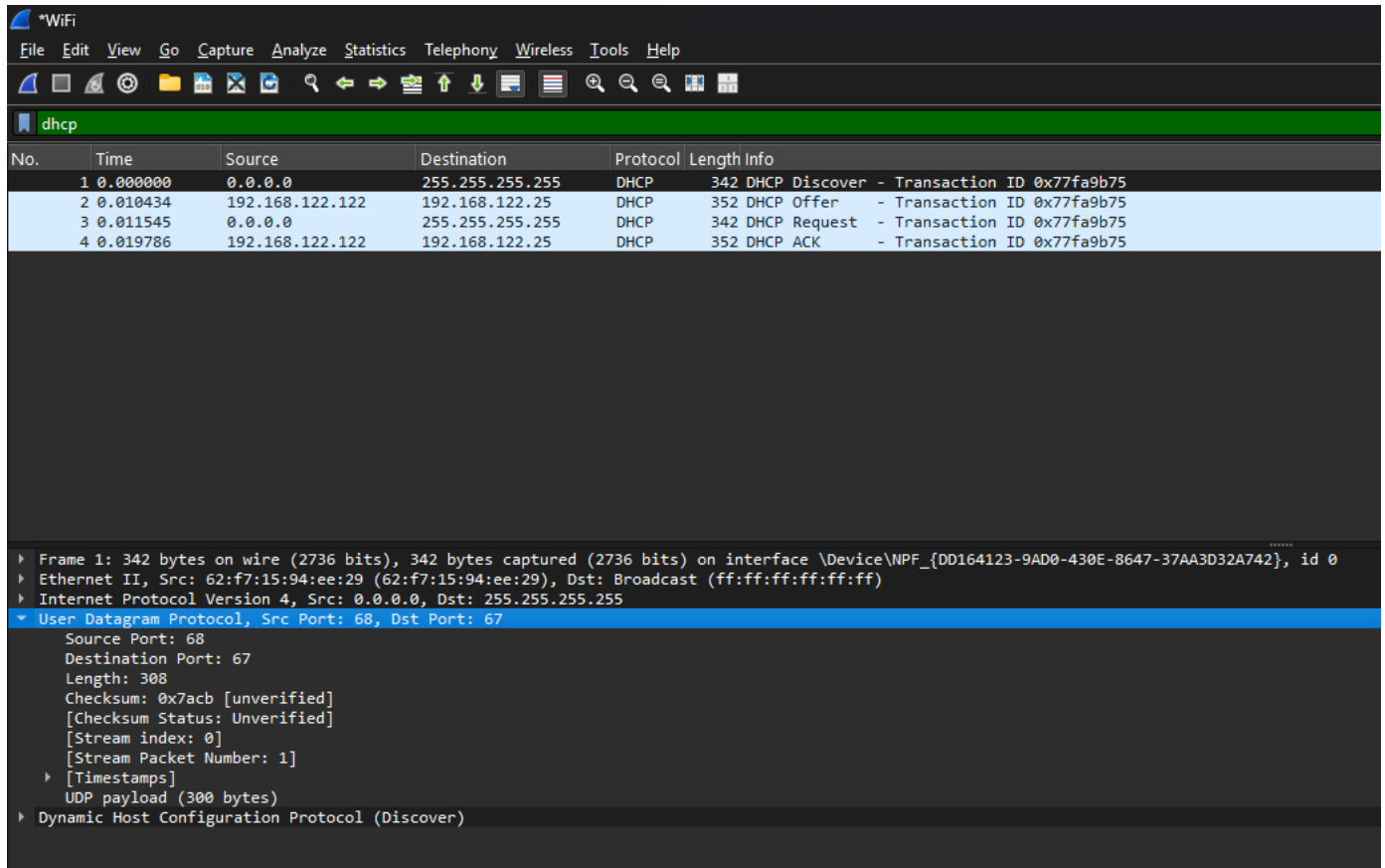


# Assignment 4 DHCP wireshark

Q1. Are DHCP messages sent over UDP or TCP?

Ans- UDP

A screenshot of the Wireshark network protocol analyzer interface. The top menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. Below the menu is a toolbar with various icons. The main display area is divided into three panes. The top pane shows a list of captured packets, with four DHCP packets selected. The middle pane shows the details of the selected packet (Frame 1), including Ethernet II, Internet Protocol Version 4, and User Datagram Protocol. The bottom pane shows the raw data of the selected packet.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x77fa9b75
2	0.010434	192.168.122.122	192.168.122.25	DHCP	352	DHCP Offer - Transaction ID 0x77fa9b75
3	0.011545	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x77fa9b75
4	0.019786	192.168.122.122	192.168.122.25	DHCP	352	DHCP ACK - Transaction ID 0x77fa9b75

Frame 1: 342 bytes on wire (2736 bits), 342 bytes captured (2736 bits) on interface \Device\NPF\_{DD164123-9AD0-430E-8647-37AA3D32A742}, id 0

Ethernet II, Src: 62:f7:15:94:ee:29 (62:f7:15:94:ee:29), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255

User Datagram Protocol, Src Port: 68, Dst Port: 67

Source Port: 68

Destination Port: 67

Length: 308

Checksum: 0x7acb [unverified]

[Checksum Status: Unverified]

[Stream index: 0]

[Stream Packet Number: 1]

[Timestamps]

UDP payload (300 bytes)

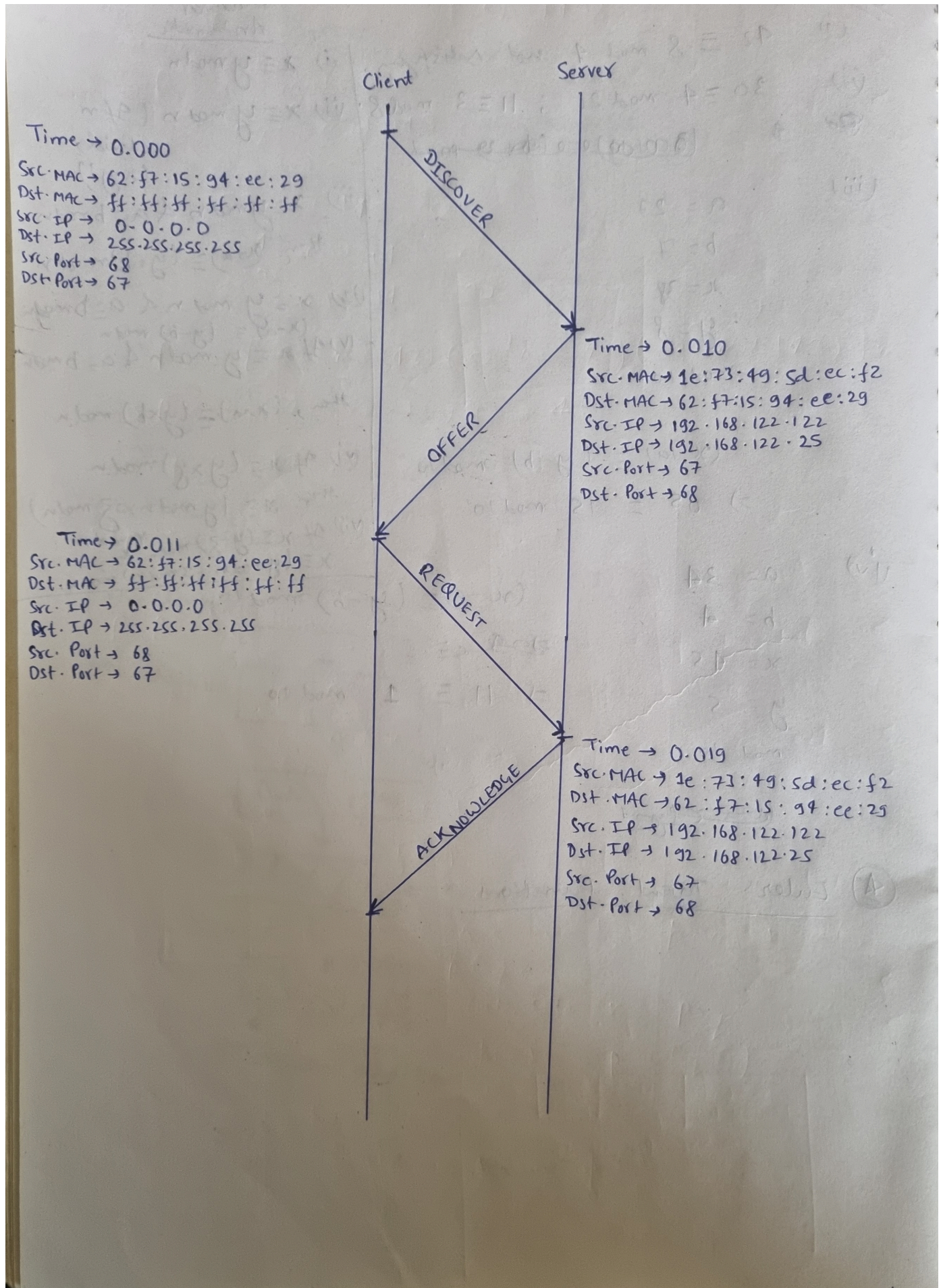
Dynamic Host Configuration Protocol (Discover)

Q2. Draw a timing diagram illustrating the sequence of the first four-packet

Discover/Offer/Request/ACK DHCP exchange between the client and server. For each packet, indicated the source and destination port numbers.



Ans-



Q3. What is the link-layer (e.g., Ethernet) address of your host?

Ans- The Ethernet address of the client is 62:f7:15:94:ee:29



dhcp						
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2	0.010434	192.168.122.122	192.168.122.25	DHCP	352	DHCP Offer - Transaction ID 0x77fa9b75
3	0.011545	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x77fa9b75
4	0.019786	192.168.122.122	192.168.122.25	DHCP	352	DHCP ACK - Transaction ID 0x77fa9b75

▶ Frame 1: 342 bytes on wire (2736 bits), 342 bytes captured (2736 bits) on interface \Device\NPF\_{DD164123-9AD0-430E-8647-3...  
 ▶ Ethernet II, Src: 62:f7:15:94:ee:29 (62:f7:15:94:ee:29), Dst: Broadcast (ff:ff:ff:ff:ff:ff)  
   ▶ Destination: Broadcast (ff:ff:ff:ff:ff:ff)  
   ▶ Source: 62:f7:15:94:ee:29 (62:f7:15:94:ee:29)  
     Type: IPv4 (0x0800)  
     [Stream index: 0]  
 ▶ Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255  
 ▶ User Datagram Protocol, Src Port: 68, Dst Port: 67  
   Source Port: 68  
   Destination Port: 67  
   Length: 308  
   Checksum: 0x7acb [unverified]  
   [Checksum Status: Unverified]  
   [Stream index: 0]  
   [Stream Packet Number: 1]  
   ▶ [Timestamps]  
   UDP payload (300 bytes)  
 ▶ Dynamic Host Configuration Protocol (Discover)

Q4. What values in the DHCP discover message differentiate this message from the DHCP request message?

Ans- There are 3 extra option field that is available in the DHCP request message but not in the DHCP discover message, they are: (i) DHCP message type/option\_53 is changed (from discover to request)  
 (ii) Requested IP address/option\_50 (iii) DHCP Server Identifier/option\_54

```

▶ Option: (53) DHCP Message Type (Request)
▶ Option: (50) Requested IP Address (192.168.122.25)
▶ Option: (54) DHCP Server Identifier (192.168.122.122)
▶ Option: (55) Parameter Request List
▶ Option: (255) End
Padding: 0000000000000000000000000000000000000000000000000000000000000000

```

Q5. What is the value of the Transaction-ID in each of the first four (Discover/Offer/Request/ACK) DHCP messages? What are the values of the Transaction-ID in the second set (Request/ACK) set of DHCP messages? What is the purpose of the Transaction-ID field?

Ans- Discover/Offer/Request/ACK\_Transaction-ID = 0x77fa9b75 ; In my case no second set of Request/Ack is present. The transaction id field is used to uniquely identify each request response pair and can change for each request response pair and it is chosen randomly by a client and remains unique throughout the same request response cycle.

```

▼ Dynamic Host Configuration Protocol (Discover)
  Message type: Boot Request (1)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0x77fa9b75

```

Q6. A host uses DHCP to obtain an IP address, among other things. But a host's IP address is not confirmed until the end of the four-message exchange! If the IP address is not set until the end of the four-message exchange, then what values are used in the IP datagrams in the four-message exchange? For each of the four DHCP messages (Discover/Offer/Request/ACK DHCP), indicate the source and destination IP addresses that are carried in the encapsulating IP Datagram

Ans- During Discover - Src. IP = 0.0.0.0 ; Dst. IP = 255.255.255.255

During Offer - Src. IP = 192.168.122.122 ; Dst. IP = 192.168.122.25

During Request - Src. IP = 0.0.0.0 ; Dst. IP = 255.255.255.255

During Acknowledge - Src. IP = 192.168.122.122 ; Dst. IP = 192.168.122.25

1	0.000000	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover	- Transaction ID 0x77fa9b75
2	0.010434	192.168.122.122	192.168.122.25	DHCP	352	DHCP Offer	- Transaction ID 0x77fa9b75
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4	0.019786	192.168.122.122	192.168.122.25	DHCP	352	DHCP ACK	- Transaction ID 0x77fa9b75

Q7. What is the IP address of your DHCP server?

Ans- 192.168.122.122 is the IP address of my DHCP server.

Time	Source	Destination	Protocol	Length	Info
1 0.000000	0.0.0.0	255.255.255.255	DHCP	342	DHCP Discover - Transaction ID 0x77fa9b75
2 0.010434	192.168.122.122	192.168.122.25	DHCP	352	DHCP Offer - Transaction ID 0x77fa9b75
3 0.011545	0.0.0.0	255.255.255.255	DHCP	342	DHCP Request - Transaction ID 0x77fa9b75
4 0.019786	192.168.122.122	192.168.122.25	DHCP	352	DHCP ACK - Transaction ID 0x77fa9b75

Q8. What IP address is the DHCP server offering to your host in the DHCP Offer message? Indicate which DHCP message contains the offered DHCP address.

Ans- 192.168.122.25 is the IP address that the DHCP server offering to our host in the DHCP Offer message. Screenshot that is mentioned below indicates the DHCP message that contains the offered DHCP address.

```

Dynamic Host Configuration Protocol (Offer)
  Message type: Boot Reply (2)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0x77fa9b75
  Seconds elapsed: 0
  ▶ Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0
  Your (client) IP address: 192.168.122.25
  Next server IP address: 192.168.122.122

```

Q9. In the example screenshot in this assignment, there is no relay agent between the host and the DHCP server. What values in the trace indicate the absence of a relay agent? Is there a relay agent in your experiment? If so what is the IP address of the agent?

Ans- In the absence of a relay agent the relay agent field is marked as 0.0.0.0, if there is presence of

any relay agent then the IP address of that particular relay agent would be mentioned there.

```
▼ Dynamic Host Configuration Protocol (Discover)
  Message type: Boot Request (1)
  Hardware type: Ethernet (0x01)
  Hardware address length: 6
  Hops: 0
  Transaction ID: 0x77fa9b75
  Seconds elapsed: 0
  ▶ Bootp flags: 0x0000 (Unicast)
  Client IP address: 0.0.0.0
  Your (client) IP address: 0.0.0.0
  Next server IP address: 0.0.0.0
  Relay agent IP address: 0.0.0.0
  Client MAC address: 62:f7:15:94:ee:29 (62:f7:15:94:ee:29)
  Client hardware address padding: 0000000000000000000000
```

Q10. Explain the purpose of the router and subnet mask lines in the DHCP offer message.

Ans- Router in option\_3 shows the IP address of the default gateway router whereas the subnet mask in option\_1 denotes the exact subnetwork from which the IP of default gateway router belongs.

```
▼ Option: (3) Router
  Length: 4
  Router: 192.168.122.122
▼ Option: (1) Subnet Mask (255.255.255.0)
  Length: 4
  Subnet Mask: 255.255.255.0
```