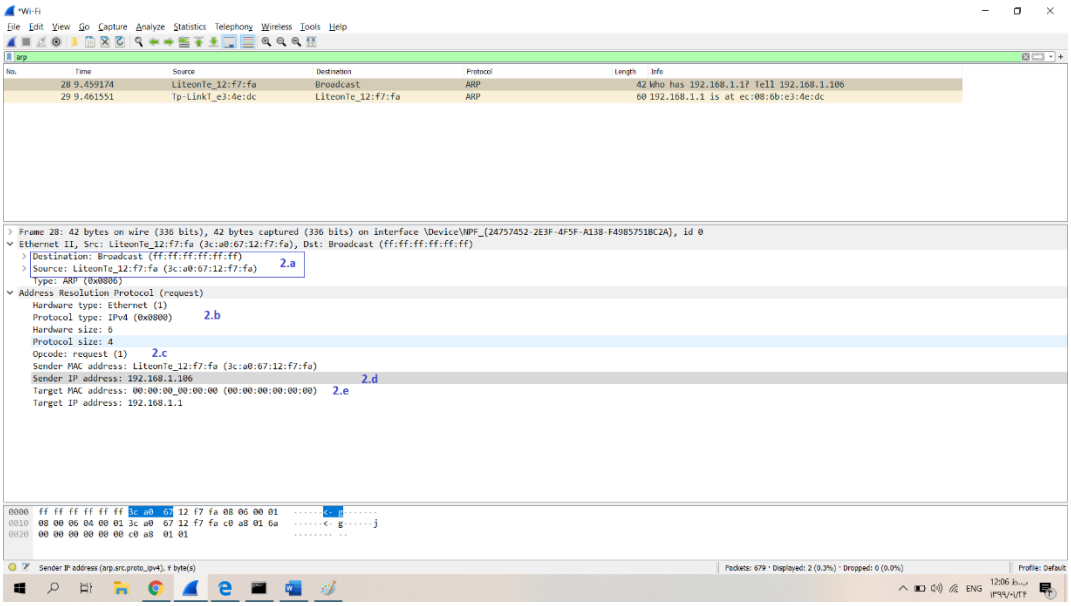

Figure 3

a) hex value of destination address: ff:ff:ff:ff:ff:ff
source address: 3c:a0:67:12:f7:fa
b) The hex value for the frame type field is 0x0800. This corresponds to IP protocol.
c) Its value is 1.
d)Yes, ARP massage contain the IP address of the sender and it is 192.168.1.106
e) The field “Target MAC address” is set to 00:00:00:00:00:00 to question the machine whose corresponding IP address (192.168.1.106) is being queried.

3.

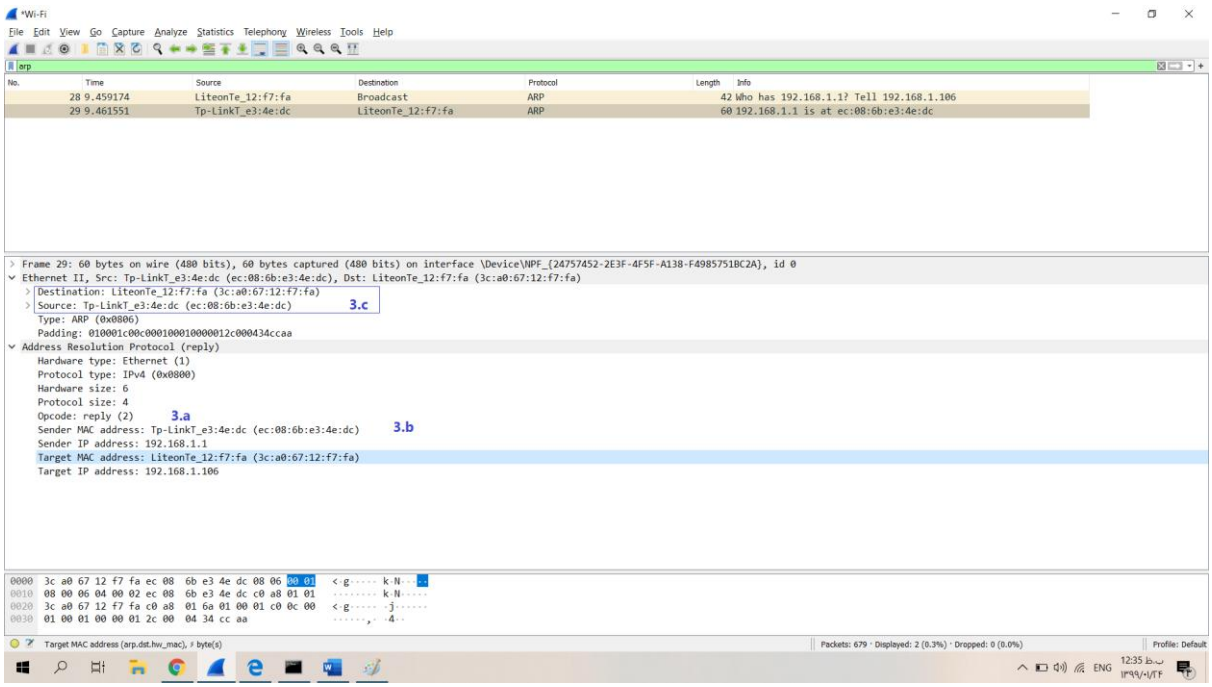

Figure 4

a) Its value is 2.

b) The answer to the earlier ARP request appears in the" Sender MAC address" field, which contains the Ethernet address ec:08:6b:e3:4e:dc for the sender with IP address 192.168.1.106.

c) Destination Address: 3c:a0:67:12:f7:fa

Source Address: ec:08:6b:e3:4e:dc

Part 3.

1.

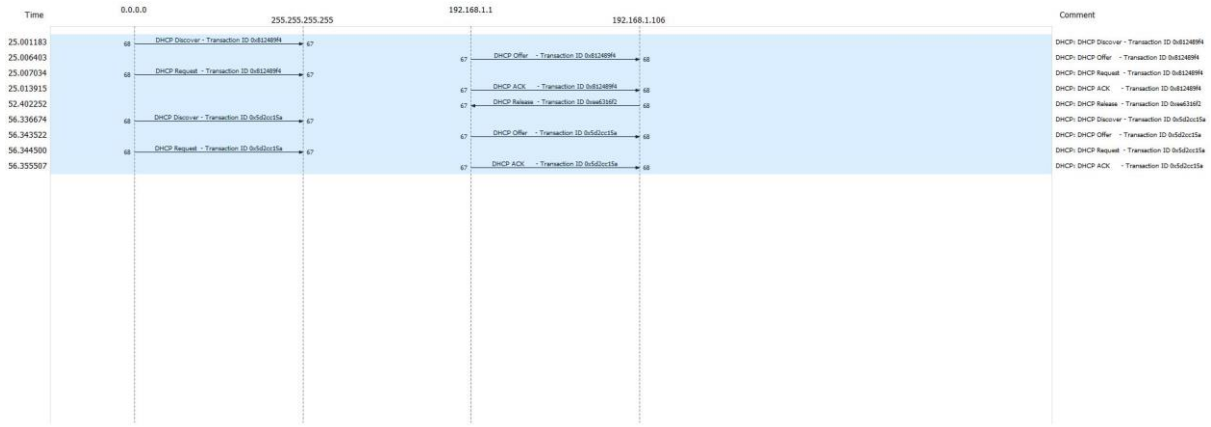

Figure 5

2. The values which differentiate the Discover message from the Request message are in “Option 53: DHCP Message Type” that for Discover is 1 according to Figure 6 and 3 for Request according to Figure 7.

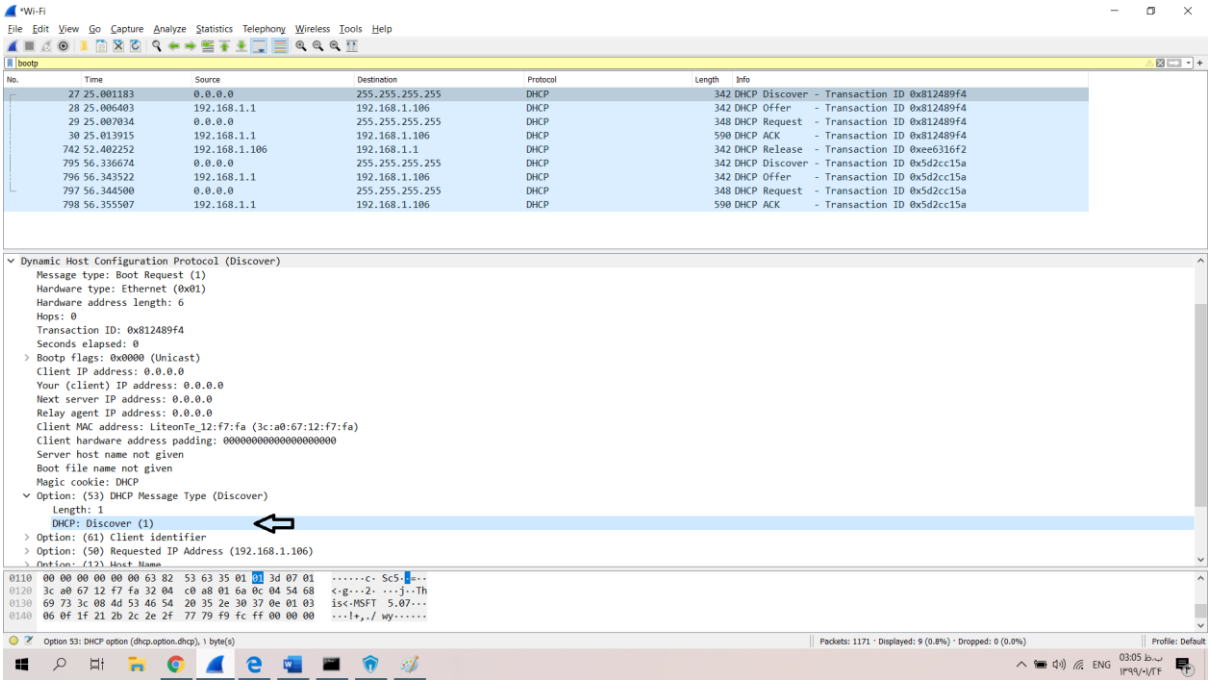

Figure 6

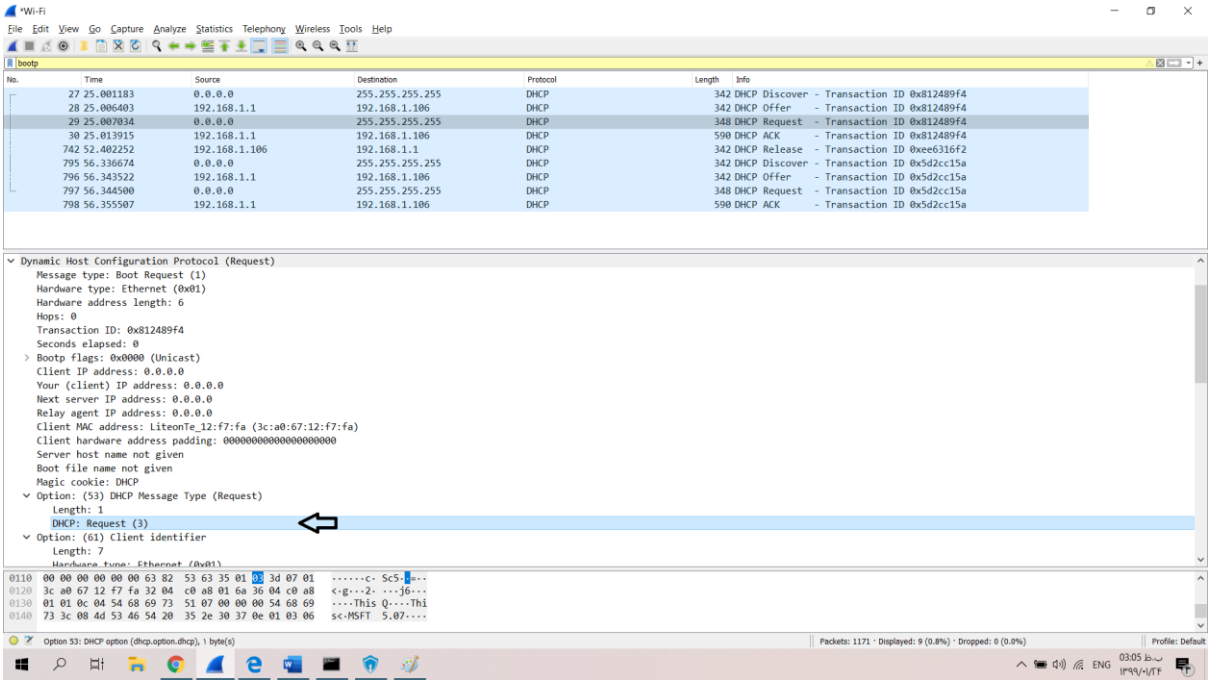

Figure 7

3. According to Figure 8, all the first four DHCP massages have the same transaction-ID (0x812489f4). The second two have the same transaction-ID (0x5d2cc15a). A Transaction ID is used so that the DHCP server can differentiate between client requests during the request process.

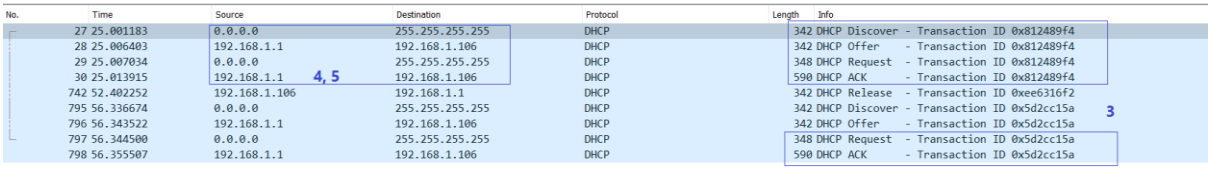

Figure 8

4. According to Figure 8:

Table 1

DHCP massage	Source IP	Destination IP
Discover	0.0.0.0	255.255.255.255
Offer	192.168.1.1	192.168.1.106
Request	0.0.0.0	255.255.255.255
ACK	192.168.1.1	192.168.1.106

5. According to Figure 8, DHCP server IP is 192.168.1.1.

6. The DHCP server offered the IP address (192.168.1.106) and (0.0.0.0) to my client machine. The DHCP message with “DHCP Message Type = DHCP Offer” contained the offered IP.

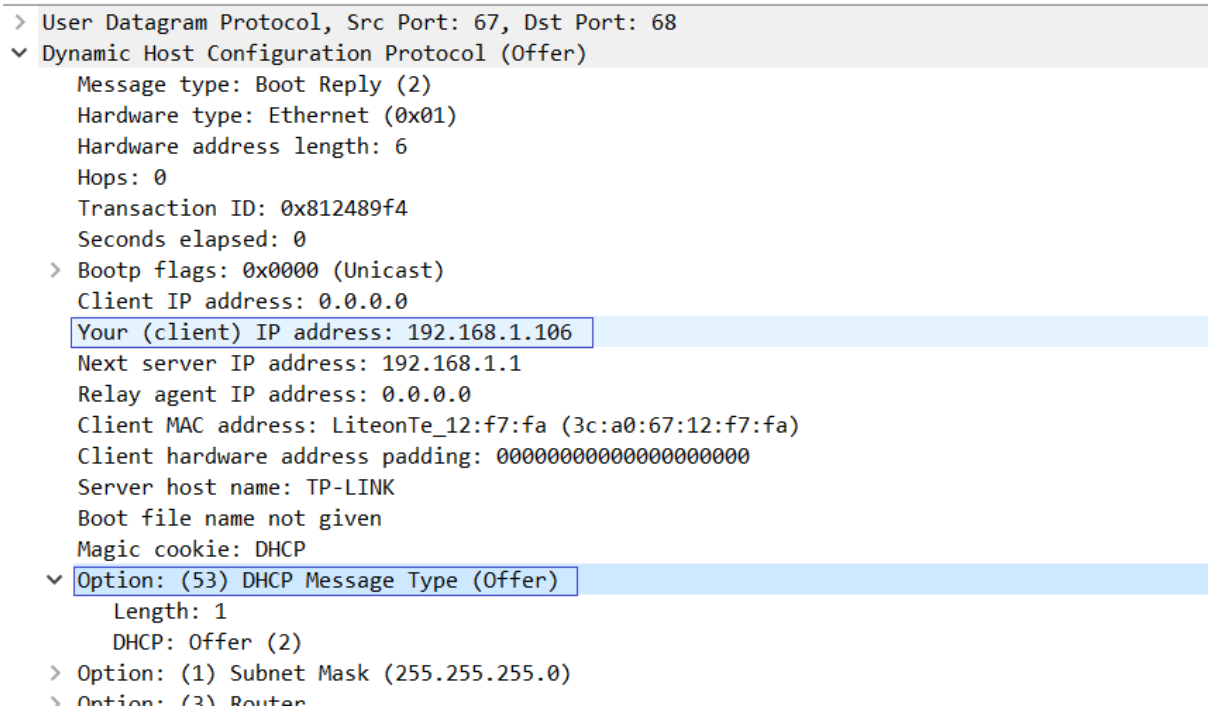

Figure 9

7. The client does not accept this IP address. It requests the offered IP address.

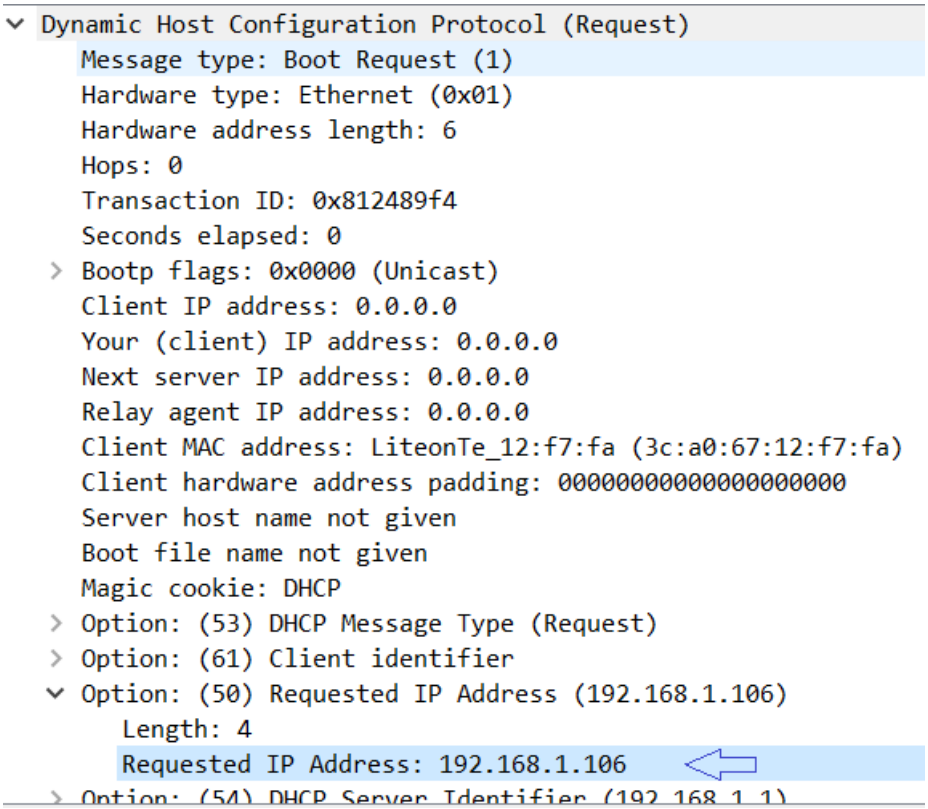

Figure 10

8. The lease time is the amount of time the DHCP server assigns an IP address to a client once the client ACK it. During the lease time, the DHCP server will not assign the IP given to the client to another client, unless it is released by the client. Once the lease time has expired, the IP address can be reused by the DHCP server to give to another client. In my experiment it is 3 days.

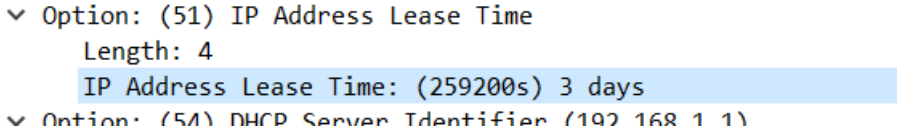

Figure 11