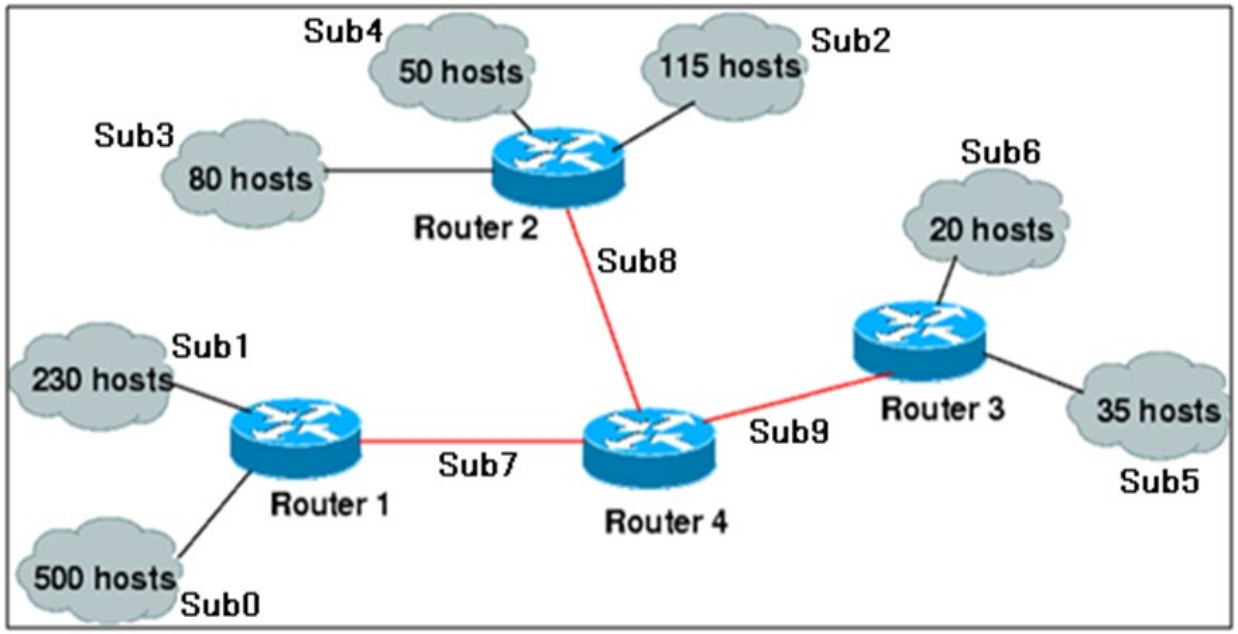
The University of Jordan, Comp. Eng. Dept.
Spring 2023: Networks lab: Experiment 2
IP Addressing: Version 4
(Problem Sheet)

Problem 1: Subnetting:

In this activity, you are given a network topology with different kinds of devices (PCs and routers), as shown in the figure below. In this activity, you will be asked to implement subnetting for the network topology depicted in the figure below. You must configure the PCs and routers interfaces with the correct IP addresses, which are obtained after applying subnetting for the given network number. After that, you should enable the RIP v2 routing protocol with the correct network address (i.e., subnet network address) to check the connectivity of your network and make sure that each device can reach another without any problems. You can check the correctness of your work by getting a 100% completion rate.



You must follow the following instructions to complete the task:

- You have been given the **182.16.0.0/19** address space to use in your network design. The plan should have equal-sized subnets and use the smallest subnet sizes that will accommodate the appropriate number of hosts.
- Fill in the table below with addresses based on the subnetting rules addressed in the handout for this experiment.

Table 1. Addressing table for the subnetting problem_1

Subnet #	Network Address	Prefix length	Subnet mask	First assignable address	Last assignable address	Broadcast Address
Subnet 0	182.16.0.0					
Subnet 1						
Subnet 2						
Subnet 3						
Subnet 4						
Subnet 5						
Subnet 6						
Subnet 7						
Subnet 8						
Subnet 9						

- Open the "Exp_2_Problem_1.pka" file. After you are done with that, complete it with the correct configurations and address assignments to PCs and routers interfaces according to the following specifications.

  1. **For each LAN interface (i.e., Subnet 0, Subnet 1, Subnet 2, Subnet 3, Subnet 4, Subnet 5, and Subnet 6):**

     - ✓ LAN interface is the connection between the PC and the router.
     - ✓ Each LAN is represented by a single PC to simplify the network topology.
     - ✓ Assign the first valid host address in each subnet to the LAN interface of each Router.
     - ✓ Assign the last valid host address in each subnet to the PC in the corresponding subnet.

  2. **For each WAN interface (Subnet 7, Subnet 8, and Subnet 9):**

     - ✓ WAN interface is the connection between two routers.
     - ✓ Assign the first valid host address in each subnet to the DCE WAN interface on the router.
     - ✓ Assign the last valid host address in each subnet to the DTE WAN interface on the router.

- On each router in the topology, **configure the RIP v2 routing protocol** based on the network address of the directly connected networks.
- Test connectivity between all LANs to ensure that the network is operating properly.
  - ✓ Ping 35 Hosts PC from 500 Hosts PC.
  - ✓ Ping 230 Hosts PC from 50 Hosts PC.

Problem 2: CIDR

- You have been given the **200.87.0.0/21** address space to use in your network design. Perform CIDR to minimize the number of routing entries that each router will advertise. Consider that the default gateway IP addresses of the hosts (i.e., the routers' LAN interfaces) are excluded from the hosts' number.
- Fill in the table below with addresses based on the CIDR rules addressed in the handout for this experiment.

Table 2. Addressing table for the CIDR problem_2

Subnet #	Addresses Required	Number of required bits for hosts	2 ^ (Number of required bits for hosts)	CIDR notation	Subnet mask	Network ID	Broadcast ID	Hosts range

- Open the "Exp_2_Problem_2.pka" file. After you are done with that, complete it with the correct configurations and address assignments to PCs and routers interfaces according to the previous specifications for LAN and WAN interfaces mentioned in the pronlem1.
- On each router in the topology, **configure the RIP v2 routing protocol** based on the network address of the directly connected networks.
- Test connectivity between all LANs to ensure that the network is operating properly.