HW5 (6 points)

# Tools:

* Dnsmasq: <https://linux.die.net/man/8/dnsmasq>, <https://www.tutorialspoint.com/unix_commands/dnsmasq.htm>

# Setup:

1. Setup a CORE scenario as shown below. For node n2, I edited its configuration and removed the IPv4 and IPv6 addresses that were assigned to it automatically.

Graphical user interface

Description automatically generated

## Part 1: Setting up DHCP server and obtaining an address (2 points)

1. Start the CORE scenario. Node n2 should not have an address.
   1. Chart

      Description automatically generated
2. Create a configuration for dnsmasq.conf for dnsmasq that allows you to give DHCP addresses in the range from 10.0.0.40 to 10.0.0.60.
3. You can run the dnsmasq server on n1 as follows: dnsmasq -C yourconfigfile -d
   1. -d for debug mode
4. (1pts) Show the content of your dnsmasq config file
   1. 
5. Use dhclient to run a DHCP client on n2
   1. dhclient -i eth0
6. (0.5pts) Show the dnsmasq debug messages shown at the n1
   1. Text

      Description automatically generated
7. (0.5pts) Show the address given to eth0 on n2.
   1. Text

      Description automatically generated
8. Release the address given to n2 using dhclient -r

## Part 2: Addition DHCP services (4 points)

1. Repeat part 1 but this time add the appropriate configuration to the dnsmasq file to:
   1. Always assign interface eth0 on node n2 the address 10.0.0.52.
   2. Set default route to 10.0.0.100
   3. Set default dns-server to 10.0.0.101
   4. Hint: look at the dhcp-host and dns-option configuration in the dnsmasq config.
2. (1pts) Show the content of your dnsmasq config file
   1. Text

      Description automatically generated
3. Start Wireshark on the node n2 interface
4. (1pts) Describe the exchange between the client (n2) and the server (n1)
   1. What is the purpose of the each DHCP message?
      1. DHCP Discover is sent from n2 to discover if a DHCP server is with in this subnet.
      2. DHCP Offer is sent from n1 to n2 to provide basic information of the subnet and a free ip address
      3. DHCP Request is sent from n2 to n1 to request this ip address.
      4. DHCP Ack is sent from n1 to n2 to confirm successful registration of ip address.
   2. Justify the source IP address used in each message?
      1. DHCP discover is sent from n2:0.0.0.0 to broadcast:255.255.255.255.
      2. DHCP offer is sent from n1:10.0.0.20 to n2:10.0.0.52
      3. DHCP Request is sent from n2:0.0.0.0 to broadcast:255.255.255.255
      4. DCHP ACK is sent from n1:10.0.0.20 to n2:10.0.0.52
5. (0.5pts) Show where in the exchange the “default router” information is passed to the client
   1. default router is passed in DHCP Offer, user datagram protocol section.
      1. Text

         Description automatically generated
   2. Show a screenshot of the command: ip route show, on n2. Do you see the default router added to the host?
      1. 
      2. Yes, it’s added
6. (0.5pts) Show where the DNS server information is passed to the client
   1. The same as default router, in the DHCP offer
   2. Text

      Description automatically generated
7. (0.5pts) Show where the duration of the DHCP lease is in the exchange
   1. Duration of lease is in the DHCP ACK packet
   2. 
8. (0.5pts) Show the message where the address is assigned to the client. Show the address value
   1. Text

      Description automatically generated
   2. Text

      Description automatically generated
   3. Ip addr: 10.0.0.52