Cpr E 489 Spring 2024
Homework #4
Due Date: 4/2/2024 (Tue) by 11:59 PM
Type your answers and submit on Canvas

1. (40 points) Suppose a router has the following routing table:

Destination	*Next-Hop Router*
220.33.0.0/16	220.33.0.1
220.33.128.0/19	220.33.128.1
220.33.148.0/22	220.33.148.1
0.0.0.0/0	220.33.1.1

   Describe how the router looks up this routing table and makes the routing decision on where to forward a packet with the following **destination IP address**:
   a. 220.33.150.1
   b. 220.33.156.2
   c. 220.33.164.3
   d. 220.77.170.4

2. (30 points) IP Addresses

   a. A host in an organization has an IP address of 199.77.55.1 with a network mask of "/19". What is the **network address of the supernet** that this IP address belongs to? (5 points) **How many Class-C address blocks** does this supernet include? (5 points) Justify your answers.

   b. A host in another organization has an IP address of 180.170.80.70 with a network mask of "/19. What is the **network address of the subnet** that this IP address belongs to? (5 points) What is the **directed broadcast address of the subnet**? (5 points) What is the **range** of the IP addresses that an **individual** host can have on this subnet? (10 points) Justify your answers.

3. (30 points) An organization is assigned a Class-C network 200.55.66.0 and wants to form subnets for its three departments: **D1 (75 hosts), D2 (125 hosts), and D3 (42 hosts).** Describe a **possible arrangement of subnets** (i.e., describe the network address and the subnet mask of each subnet) to make this possible. Justify your answer. Note that a department may be assigned multiple subnets; subnets may have different sizes and they shall not overlap.