VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB RECORD

Computer Network Lab (23CS5PCCON)

Submitted by

Shilpa K M (1BM23CS419)

in partial fulfillment for the award of the degree of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING

(Autonomous Institution under VTU)

BENGALURU-560019

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B.M.S. College of Engineering

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled " Computer Network (23CS5PCCON)" carried out by **Shilpa K M (1BM23CS419),** who is bonafide student of **B.M.S. College of Engineering.** It is in partial fulfilment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum. The Lab report has been approved as it satisfies the academic requirements of the above-mentioned subject and the work prescribed for the said degree.

Sneha P Assistant Professor Department of CSE, BMSCE	Dr. Kavitha Sooda Professor & HOD Department of CSE, BMSCE

Index-Cycle-I

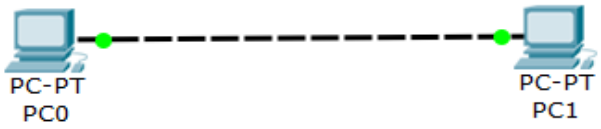
Github Link:
https://github.com/SHILPA-45/CN_1BM23CS419.git

Index-Cycle-II

Cycle-I

Program 1

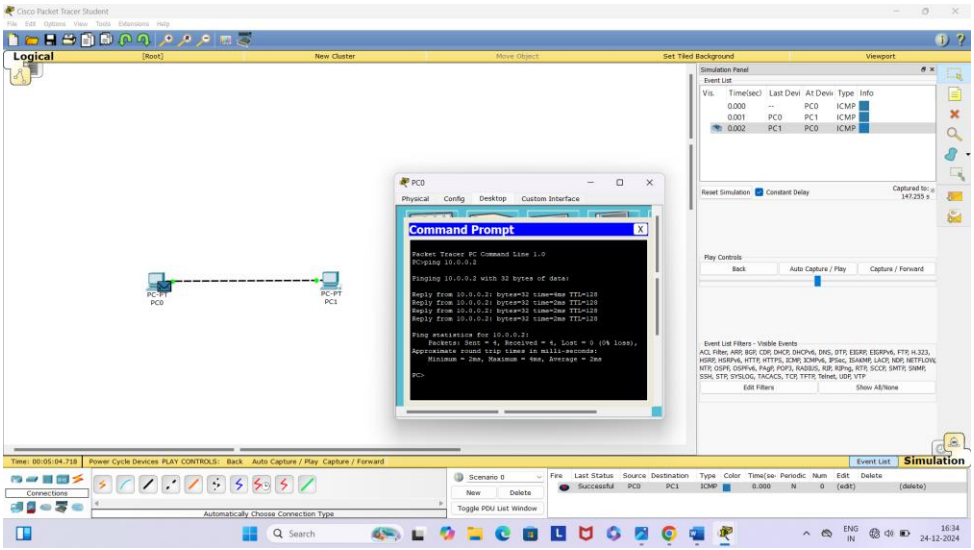
1. **Aim:** Connecting the two end devices
2. **Topology:**



3. **Procedure:**

- Start creating a network by first selecting the two end devices. Add two generic PC to the workspace
- Under connection select the default cable connect the device with it. The light should be turn green at this point.
- Click on the PC0, Open the PC0 configuration window and change the setting using the config tab.
- Under Interface, click FastEthernet and set IP address as 10.0.0.1 and then calculate the other parameter such as subnet mask, mac address etc..
- Same procedure followed for PC1 and also send the messages to end devices in simulation mode.

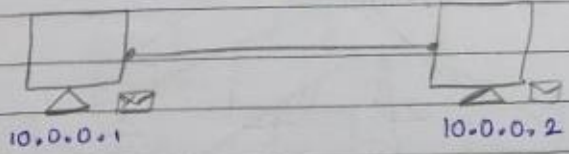
4. **Output:**



5. Observation:

Topology and Simulation

Aim : connecting the two End Devices(PC)



Procedure :-

1] Start creating a network by first selecting the two End devices. Add two Generic PC to the workspace

2] Under connections select the default cable connect the device with it. The light should be turn green at this point

3] Click on the PC. Open the PC configuration window & change the setting using the config tab

4] under Interface, click FastEthernet and set IP address as 10.0.0.1 and then Packet Tracer automatically calculates other parameter such as Subnet mask, MAC address etc.

5] Same procedure followed for PC2 also.

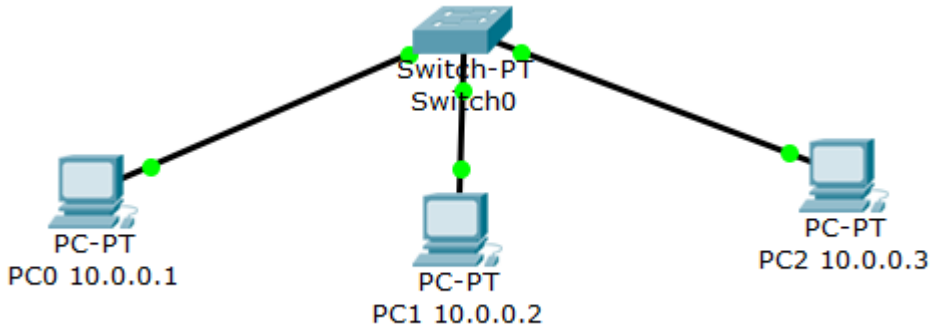
6] Send the messages to End devices in Simulation mode

Conclusion :

* You will capturing the Events and Viewing Animations in Simulation mode
* You can check the whether messages are successfully reached or not. b/w the source to destination

Program 2

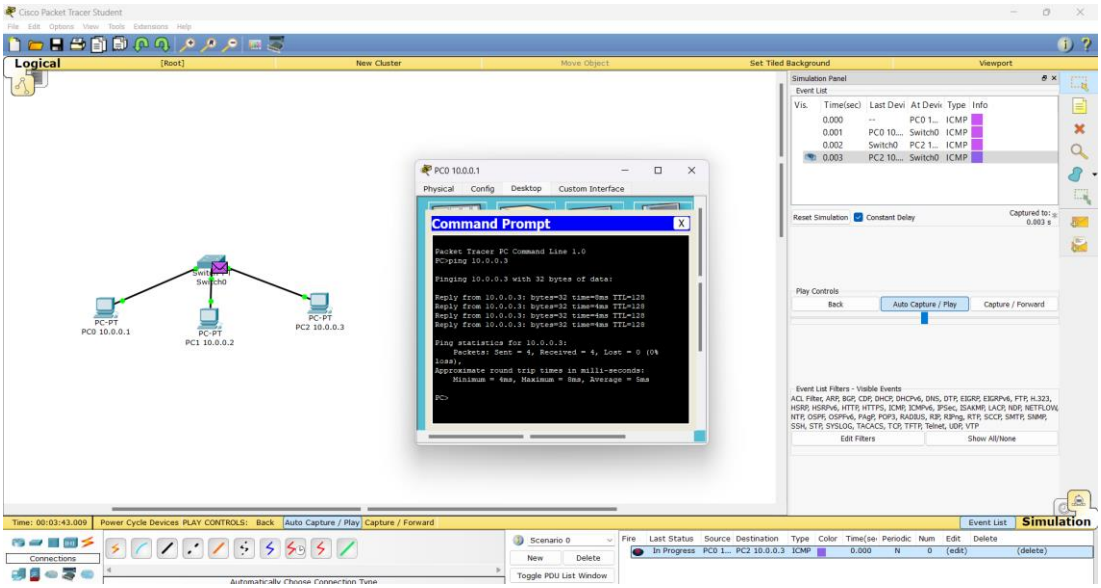
1. **Aim:** Connecting the 3 end devices by using Switch
2. **Topology:**



3. **Procedure:**

- Start creating a network by first selecting 3 end devices. Drag 3 PC and switch also.
- Give IP address for every end devices.
- Connect the 3 PC to switch by using default wire.
- Put the messages to source and destination devices in simulation mode.
- Then Capturing the events and viewing the animation in simulation mode.
- Ping from any device to every other devices.

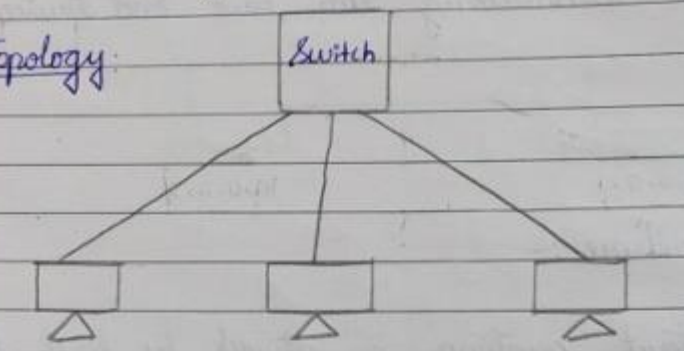
4. **Output:**



5. Observation:

Aim : Connecting the 3 end devices by using Switch

Topology:



Procedure :

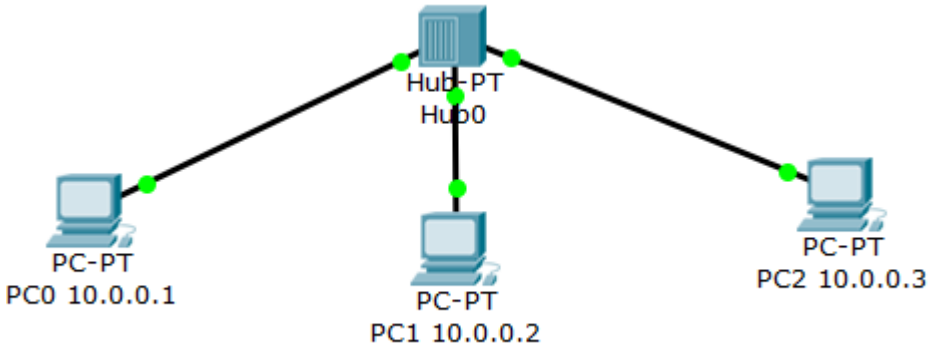
1) Start creating a network by first selecting 3 end devices. drag 3 PC and drag Switch also
2) Give IP address for every End devices
3) Connect the 3 PC to Switch by using default wire.
4) Put the message to source and destination devices in Simulation mode
5) Then capturing the events and viewing the Animation in Simulation mode

Observation:-

* We can observe the progress and Status of the transmission.
* We can check whether the messages are successfully reached or not between the Source to destination

Program 3

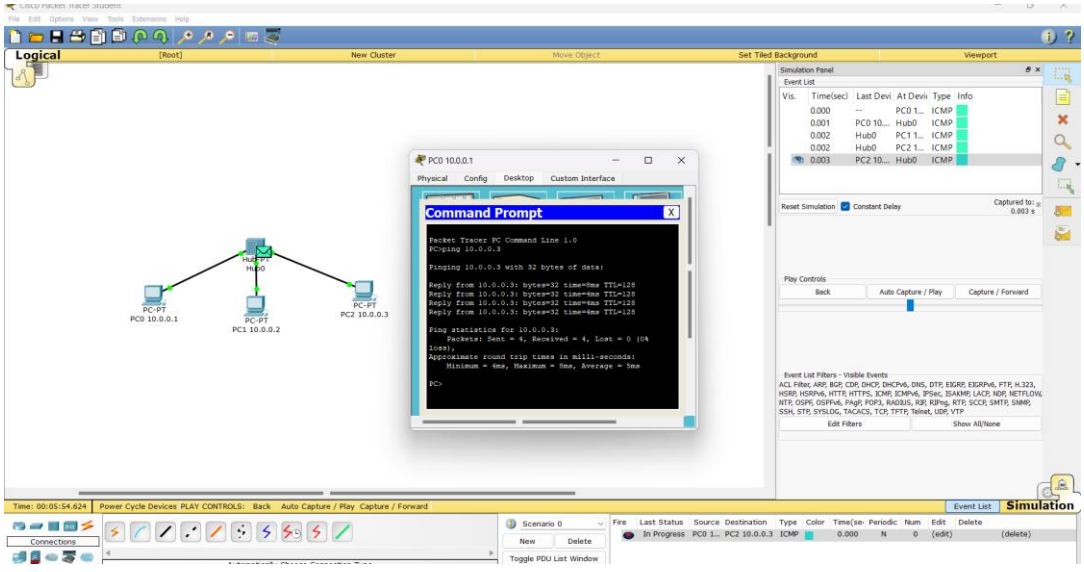
1. **Aim:** Connecting the 3 PCs by using HUB
2. **Topology:**



3. **Procedure:**

- Start creating a network by first selecting the end devices. Drag 3 PCs and Hub.
- Give IP Address for each 3 PCs.
- Connect the 3 PCs to hub by using default wire.
- Put the packets on source and destination.
- Then, capturing the events and viewing the animation in simulation mode.
- Ping from any devices to any other devices.

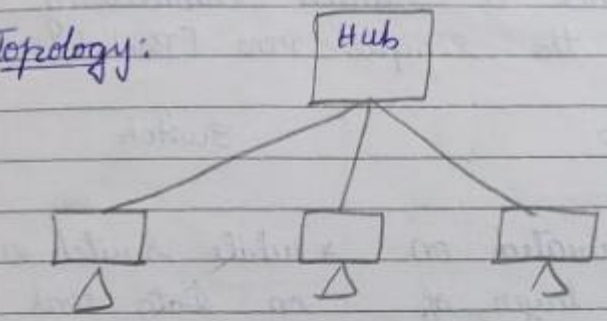
4. **Output:**



5. Observation:

Aim :- connecting the 3 PC by using Hub

Topology:



10.0.0.6 10.0.0.7 10.0.0.8

Procedure :

1) Start creating a network by first selecting end devices . drag 3 PC and drag 1 Hub
2) Give IP address for each 3 PC
3) Connect the 3 PC to 8 Hub by using default wire
4) Put the message to source & destination
5) Then capturing the events & viewing the animation

Observation:

* We can observe the progress & status of the transmission
* We can check whether the messages are ~~sent~~ successfully reached or not b/w the source to destination

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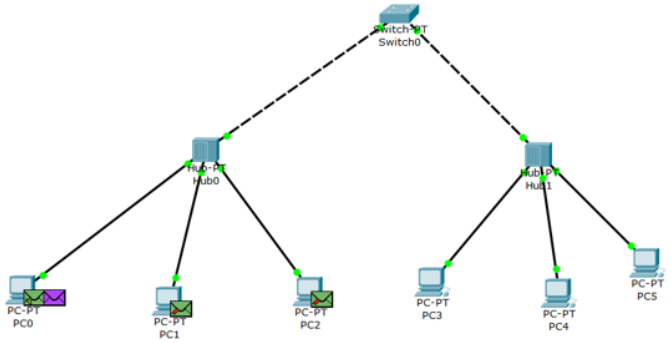
Program 4

1. **Aim:** Create a topology involving multiple hubs and a switch. Connecting them to simulates the simple PDU[Packet Data Unit].

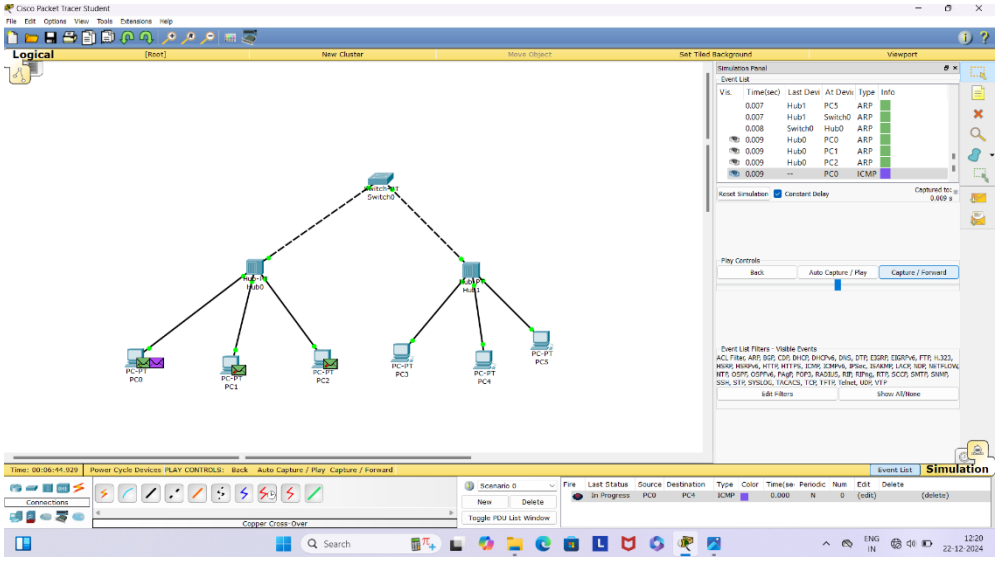
2. **Topology:**



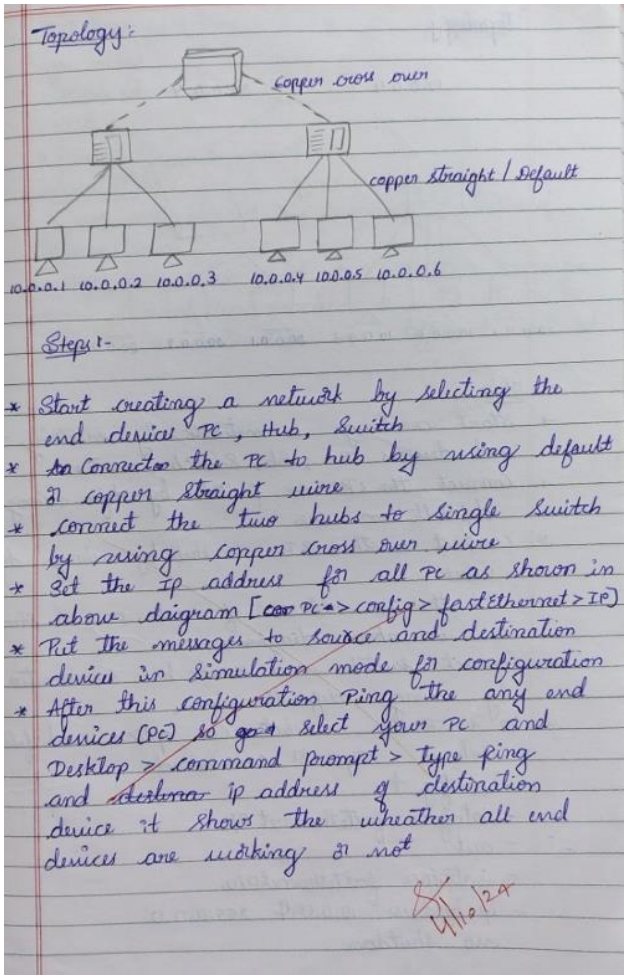
3. **Procedure:**

- Start creating a network by selecting the end devices PCs, Hub and Switch.
- Connect the PCS to hub by using copper straight wire.
- Connect the two hubs to single switch by using copper cross over wire.
- Set IP address for all PCs.
- Go to Router, select CLI option and followed below steps or commands.
    - -config t
    - -interface fastethernet 0/0
    - -exit
    - -interface fastethernet 0/0
    - -ip add 10.0.0.4 255.0.0.0
    - -no shut
    - -interface fastethernet 1/0
    - -ip add 10.0.0.4 255.0.0.0
    - -no shut
- Put the packets on source and destination.
- Then, capturing the events and viewing the animation in simulation mode.
- Ping any device to any other devices.

4. Output:



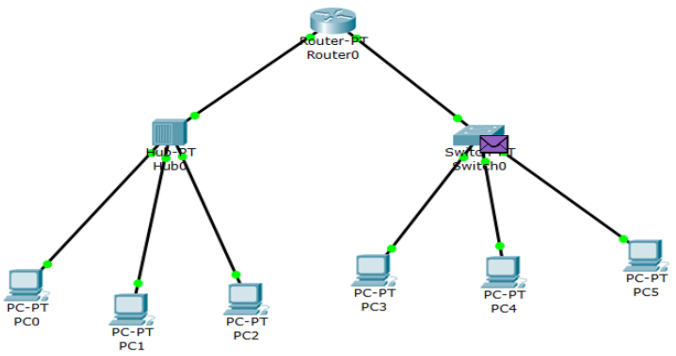
5. Observation:



Program 5

1. Aim: Create a topology involving multiple hubs and a switch and a router . Connecting them to simulates the simple PDU[Packet Data Unit].

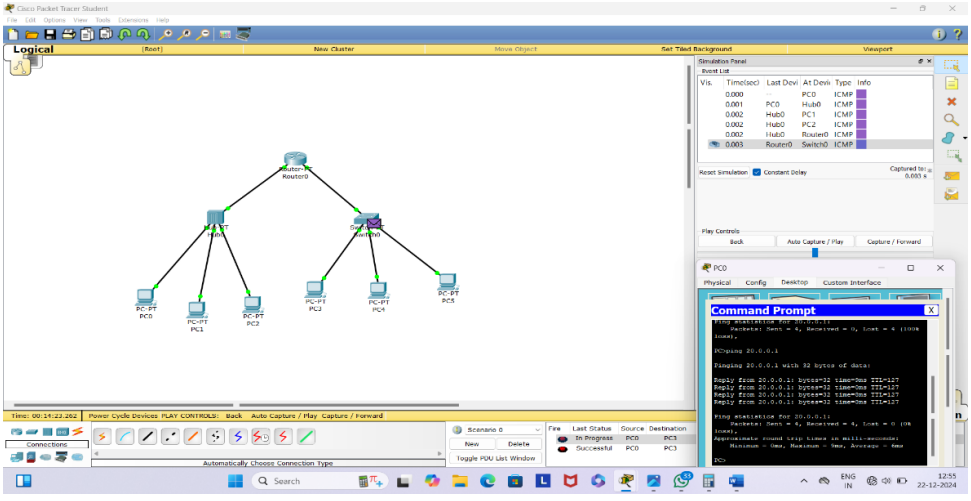
2. Topology:



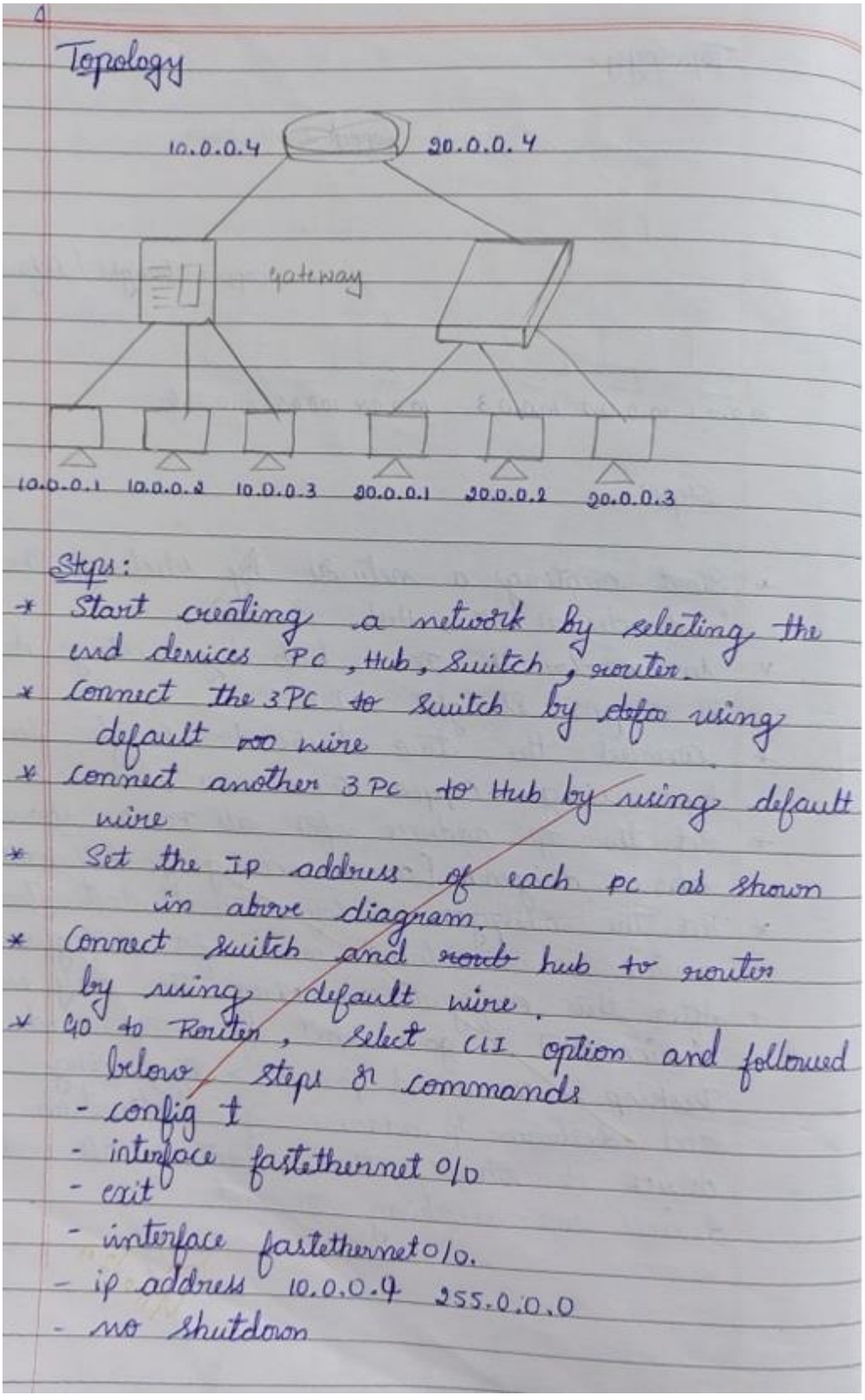
3. Procedure:

- Start creating a network by selecting the end devices PCs, Hub, Router and Switch.
- Connect the PCS to hub by using copper straight wire.
- Connect switch and hub to router by using default wire.
- Connect the two hubs to single switch by using copper cross over wire.
- Set IP address for all PCs.
- Put the packets on source and destination.
- Then, capturing the events and viewing the animation in simulation mode.
- Ping any device to any other devices.

4. Output:



5. Observation:

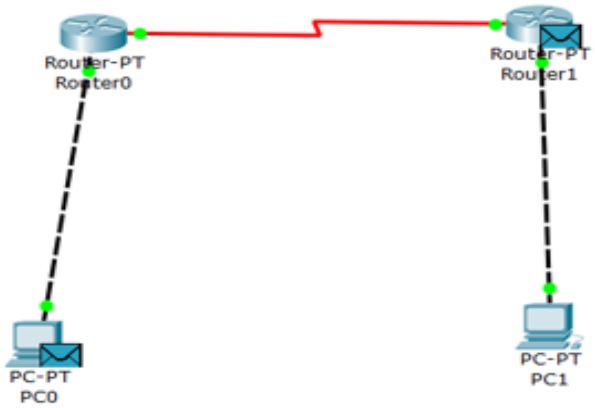


Steps:

* Start creating a network by selecting the end devices PC, Hub, Switch, router.
* Connect the 3 PC to Switch by defa using default wire
* Connect another 3 PC to Hub by using default wire
* Set the IP address of each PC as shown in above diagram.
* Connect Switch and hub to router by using default wire.
* Go to Router, Select CLI option and followed below steps or commands
  - config t
  - interface fastethernet 0/0
  - exit
  - interface fastethernet 0/0.
  - ip address 10.0.0.4 255.0.0.0
  - no shutdown

Program 6

1. **Aim:** Connect two network using two router.
2. **Topology:**



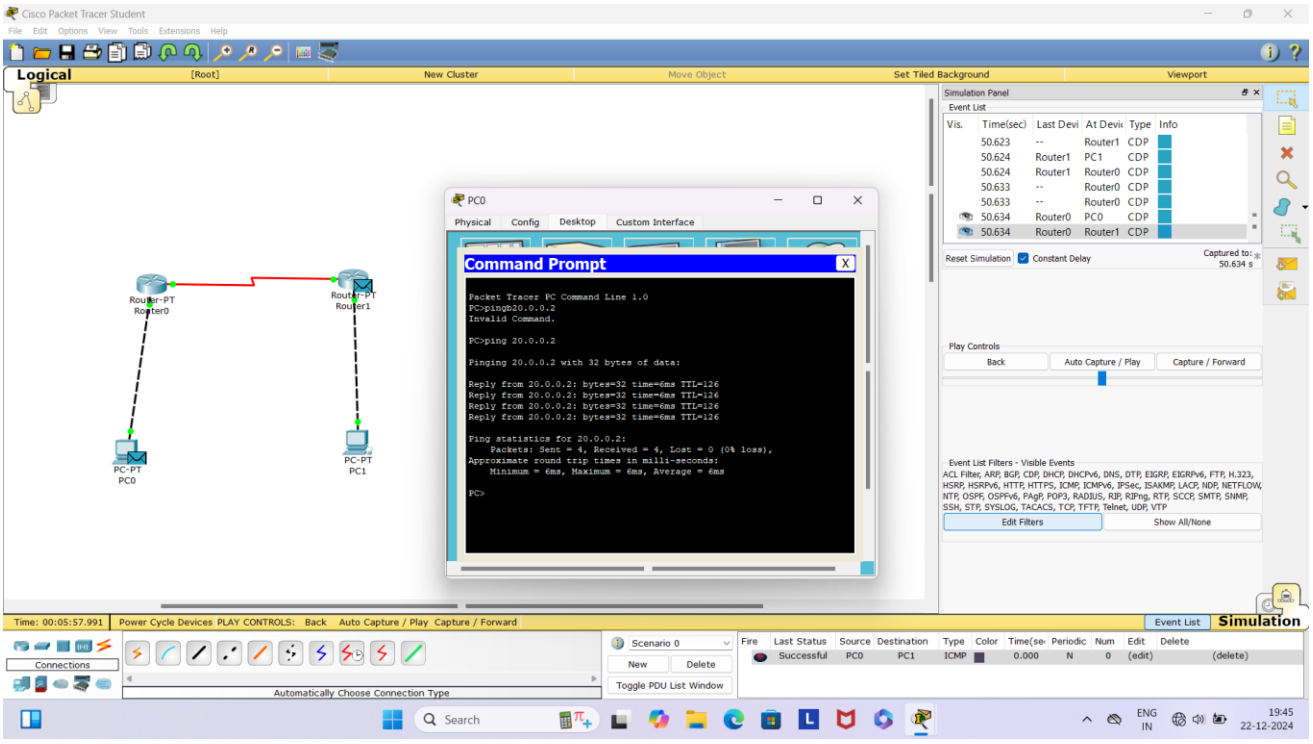
3. **Procedure:**

- Start creating a network by selecting the end devices PCs, Router
- Connect the PCS to hub by using copper straight wire.
- Connect router to router by using Serial DTE wire.
- Set IP address as 10.0.0.1 for routerq1 and 20.0.0.1 for router2 in fastethernet.
- Set IP address as 30.0.0.1 for routerq1 and 30.0.0.2 for router2 in Serial.
- Set IP address as 10.0.0.2 for PC0 and 20.0.0.2 for PC1 and gateway as 10.0.0.1 for PC0 and 20.0.0.1 for PC1.
- Go to Router1, Click on CLI option and follow the below steps or commands
    - -config t
    - -interface serial 2/0
    - -ip add 30.0.0.1 255.0.0.0
    - -no shut
    - -ip route 20.0.0.0. 255.0.0.0 30.0.0.2
    - -no shut
    - -exit
    - -show ip route.
- Go to Router2, Click on CLI option and follow the below steps or commands

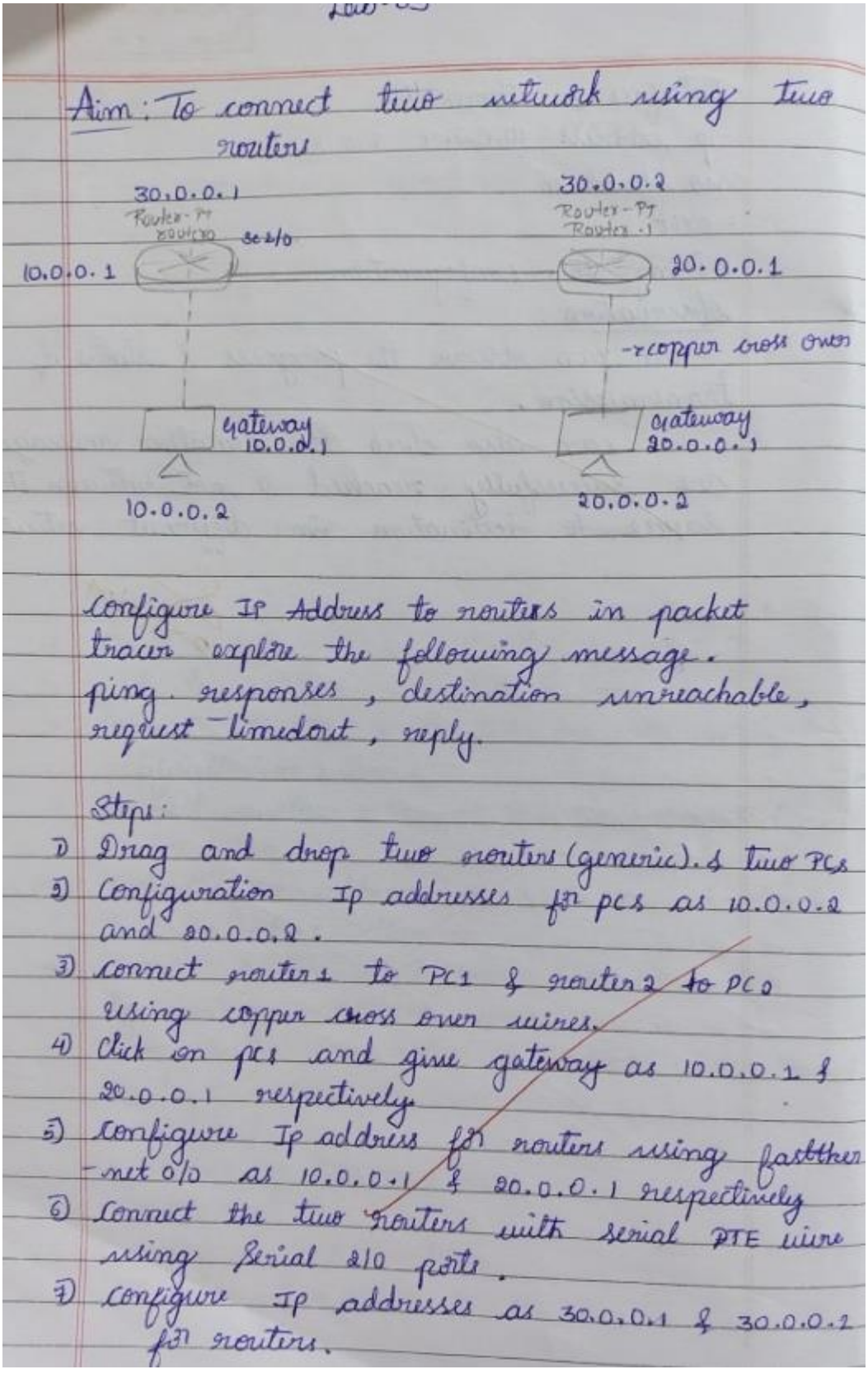
- -config t
- -interface serial 2/0
- -ip add 30.0.0.2 255.0.0.0
- -no shut
- -ip route 10.0.0.0. 255.0.0.0 30.0.0.2
- -no shut
- -exit
- -show ip route

- Put the packets on source and destination.
- Then, capturing the events and viewing the animation in simulation mode.
- Ping any device to any other devices.

4. Output:



5. Observation:



8) The steps to configure in CLI are :-
- Type y
- enable
- config t
- interface Serial 2/0
- ip address 30.0.0.1 255.0.0.0
- no shutdown
- exit

9) click on routers to go CLI and type y and exit until you see 'Router#' then type show ip route

10) click on router 1 and go to CLI then type -> config t
ip route 20.0.0.0 255.0.0.0 30.0.0.2
follow the same steps for router-2 with ip route 10.0.0.0 255.0.0.0 30.0.0.1

11) Pass the messages from PC1 to PC2 in Simulation mode

12) Check the status

13) check click on routers -> go to CLI type y and exit until you see
Router#
then type show ip route.

14) click on PC1 and go to command prompt and ping commands as ping 20.0.0.2 and check reply status.

15) Do not give IP address for one PC and check distination is unreachable

16) You can also o view requests timedout message

Output:

ping 20.0.0.2

pinging 20.0.0.2 with 32 bytes of data:

Reply from 20.0.0.2: bytes = 32 time = 2ms TTL = 126

Reply from 20.0.0.2: bytes = 32 time = 1ms TTL = 126

Reply from 20.0.0.2: bytes = 32 time = 2ms TTL = 126

Reply from 20.0.0.2: bytes = 32 time = 1ms TTL = 126

ping statistics for 20.0.0.2:

packet: sent = 4, Recieved = 4 lost = 0 (0% loss),

Approximate round trip times in milli-seconds

Minimum = 1ms, Maximum = 2ms, Average = 1ms

10) Remove gateway given in a network & pass messages and ping commands.

O/P:

ping 20.0.0.2

pinging 20.0.0.2 with 32 bytes of data:

Request timed out

Request timed out

Request timed out

Request timed out

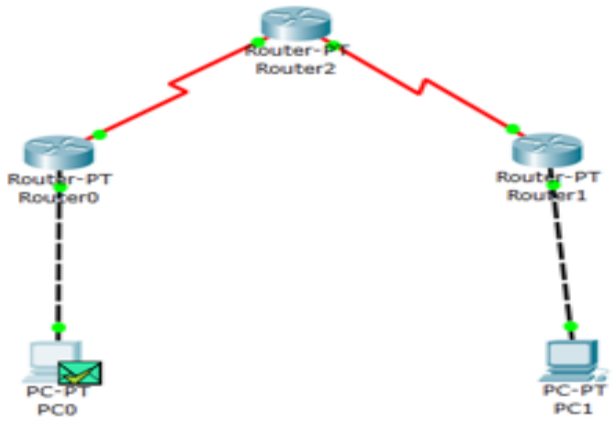
ping Statistics for 20.0.0.2:

Packets: Sent = 4, Recieved = 0, lost = 4 (100% loss)

25/10/24

Program 7

1. **Aim:** Configure the Static routrer and Default router.
2. **Topology:**



3. **Procedure:**

- Start creating a network by selecting the end devices PCs, Routers.
- Connect the PCS to Router by using copper cross over wire.
- Connect router to router by using Serial DTE wire.
- Set IP address as 10.0.0.1 for routerq0 and 20.0.0.1 for router1 in fastethernet.
- Set IP address as 30.0.0.1 for routerq0 , 40.0.0.1 for router2 , 30.0.0.2 and 40.0.0.2 for router2 in Serial.
- Set IP address as 10.0.0.1 for PC0 and 20.0.0.1 for PC1 and gateway as 10.0.0.2 for PC0 and 20.0.0.2 for PC1.
- Go to Router0, Click on CLI option and follow the below steps or commands for **STATIC ROUTER:**
    - -config t
    - -ip route 40.0.0.0 255.0.0.0 30.0.0.2
    - -ip route 20.0.0.0 255.0.0.0 30.0.0.2
    - -ip route 10.0.0.0 255.0.0.0 30.0.0.2
    - -exit
    - -show ip route
- Go to Router2, Click on CLI option and follow the below steps or commands for **STATIC**

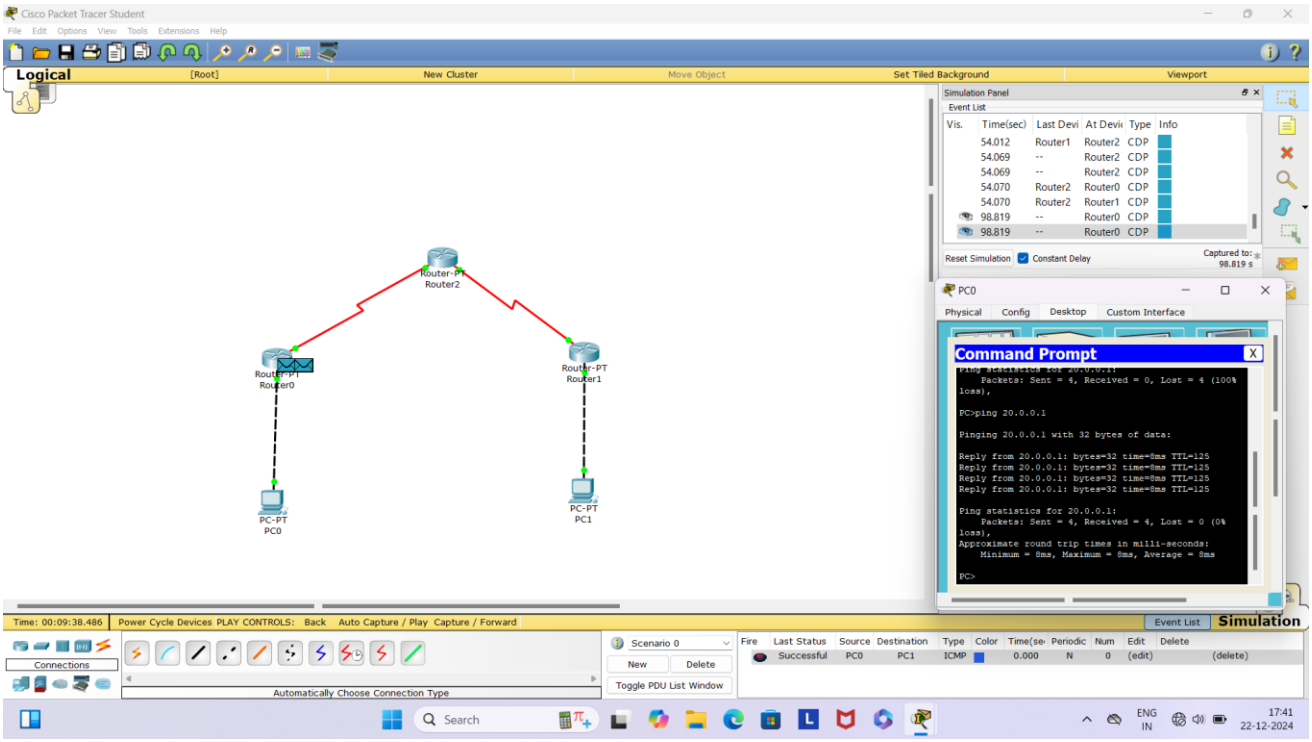
ROUTER:

- -config t
- -ip route 10.0.0.0 255.0.0.0 30.0.0.1
- -ip route 20.0.0.0 255.0.0.0 40.0.0.1
- -exit
- -show ip route

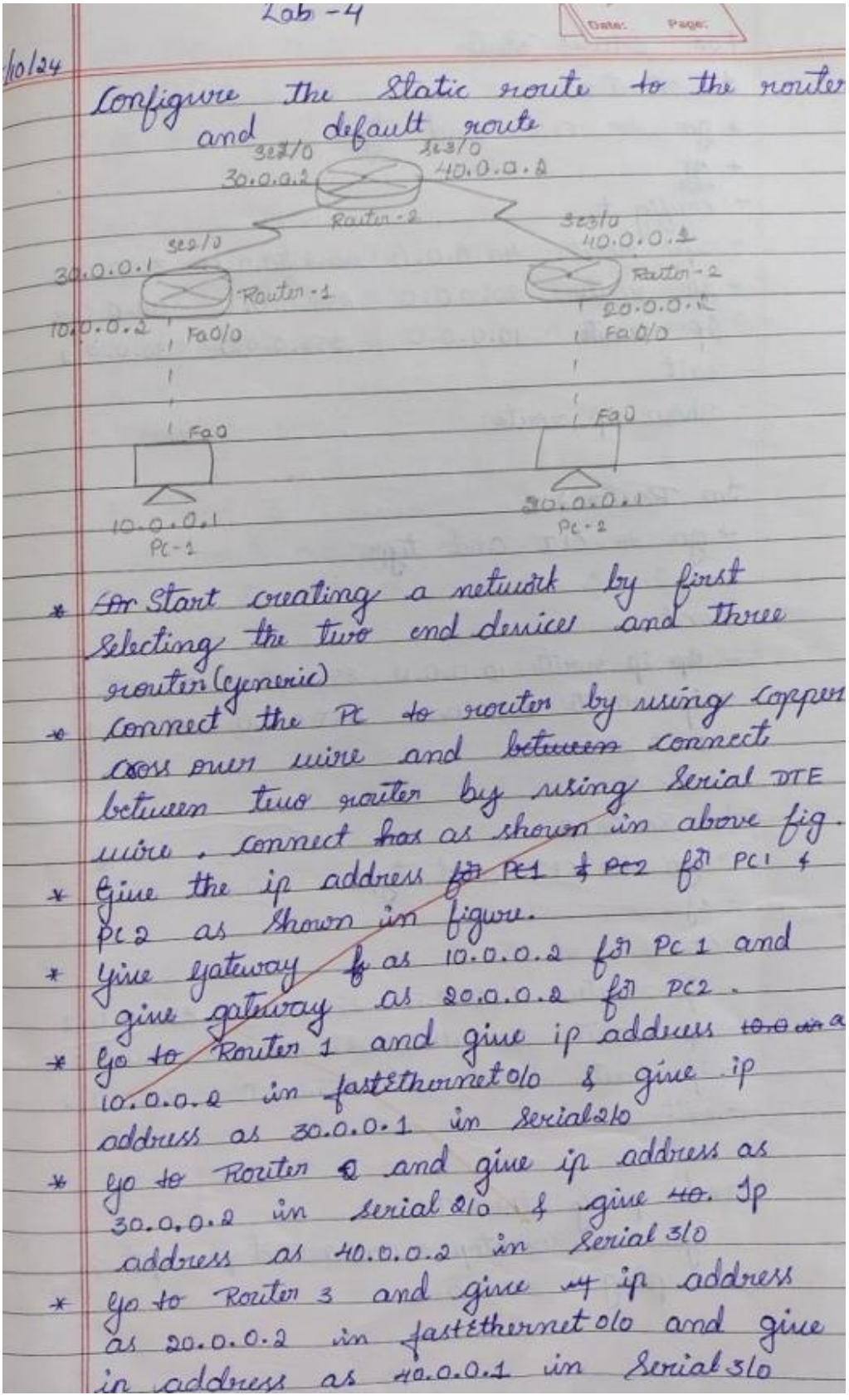
- Go to Router1, Click on CLI option and follow the below steps or commands for **STATIC ROUTER:**
  - -config t
  - -ip route 10.0.0.0 255.0.0.0 40.0.0.2
  - -ip route 20.0.0.0 255.0.0.0 40.0.0.2
  - -ip route 30.0.0.0 255.0.0.0 40.0.0.2
  - -exit
  - -show ip route
- Go to Router0, Click on CLI option and follow the below steps or commands for **DEFAULT ROUTER:**
  - -config t
  - -ip route 0.0.0.0 0.0.0.0 30.0.0.2
  - -ip route 0.0.0.0 0.0.0.0 30.0.0.2
  - -ip route 0.0.0.0 0.0.0.0 30.0.0.2
  - -exit
  - -show ip route
- Go to Router1, Click on CLI option and follow the below steps or commands for **DEFAULT ROUTER:**
  - -config t
  - -ip route 0.0.0.0 0.0.0.0 40.0.0.2
  - -ip route 0.0.0.0 0.0.0.0 40.0.0.2
  - -ip route 0.0.0.0 0.0.0.0 40.0.0.2
  - -exit
  - -show ip route
- Go to Router2, Click on CLI option and follow the below steps or commands for **DEFAULT ROUTER:**

- -config t
- -ip route 0.0.0.0 0.0.0.0 30.0.0.1
- -ip route 0.0.0.0 0.0.0.0 40.0.0.1
- -exit
- -show ip route

4. Output:



5. Observation:



For Static Route

In Router 1

* go to CLI and type
* y
- config t
- ip route 40.0.0.0 255.0.0.0 30.0.0.2
- ip route 20.0.0.0 255.0.0.0 30.0.0.2
- ip route 10.0.0.0 255.0.0.0 30.0.0.2
- exit
- show ip route

In Router 2

-> go to CLI and type
- y
- exit
- ip route 10.0.0.0 255.0.0.0 30.0.0.1
- ip route 20.0.0.0 255.0.0.0 40.0.0.1
- exit

In Router 3

-> go to CLI and type
- y
- exit
- ip route 10.0.0.0 255.0.0.0 30.0.0.2
- ip route 30.0.0.0 255.0.0.0 40.0.0.2
- ip route 20.0.0.0 255.0.0.0 40.0.0.2
- exit

and ping the PC

go to Desktop → Command prompt →
ping 20.0.0.1

Bajna Gold
Date: Page:

For Default Route

In Routers
go to CLI & type
-y
-exit
- ip route 10.0.0.0 255.0.0.0 30.0.0.2
- ip route 0.0.0.0 0.0.0.0 30.0.0.2
- ip route 0.0.0.0 0.0.0.0 30.0.0.2
- exit
- show ip route

In Router 2
- ip route 0.0.0.0 0.0.0.0 30.0.0.1
- ip route 0.0.0.0 0.0.0.0 40.0.0.1

In Router 3
- ip route 0.0.0.0 0.0.0.0 40.0.0.2
- ip route 0.0.0.0 0.0.0.0 40.0.0.2
- ip route 0.0.0.0 0.0.0.0 40.0.0.2

- In PC1
- ping 20.0.0.1

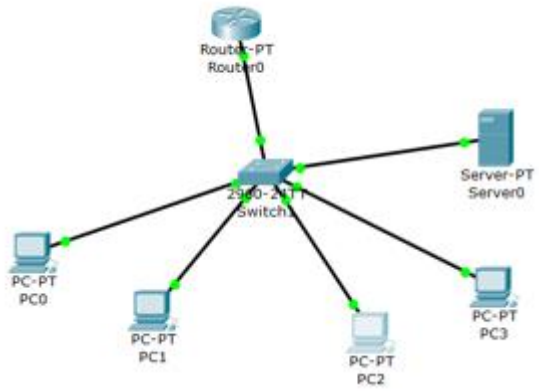
Output: pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1 : bytes = 32 time = 8ms TTL = 128
Reply from 20.0.0.1 : bytes = 32 time = 8ms
Reply from 20.0.0.1 : bytes = 32
Reply from 20.0.0.1 : bytes = 32

Program 8

1. **Aim:** How to configure DHCP within a LAN

2. **Topology:**



3. **Procedure:**

- Create a LAN like this.
- Configure router interface with ip 10.0.0.1 and subnet mask 255.0.0.0

  Router>enable

  Router#config t

  Router(config)#interface fastethernet0/0

  Router(config-if)#ip address 10.0.0.1 255.0.0.0

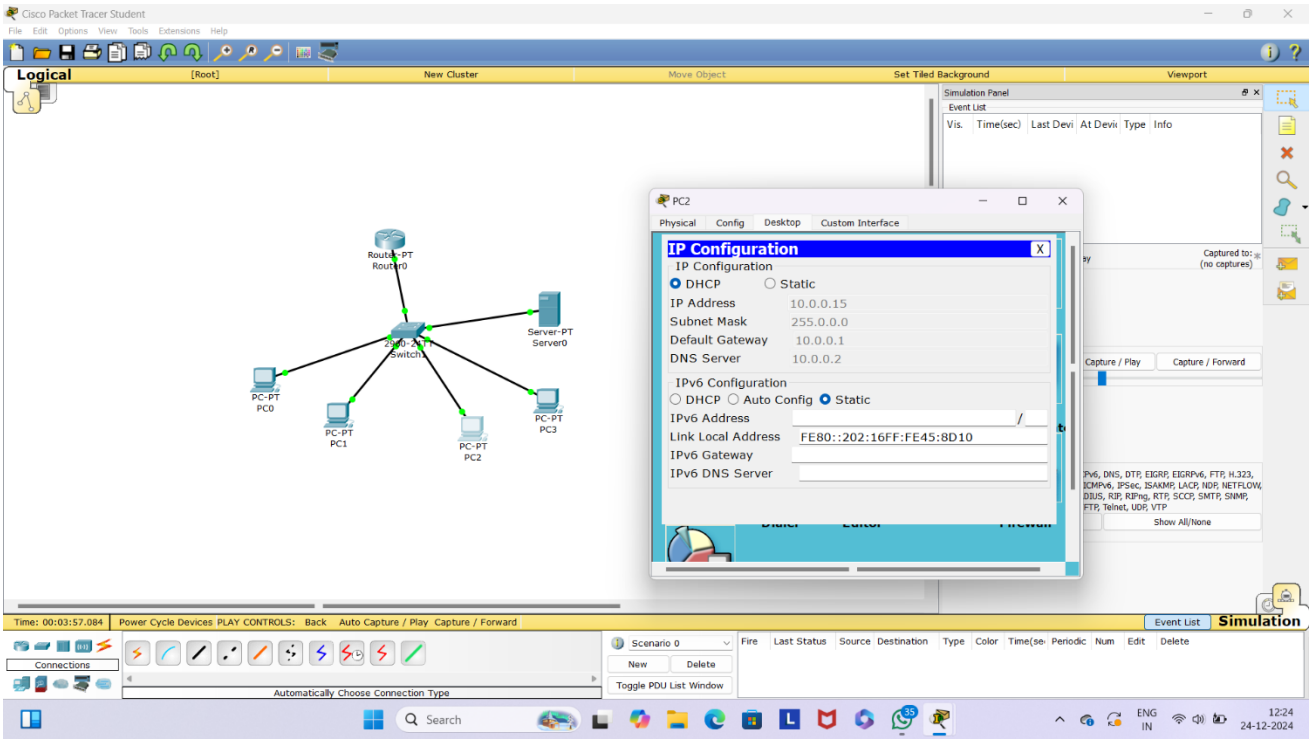
  Router(config-if)#no shutdown

  Router(config-if)#exit

  Router(config)#
- click on server-> config, then assign gateway in our example 10.0.0.1
- Then Click on Fastethernet and assign ip address and subnet mask.I am going to use 10.0.0.2 and subnet mask 255.0.0.0 for our server.
- Click on DHCP,there you can see default pool,
- Just give default gate way,here we are using 10.0.0.1.
- DNS server,Just give our server ip address,10.0.0.2.
- Then just edit start ip address.I am going to give 10.0.0.10 and subnet mask 255.0.0.0

- In Maximum Number of Users,Here we are using Class A Network so we can use 1,67,77,216 ip address.just give how many ip address you want in this pool.I am going to give 500
- Assign TFTP server ip address,just give our server ip address,10.0.0.2.
- And click on save.That's it...
- Now, Click on any of the PC-> then click on Desktop->Ip configuration,and Choose 'DHCP' wait for some time,if your dhcp request failed then try few more times.This is how you should get.

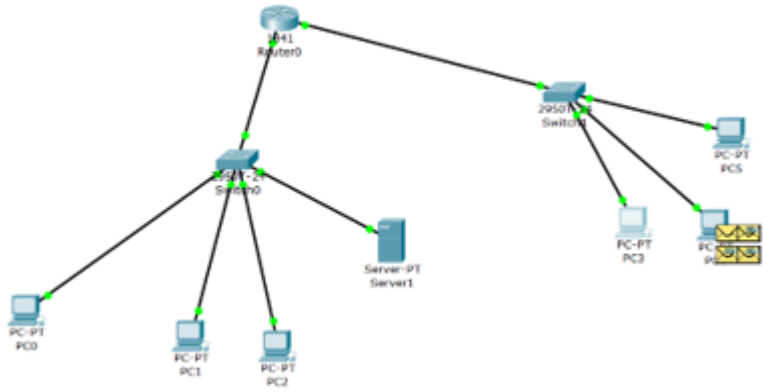
4. Output:



Program 9

1. Aim: How to get IP from DHCP that Is present in some other network using IP helper address.

2. Topology:



3. Procedure:

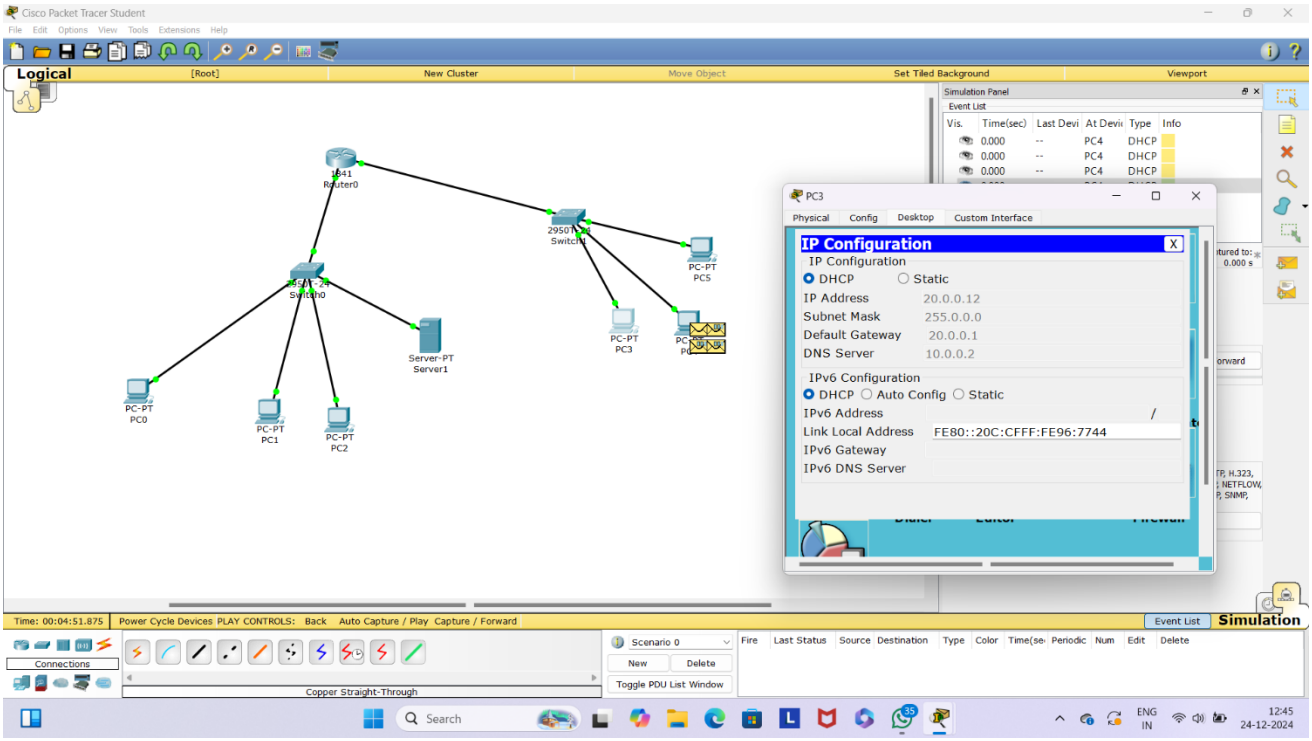
- Create a LAN like this.
- Configure the router interface fastethernet0/0 and fastethernet 0/1 with ip address .
  - Router>enable
  - Router#config terminal
  - Router(config)#interface fastethernet0/0
  - Router(config-if)#ip address 10.0.0.1 255.0.0.0
  - Router(config-if)#no shutdown
  - Router(config-if)#exit

  - Router(config)#interface fastethernet0/1
  - Router(config-if)#ip address 20.0.0.1 255.0.0.0
  - Router(config-if)#no shutdown
  - Router(config-if)#exit
- Click on server->config->then just give the gateway ip address .Gateway for this network is 10.0.0.1
- Then click on fastethernet assign ip address.I am going to give 10.0.0.2 and subnetmask

255.0.0.0.Once we have configured the ip address for the server,DHCP server automatically assign 10 network for default pool.We don't have to create pool for 10 Network again.Just we need to give ip for DNS,Gateway and TFTP then we may configure starting ip address or leave it and Save.

- Now,Click on Pc in a LAN with Server and Check whether DHCP working fine in this network.Click on any PC->Desktop->Ip configuration->Choose DHCP,then you will get ip from dhcp server for this PC.
- Now,we see how to get ip address for PC that is in a network without Server.For that, first we have to add network pool in a dhcp server.
- So,Click on Server->Config->DHCP.
- Just edit Pool Name with any other name.I am going to give 20Network.
  - Default Gateway->20.0.0.1,
  - DNS Server->10.0.0.2
  - Start Ip Address->20.0.0.10
  - Subnet Mask->255.0.0.0
  - Maximun Number Of Users->100
  - TFTP Server10.0.0.2
- Then,Click on Add and Save.
- Now go to router and give ip helper address under fastethernet0/1,that is server address here our server address is 10.0.0.2.Now we can get ip for this network also.
- In Router,(Global configuration mode)
  - Router(config)#interface fastethernet0/1
  - Router(config-if)#ip helper-address 10.0.0.2
  - Router(config-if)#exit
- Now,check whether PC from network without server getting ip from the DHCP server in another Network.Click on any PC->Desktop->Ip configuration->Choose DHCP.Now i got ip address from dhcp server.
- I am getting ip address from dhcp server..thats it.

4. Output:


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
1841
Router0
2950-24
Switch0
Server-PT
Server1
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
PC-PT
PC5
PC3
Physical
Config
Desktop
Custom Interface
IP Configuration
IP Configuration
DHCP
Static
IP Address
20.0.0.12
Subnet Mask
255.0.0.0
Default Gateway
20.0.0.1
DNS Server
10.0.0.2
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::20C:CFFF:FE96:7744
IPv6 Gateway
IPv6 DNS Server
Time: 00:04:51.875
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
Search
ENG
IN
12:45
24-12-2024

5. Observation:

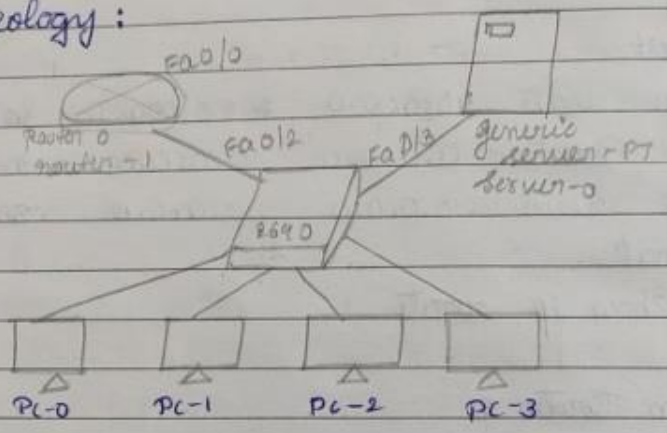
Lab - 05

8/11/24

DHCP - How to configure DHCP within a LAN?

1) Create a LAN like this

Topology:



* configuration router interface with if 10.0.0.1 and subnet mask 255.0.0.0
* click on server → config, then assign gateway 10.0.0.1
* Then click on fastethernet & assign ip address 10.0.0.2 and subnet mask 255.0.0.0
* Click on DHCP, there default pool.
* Give default gateway : 10.0.0.1
  DNS Server : 10.0.0.2
  Start ip address : 10.0.0.10
  Subnet mask : 255.0.0.0
  Max. no. of users : 500
  Server ip address : 10.0.0.2
* Click on save
* Click on any of pc → Desktop → Ip configuration and choose DHCP [check result], if your DHCP request failed then try few more times.

give ip for DNS, gateway & TFTP as given before and save

* Click on server → config → then ✓
* Click on PC in a LAN with server and check whether DHCP working fine in this network.
* To check for PC that is in a network without server.
* To check for PC that is in a network without server.

click on server → config → DHCP

* Edit pool name with any other name to network.

Default gateway → 10.0.0.1
DNS Server → 10.0.0.2
Start ip address → 10.0.0.10
Subnet Mask → 255.0.0.0
Maxp. no. of users → 100
TFTP Server → 10.0.0.2

Then, click on add & save

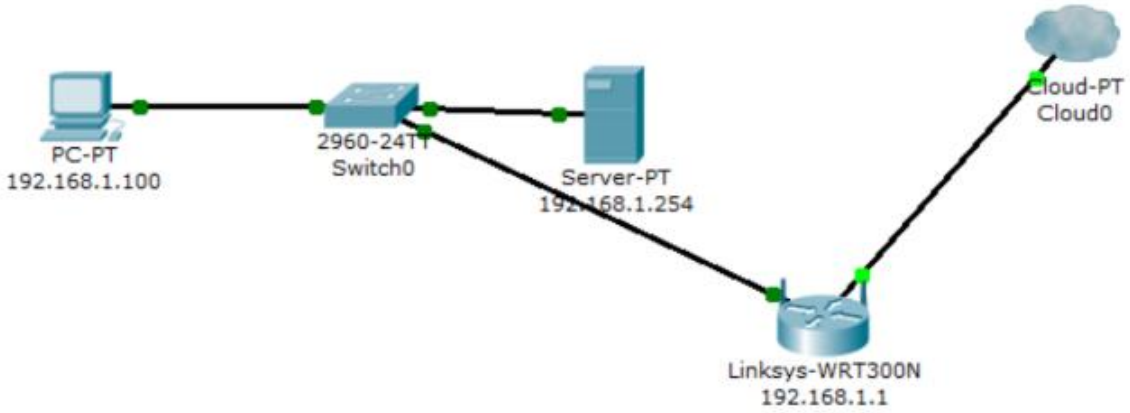
* Go to router & give ip address under fastethernet 0/1 i.e server address as 10.0.0.2
* In router, [global configuration mode]

Router (config) # interface fastethernet 0/1
ip helper-address 10.0.0.2
exit

* Click on any PC → Desktop → Ip configuration → choose DHCP Ip address from dhcp server is displayed

Program 10

1. **Aim:** How to demonstrate WEB server and DNS using Packet Tracer
2. **Topology:**



3. **Procedure:**

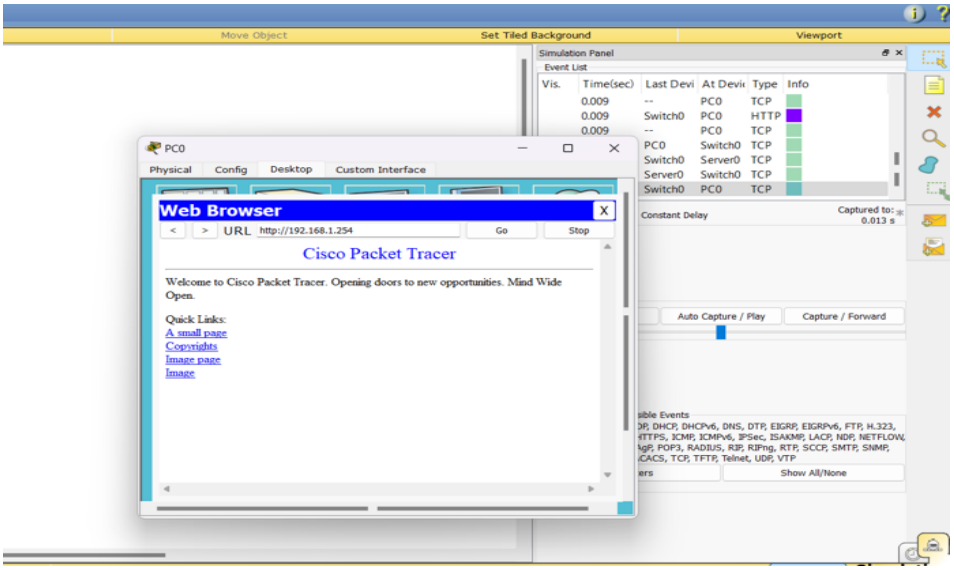
- Create topology.
- Click on wireless devices and then click on a Linksys wireless router
- Lets label this wireless router with its ip address that we are going to give it 192.168.1.1 – we are giving it .1 on its address as typically the routers have the first address
- We will then symbolise the Internet by adding a cloud the cloud will symbolise the Internet
- Your screen should now look like this
- Now click on the connections button
- From a switch to a router is a straight through cabl
- From the switch to the router click the next available port fast Ethernet 0/3 And on the router go to its Ethernet Port 1
- Then from the router to the Internet – typically in your home this would be from

the router to a modem or to a cable modem or sometimes your ISP may give you a wireless router that has a modem built into it

- To join the router to the cloud click on the automatic chose connection type option
- If you hover the mouse of your router you will notice that the cloud is attached to the routers internet port
- Double click on the router, You will notice that the router has four Ethernet ports (that are used for you local area network) and one WAN port (this is the port that goes to the Internet)So let's configure the wireless router. Click on the config tab
- Click on the Lan option to the left of the screen and you will notice that the IP address is incorrect.
- Change the IP address to 192.168.1.1 We should now be able to ping from our pc to our router
- Double click on your pc, Click on the desktop tab at the top and then click on the command prompt box in the middle
- Type in the command – ping 192.168.1.1 you are now pinging the router to make sure that there is a connection.
- We will now configure the default gateway. Double click on the pc Click on desktop and then click on IP Configuration
- We will now add the address of our router as our default gateway
- Lets add some more services to our web server
- Double click on the pc
- Click desktop and then click web browser
- If we type the address of our server we will get our web page that we saw earlier But let's say we wanted this website to be called superyahoo.com we would get the following screen

- It was supposed to go to our web server but obviously it didn't.
- We have put in this domain address but it doesn't go to our domain server
- We need to set up a dns to resolve this name to an IP address
- We can set up a dns server on our server. Double click on the server
- First off the server now has a default gateway also so we can fill in the router address
- Now click on our web server by pressing http on the left hand side of the screen
- Where you see the word Cisco Packet Tracer in the html code change it to super yahoo
- Now click on dns on the left hand side of the screen
- Make sure that it is turned on. Under name type: superyahoo.com
- Under address type: 192.168.1.254 so superyahoo.com resolves to the ip address 192.168.1.254 Click add
- Now double click on your pc. Click on IP configuration And under dns server type the address of our server see below
- So now if we open up our web browser and type in superyahoo.com we should see. our new webpage displayed.

4. Output:

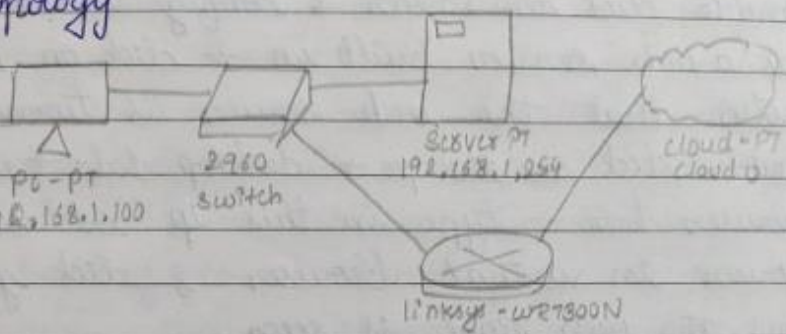


5. Observation:

DNS:

How to demonstrate WEB server and DNS

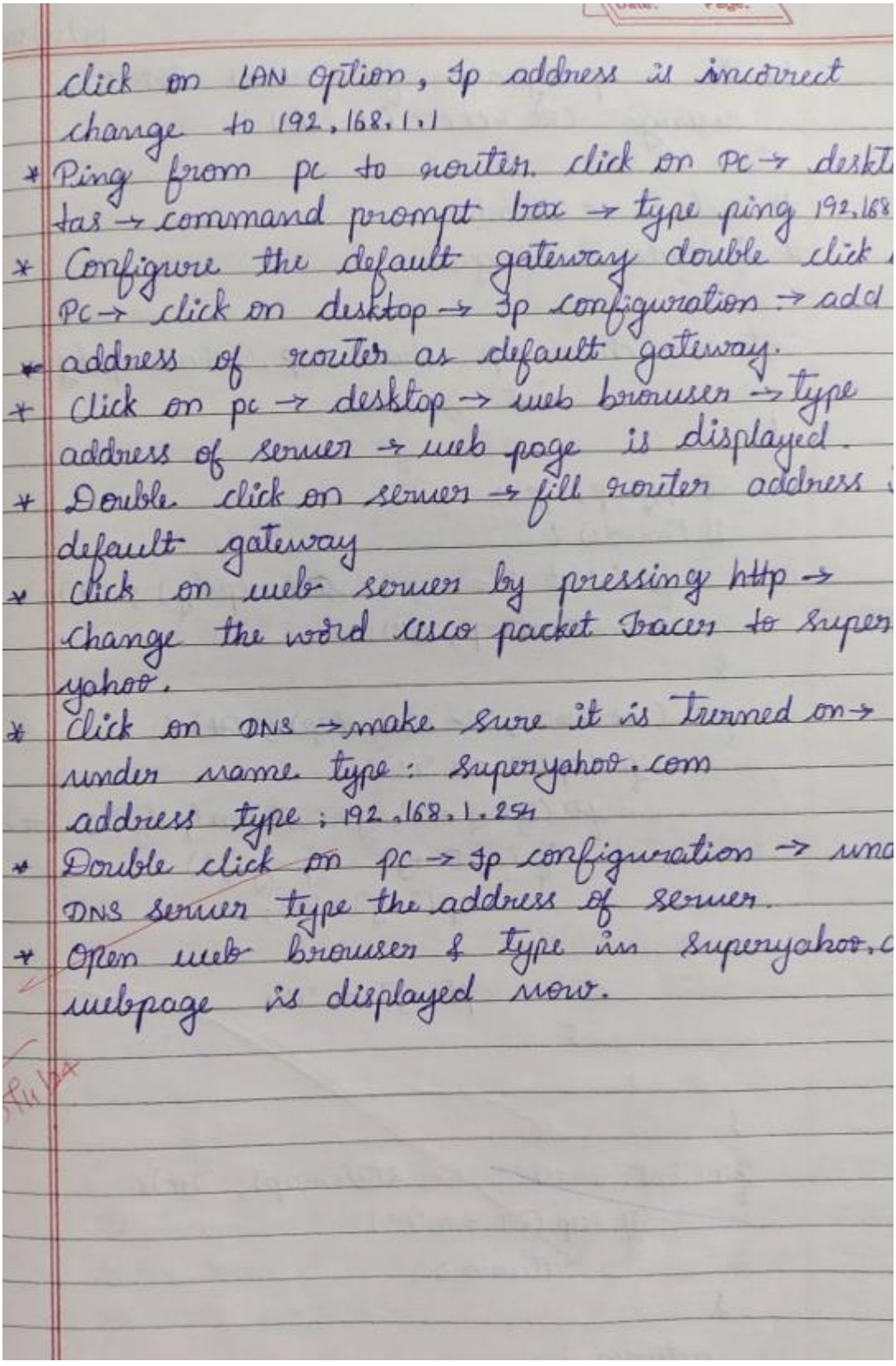
Topology



* First we create a LAN
* Click on end devices and then click on a generic pc, & click on switches & then click a 2960 switch.
* click on end devices & then click on a generic Server & place these in logical workspace
* connect these devices together & run a test b/w the client & the server using a Straight through cable.
* click on server label & type in ip address as 192.168.1.254 & 192.168.1.200 for Pc label.
* click on server → config → Interface → fast ether → port status on → in static ip address type 192.168.1.254 → place cursor in subnet mask box → close the window.
* To set up Pc click on it → config tab → fast ethernet → port status on → enter static ip address as 192.168.1.100 → click cursor or into subnet mask → close this screen
* Ping from pc to Server to make sure that we have a connection.

Double click on the pc → desktop tab → command prompt box → type in the command - ping 192.168.1.254

* Double click on server → config tab → server has a web server built in → click on Http notice that the web server is turned on
* Double click on the pc → desktop tab → web browser box → type in this ip address of server in virtual browser & click go
Now, the web page is seen
close that screen
* We are now connected to the Http server, enter username as student and password as student, enable all option, add & save
* click on wireless devices and then click on linksys wireless router
* label thus ~~we~~ wireless router with its ip address as 192.168.1.1
* By adding a cloud the cloud will symbolise the internet.
* Connect switch to a router via straight through cable using fastethernet 0/3 of switch & ethernet of router
* Use automatic choose connection type option between router & cloud attached to the router internet port)
* Click on the router
* Router has four ethernet ports (LAN) & one WAN port
* click on f config tab, display name, address is correct

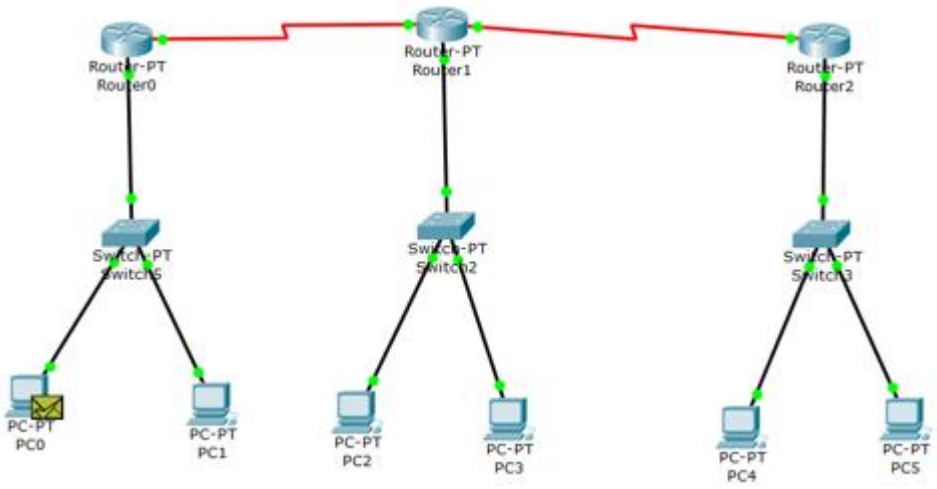

click on LAN option, Ip address is incorrect change to 192.168.1.1

* Ping from pc to router. click on PC → deskt tas → command prompt box → type ping 192.168
* Configure the default gateway double click PC → click on desktop → Ip configuration → add
* address of router as default gateway.
* Click on pc → desktop → web browser → type address of server → web page is displayed.
* Double click on server → fill router address default gateway
* Click on web server by pressing http → change the word cisco packet Tracer to Super yahoo.
* Click on DNS → make sure it is turned on → under name type : Superyahoo.com address type : 192.168.1.254
* Double click on pc → Ip configuration → una DNS server type the address of server.
* Open web browser & type in Superyahoo.c webpage is displayed now.

Program 11

1. **Aim:** Configure the Routing Information Protocal[RIP]

2. **Topology:**



3. **Procedure:**

- Create topology.
- Give ip address as 10.0.0.2 for PC0, 10.0.0.3 for PC1, 20.0.0.2 for PC2, 20.0.0.3 for PC3, 30.0.0.2 for PC4 and 30.0.0.3 for PC5.
- Give IP address as 10.0.0.1 for router0, 20.0.0.1 for router1 and 30.0.0.1 for router2 in fastethernet.
- Give IP address as 40.0.0.1 for router0, 40.0.0.2 and 50.0.0.1 for router1 and 50.0.0.1 for router2 in Serial DTE.
- Give gateway for PC0 and PC1 as 10.0.0.1
- Give gateway for PC2 and PC3 as 20.0.0.1
- Give gateway for PC4 and PC5 as 30.0.0.1
- In Router0, Go to CLI-

  -config t

  -router rip

  -network 10.0.0.0

  -network 40.0.0.0

  -exit

  -show ip route

- In Router1, Go to CLI-

  -config t

  -router rip

  -network 20.0.0.0

  -network 40.0.0.0

  -network 50.0.0.0

  -exit

  -show ip route

- In Router0, Go to CLI-

  -config t

  -router rip

  -network 30.0.0.0

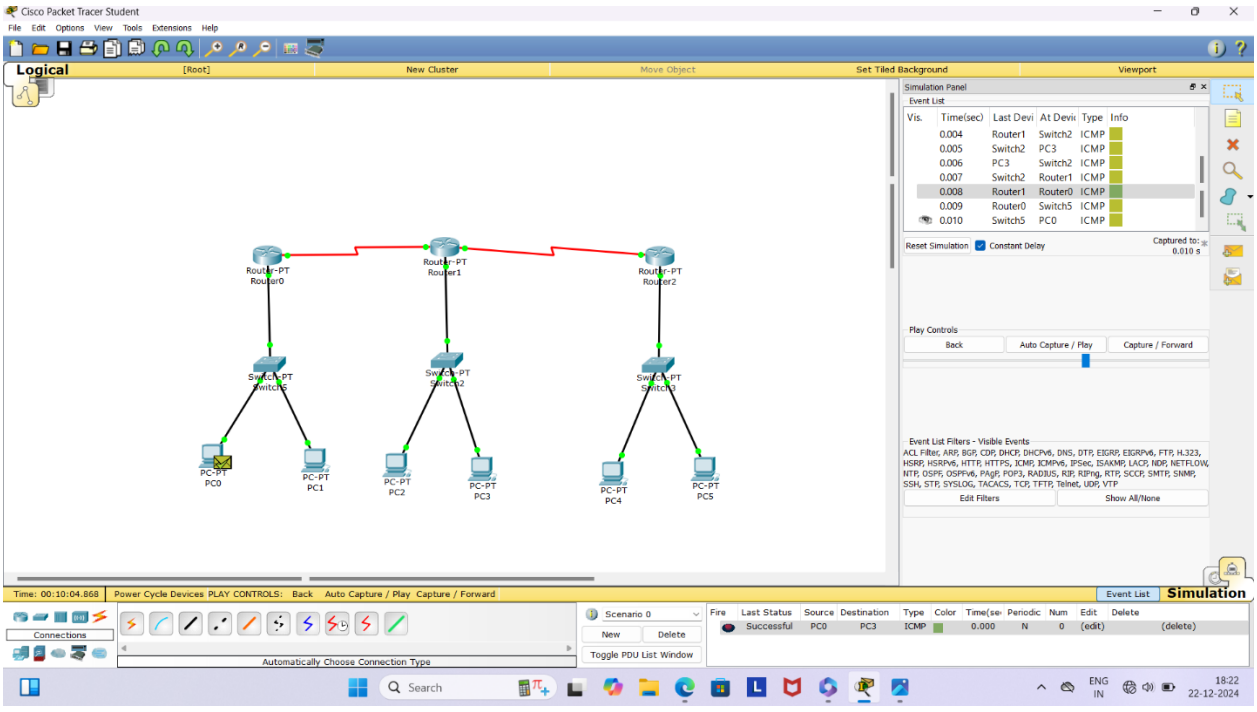
  -network 50.0.0.0

  -exit

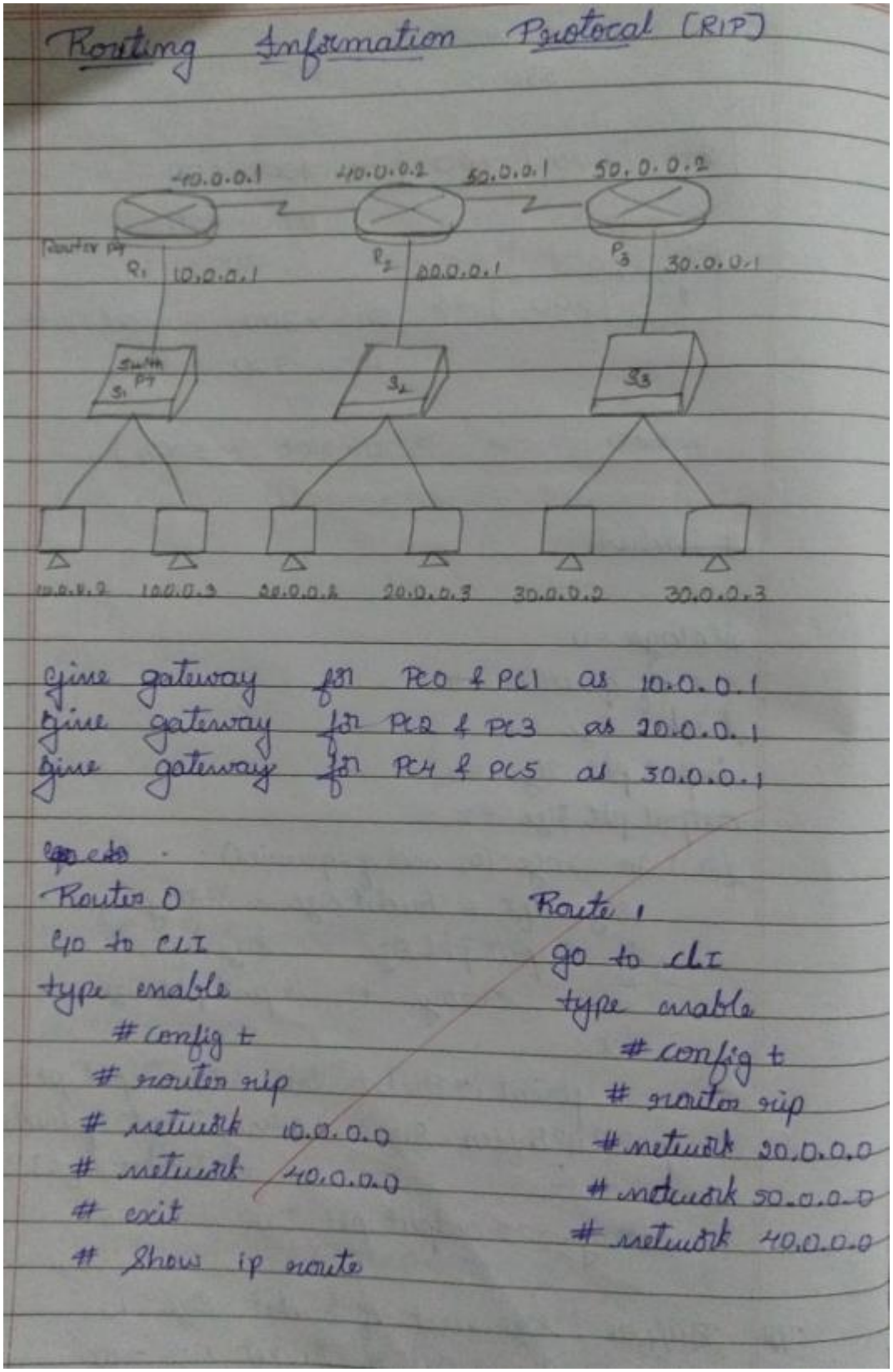
  -show ip route

- Ping from different network.

4. Output:



5. Observation:



Router 2
Go to CLI
type enable
config t
router rip
network 30.0.0.0
network 50.0.0.0

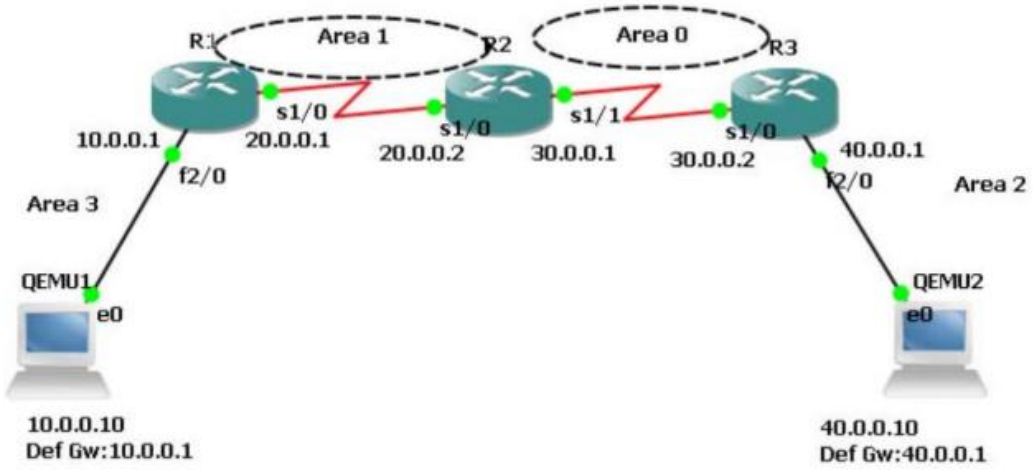
Ping the different network

check TTL (Time to live):
* Simulate the network & select router in a last device and At device
* Then, click on Inbound PDU details
* observe TTL is 254
* Then, click on outerbound PDU details
* observe TTL as is 253
* TTL is decreasing compared ~~out~~ b/w Inbound (TTL) & outbound (TTL)

Program 12

1. **Aim:** Configure the Open Short Path First [OSPF] dynamic protocal.

2. **Topology:**



3. **Procedure:**

- Create topology like above mentioned.
- Cofigure ip addres to all interfaces
- In Router R1,
  - R1(config)#interface fastethernet 2/0
  - R1(config-if)#ip address 10.0.0.1 255.0.0.0
  - R1(config-if)#no shutdown
  - R1(config-if)#exit
  - R1(config)#interface serial 1/0
  - R1(config-if)#ip address 20.0.0.1 255.0.0.0
  - R1(config-if)#encapsulation ppp
  - R1(config-if)#clock rate 64000
  - R1(config-if)#no shutdown
  - R1(config-if)#exit
- In Router R2,
  - R2(config)#interface serial 1/0
  - R2(config-if)#ip address 20.0.0.2 255.0.0.0

- R2(config-if)#encapsulation ppp
- R2(config-if)#no shutdown
- R2(config-if)#exit
- R2(config)#interface serial 1/1
- R2(config-if)#ip address 30.0.0.1 255.0.0.0
- R2(config-if)#encapsulation ppp
- R2(config-if)#clock rate 64000
- R2(config-if)#no shutdown
- R2(config-if)#exit

- In Router R3,
- R3(config)#
- R3(config)#interface serial 1/0
- R3(config-if)#ip address 30.0.0.2 255.0.0.0
- R3(config-if)#encapsulation ppp
- R3(config-if)#no shutdown
- R3(config-if)#exit
- R3(config)#
- R3(config)#interface fastethernet 2/0
- R3(config-if)#ip address 40.0.0.1 255.0.0.0
- R3(config-if)#no shutdown
- R3(config-if)#exit

- Now,Enable ip routing by configuring ospf routing protocol in all routers,
- In Router R1,
- R1(config)#router ospf 1
- R1(config-router)#router-id 1.1.1.1
- R1(config-router)#network 10.0.0.0 0.255.255.255 area 3
- R1(config-router)#network 20.0.0.0 0.255.255.255 area 1
- R1(config-router)#exit

- In Router R2,
- R2(config)#router ospf 1
- R2(config-router)#router-id 2.2.2.2
- R2(config-router)#network 20.0.0.0 0.255.255.255 area 1

- R2(config-router)#network 30.0.0.0 0.255.255.255 area 0
- R2(config-router)#exit

- In Router R3,
- R3(config)#router ospf 1
- R3(config-router)#router-id 3.3.3.3
- R3(config-router)#network 30.0.0.0 0.255.255.255 area 0
- R3(config-router)#network 40.0.0.0 0.255.255.255 area 2
- R3(config-router)#exit

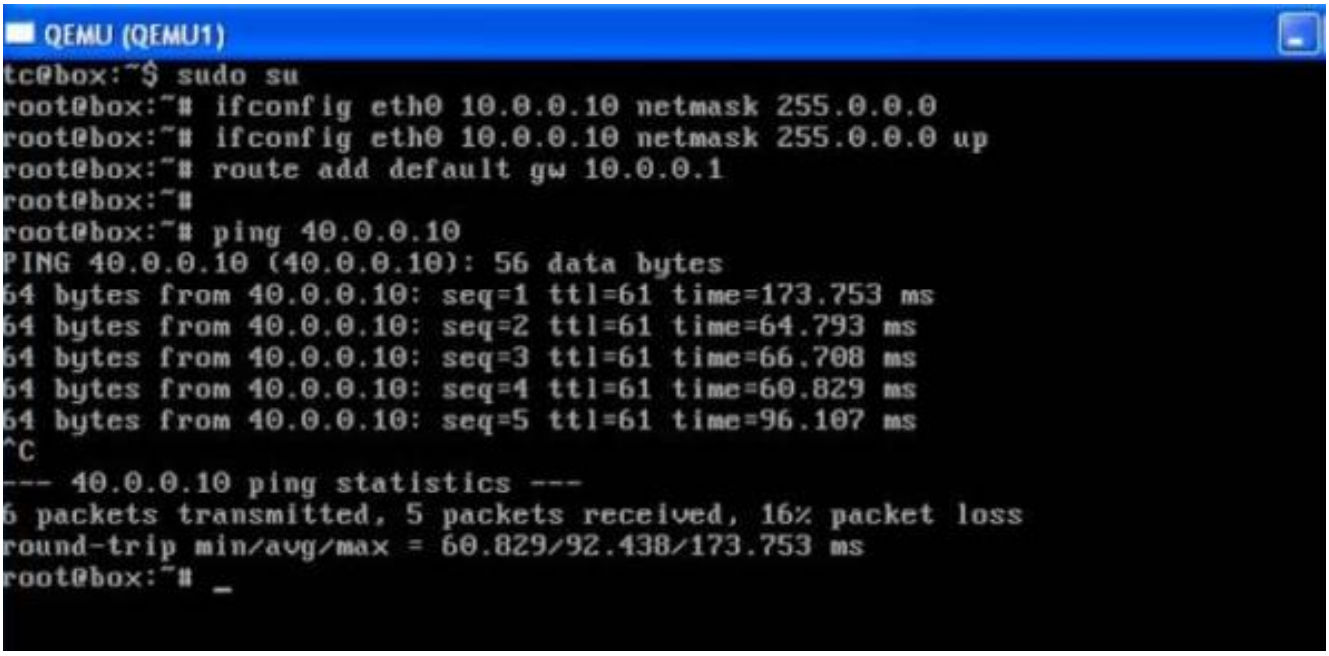
- You have to configure router id when we configure ospf.It is used to identify the router
- Now check routing table of R1,
- Router#show ip route
- There must be one interface up to keep ospf process up. So its better to configure loopback address to routers. It is a virtual interface never goes down once we configured.
- R1(config-if)#interface loopback 0
- R1(config-if)#ip add 172.16.1.252 255.255.0.0
- R1(config-if)#no shutdown
- R2(config-if)#interface loopback 0
- R2(config-if)#ip add 172.16.1.253 255.255.0.0
- R2(config-if)#no shutdown
- R3(config-if)#interface loopback 0
- R3(config-if)#ip add 172.16.1.254 255.255.0.0
- R3(config-if)#no shutdown

- Now ,Check Routing table of R3,
- R3#show ip route
- Here,R3 doesn't know about the area 3 so we have to create virtual link between R1 andR2
- Create virtual link between R1,R2,by this we create a virtual link to connect area 3 to area 0.
- In Router R1,
- R1(config)#router ospf 1
- R1(config-router)#area 1 virtual-link 2.2.2.2
- R1(config-router)#

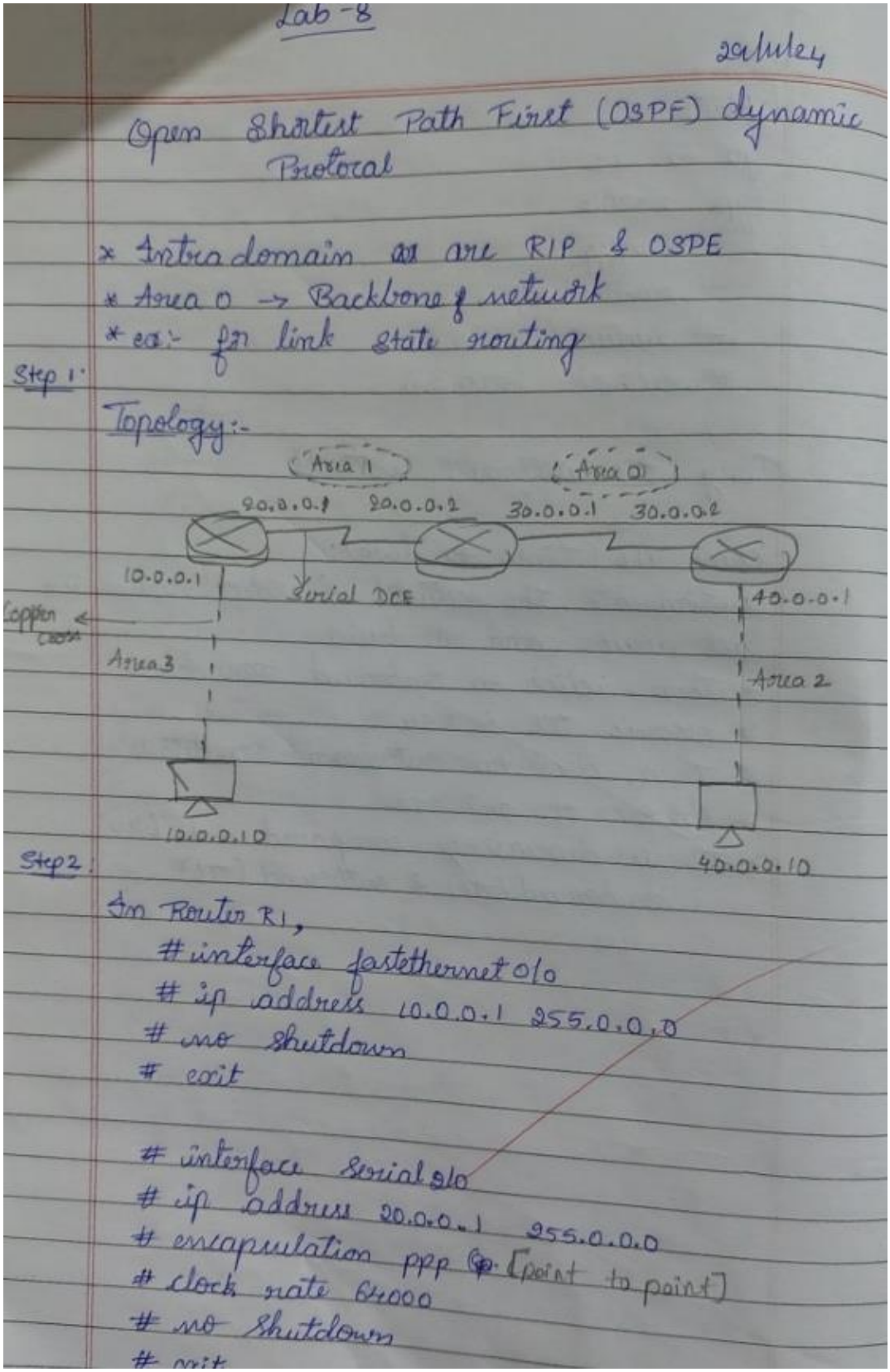
- In Router R1,

- R2(config-router)#
- R2(config-router)#area 1 virtual-link 1.1.1.1
- R2(config-router)#exit
- R3#show ip route
- Check connectivity between host 10.0.0.10 to 40.0.0.10

4. Output:



5. Observation



In Router R2

```
# interface Serial 2/0
# ip address 20.0.0.2 255.0.0.0
# encapsulation ppp
# no shutdown
# exit

# interface Serial 3/0
# ip address 30.0.0.1 255.0.0.0
# encapsulation ppp
# clock rate 64000
# no shutdown
# exit
```

In Router R3

```
# interface Serial 2/0
# ip address 30.0.0.2 255.0.0.0
# encapsulation ppp
# no shutdown
# exit
```

Step 3: Now, enable ip routing by configuring ospf routing protocal in all routers

In Router R1,

```
# router ospf 1
# router-id 1.1.1.1
# network 10.0.0.0 0.255.255.255 area 3
# network 20.0.0.0 0.255.255.255 area 1
# exit
```

configure ospf. It is used to identify the router

Step 4: Now check routing table of R1

exit

#Show ip route

o/p

Gateway of last resort is not set

C 10.0.0.0/8 is directly connected, FastEthernet 0/0

C 20.0.0.0/8 is —11— 11— , Serial 2/0

O IA 40.0.0.0/8 [110/129] via 20.0.0.2, 00:04:23, Serial 2/0

O IA 30.0.0.0/8 [110/128] via 20.0.0.2, 00:07:22, —11—

Here, R2 knowns area 0 network 20.0.0.0 connected to R2 from R1, so R1 learns network through this network

R3(config)# router ospf 1, Here 1 is Process ID, it can be 1-65535. It initializes ospf process

There must be one ~~ref~~ interface up to keep ospf process up. So it's better to config loopback address to routers. It is virtual interface never goes down once we configured

R1(config-if)# interface loopback 0

ip address 172.16.1.252 255.255.0.0

no shutdown

R2(config-if)# interface loopback 0

ip address 172.16.1.253 255.255.0.0

no shutdown

R3(config)# conf interface loopback 0
ip add 172.16.1.254 255.255.0.0
no shutdown

Step5 : check routing table of R3
show ip route

Step6: Create virtual link blw R1, R2 by this we create virtual link for connect area 3 to area 0

On R1
router ospf 1
area 1 virtual-link 2.2.2.2
#

On R2
router 1 virtual-link 1.1.1.1
exit

Step7 On R3
show ip route

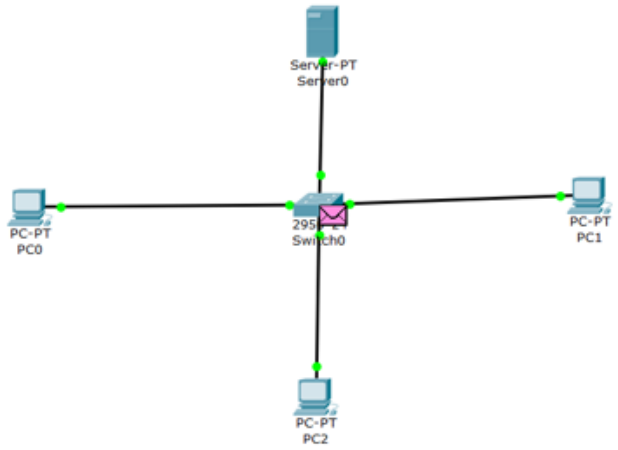
Step8: Check connectivity blw host 10.0.0.10 to 10.0.0.10

20/12/21

Program 13

1. Aim: To construct simple LAN and understand the concept and operation of Address Resolution Protocol[ARP]

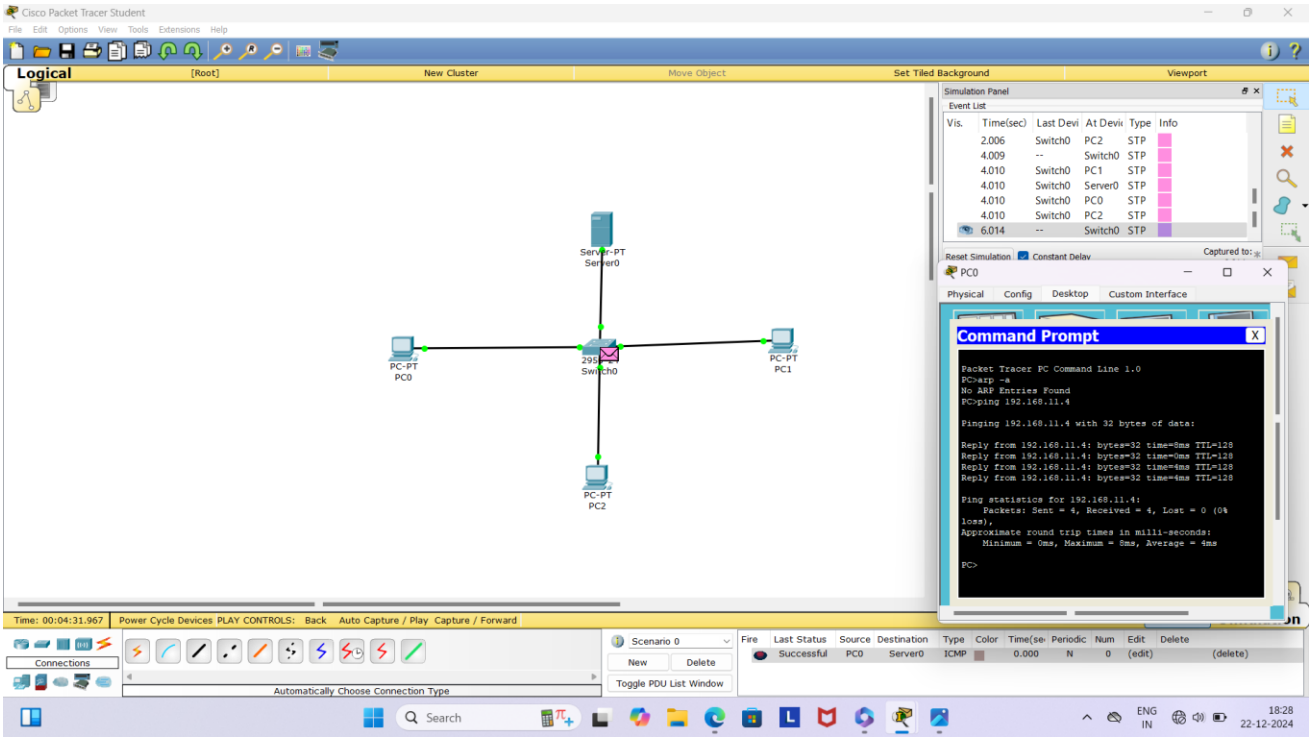
2. Topology:



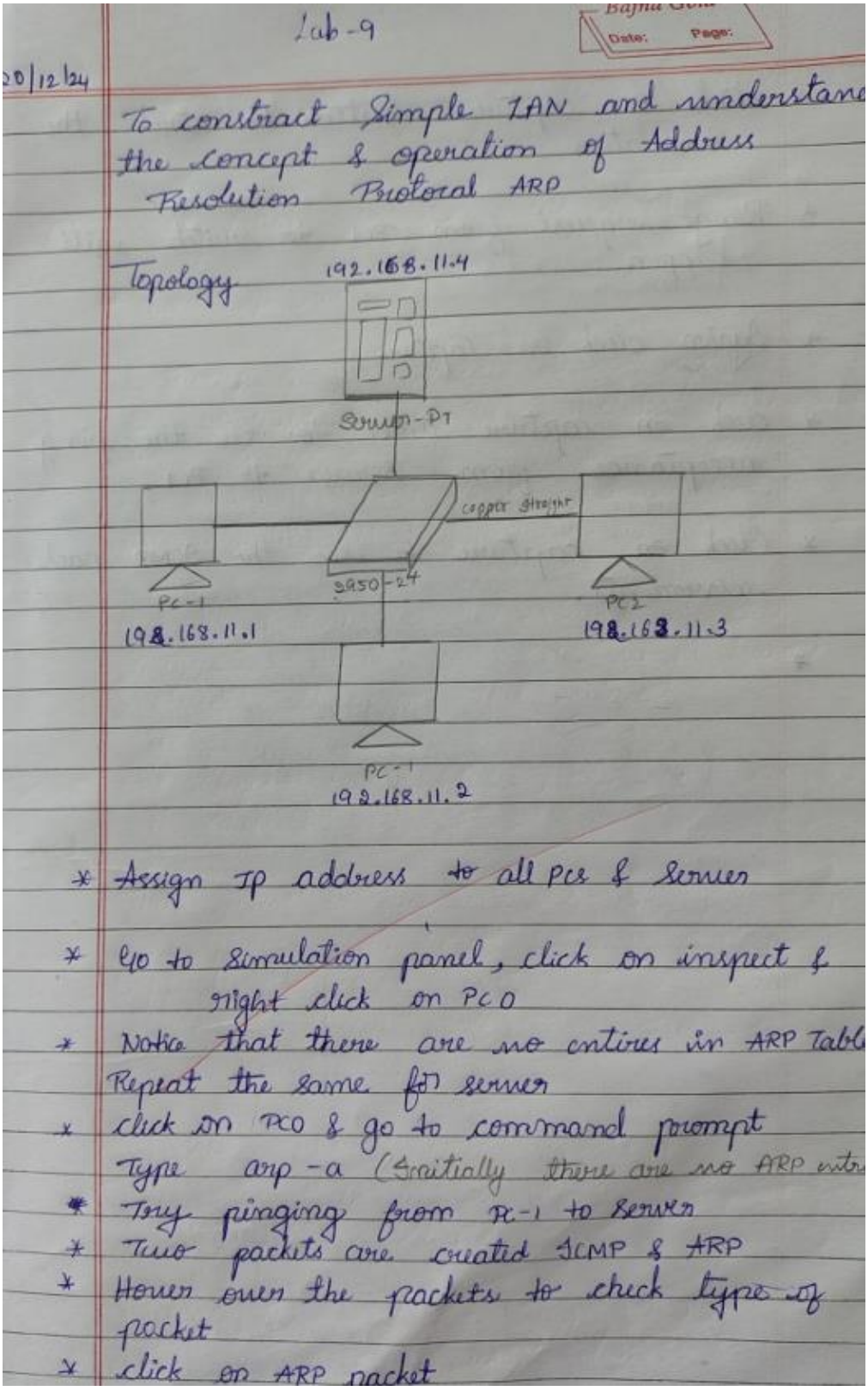
3. Procedure:

- Assign IP addresses to all PCs and Server
- Go to simulation panel, click on inspect and right click on PC0
- Notice that there are no entries in the ARP Table
- Repeat the same for Server
- Click on PC0 and go to command prompt
- Type arp -a (Initially there are no ARP entries)
- Try pinging from PC0 to Server
- Two packets are created ICMP and ARP
- Hover over the packets to check the type of packet
- Click on ARP packet
- Click on capture button to start the simulation
- Ping request from PC0 to Switch will happen
- Again click on capture
- Click on capture twice to see the ping acceptance from server0 to PC0
- Click on capture to see the ICMP packet movements

4. Output:


Cisco Packet Tracer Student
Logical
Server-PT Server0
PC-PT PC0
PC-PT PC1
PC-PT PC2
Switch0
Simulation Panel
Event List
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>arp -a
No ARP Entries Found
PC>ping 192.168.11.4
Pinging 192.168.11.4 with 32 bytes of data:
Reply from 192.168.11.4: bytes=32 time=8ms TTL=128
Reply from 192.168.11.4: bytes=32 time=0ms TTL=128
Reply from 192.168.11.4: bytes=32 time=4ms TTL=128
Reply from 192.168.11.4: bytes=32 time=4ms TTL=128
Ping statistics for 192.168.11.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 8ms, Average = 4ms
PC>
Time: 00:04:31.967
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Search
ENG IN
18:28
22-12-2024

5. Observation:



* click on capture button to start the simulation.

* Ping request from PC1 to Switch will happen.

* Again click on capture

* click on capture twice to see the ping acceptance from server to PC1

* Click on capture to see the ICMP packet movements.

*

Program 14

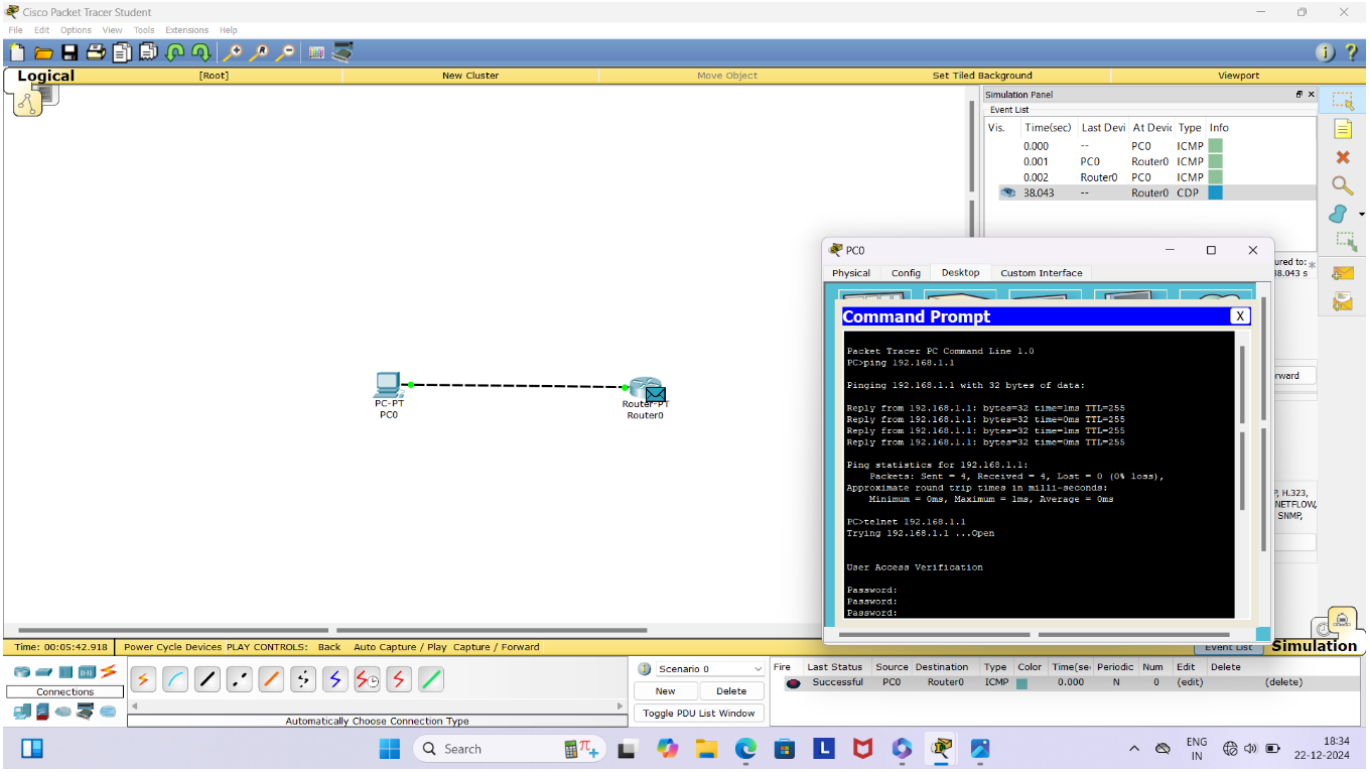
1. **Aim:** TELNET PROTOCOL

2. **Topology:**

3. **Procedure:**

- Create the topology
- Configure the IP address and gateway for PC0
- Configure the router in CLI
  - -conf t
  - -hostname R1
  - -enable secret rp
  - -interface fastethernet 0/0
  - -ip add 192.168.1.1 255.255.255.0
  - -no shut
  - -line vty 0 5
  - -login
  - -password tp
  - -exit
- Go to PC – Command prompt
  - -ping 192.168.1.1
  - -telnet 192.168.1.1

4. Output:


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last Devi At Devic Type Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 PC0 ICMP
38.043 -- Router0 CDP
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.1
Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=1ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Reply from 192.168.1.1: bytes=32 time=1ms TTL=255
Reply from 192.168.1.1: bytes=32 time=0ms TTL=255
Ping statistics for 192.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>telnet 192.168.1.1
Trying 192.168.1.1 ...Open
User Access Verification
Password:
Password:
Password:
PC-PT
PC0
Router-PT
Router0
Time: 00:05:42.918
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(se Periodic Num Edit Delete
Successful PC0 Router0 ICMP 0.000 N 0 (edit) (delete)
Search
ENG
IN
18:34
22-12-2024

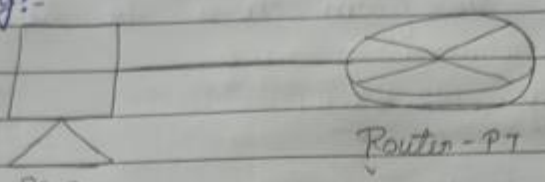
5. Observation:

Lab-10

Bafna Gold

TELNET PROTOCOL

Topology:-



* Create the topology
* Configure the Ip address & gateway for PC-0
* In PC-0: go to Desktop
  - Select Ip configuration
  - Select Static
  - Give Ip address as 192.168.1.2
  - Give default gateway as 192.168.1.1
* In Router: go to CLI
  - Type -

```
Router > en
Router # conf t
Router(config) # hostname R1
R1(config) # enable secret cp
R1(config) # intf. interface fastethernet 0/0
R1(config-if) # ip add 192.168.1.1 255.255.255.0
R1(config-if) # no shut
R1(config-if) # line vty 0 5
R1(config-if) # login
R1(config-line) # password cp
R1(config-line) # exit
R1(config) # exit
```

R1 # wr

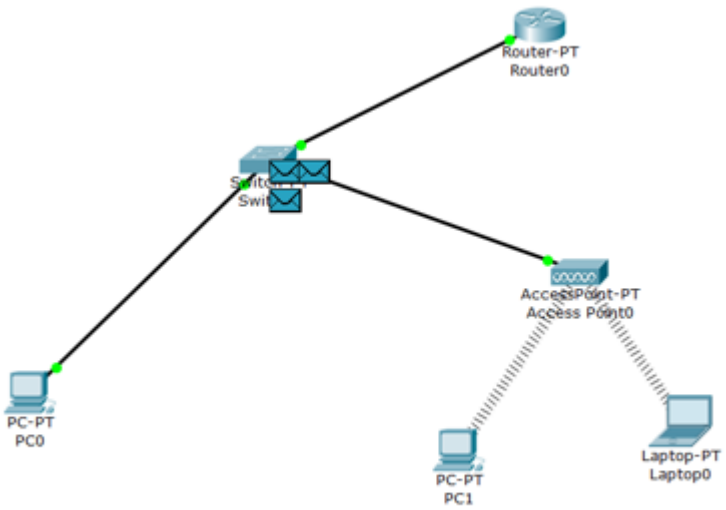
* Ping the from PC-0 to Server
In Command prompt
C:\ping 192.168.1.1

C:\>telnet 192.168.1.1
password :
R1>
R1>en
password:
R1#

Program 15

1. **Aim:** To construct a WLAN and make the nodes communicate Wirelessly.

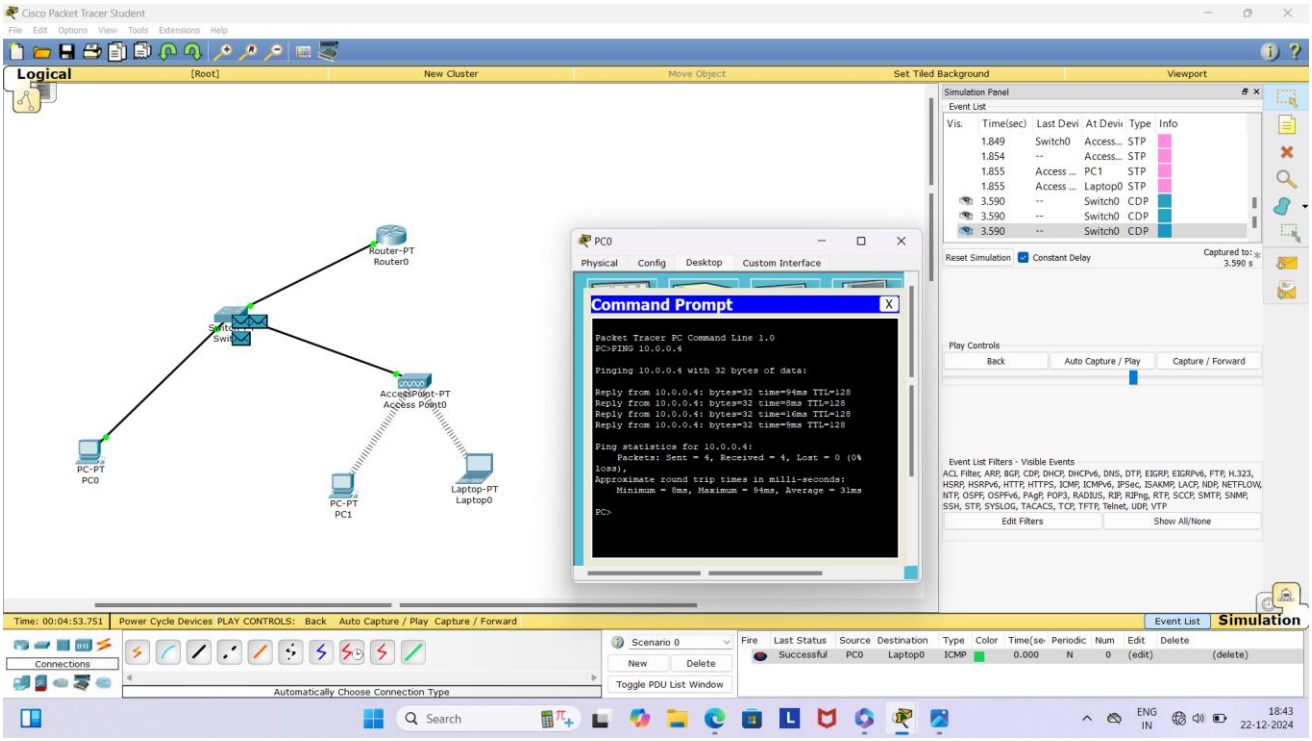
2. **Topology:**



3. **Procedure:**

- Construct the above topology
- Configure PC3 and the Router1 as is normally done
- Configure Access Point1- Port1 -> SSID Name- any name(WLAN here)
- Select WEP and give any 10 digit hex key – 1234567890 here
- Configuring PC4 and Laptop with Wireless standards
- Switch off the device. Drag the existing PT-HOST-NM-1AM to the component listed in the LHS. Drag WMP300N wireless interface to the empty port. Switch On the device.
- In the config tab a new wireless interface would have been added. Now configure SSID, WEP, WEP Key, IP address and Gateway (as normally done) to the device.
- Ping from every device to every other device and see the results

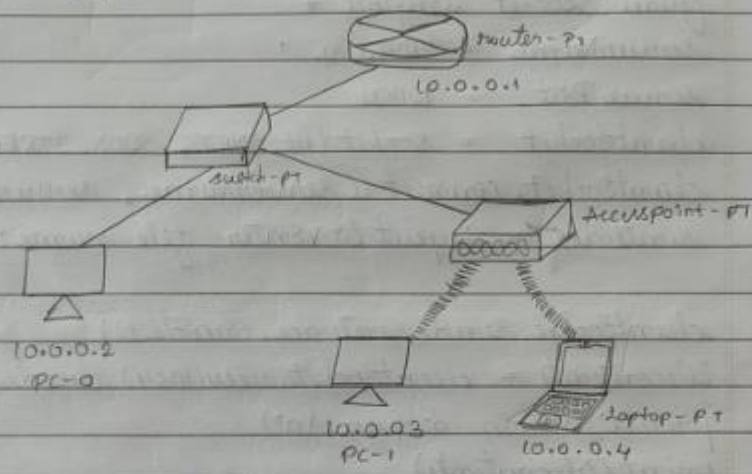
4. Output:


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
Switch-PT
Switch0
Access Point-PT
Access Point0
PC-PT
PC0
PC-PT
PC1
Laptop-PT
Laptop0
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>PING 10.0.0.4
Pinging 10.0.0.4 with 32 bytes of data:
Reply from 10.0.0.4: bytes=32 time=94ms TTL=128
Reply from 10.0.0.4: bytes=32 time=8ms TTL=128
Reply from 10.0.0.4: bytes=32 time=16ms TTL=128
Reply from 10.0.0.4: bytes=32 time=9ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 94ms, Average = 31ms
PC>
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:04:53.751
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Successful
PC0
Laptop0
ICMP
Search
ENG
IN
18:43
22-12-2024

5. Observation:

To construct a WLAN & make the nodes communicate wirelessly

Topology:-

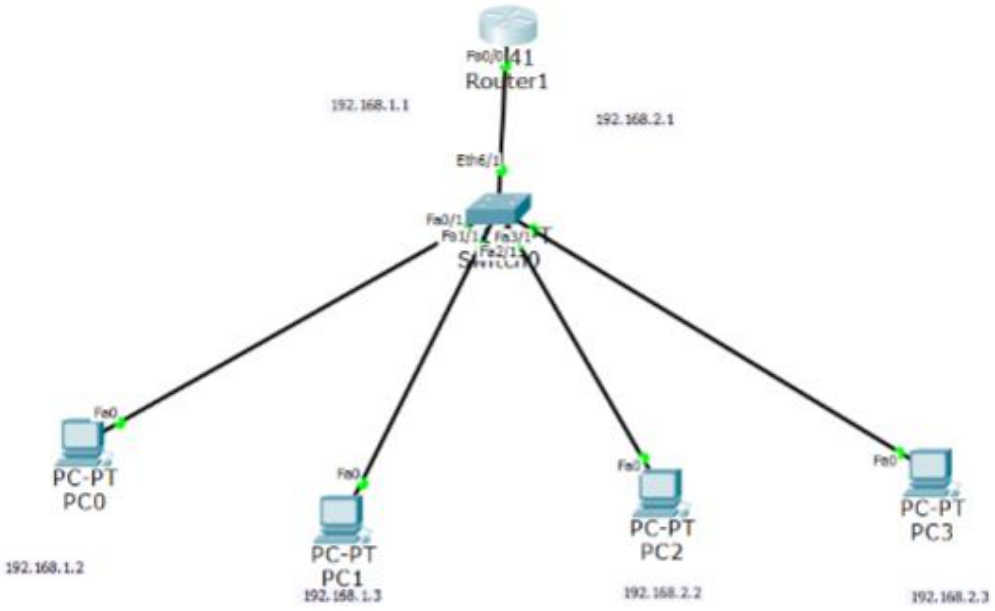


* Create Topology
* Configure PC3 & router as is normally done
* In Access point
  * Config → port 1 → SSID Name - WLAN (give any name)
  * Select WEP and give 10 digit hex key - 1234567890
* In PC-1 and laptop with wireless Standards
  - Switch off the device.
  - Drag existing PT-HOST-NM-1AM to component listed in the LHS
  - Drag WMP300N wireless interface to the empty port. Switch On devices
* In config tab a new wireless interface would have been added. Now config SSID, WEP, WEPkey, Ip addr, gateway to the device
* Ping from every devices to every other devices

Program 16

1. **Aim:** To create a new VLAN, we use class C type addresses.

2. **Topology:**

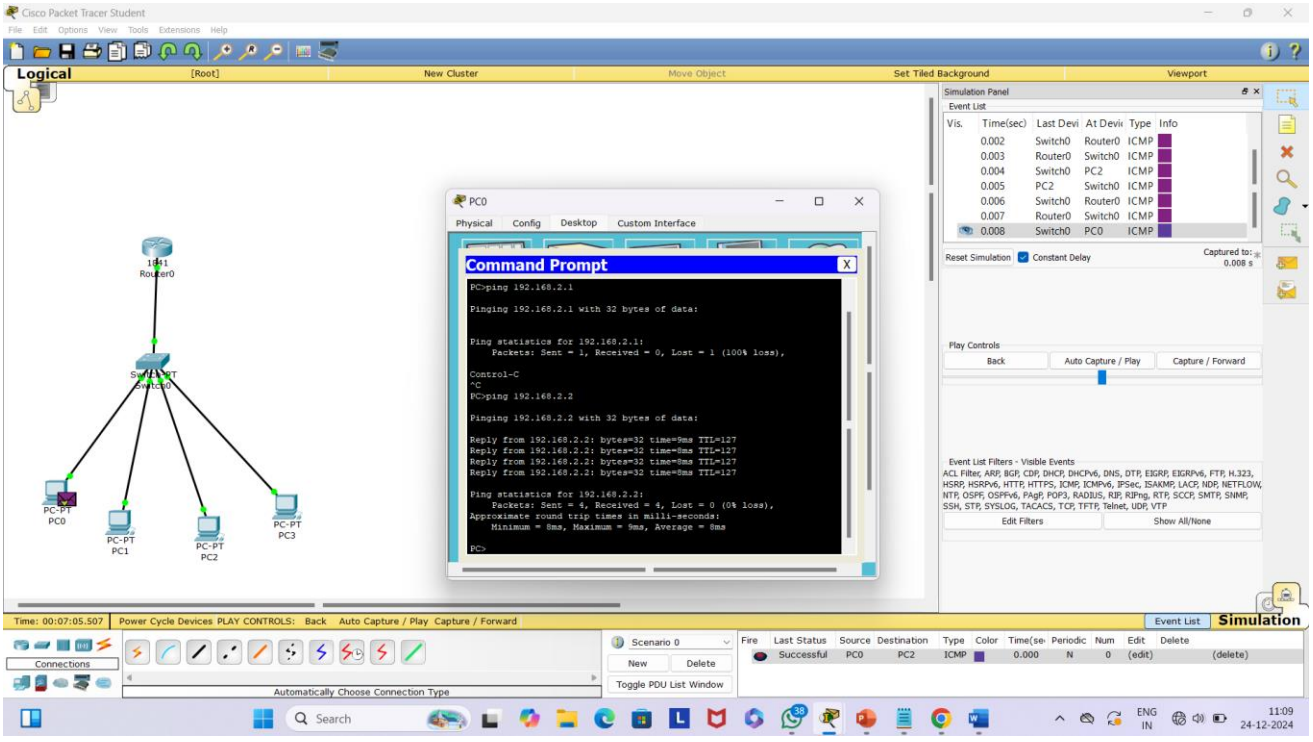


3. Procedure:

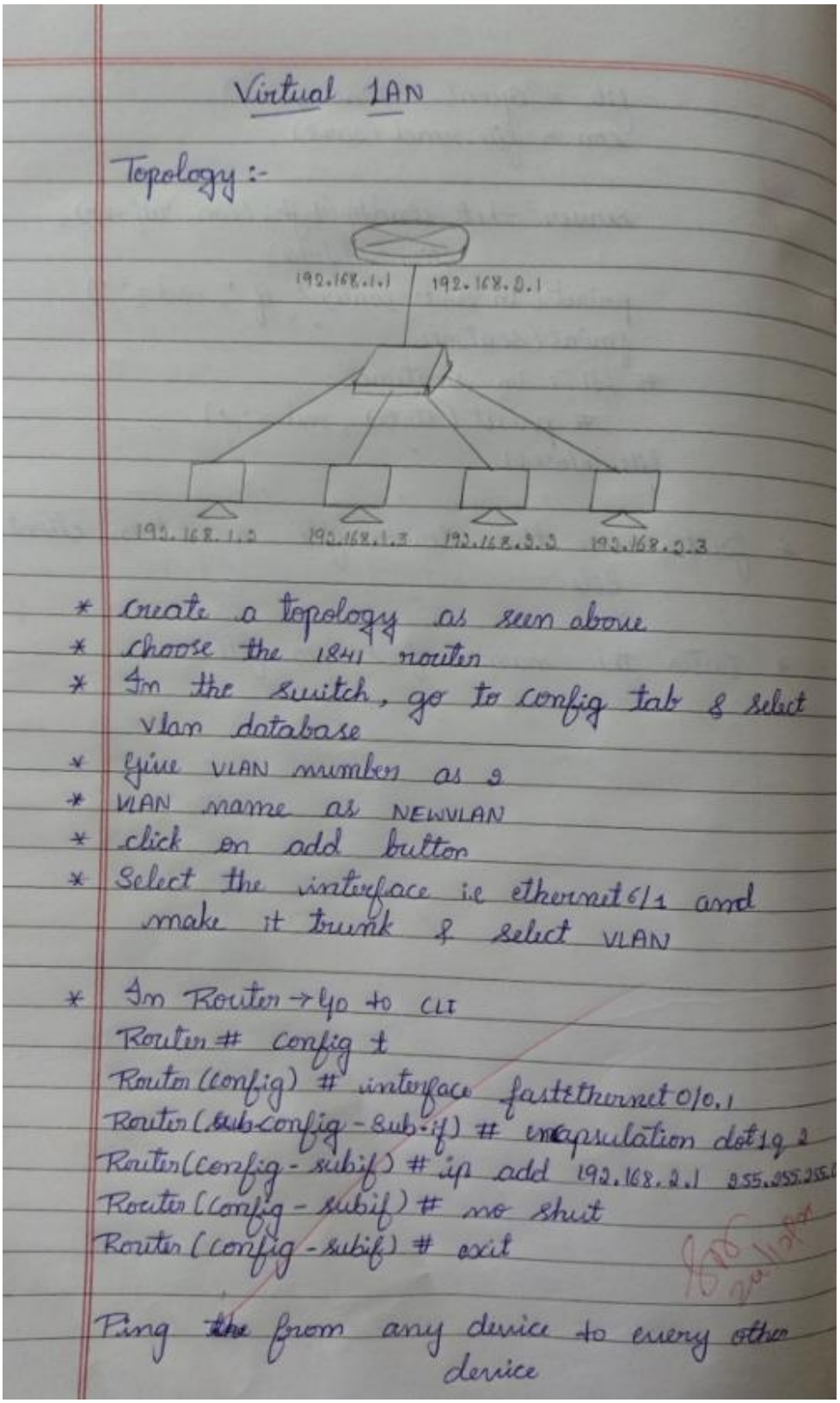
- Create a topology as seen below
- Choose the 1841 router
- In the switch, go to Config tab and Select VLAN Database
- Give any VLAN number say 2 here Include any name. Say Add
- Select the interface ie ethernet 6/1 (near the switch from router) and make it the trunk
- VLAN trunking allows switches to forwards frames from different VLANs over a single link called trunk.
- This is done by adding an additional header information called tag to the Ethernet frame.
- The process of adding this small header is called VLAN tagging
- Look into the interfaces of the switches with the 2 NEWVLAN systems.
- This makes the switch understand NEWVLAN.
- Next the router is to understand the NEWVLAN. Do this for fasterthernet 2/1 and 3/1
- Config tab of router select VLAN DATABASE enter the number and name of the vlancreated

- Goto CLI,
  - Router(vlan)#exit
  - APPLY completed.
  - Exiting....
  - Router#config t
  - Router(config)#interface fastEthernet 0/0.1
  - Router(config-subif)#
  - Router(config-subif)#encapsulation dot1q 2
  - Router(config-subif)#ip address 192.168.2.1 255.255.255.0
  - Router(config-subif)#no shut
  - Router(config-subif)#exit
  - Router(config)#exit

4. Output:



5. Observation:



Virtual LAN

Topology :-

* Create a topology as seen above
* Choose the 1841 router
* In the switch, go to config tab & select Vlan database
* Give VLAN number as 2
* VLAN name as NEWVLAN
* click on add button
* Select the interface i.e ethernet 0/1 and make it trunk & select VLAN

* In Router → go to CLI
  Router # config t
  Router (config) # interface fastethernet 0/0.1
  Router (sub-config - sub-if) # encapsulation dot1q 2
  Router (config - subif) # ip add 192.168.2.1 255.255.255.0
  Router (config - subif) # no shut
  Router (config - subif) # exit

Ping the from any device to every other device

Cycle-II

Program 1

1. Aim: Write a program for Error Detection using CRC-CCITT(16 bits)

2. Algorithm:

- Start
- Enter the message to be transmitted
- Append the message with 16(since it is 16-bit CRC) 0`s (i.e. if you input 5 digit message, the appeneded message should be 21-bits.)
- XOR appended message and transmit it.(Here, you compare with an already exisitng string such as 10001000000100001 and replace the bits the same way XOR operation works)
- Verify the message that is received is the same as the one sent.
- End

3. Code:

```
#include &lt;iostream&gt;
#include &lt;string.h&gt;
using namespace std;
int crc(char *ip, char *op, char *poly, int mode)
{
strcpy(op, ip);
if (mode) {
for (int i = 1; i &lt; strlen(poly); i++)
strcat(op, &quot;0&quot;);
}
/* Perform XOR on the msg with the selected polynomial */
for (int i = 0; i &lt; strlen(ip); i++) {
if (op[i] == &#39;1&#39;) {
for (int j = 0; j &lt; strlen(poly); j++) {
if (op[i + j] == poly[j])
op[i + j] = &#39;0&#39;;
else
op[i + j] = &#39;1&#39;;
```

```
}
}
}
/* check for errors. return 0 if error detected */
for (int i = 0; i &lt; strlen(op); i++)
if (op[i] == &#39;1&#39;)
return 0;
return 1;
}
int main()
{
char ip[50], op[50], recv[50];
char poly[] = &quot;10001000000100001&quot;;
cout &lt;&lt; &quot;Enter the input message in binary&quot;&lt;&lt; endl;
cin &gt;&gt; ip;
crc(ip, op, poly, 1);
cout &lt;&lt; &quot;The transmitted message is: &quot; &lt;&lt; ip &lt;&lt; op + strlen(ip) &lt;&lt;
endl;
cout &lt;&lt; &quot;Enter the recevied message in binary&quot; &lt;&lt; endl;
cin &gt;&gt; recv;
if (crc(recv, op, poly, 0))
cout &lt;&lt; &quot;No error in data&quot; &lt;&lt; endl;
else
cout &lt;&lt; &quot;Error in data transmission has occurred&quot; &lt;&lt; endl;

return 0;
}
```

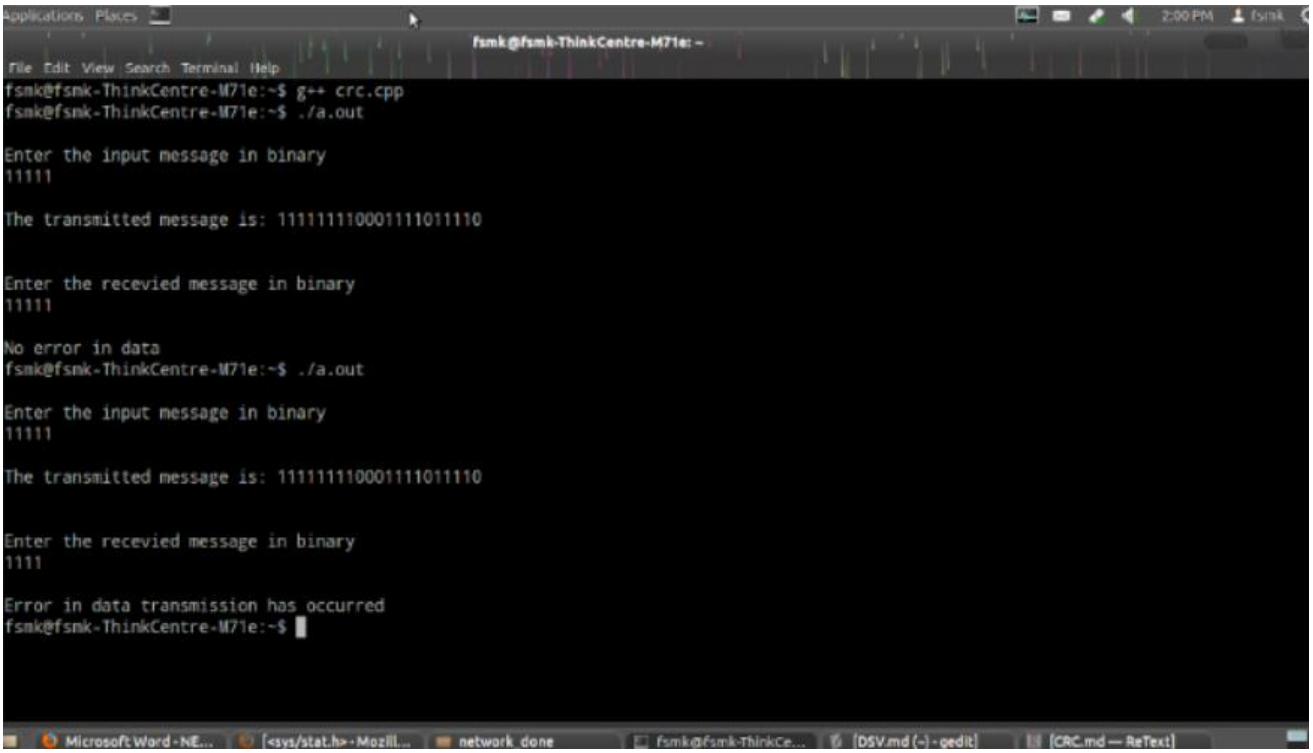
4. Output:

Commands for execution:-

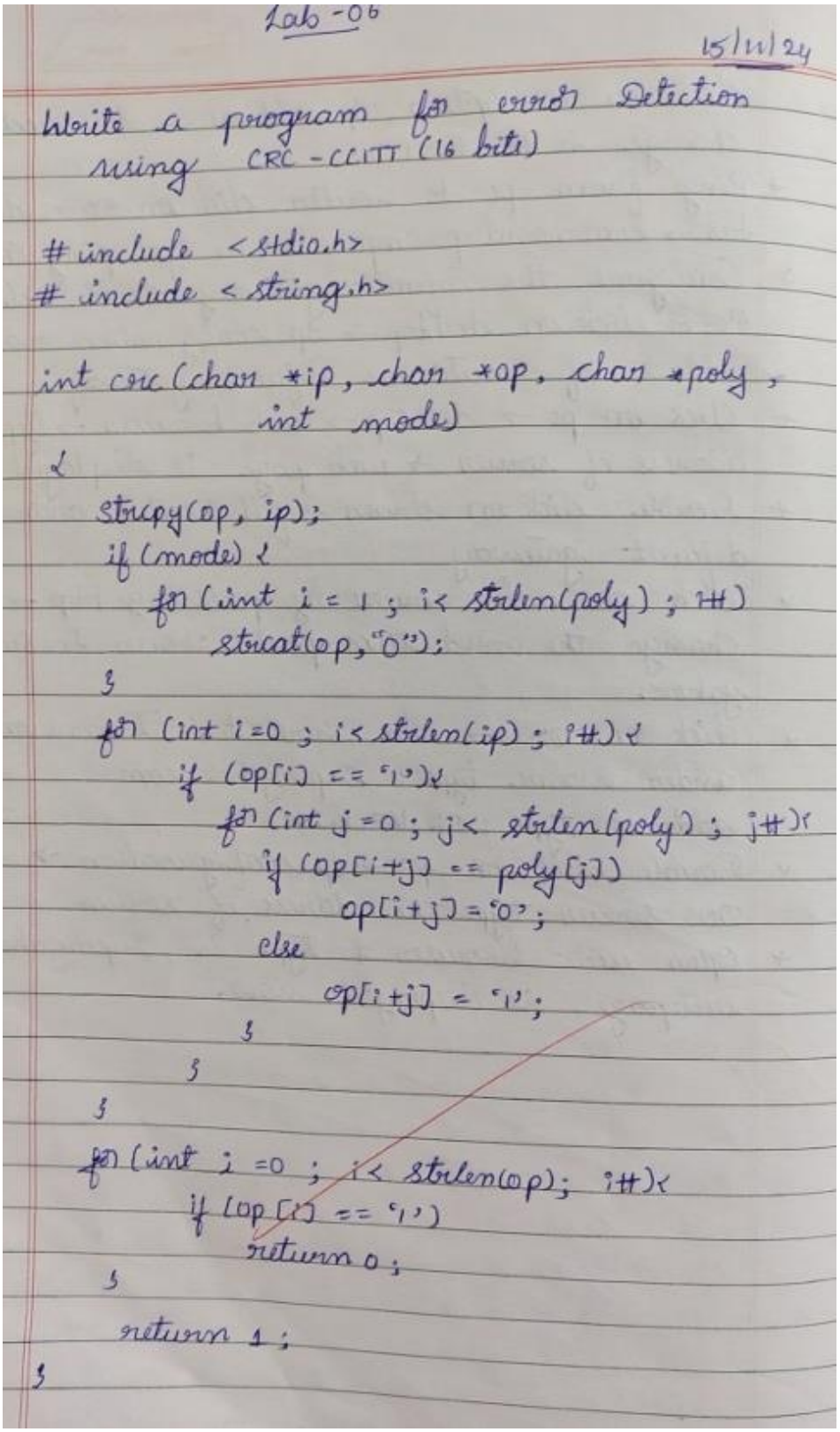
- Open a terminal.
- Change directory to the file location.
- Run g++ filename.cpp

 If there are no errors, run ./a.out

Screenshots:-



6. Observation:



Lab - 06

15/11/24

Write a program for error Detection using CRC - CCITT (16 bits)

```
#include <stdio.h>
#include <string.h>

int crc(char *ip, char *op, char *poly,
        int mode)
{
   strcpy(op, ip);
   if (mode) {
      for (int i = 1; i< strlen(poly); i++)
         strcat(op,"0");
   }
   for (int i=0; i< strlen(ip); i++) {
      if (op[i] == '1'){
         for (int j =0; j< strlen(poly); j++){
            if (op[i+j] == poly[j])
               op[i+j] = '0';
            else
               op[i+j] = '1';
         }
      }
   }
   for (int i =0; i< strlen(op); i++){
      if (op[i] == '1')
         return 0;
   }
   return 1;
}
```

```
int main(){
    char ip[50], op[50], recv[50];
    char poly[] = "10111";

    printf("Enter the input message in
                    binary: \n");
    scanf("%s", ip);

    crc(ip, op, poly, 2);

    print("The transmitted message is: %s%s\n
          ip, op + strlen(ip));
    print("Enter the received message in binary:
                                \n");

    print(" scanf("%s", recv);

    if (crc(recv, op, poly, 0))
        printf("No error in data\n");
    else
        printf("Error in data transmission has
                occured\n");

    return 0;
}
```

O/P

```
Enter the input message in binary : 10100111
The transmitted message is : 10100111100
Enter received message in binary : 101001111010
No error in data
```

Program 2

1. Aim: Write a program for Leaky bucket algorithm

2. Algorithm:

- The following is an algorithm for variable-length packets:
  - Initialize a counter to n at the tick of the clock.
  - Repeat until n is smaller than the packet size of the packet at the head of the queue.
  - Pop a packet out of the head of the queue, say P.
  - Send the packet P, into the network
  - Decrement the counter by the size of packet P.
  - Reset the counter and go to step 1.

3. Code:

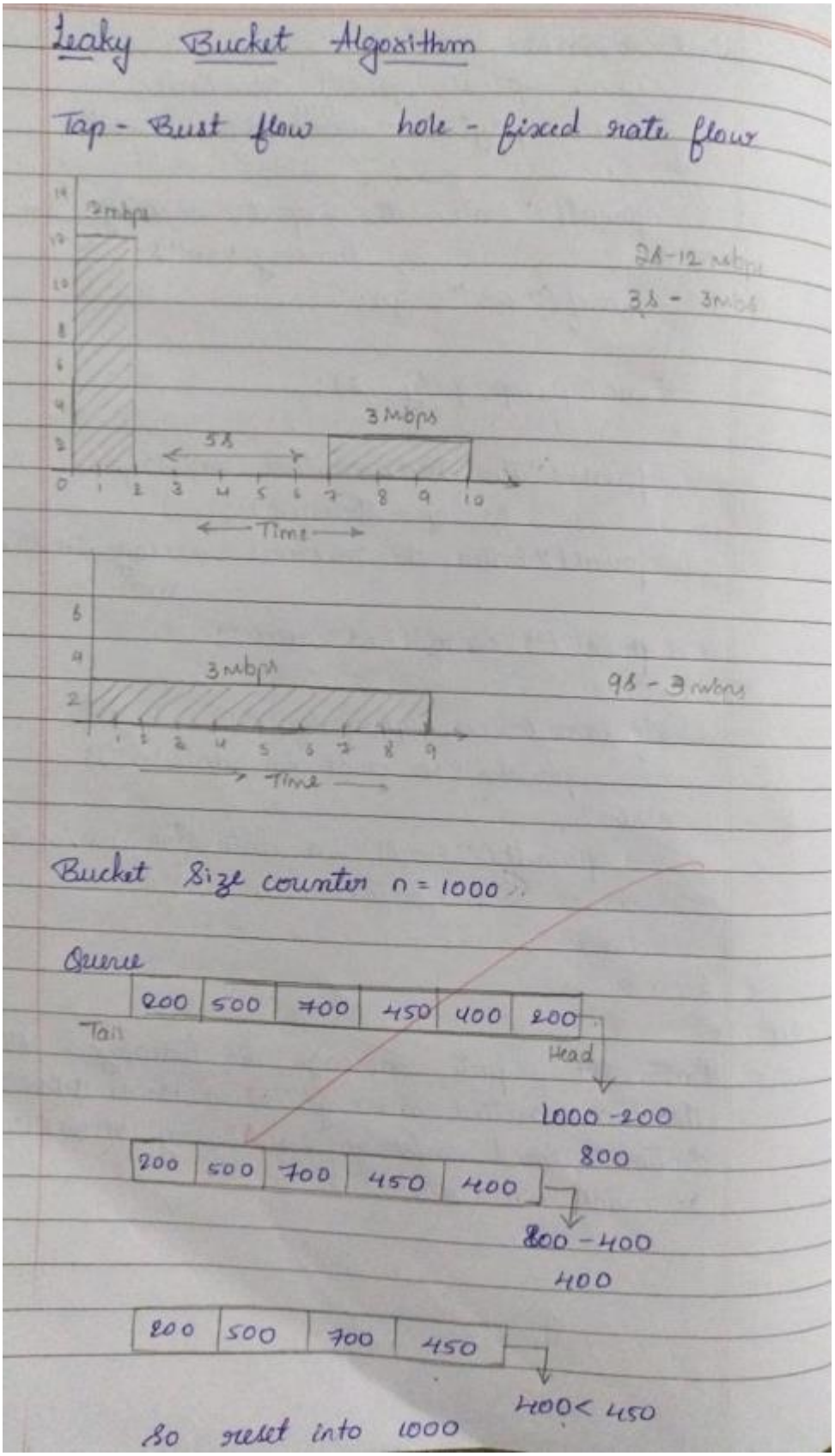
```
#include <bits/stdc++.h>
using namespace std;
int main()
{
int no_of_queries, storage, output_pkt_size;
int input_pkt_size, bucket_size, size_left;
// initial packets in the bucket
storage = 0;
// total no. of times bucket content is checked
no_of_queries = 4;
// total no. of packets that can
// be accommodated in the bucket
bucket_size = 10;
// no. of packets that enters the bucket at a time
input_pkt_size = 4;
// no. of packets that exits the bucket at a time
output_pkt_size = 1;
for (int i = 0; i < no_of_queries; i++) // space left
{
size_left = bucket_size - storage;
```

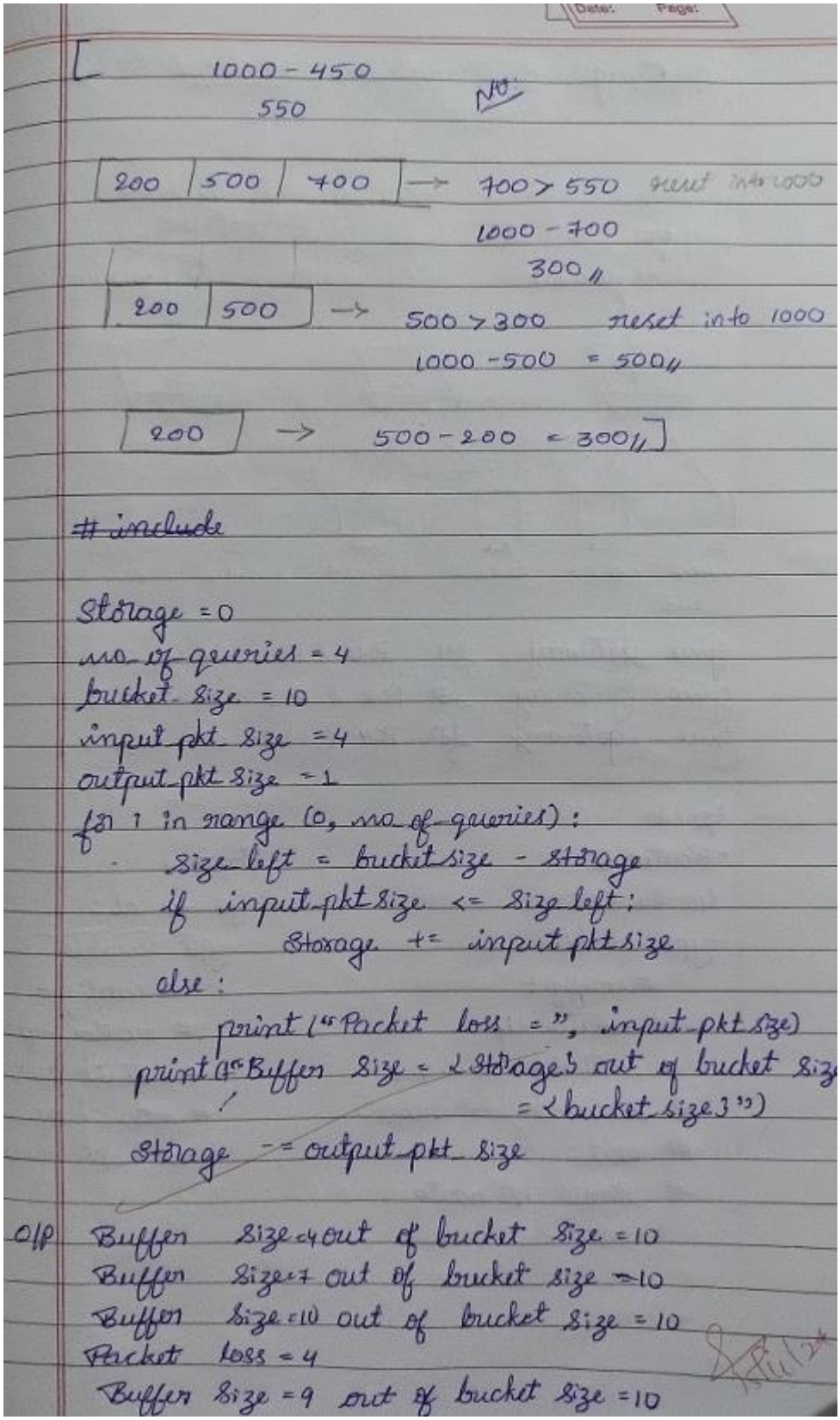
```
if (input_pkt_size <= size_left) {
// update storage
storage += input_pkt_size;
}
else {
printf("Packet loss = %d\n", input_pkt_size);
}
printf("Buffer size= %d out of bucket size= %d\n",
storage, bucket_size);
storage -= output_pkt_size;
}
return 0;
}
```

4. Output:

```
Buffer size= 4 out of bucket size= 10
Buffer size= 7 out of bucket size= 10
Buffer size= 10 out of bucket size= 10
Packet loss = 4
Buffer size= 9 out of bucket size= 10
```

5. Observation:





1000 - 450
550

| 200 | 500 | 400 | → 700 > 550 reset into 1000

1000 - 700
300

| 200 | 500 | → 500 > 300 reset into 1000
1000 - 500 = 500

| 200 | → 500 - 200 = 300 |

~~#include~~

Storage = 0
no_of_queries = 4
bucket_size = 10
input_pkt_size = 4
output_pkt_size = 1
for i in range (0, no_of_queries):
    size_left = bucket_size - storage
    if input_pkt_size <= size_left:
        Storage += input_pkt_size
    else:
        print ("Packet loss =", input_pkt_size)
    print ("Buffer Size =", Storage, "out of bucket size = ", bucket_size)
    Storage -= output_pkt_size

O/P Buffer Size = 4 out of bucket size = 10
Buffer Size = 7 out of bucket size = 10
Buffer Size = 10 out of bucket size = 10
Packet loss = 4
Buffer Size = 9 out of bucket size = 10

Program 3

1. Aim: Write a program for Socket Programming [TCP]

2. Code:

ClientTCP.py

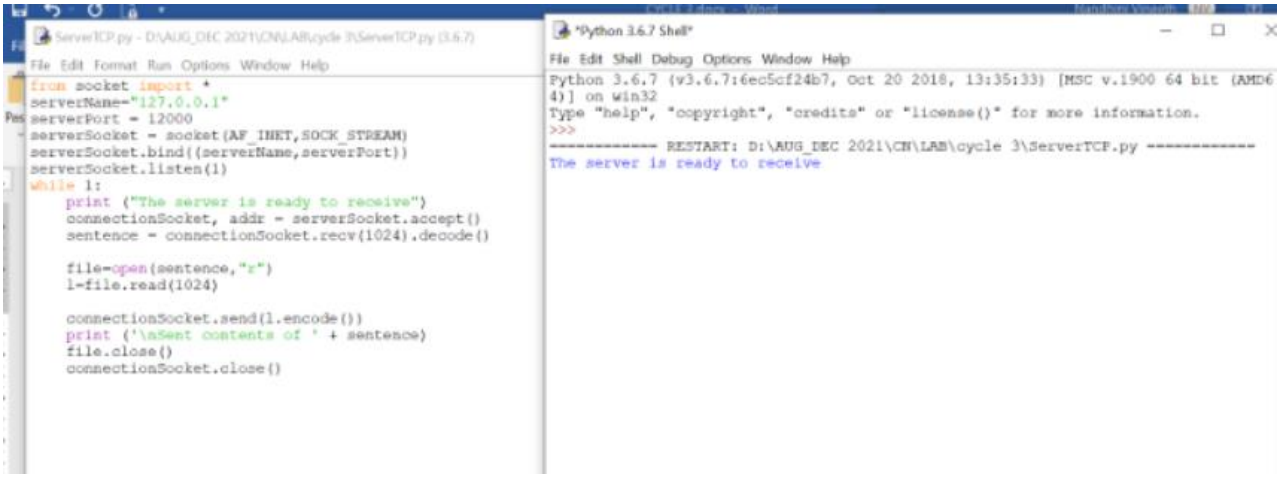
```
from socket import *
serverName = &amp;#39;127.0.0.1&amp;#39;
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input(&amp;quot;\nEnter file name: &amp;quot;)
clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print (&amp;#39;\nFrom Server:\n&amp;#39;)
print(filecontents)
clientSocket.close()
```

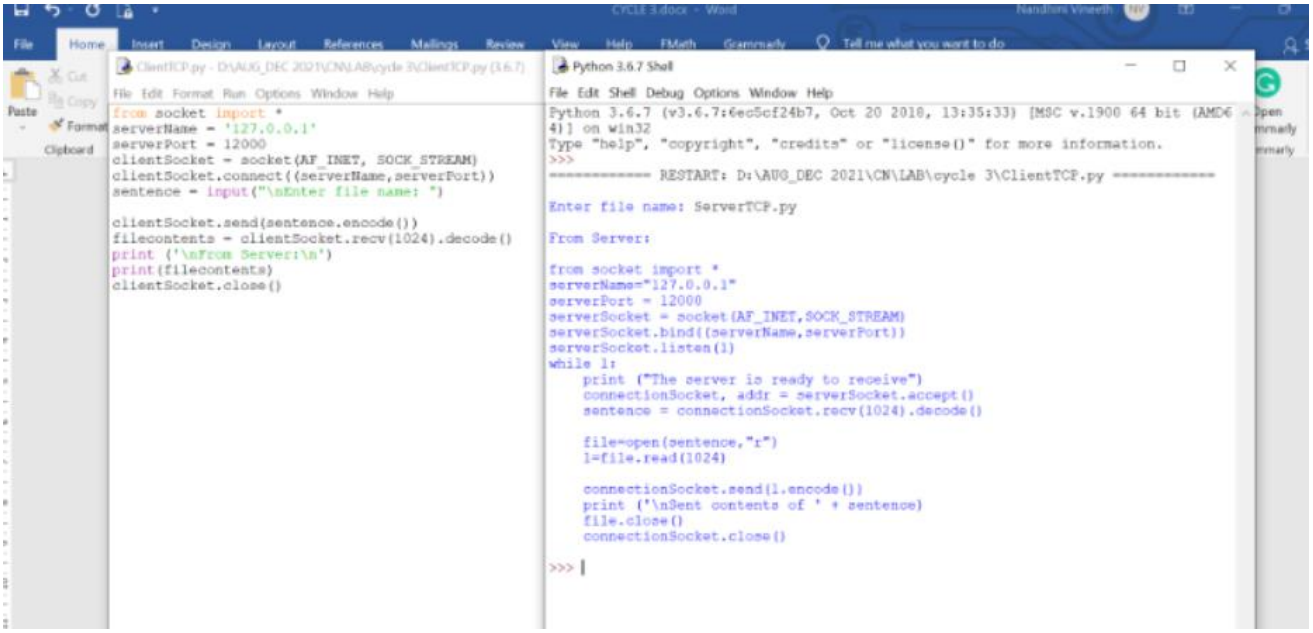
ServerTCP.py

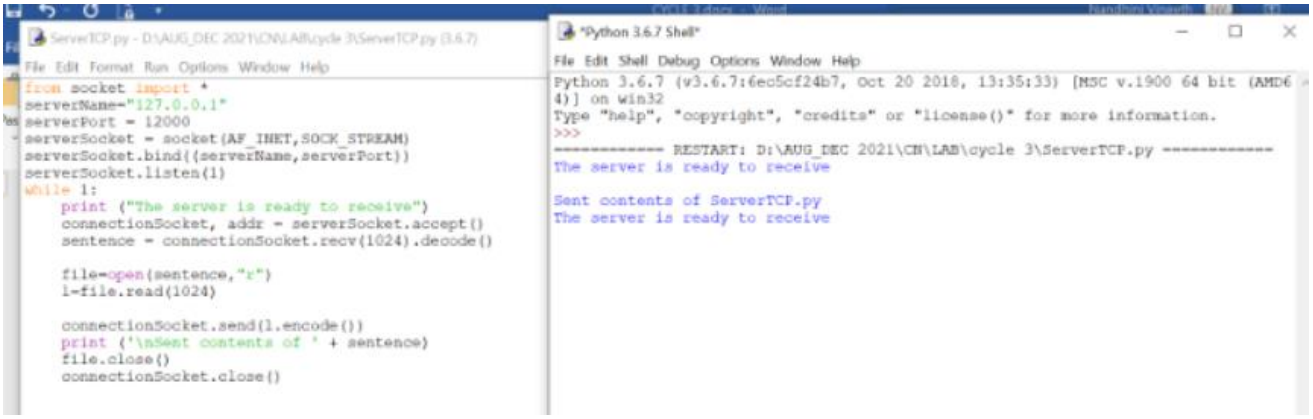
```
from socket import *
serverName=&amp;quot;127.0.0.1&amp;quot;
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
print (&amp;quot;The server is ready to receive&amp;quot;)
connectionSocket, addr = serverSocket.accept()
sentence = connectionSocket.recv(1024).decode()
file=open(sentence,&amp;quot;r&amp;quot;)
l=file.read(1024)
connectionSocket.send(l.encode())
print (&amp;#39;\nSent contents of &amp;#39; + sentence)
file.close()
```

connectionSocket.close()

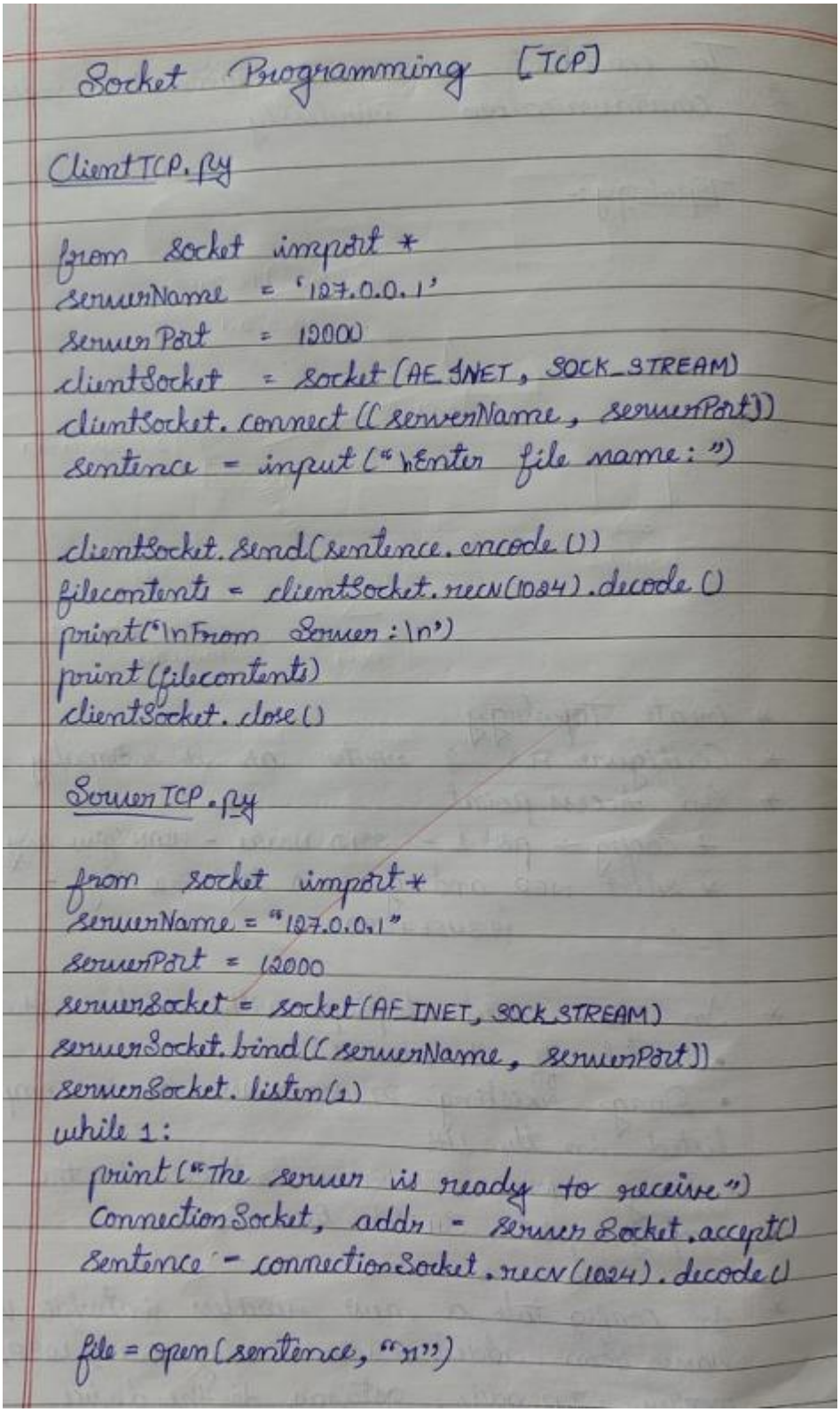
3. Output:







4. Observation:



Socket Programming [TCP]

ClientTCP.py

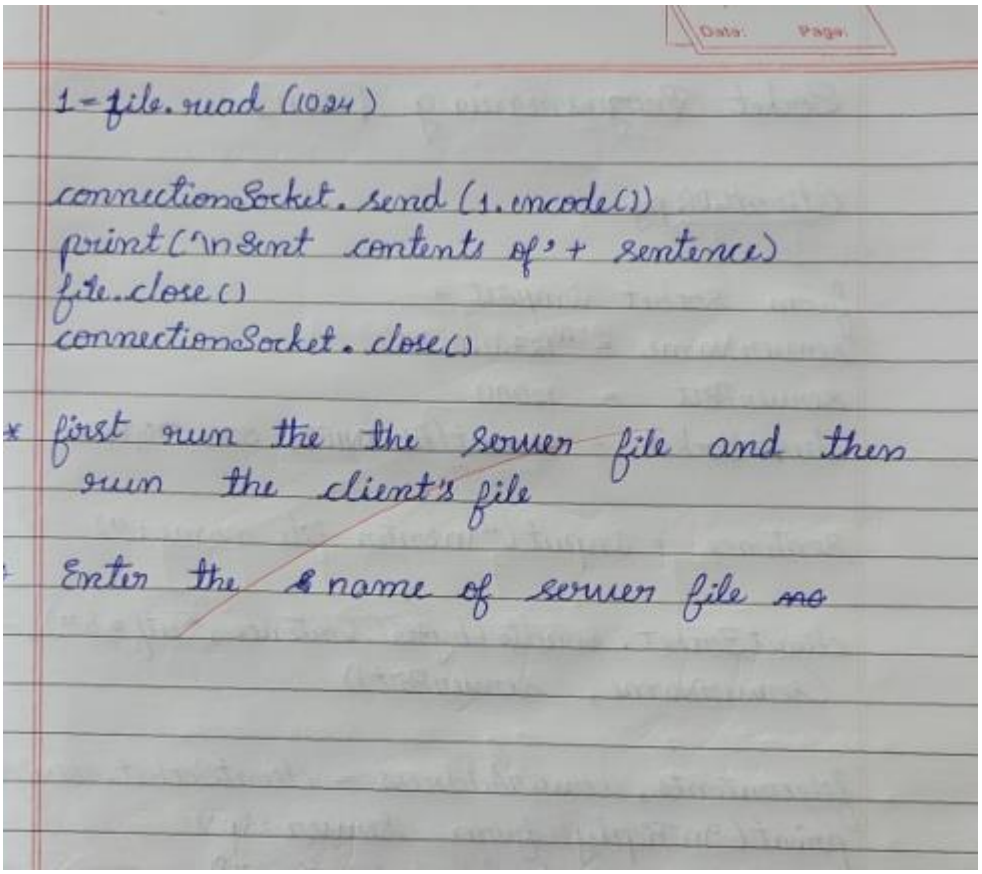
```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName, serverPort))
sentence = input("\nEnter file name: ")

clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print('\nFrom Server:\n')
print(filecontents)
clientSocket.close()
```

ServerTCP.py

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_STREAM)
serverSocket.bind((serverName, serverPort))
serverSocket.listen(1)
while 1:
    print("The server is ready to receive")
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024).decode()

    file = open(sentence, "r")
```



```
l = file.read (1024)

connectionSocket.send (l.encode())
print ('\nSent contents of' + sentence)
file.close()
connectionSocket.close()
```

* first run the the server file and then run the client's file

Enter the name of server file ~~no~~

Program 4

1. Aim: Write a program for Socket Programming [UDP]

2. Code:

ClientUDP.py

```
from socket import *
serverName = &amp;quot;127.0.0.1&amp;quot;
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)
sentence = input(&amp;quot;\nEnter file name: &amp;quot;)
clientSocket.sendto(bytes(sentence,&amp;quot;utf-8&amp;quot;),(serverName, serverPort))
filecontents,serverAddress = clientSocket.recvfrom(2048)
print (&amp;#39;\nReply from Server:\n&amp;#39;)
print (filecontents.decode(&amp;quot;utf-8&amp;quot;))
# for i in filecontents:
# print(str(i), end = &amp;#39;&amp;#39;)
clientSocket.close()
clientSocket.close()
```

ServerUDP.py

```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind((&amp;quot;127.0.0.1&amp;quot;, serverPort))
print (&amp;quot;The server is ready to receive&amp;quot;)
while 1:
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode(&amp;quot;utf-8&amp;quot;)
file=open(sentence,&amp;quot;r&amp;quot;)
con=file.read(2048)
serverSocket.sendto(bytes(con,&amp;quot;utf-8&amp;quot;),clientAddress)
print (&amp;#39;\nSent contents of &amp;#39;, end = &amp;#39; &amp;#39;)
```

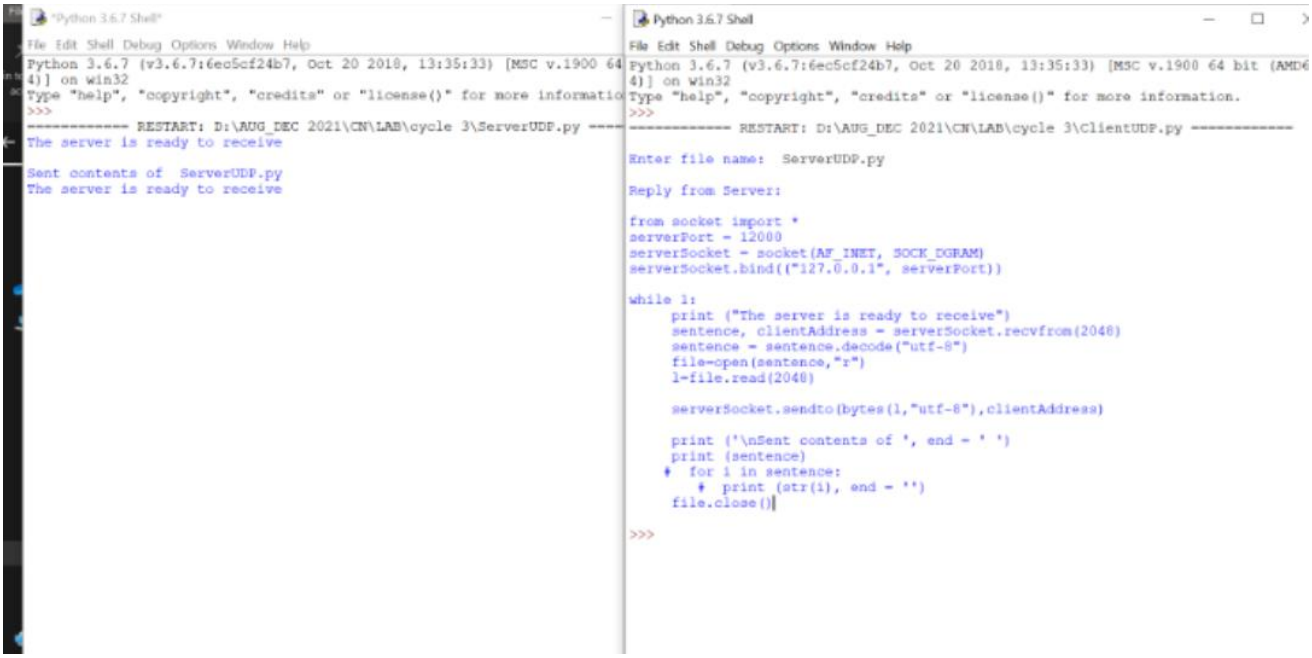
print (sentence)

for i in sentence:

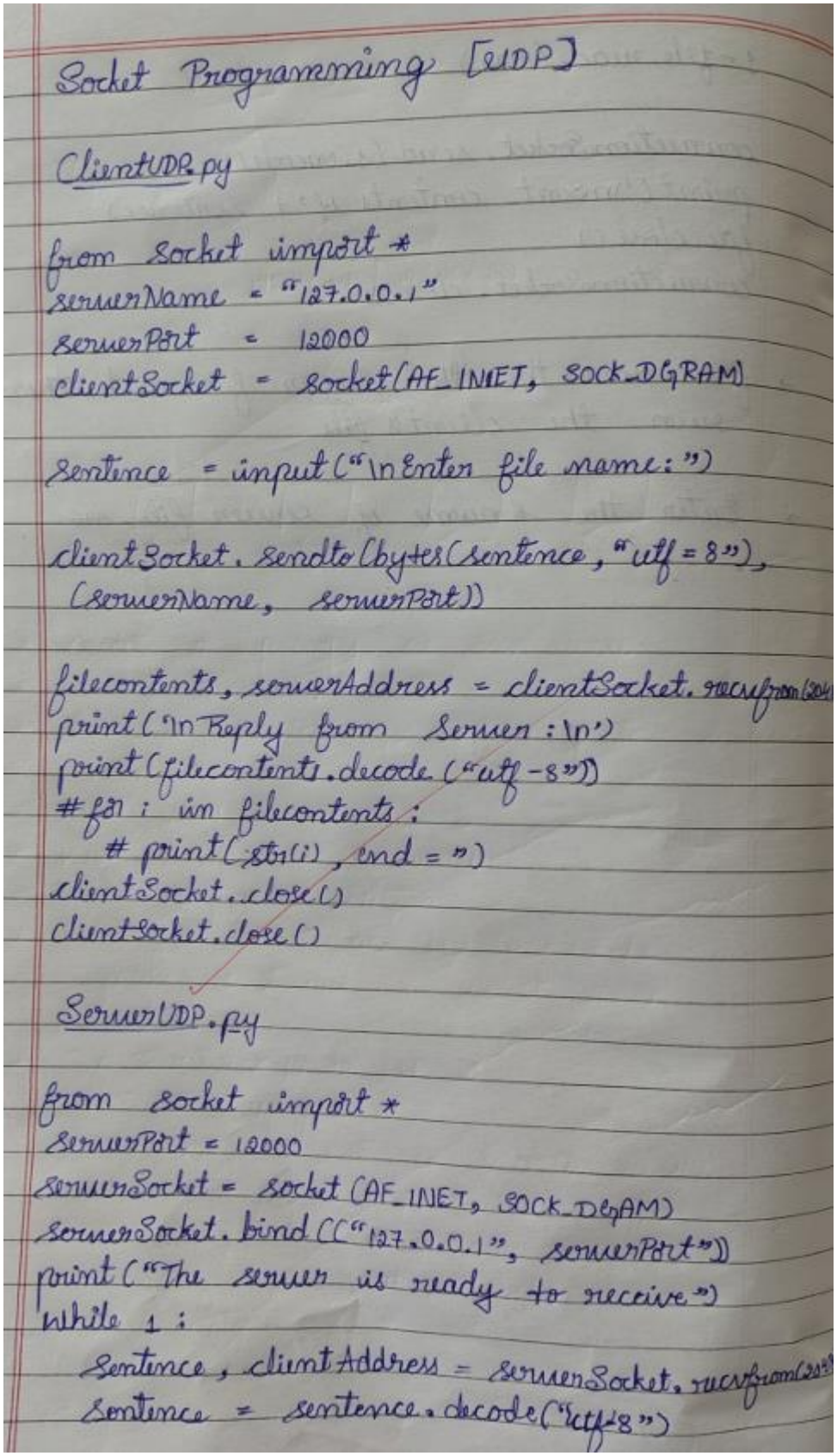
print (str(i), end = '')

file.close()

3. Output:



4. Observation:



Socket Programming [UDP]

ClientUDP.py

```
from Socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)

Sentence = input("\nEnter file name:")

clientSocket.sendto(bytes(sentence, "utf=8"),
(serverName, serverPort))

filecontents, serverAddress = clientSocket.recvfrom(20
print('\nReply from Server :\n')
print(filecontents.decode("utf-8"))
#for i in filecontents:
    # print(str(i), end = "")
clientSocket.close()
clientSocket.close()
```

ServerUDP.py

```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort"))
print("The server is ready to receive")
while 1:
    Sentence, clientAddress = serverSocket.recvfrom(20
    Sentence = sentence.decode("utf-8")
```

```
file = open(sentence, "r")
con = file.read (2048)

serverSocket.sendto(bytes(con, "utf-8"),
                    clientAddress)
print('In Sent content of ', end = ' ')
print(sentence)
# for i in sentence:
    # print (str(i), end = ' ')
file.close()
```

* first run the server file and then client file

* Enter the name of server file