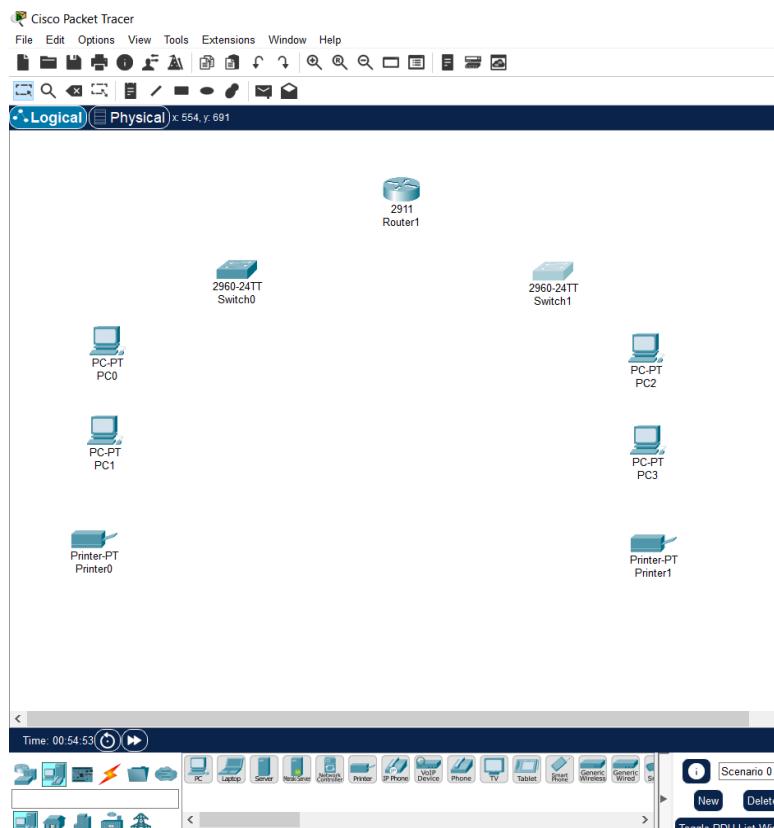


SIMPLE OFFICE NETWORK

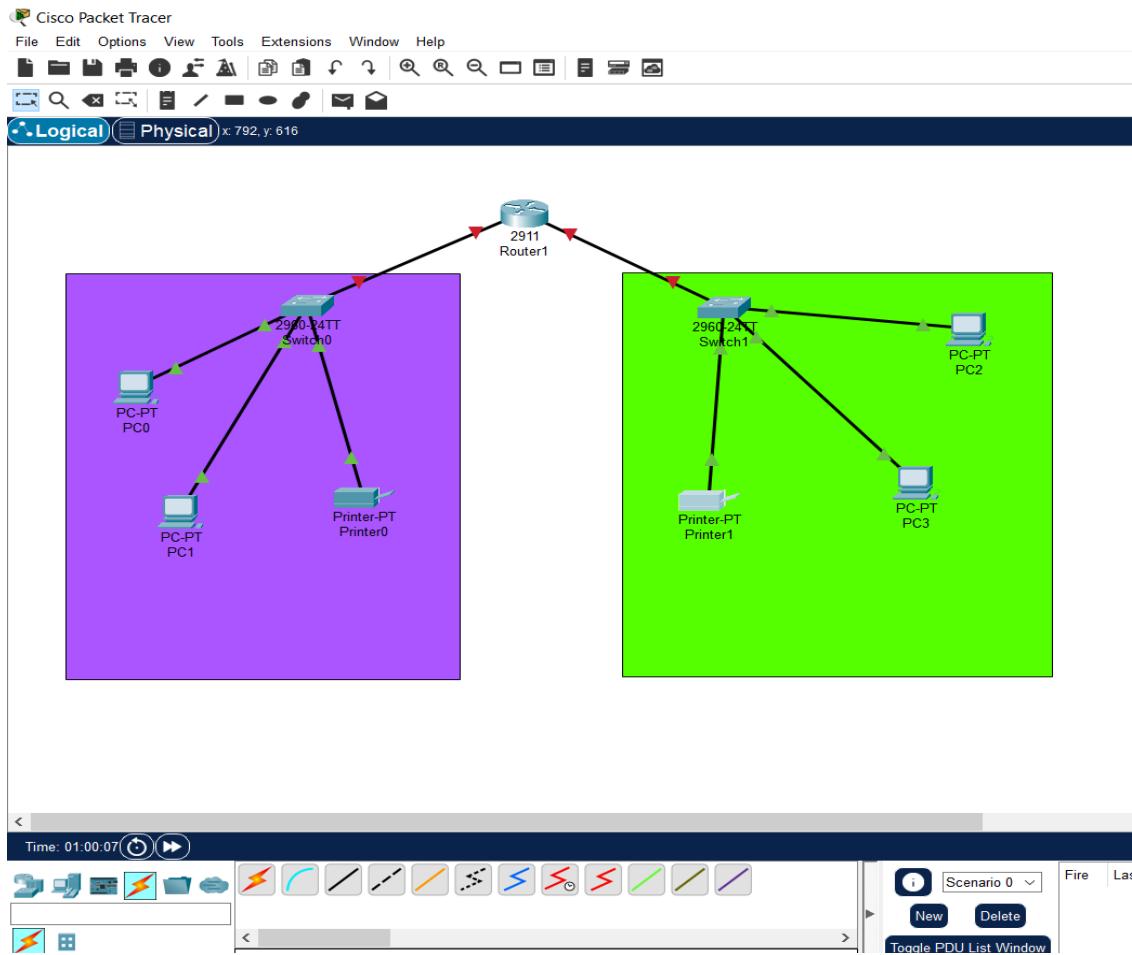
- 2. Design a network in CISCO packet tracer to connect **ACCOUNTS** and **DELIVERY** departments through the following: [40 points]**
- Each department should contain at least 2 PCs.
 - Appropriate number of switches and routers should be used in the network.
 - Using the given network address 192.168.40.0, all interfaces should be configured with appropriate IP addresses, subnet mask and gateways.
 - All devices in the network should be connected using appropriate cables.
 - Test the connectivity between **ACCOUNTS** and **DELIVERY** department -PCs in **DELIVERY** department should be able to ping the PCs in **ACCOUNTS** department.

From the above case project, we understand that we need 2 subnets which means we will need one router and 2 switches, one for each department.

Aside from each department needing 2 PCs, other devices need to be considered such as printers which are typically found in an office at least one in each department.



In the case of cabling, to pick an appropriate cable, I used the automatic feature on the Cisco packet tracer to make things easier. This means part (d.) of the problem is complete.



Subnetting

N/w address - 192.168.40.0

The number of subnets = 2 (number of departments).

2^n =no.of subnets

Therefore: $2^n = 2$

$$N = 1$$

The 1 will represent the no. of borrowed bits for the subnets.

Normally we have 4 octets, 8 bits: 255.255.255.255

So the first 3 octets all have 8 bits. The last octet has one borrowed bit while the rest remain as 0.

11111111.11111111.11111111.10000000

When converted to decimal: $255.255.255.(2^7)$

= 255.255.255.128 This is our subnet mask

The block size which tells us how to move from one subnet to another, is determined by the last octet. In this case, our block size is 128.

1st Subnet

Subnet mask = 255.255.255.128

Network ID = 192.168.40.0

Range of valid host = 192.168.40.1 - 192.168.40.126

Broadcast ID = 192.168.40.127 (the last available IP address)

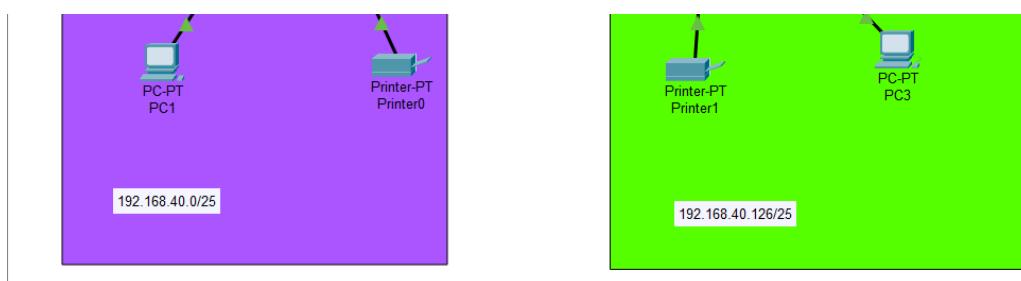
2nd Subnet

Subnet mask = 255.255.255.128

Network ID = 192.168.40.128

Range of valid host = 192.168.40.129 - 192.168.40.254

Broadcast ID = 192.168.40.255



Configuration

For the first subnet, we will use the subnet mask to come up with the slash notation. We change the subnet to binary again giving us 25.

= 192.268.40.0/25

Second subnet = 192.168.40.128/25

Router

En

Config t

Int range gig0/0-1

No shutdown

Do wr

exit

To assign IP addresses

Int gig0/0 (for the 1st subnet)

Ip address 192.168.40.1 255.255.255.128

Int gi0/1 (for the 2nd subnet)

192.168.40.129 255.255.255.128

Do wr

Exit

Do sh start

```

!
!
!

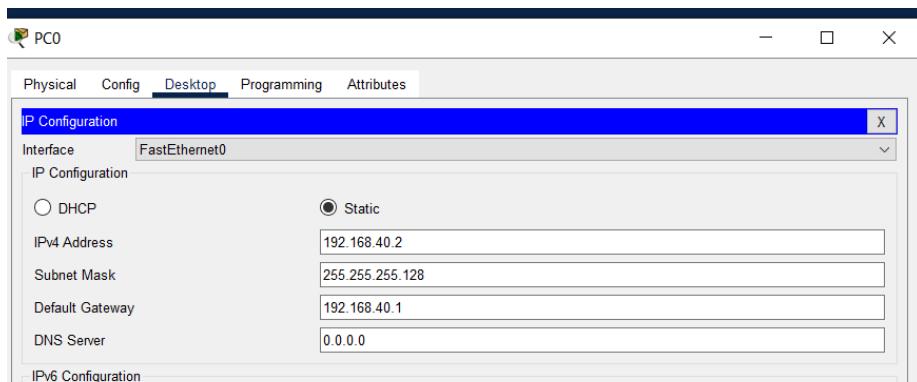
Router(config)#xit
^
% Invalid input detected at '^' marker.

Router(config)#int gig0/0
Router(config-if)#ip address 192.168.40.1 255.255.255.128
Router(config-if)#exit
Router(config)#int gig0/1
Router(config-if)#ip address 192.168.40.129 255.255.255.128
Router(config-if)#do wr
Building configuration...
[OK]
Router(config-if)#exit
Router(config)#do sh start
Using 723 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
```

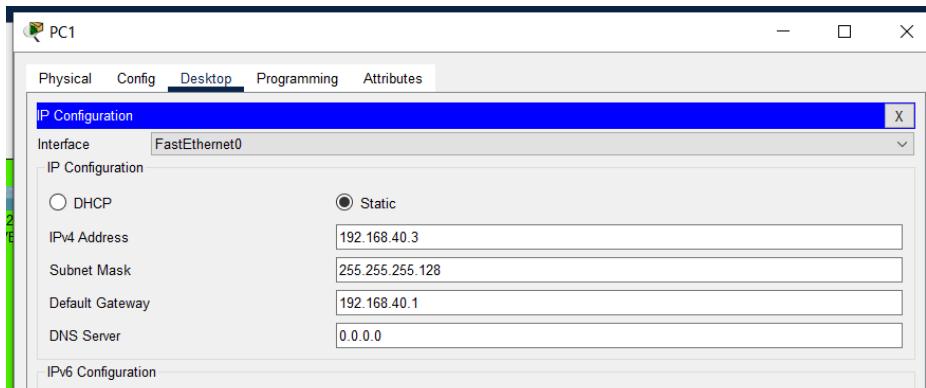
Next is to assign host IP addresses to the devices and test communication.

In the 1st subnet, .1 has been given to the router to act as the default gateway.

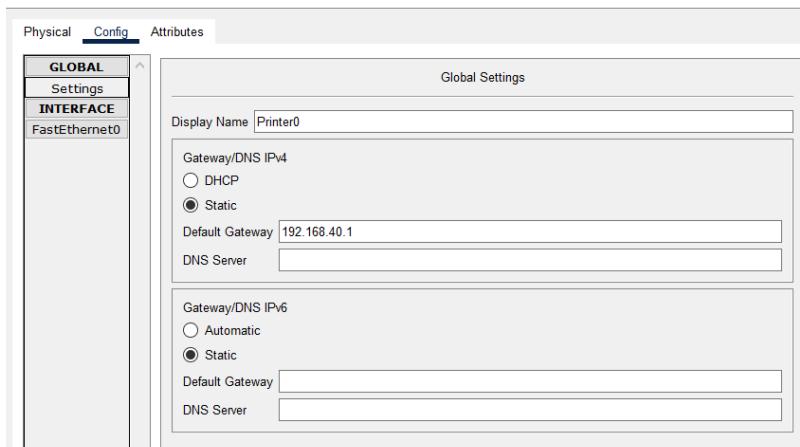
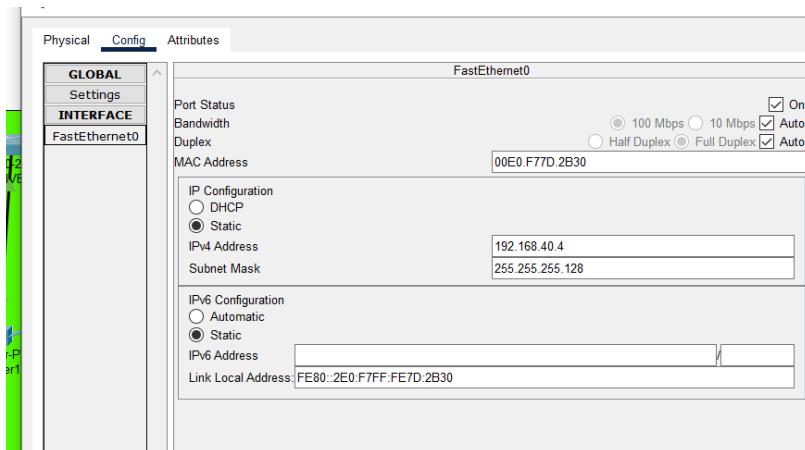
On the first PC:



Second PC:



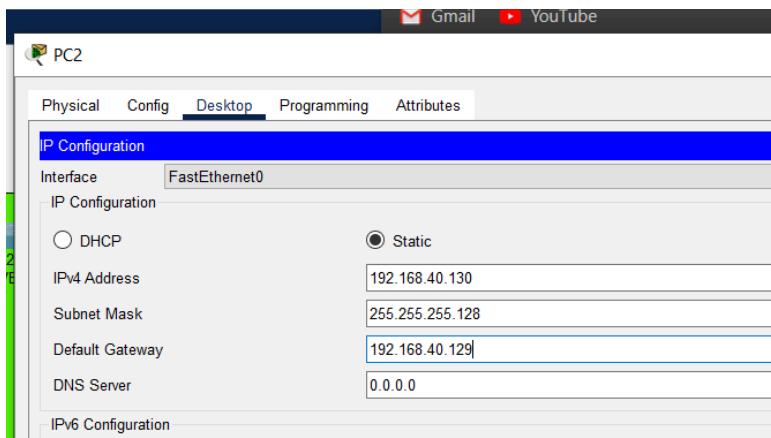
Printer:



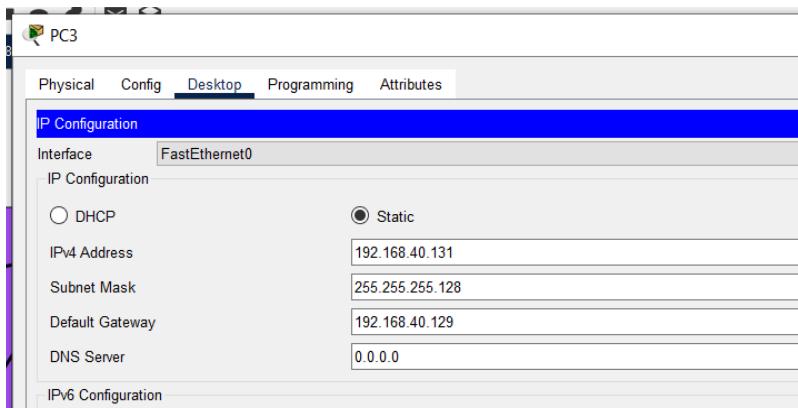
For the 2nd subnet the range is from .129-.254

The .129 has been taken by the router which is the default gateway.

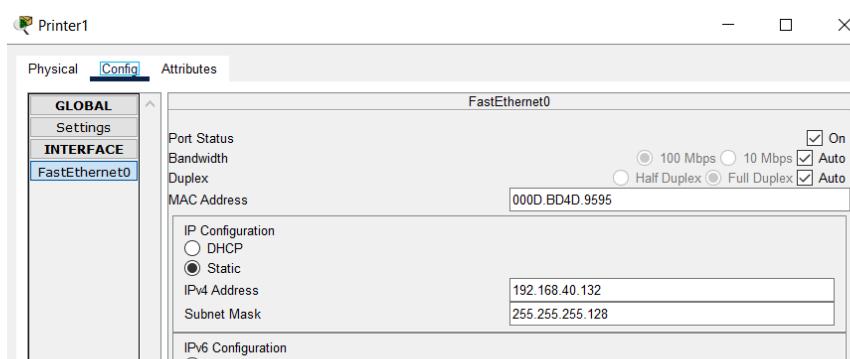
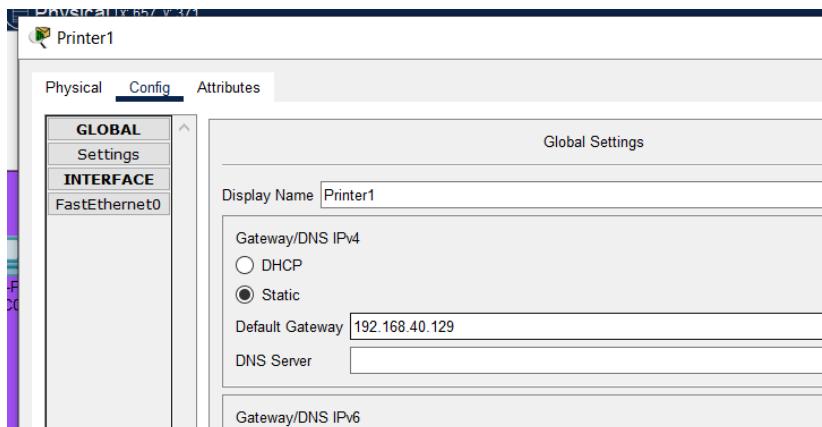
First PC:



Second PC:



Printer:



For part (e.), testing communication we will ping from one subnet to another using the devices.

They should all be successful:

```

PC1

Physical Config Desktop Programming Attributes

Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.40.131

Pinging 192.168.40.131 with 32 bytes of data:

Request timed out.
Reply from 192.168.40.131: bytes=32 time=10ms TTL=127
Reply from 192.168.40.131: bytes=32 time<1ms TTL=127
Reply from 192.168.40.131: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.40.131:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 3ms

C:\>

```

