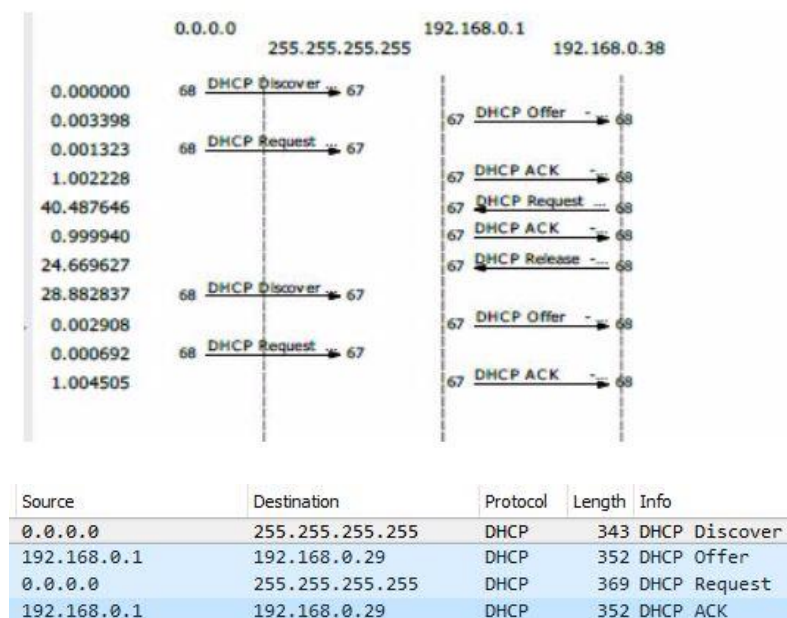Answer the following questions:

1. Are DHCP messages sent over UDP or TCP?

ANS:

UDP

2. Draw a timing datagram 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. Are the port numbers the same as in the example given in this lab assignment?

ANS:

Source	Destination	Protocol	Length	Info
0.0.0.0	255.255.255.255	DHCP	343	DHCP Discover
192.168.0.1	192.168.0.29	DHCP	352	DHCP Offer
0.0.0.0	255.255.255.255	DHCP	369	DHCP Request
192.168.0.1	192.168.0.29	DHCP	352	DHCP ACK

Yes the port numbers are same.

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

ANS:

Ethernet address: e0:2a:82:fb:36:2d

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

ANS:

Option: (53) DHCP Message Type (Discover)

Length: 1

DHCP: Discover (1)

Option: (53) DHCP Message Type (Request)

Length: 1

DHCP: Request (3)

This option(53) differentiates the discover and request.

5. 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:

The transaction ID for first four (Discover/Offer/Request/ACK): 0x8bf4618f

The transaction ID for second (Request/ACK) : 0xc8bee5ce

A Transaction ID is used for the DHCP server can differentiate between client requests during the request process.

6. 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:

The DHCP client and server both use 255.255.255.255 as the destination address for discover and request and 192.168.0.29 for offer and Ack. The client uses source IP address 0.0.0.0, while the server uses its actual IP address (192.168.0.1) as the source.

Source	Destination	Protocol	Length	Info
0.0.0.0	255.255.255.255	DHCP	343	DHCP Discover - Transaction ID 0x8bf4618f
192.168.0.1	192.168.0.29	DHCP	352	DHCP Offer - Transaction ID 0x8bf4618f
0.0.0.0	255.255.255.255	DHCP	369	DHCP Request - Transaction ID 0x8bf4618f
192.168.0.1	192.168.0.29	DHCP	352	DHCP ACK - Transaction ID 0x8bf4618f

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

ANS: IP address of DHCP server: 192.168.0.1

8. 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:

DHCP server is offering ip address: 192.168.0.29

Client IP address: 192.168.0.29

Option: (53) DHCP Message Type (Offer)

Length: 1

DHCP: Offer (2)

9. 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:

Relay agent IP address is 0.0.0.0, which indicates that there is no DHCP Relay used. There was no Relay Agent used in my experiment.

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

ANS:

The router line indicates to default gateway and the subnet mask line indicates the client which subnet mask it should be use.

11. In the DHCP trace file noted in footnote 2, the DHCP server offers a specific IP address to the client (see also question 8. above). In the client's response to the first server OFFER message, does the client accept this IP address? Where in the client's RESPONSE is the client's requested address?

ANS:

Option: (50) Requested IP Address

Length: 4

Requested IP Address: 192.168.0.38

In my experiment, the host requests the offered IP address in the DHCP Request message.

12. Explain the purpose of the lease time. How long is the lease time in your experiment?

ANS: The amount of time the DHCP server assigns an IP address to a client is called lease time. 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.

13. What is the purpose of the DHCP release message? Does the DHCP server issue an acknowledgment of receipt of the client's DHCP request? What would happen if the client's DHCP release message is lost?

ANS:

The client sends a DHCP Release message to cancel its lease on the IP address given to it by the DHCP server. The DHCP server does not send a message back to the client acknowledging the DHCP Release message. If the DHCP Release message from the client is lost, the DHCP server would have to wait until the lease period is over for that IP address until it could reuse it for another client.

Option: (51) IP Address Lease Time

Length: 4

IP Address Lease Time: (86400s) 1 day

14. Clear the bootp filter from your Wireshark window. Were any ARP packets sent or received during the DHCP packet-exchange period? If so, explain the purpose of those ARP packets.

ANS:

Yes, there are ARP requests made by the DHCP server. Before offering an IP address to a client, the DHCP server issues an ARP request for the offered IP to make sure the IP address is not already in use by another workstation.