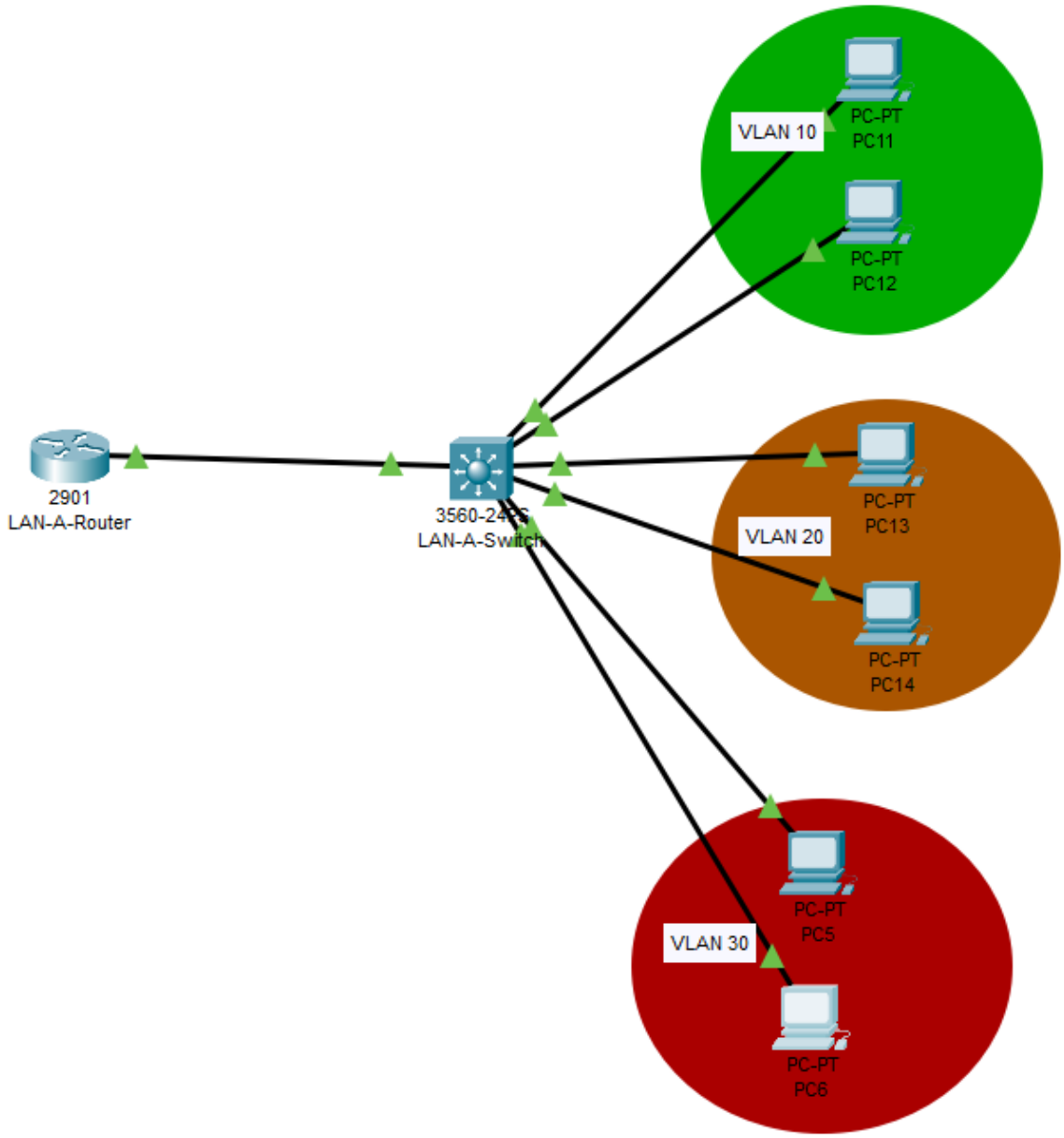
Lawton Pittenger
CNT-4703
LAB 5
LAB COMPLETED REMOTELY

1. Packet Tracer file: CNT4703C-Lab5-[full-name-of-student]
    - Included with assignment
2. Screenshots of Packet Tracer Model
    a. Network Topology (Logical)



b. Successful Ping from PC to PC

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::200:CFF:FE52:43E3
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.10.2
   Subnet Mask.....: 255.255.255.240
   Default Gateway.....: ::
                                 192.168.10.1

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0

C:\>ping 192.168.10.3

Pinging 192.168.10.3 with 32 bytes of data:

Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

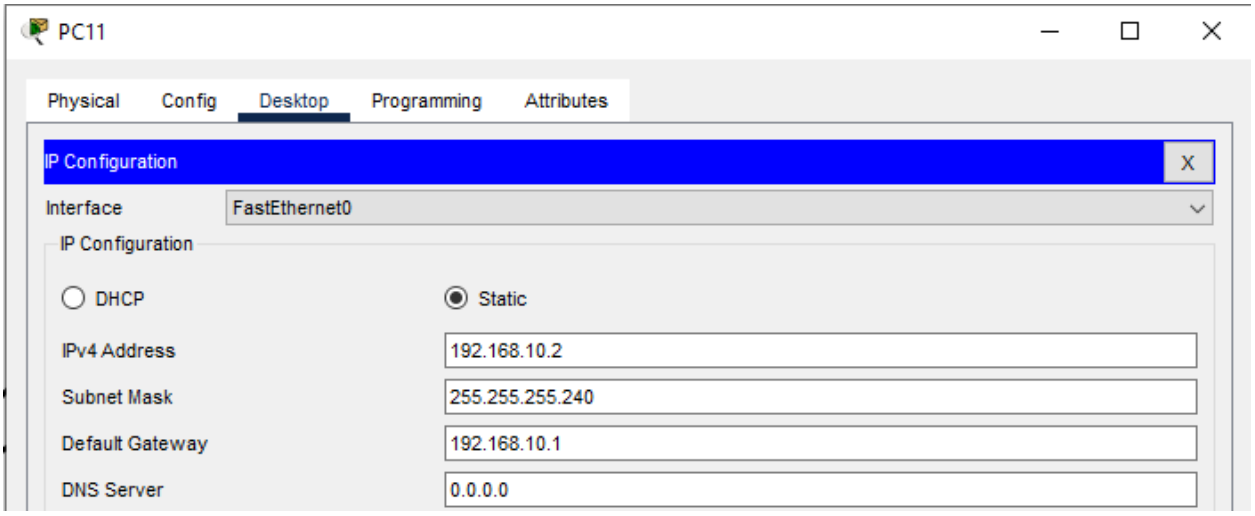
c. Unsuccessful Ping from PC to PC (between VLANs)

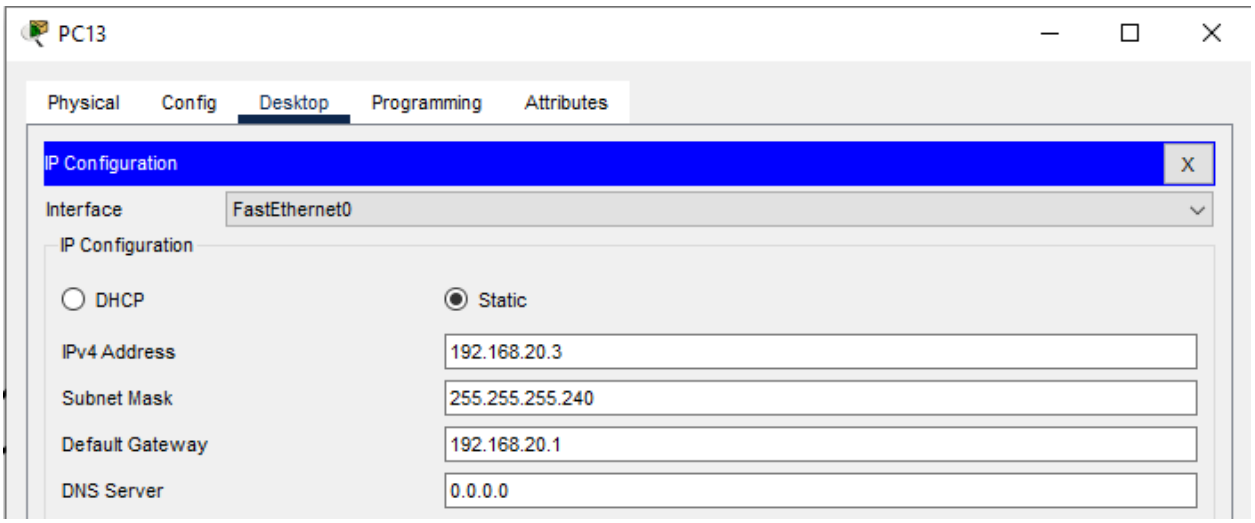
```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::200:CFF:FE52:43E3
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.10.2
   Subnet Mask.....: 255.255.255.240
   Default Gateway.....: ::
                                 192.168.10.1

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0

C:\>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.20.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

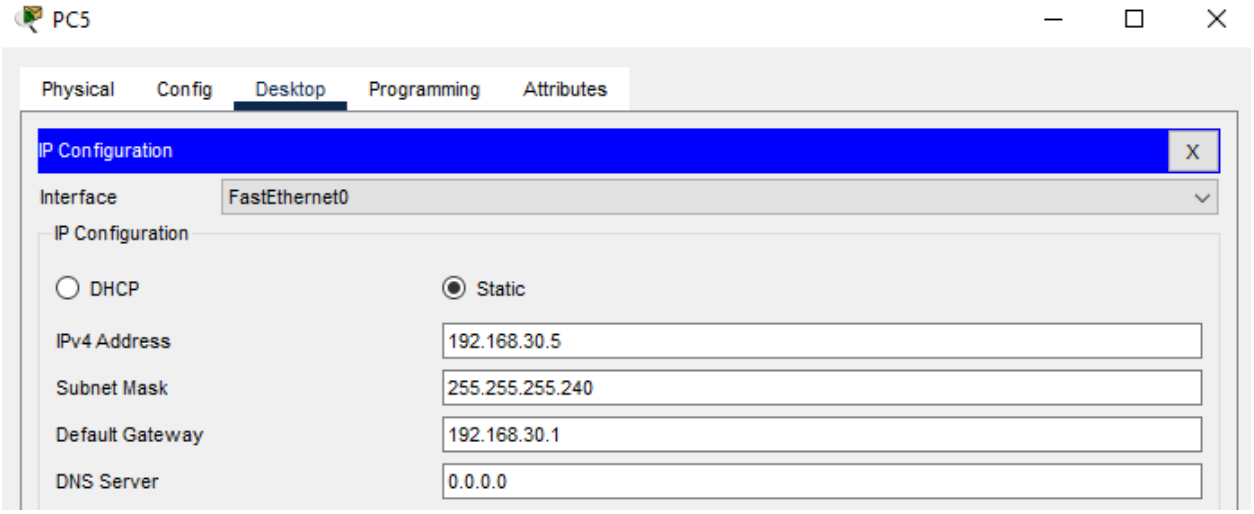
d. Command Output: [hostname]#show vlan

```
LAN-A-Router>show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
10   zone10                           active
20   zone20                           active
30   zone30                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
20   enet  100020     1500  -      -      -        -    -        0      0
30   enet  100030     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------

LAN-A-Router>
LAN-A-Switch>show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Gig0/1, Gig0/2
10   zone10                           active    Fa0/1, Fa0/2
20   zone20                           active    Fa0/3, Fa0/4
30   zone30                           active    Fa0/5, Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
20   enet  100020     1500  -      -      -        -    -        0      0
30   enet  100030     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0
```

3. Photos of Switch/Router/Workstations
    a. Configuration of Interfaces (IPv4)
        i. 1 Workstation from each VLAN







b. Command Output:

i. Router: #show ip int brief

```
LAN-A-Router>show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  administratively down down
GigabitEthernet0/1     172.168.1.1     YES manual up                    up
GigabitEthernet0/1.1   192.168.1.1     YES manual up                    up
GigabitEthernet0/1.10  192.168.10.1    YES manual up                    up
GigabitEthernet0/1.20  192.168.20.1    YES manual up                    up
GigabitEthernet0/1.30  192.168.30.1    YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
LAN-A-Router>
```

ii. Switch: #show vlan

```
LAN-A-Switch>show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Gig0/1, Gig0/2
10   zone10                           active    Fa0/1, Fa0/2
20   zone20                           active    Fa0/3, Fa0/4
30   zone30                           active    Fa0/5, Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
20   enet  100020     1500  -      -      -        -    -        0      0
30   enet  100030     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------
```

iii. Ping from Router to Workstation

```
LAN-A-Router>ping 192.168.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

iv. Ping from Workstation to Workstation

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::201:C7FF:FE40:2441
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.20.3
   Subnet Mask.....: 255.255.255.240
   Default Gateway.....: ::
                                 192.168.20.1

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0

C:\>ping 192.168.20.4

Pinging 192.168.20.4 with 32 bytes of data:

Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128
Reply from 192.168.20.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.20.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

LAB 5 Questions:

1. On the CISCO Router/Switch:
   a. How many sub-interfaces were used?
      - **Four sub-interfaces were used on the router.**
   b. What is the command to check how the interfaces are configured?
      - **show ip int brief**
   c. What is the command to check what VLANs are set?
      - **show vlan**
   d. Which port(s) were trunked?
      - **Fa0/24 was used as the dedicated trunk port.**
2. How many Mask Bits are there in a 192.168.100.0/28 subnet?
      - **There are 28 mask bits in the subnet, as shown in the representation 192.168.100.0/28, because in CIDR representation of IPv4 the part after front slash, i.e, /28 represents the amount of 1's in its binary representation.**
   a. What is the subnet mask? Convert this mask to binary.
      - **The subnet mask for the above is 255.255.255.240**
      - **1st octet 8 1's represents = 255**

- **2nd octet 8 1's represents = 255**
- **3rd octet 8 1's represents = 255**
- **4th octet 4 bit 1's and 4 bit 0 represents = 240**
- **Convert this mask to binary**
- **255.255.255.240 => 1111 1111 . 1111 1111 . 1111 1111 . 1111 0000**

b. How many addresses are available in this subnet?

- **In the subnet mask we can see there are 4 zeros.**
    - **1111 1111 . 1111 1111 . 1111 1111 . 1111 0000**
- **And Subnet IDs are represented with 1st 28 bits, and the last 4 bits represents Host addresses.**
- **Using 4 bits we can represent 2^4 = 16 addresses.**
- **Among these 16 addresses 1 address is for subnet ID, and 1 address is for the broadcast address.**
- **Hence There are (16 - 2) = 14 addresses are available in the subnet.**

3. What is the maximum length you can run CAT5e?
    - **The maximum length for a CAT5e cable run is 100 meters (328 feet). This maximum length includes the length of all patch cables and connectors in the run.**
4. What is a MAC Address?
    - **A MAC address (Media Access Control address) is a unique identifier assigned to a network interface controller (NIC) for use as a network address in communications within a network segment. The MAC address is a 48-bit (6-byte) identifier that is usually represented in hexadecimal format with colons or dashes between each byte, such as 00:11:22:33:44:55. MAC addresses are assigned to devices by the manufacturer and are typically hard-coded into the device's firmware. They are used in Ethernet and Wi-Fi networks to identify a specific device on the network and allow for communication between devices. MAC addresses are used at the Data Link layer of the OSI model and are used by the network protocols to uniquely identify each device on the network. The MAC address is not routable beyond the local network and is used for communication within the local network only.**
5. What is a gateway and what purpose does it serve on a network?
    - **A gateway is a network device that acts as an access point to another network. It serves as the connection point between two networks that use different protocols or network architectures. In a local area network (LAN), a gateway is typically a router that connects the LAN to the internet or another network. The gateway's IP address is used by devices on the LAN to route data outside the network, such as to the internet or to another network. The gateway is responsible for translating the data between the different network architectures and protocols, and ensuring that it reaches its intended destination. The gateway also serves as a security mechanism by controlling access to the network. It can be configured to block unauthorized access attempts and to provide security features such as firewall protection, virtual private network (VPN) connections, and network address translation (NAT). In summary, the gateway plays a critical role in enabling devices on a network to communicate with other networks and the internet, while also providing security and control over network access.**