CS 334/CS 534 Lab 6

Subnetting Lab

Objectives:

- Design an IP Addressing Scheme
- Assign IP Addresses to Network Devices and Verify Connectivity

Scenario:

You are the Network Engineer for UAB IT. You are given the network address of 192.168.10.0/24 to subnet. Each LAN in the network requires enough space for at least 25 addresses for end devices, the switch, and the router. The connection between Router 0 (R0) and Router 1 (R1) will require an IP address for each end of the link.

First, let's check the packet tracer skeleton file that you may find on Canvas.

Due to the level of this lab, I will break this into parts. Each part will have questions and help you step through designing and deploying this network.

PART 1: Design an IP Addressing Scheme (40 pts)

Subnet the network into the appropriate number of subnets.

a. Based on the packet tracer file given on Canvas, how many subnets are needed?
b. How many bits must be "borrowed" to support the number of subnets in the topology table.
c. How many subnets does this create?
d. How many usable hosts does this create per subnet?
   Note: if the answer is less than the 25 hosts required, you borrowed too many bits.
e. Calculate the Binary Value for the first 5 subnets. The first is already shown:

NET 0	192.168.10. 0 0 0 0 0 0 0 0

f. Calculate the binary and decimal value of the new subnet mask.
    a. Binary → 11111111.11111111.11111111. ____
    b. Decimal → 255.255.255.___

g. Fill in the Subnet Table, listing the decimal value of all available subnets, the first and last usable host address, and the broadcast address.
Note: You may not need to use all rows.

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0				
1				
2				
3				
4				
5				

Assign IP Addresses to Network Devices and Verify Connectivity (60 points)

a. Assign Subnet 0 to the LAN connected to the Gig0/0 int of R0
b. Assign Subnet 1 to the LAN connected to the Gig1/0 int of R0
c. Assign Subnet 2 to the LAN connected to the Gig1/0 int of R1
d. Assign Subnet 3 to the LAN connected to the Gig0/0 int of R1
e. Assign Subnet 4 to the LAN connected to the WAN link between R0 and R1

Configure IP addressing on R0 and R1 LAN interfaces.
Configure IP Addressing on the PCs including the default gateways

Set up static routes to route packets across the WAN.
Every device should be able to ping every other device.

Notice that it is normal if the **first** ping message between 2 PCs fails due to the ARP protocol.

Things to remember:

- Make sure to turn necessary interfaces on
- Create tables to help you keep up with things.