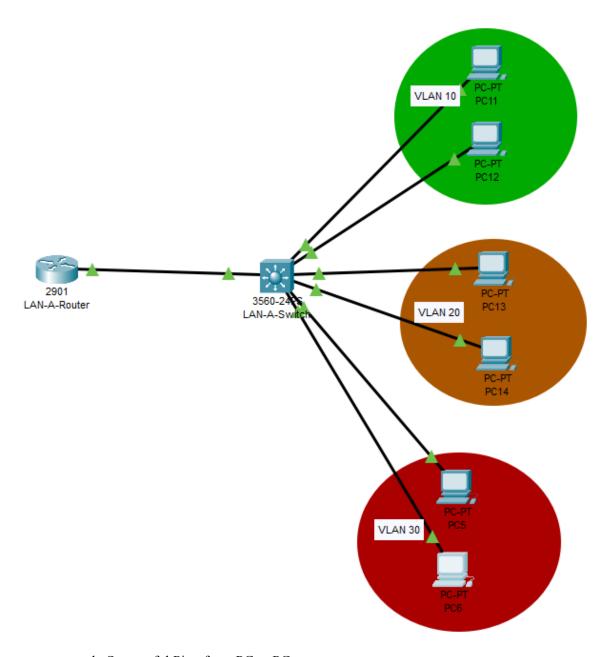
- 1. Packet Tracer file: CNT4703C-Lab5-[full-name-of-student]
 - Included with assignment
- 2. Screenshots of Packet Tracer Model
 - a. Network Topology (Logical)



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
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)

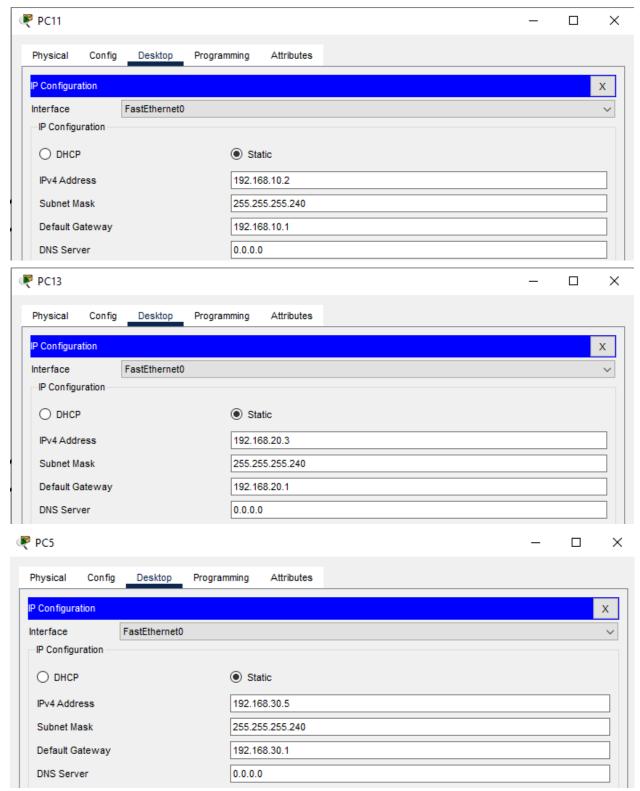
```
C:\>ipconfig
FastEthernet0 Connection: (default port)
  Connection-specific DNS Suffix..:
  Link-local IPv6 Address.....: FE80::200:CFF:FE52:43E3
  IPv6 Address.....: ::
  IPv4 Address..... 192.168.10.2
  Subnet Mask..... 255.255.255.240
  Default Gateway....::
                               192.168.10.1
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),
```

d. Command Output: [hostname]#show vlan

LAN-A-Router>show vlan

| VLAN | Name | | | | Stat | tus | Por | cts | | | |
|--|--|--------------------|------------------|--------|--|--|--|---|---|--|----------------------------|
| 1 | defau | l+ | | | act | ive | | | | | |
| _ | zonel(| | | | act: | | | | | | |
| | zone2 | | | | act: | | | | | | |
| 30 | zone3 | 0 | | | act: | ive | | | | | |
| 1002 | fddi- | default | | | act: | ive | | | | | |
| 1003 | token- | -ring-defau | lt | | act: | ive | | | | | |
| | | et-default | | | act: | | | | | | |
| 1005 | trnet- | -default | | | act: | ive | | | | | |
| | | SAID | | | | | | | | | |
| | | 100001 | | | _ | _ | | _ | _ | | 0 |
| | | | | | _ | _ | | _ | | 0 | 0 |
| | | 100020 | 1500 1500 | - | - | - | | - | | 0 | 0 |
| 30 | enet | 100030 | 1500 | - | - | - | | | - | 0 | 0 |
| 1002 | fddi | 101002 | | | | | | - | - | 0 | 0 |
| | | 101003 | 1500 1500 | - | - | - | | - | | 0 | 0 |
| | | | | | | - | | ieee | | 0 | 0 |
| 1005 | trnet | 101005 | 1500 | - | - | _ | | ibm | - | 0 | 0 |
| VLAN | Type | SAID | MTU | Parent | RingNo | Bridge | No | Stp | BrdgMode | Transl | Trans2 |
| | | | | | | | | | | | |
| Remot | te SPA1 | N VLANs | | | | | | | | | |
| Prima | arv Sed | condary Typ | e | | Ports | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| LAN-A | A-Route | | | | | | | | | | |
| LAN-A | A-Route | er> | | | | tus | Por | ts. | | | |
| LAN-A | A-Route | er> | | | | tus | | | | | |
| LAN-A | A-Route | er> | | | Star | tus | Fa0 |)/7, 1 | Fa0/8, Fa0 | 0/9, Fa | |
| LAN-A | A-Route | er> | | | Star | tus ive | Fa0 |)/7, I | Fa0/8, Fa0 Fa0/12, I | 0/9, Fa(Fa0/13, | Fa0/14 |
| LAN-A | A-Route | er> | | | Star | tus ive | Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, | Fa0/8, Fa0 Fa0/12, F Fa0/16, F | 0/9, Fa0 Fa0/13, Fa0/17, | Fa0/14 Fa0/18 |
| LAN-A | A-Route | er> | | | Star | tus ive | Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-P LAN-P VLAN | A-Route A-Switc Name defau | er> ch>show vla | | | Star act: | tus ive | Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, | Fa0/8, Fa0 Fa0/12, P Fa0/16, P Fa0/20, P Gig0/1, 0 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-A LAN-A VLAN 1 | A-Route | er> ch>show vla | | | Sta act: act: | tus ive | Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/15, 0/19, 0/23, | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-A LAN-A VLAN 1 | A-Route A-Swite Name defau: | er> ch>show vla | | | Sta act: act: | tus ive ive ive | Fa0 Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-A LAN-A VLAN 1 10 20 30 | A-Route A-Switch Name defau zone1(zone2(zone3) | er> ch>show vla | | | Sta act: act: act: | tus ive ive ive ive | Fa0 Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/1, 1 | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-2 LAN-2 VLAN 1 | A-Route A-Switch Name defau: zone1(zone2) zone3(fddi-c | er> ch>show vla | n | | Sta act: act: act: act: act: | tus ive ive ive ive ive | Fa0 Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/1, 1 | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-confddine | ch>show vla | n | | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive | Fa0 Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/1, 1 | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-confddine | ch>show vla | n | | Sta act: act: act: act: act: act: | tus ive ive ive ive ive ive ive | Fa0 Fa0 Fa0 Fa0 Fa0 Fa0 | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/1, 1 | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa Fa0/13, Fa0/17, Fa0/21, | Fa0/14 Fa0/18 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-confddine | ch>show vla | n | | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, Fa0/16, Fa0/20, Fa0/20, Gig0/1, GFa0/2 | 0/9, Fa(Fa0/13, Fa0/17, Fa0/21, Gig0/2 | Fa0/14 Fa0/18 Fa0/22 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-content token- fddine trnet- | ch>show vla | n | Parent | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, (Fa0/2 Fa0/4 Fa0/6 | 0/9, Fa(Fa0/13, Fa0/17, Fa0/21, Gig0/2 | Fa0/14 Fa0/18 Fa0/22 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN 1 | A-Route A-Switch Name defau zone1(zone2) zone3(fddi-cherifdding trnet- Type enet | ch>show vla | n lt MTU | Parent | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, (Fa0/2 Fa0/4 Fa0/6 | D/9, Fa() Fa0/13, Fa0/17, Fa0/21, Gig0/2 Trans1 | Fa0/14 Fa0/18 Fa0/22 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN 1 | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-chem- fddine trnet- Type enet enet | ch>show vla | n It MTU 1500 | Parent | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, (Fa0/2 Fa0/4 Fa0/6 | 77 June 10 Jun | Trans2 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN 1 10 20 30 | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-chen- fddine trnet- Type enet enet enet enet | ch>show vla | MTU | Parent | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, (Fa0/2 Fa0/4 Fa0/6 | 7/9, Fa() Fa()/13, Fa()/17, Fa()/21, Fig()/2 Trans1 0 0 0 | Trans2 0 0 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN 1 10 20 30 1002 | A-Route A-Switch Name defau zone10 zone20 zone30 fddi-chen- fddine trnet- Type enet enet enet enet fddi | ch>show vla | MTU | Parent | Star act: act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, (Fa0/2 Fa0/4 Fa0/6 | D/9, Fa(Fa0/13, Fa0/17, Fa0/21, Gig0/2 Transl 0 0 0 0 | Trans2 0 0 0 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN 1 10 20 30 1002 1003 | A-Route A-Switch Name defau zone1(zone2) zone3(fddi-chen- fddine trnet- Type enet enet enet enet fddi tr | ch>show vla | MTU | Parent | Star act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | Stp | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, 0 Fa0/2 Fa0/4 Fa0/6 BrdgMode | D/9, Fa(Fa0/13, Fa0/17, Fa0/21, Gig0/2 Transl 0 0 0 0 0 | Trans2 0 0 0 0 |
| LAN-A LAN-A VLAN 1 10 20 30 1002 1003 1004 1005 VLAN 1 10 20 30 1002 1003 1004 | A-Route A-Switch Name defaul zone1(zone2) zone3(fddi-(token- fddine trnet- Type enet enet enet fddi tr fddnet | ch>show vla | MTU | Parent | Star act: act: act: act: act: act: act: act: | tus ive ive ive ive ive ive ive ive ive | FaC FaC FaC FaC FaC FaC | 0/7, 1 0/11, 0/15, 0/19, 0/23, 0/23, 0/1, 1 0/3, 1 | Fa0/8, Fa0 Fa0/12, I Fa0/16, I Fa0/20, I Gig0/1, 0 Fa0/2 Fa0/4 Fa0/6 BrdgMode | D/9, Fa(Fa0/13, Fa0/17, Fa0/21, Gig0/2 Transl 0 0 0 0 | Trans2 0 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

| l | | | | | | |
|------------------------|--------------|-----|--------|---------------------|-----|----------|
| LAN-A-Router>show ip i | nt brief | | | | | |
| Interface | IP-Address | OK? | Method | Status | | Protocol |
| GigabitEthernet0/0 | unassigned | YES | unset | administratively do | own | 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 do | own | down |
| LAN-A-Router> | | | | | | |

ii. Switch: #show vlan

| VLAN Name | | | | | Stat | tus Po | Ports | | | | | |
|-----------|---|---------|------|--------|--------|----------|--------------------------------|-------------|--------|--------|--|--|
| | N Name | | | | | | PORTS | | | | | |
| 1 | defau | default | | | | ive Fa | Fa0/7, Fa0/8, Fa0/9, Fa0/10 | | | | | |
| | | | | | | | | Fa0/12, 1 | | | | |
| | | | | | | | | Fa0/16, 1 | | | | |
| | | | | | | | Fa0/19, Fa0/20, Fa0/21, Fa0/22 | | | | | |
| | 010 | | | | | | Fa0/23, Gig0/1, Gig0/2 | | | | | |
| | zone10 zone20 | | | | | | | a0/1, Fa0/2 | | | | |
| | | | | | | | Fa0/3, Fa0/4 Fa0/5, Fa0/6 | | | | | |
| | | default | | | | | 10/5, 1 | 20/0 | | | | |
| | fddi-default active token-ring-default active | | | | | | | | | | | |
| | fddinet-default | | | | | | | | | | | |
| 1005 | | | | | | active | | | | | | |
| VLAN | Type | SAID | MTU | Parent | RingNo | BridgeNo | Stp | BrdgMode | Transl | Trans2 | | |
| 1 | enet | 100001 | 1500 | | | | | | 0 | 0 | | |
| | | 100010 | | | | _ | _ | _ | - | 0 | | |
| | | 100020 | | | _ | | | _ | 0 | 0 | | |
| | | 100030 | | | - | - | - | _ | 0 | 0 | | |
| | | 101002 | | | | | - | - | 0 | 0 | | |
| 1003 | tr | 101003 | 1500 | - | - | - | - | - | 0 | 0 | | |
| 1004 | fdnet | 101004 | 1500 | - | - | - | ieee | - | 0 | 0 | | |
| 1005 | trnet | 101005 | 1500 | - | - | - | ibm | - | 0 | 0 | | |
| VLAN | Туре | SAID | MTU | Parent | RingNo | BridgeNo | Stp | BrdgMode | Transl | Trans2 | | |
| | | | | | | | | | | | | |

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
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 Ouestions:

- 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.