**CS3506 Lab 1 - Wireshark UDP/DHCP - Assignment**

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

STUDENT NUMBER: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1. UDP**

* 1. Select one UDP packet. From the packet content field, identify and determine the length (in bytes) of each of the UDP header fields.
  2. The value in the Length field is the length of what? Verify your claim with your captured UDP packet.
  3. Input to the network interface is zeroes and ones. How does it know where the next frame starts? Based on the headers you see (Ethernet, IP, UDP), what is the maximum frame size?
  4. Based on information in the UDP header alone, what is the highest possible source port number? Explain your answer.
  5. Examine a pair of UDP packets in which the first packet is sent by your host and the second packet is a reply to the first packet. Describe the relationship between the port numbers in the two packets.
  6. Consider a system using Ethernet/IP/UDP, with a maximum Ethernet Frame size of 500 bytes + the three last digits of your student number. What is the maximum number of bytes of UDP payload supported?

1. **DHCP**
2. Draw a time sequence diagram illustrating the first four-packet Discover/Offer/Request/ACK DHCP exchange between the client and server. For each packet, indicate the source and destination port numbers. (Do not simply copy and paste this from another source).
3. What is the link-layer (i.e., Ethernet) address of the host sending the DHCP Discover message?
4. What is the purpose of having a DHCP discover and a DHCP request message? (Why are they both needed?)
5. What is the purpose of the Transaction-ID field?
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), indicate the source and destination IP addresses that are carried in the encapsulating IP datagram.
7. What IP address is the DHCP server offering to the host in the DHCP Offer message? Indicate which DHCP message field contains the offered DHCP address.
8. Explain the purpose of the router and subnet mask lines in the DHCP offer message.
9. Explain the purpose of the DHCP lease time.
10. 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?