CS312 :: Homework 5

This assignment will give you some practice in designing networks. Often, when I investigate networks that I'm inheriting, I will put together a logical diagram like this, and will map out every host and address on the network. It provides a solid foundation on which to plan improvements to the network.

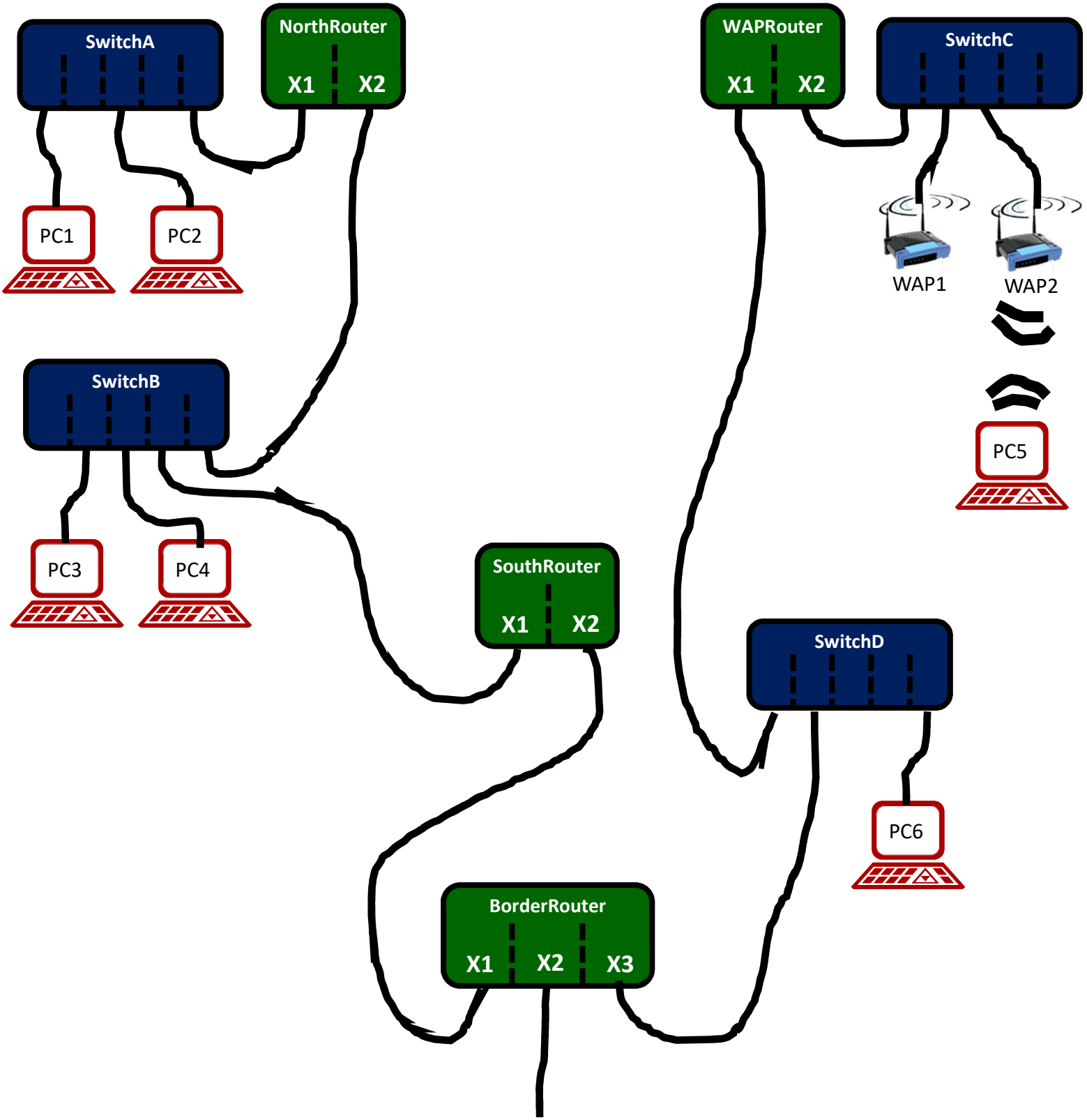
Question 1: Figure Out the Addresses

On the next page is a drawing of a sample network that consists of routers, switches, PCs, DHCP servers, and wireless access points. The third page is filled with the data for this network at this particular moment in time: fill in all the blanks. Structure the network according to the specifications given below. This is the only task in this assignment.

Specifications

- BorderRouter should have NAT enabled on X2, but all other interfaces across all other routers should have NAT disabled.
- All IP address and network addresses given should be complete CIDR addresses with the appropriate subnet mask. For example, 192.168.1.0/24 is a 254-host network, while 192.168.1.1/32 is a single host. You may need to review CIDR notation: use the links provided on the Week 5 Canvas page.
- A VPN is established between NorthRouter and WAPRouter. This VPN connection is established by each of these two routers on the interface closer to the other target router (i.e. these routers have more than one interface: use the interface closer to the target).
- WAPRouter port X2 is running a DHCP server that assigns IP addresses all the way out to the devices that connect wirelessly to the WAPs. That is, the WAPs do not have DHCP servers active.
- There may be additional DHCP servers running, though their details are not given. Only one DHCP server may be active in each subnet.
- PC5 is connected wirelessly to WAP2.
- Network cables that cross each other are not connected.

There are 36 incomplete addresses. Each complete AND correct address filled in is worth 1 point. Four additional points can be awarded by the TAs: you get all 4 of these points if you get all addresses correct, and 2 of these points if you get all addresses correct except for one.


SwitchA
NorthRouter
X1
X2
WAPRouter
X1
X2
SwitchC
PC1
PC2
WAP1
WAP2
SwitchB
PC5
PC3
PC4
SouthRouter
X1
X2
SwitchD
PC6
BorderRouter
X1
X2
X3

- **NorthRouter**
  - Default Gateway: 192.168.4.1/__
  - X1
    - Network: ___.___.5.0/24
    - IP Address: 192.168.5.1/32
    - DHCP Server
      - Network: 192.168.5.0/24
      - Starting IP Address: 192.168.5.10/32
      - Ending IP Address: 192.168.___.100/32
  - X2
    - Network: 192.168.4.0/24
    - IP Address: 192.168.4.20/__
- **SouthRouter**
  - Default Gateway: 192.168.3.___/32
  - X1
    - Network: 192.168.___.___/24
    - IP Address: ___.___.___.1/__
  - X2
    - Network: 192.168.3.124/30
    - IP Address: 192.168.3.126/32
- **BorderRouter**
  - Default Gateway: 10.0.0.1/32
  - X1
    - Network: 192.168.3.___/__
    - IP Address: 192.168.3.___/32
  - X2
    - Network: 10.0.0.0/24
    - IP Address: 10.0.0.2/__
  - X3
    - Network: ___.___.___.___/__
    - IP Address: ___.___.___.1/__
- **WAPRouter**
  - Default Gateway: 192.168.2.1/32
  - X1
    - Network: 192.168.2.0/24
    - IP Address: 192.168.2.2/32
  - X2
    - Network: ___.___.___.___/__
    - IP Address: 192.168.0.1/32
    - DHCP Server
      - Network: ___.___.___.___/__
      - Starting IP Address: 192.168.0.10/32
      - Ending IP Address: ___.___.255.254/32
- **WAP1**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.0.2/32
- **WAP2**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.0.3/32
- **PC1**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.5.10/32
  - Default Gateway: 192.168.5.1/32
- **PC2**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.5.101/32
  - Default Gateway: 192.168.5.1/32
- **PC3**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.4.10/32
  - Default Gateway: ___.___.___.___/__
- **PC4**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.4.11/32
  - Default Gateway: ___.___.___.___/__
- **PC5**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.0.10/32
  - Default Gateway: 192.168.0.1/32
- **PC6**
  - Network: ___.___.___.___/__
  - IP Address: 192.168.___.10/32
  - Default Gateway: 192.168.___.___/32
- **Route1**
  - Stored in Router: _____
  - Targets Network: 192.168.0.0/__
  - Gateway IP Address: 192.168.___.___/32
- **Route2:**
  - Stored in Router: _____
  - Targets Network: 192.168.5.0/24
  - Gateway IP Address: 192.168.3.126/32
- **Route3:**
  - Stored in Router: _____
  - Targets Network: 192.168.5.0/24
  - Gateway IP Address: 192.168.4.20/32
- **VPN Endpoint IP Address 1:** 192.168.4.___/32
- **VPN Endpoint IP Address 2:** 192.168.___.___/32
- **A packet just arrived** at BorderRouter, destined for 192.168.0.10/32. Out of which interface will it leave BorderRouter: X_
- **One of these PCs** DEFINITELY has a statically assigned IP address. Some of them MAY have a DHCP-assigned address. Which one PC DEFINITELY has a statically assigned IP address: PC_