VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT on

COMPUTER NETWORKS

Submitted by

ARYAN RAUNIYAR (1BM21CS034)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
BENGALURU-560019
JUN-2023 to SEP-2023
(Autonomous Institution under VTU)

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 NETWORKS" carried out by **ARYAN RAUNIYAR (1BM21CS034),** who is a bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2023. The Lab report has been approved as it satisfies the academic requirements in respect of a **Computer Networks - (22CS4PCCON)** work prescribed for the said degree.

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WEEK 1

Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping messages.

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Create a topology and simulate sending a simple PDU from source to destination using a simple HUB and switch as connecting devices.

→ Aim

To create a topology and simulate sending a simple PDU from source to destination using a simple HUB and switch as connecting device.

Procedure.

1. Start creating the topology.
2. Select the HUB in the logical workspace and connect three PC's to the ~~HUB~~ generic HUB through cu straight wire.
3. Set the IP address for all 3 PC's by clicking on PC
4. ~~Similarly select the~~ going to config and typing the needed ip address.

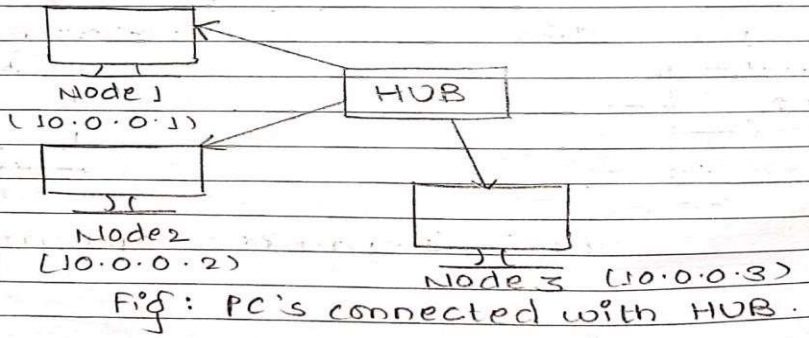

Fig: PC's connected with HUB.

4. Similarly a switch is selected in the logical workspace and connect 3 PC's to the generic switch - PT through copper st. wire.
5. Set the IP address for all 3 PC's by clicking on PC, going to configure and typing the needed ip address.

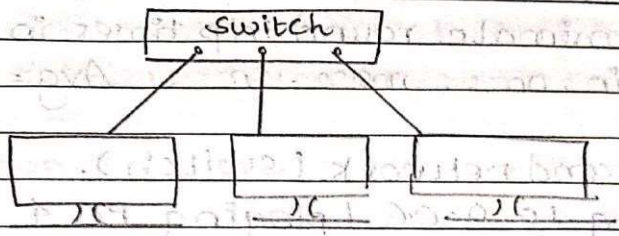

fig: PC's connected with switch.

6. Now connect the HUB and the switch with the help of a copper-cross over wire. This completes the designing of the required topology.

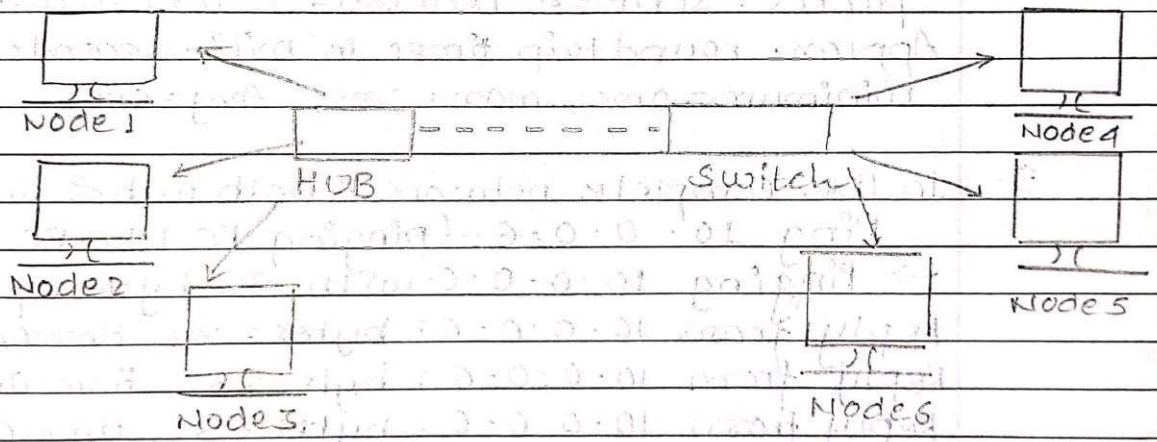

Fig: The required topology.

Output:

1. In first network (HUB)

ping 10.0.0.3 (Pinged PC 1 with PC 3)

→ Pinging 10.0.0.3 with 32 bytes of data

Reply from 10.0.0.3 : bytes=32 time=0ms TTL=128
Reply from 10.0.0.3 : bytes=32 time=0ms TTL=128
Reply from 10.0.0.3 : bytes=32 time=0ms TTL=128
Reply from 10.0.0.3 : bytes=32 time=0ms TTL=128

Pinging statistics for 10.0.0.3

Packets : sent = 4, recieved = 4, lost = 0 (0% loss).
Approximate round trip times in milisecond:
min = 0ms, max = 0ms, Avg = 0ms.

2. In second network (switch).
Ping 10.0.0.6 (pinging PC 4 to PC 6)
→ Pinging 10.0.0.6 with 32 bytes of data.
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 2ms TTL = 128
Ping statistics for 10.0.0.6
packes : sent = 4, recieved = 4, lost = 0 (0% loss),
Approx. round trip times in mili-seconds:
minimum = 0ms, max = 2ms, Avg = 0ms.

3. In the complete network (both hub & switch).
Ping 10.0.0.6 (pinging PC 1 to PC 6)
→ Pinging 10.0.0.6 with 32 bytes of data.
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Reply from 10.0.0.6 : bytes = 32 time = 0ms TTL = 128
Ping stats for 10.0.0.6
packets : sent = 4, recieved = 4, lost = 0 (0% loss)
Approximate round trips times in mili-seconds:
minimum = 0ms, max = 0ms, Avg = 0ms.

Observation:
1. When a packet is sent from PC 1 to PC 3 that are connected to the HUB it is broadcasted to all the PC, but acknowledgment is recieved from only the addressed PC.

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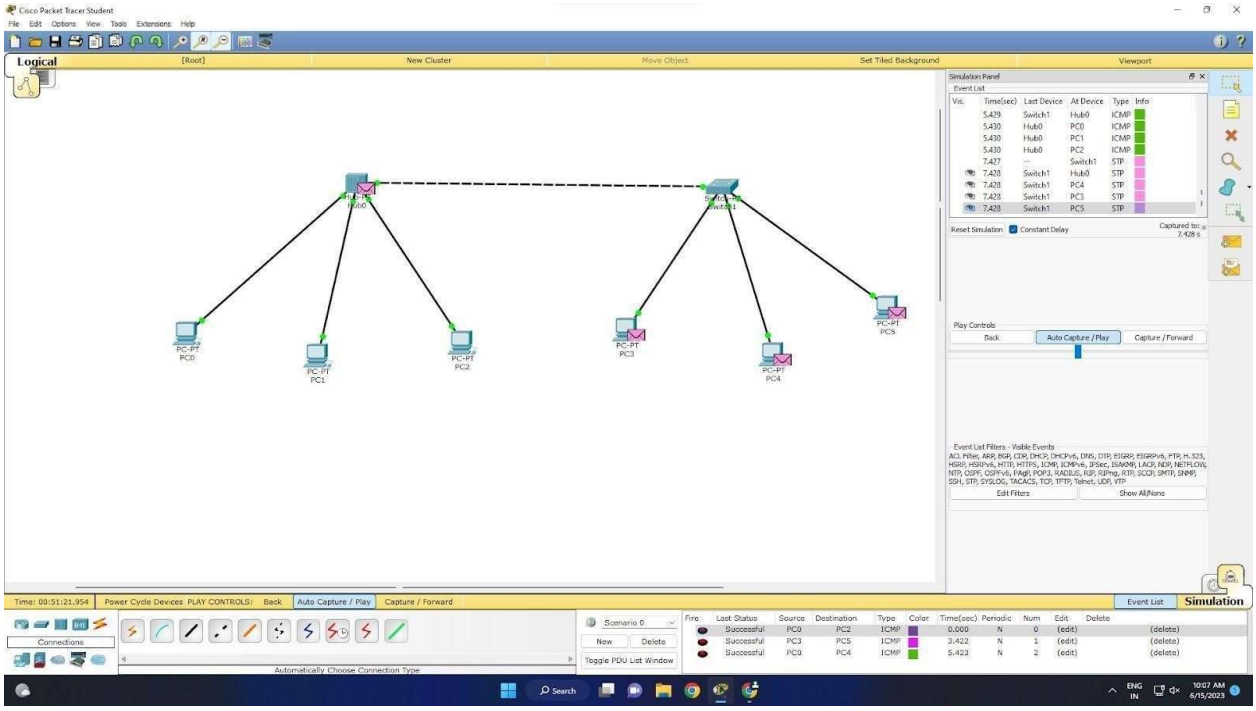
2. When PC ~~is~~ Packet is sent from PC 4 to PC 6 connected to a switch ~~it~~ at first it is broadcated to all and acknowledgement is only recieved from the addressed PC but from next time it is only unicasted that is sent to the add. PC.

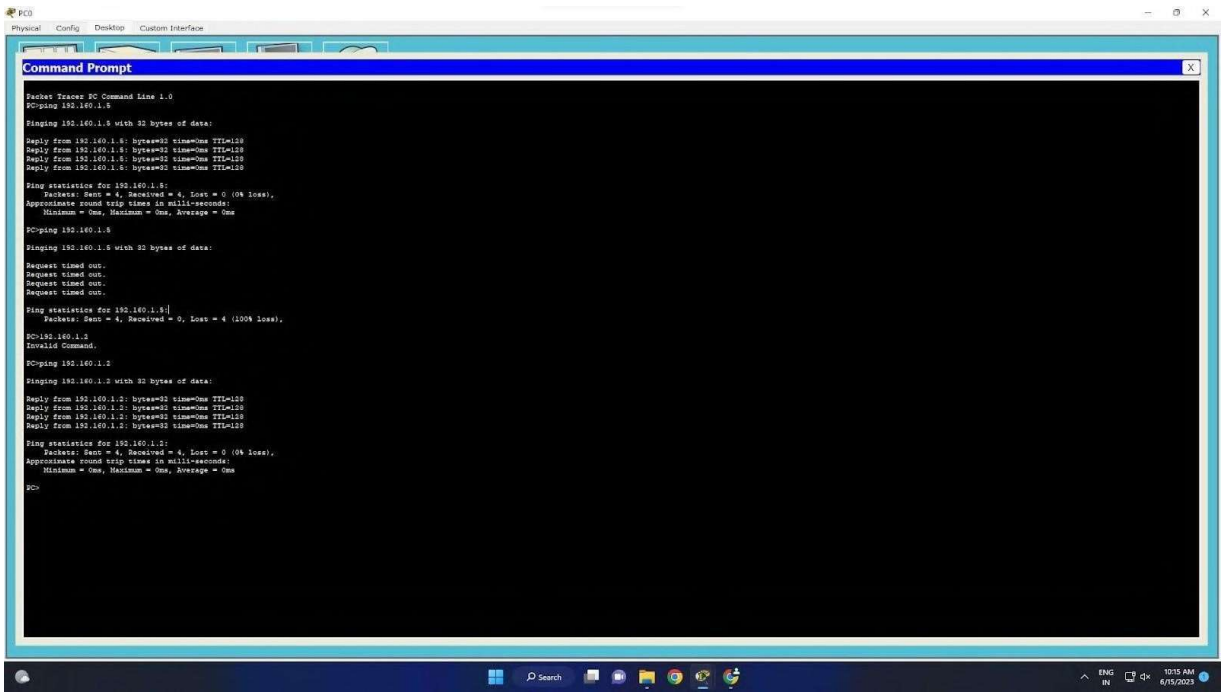
3. When Packet is sent from PC 1 to PC 6 that are connected to HUB and switch, which are also connected to eachother the packet is sent to all PC connected to HUB but no ackno. is recieved and it is only sent to the addressed PC conn. through switch and ack. is also recieved only for it.

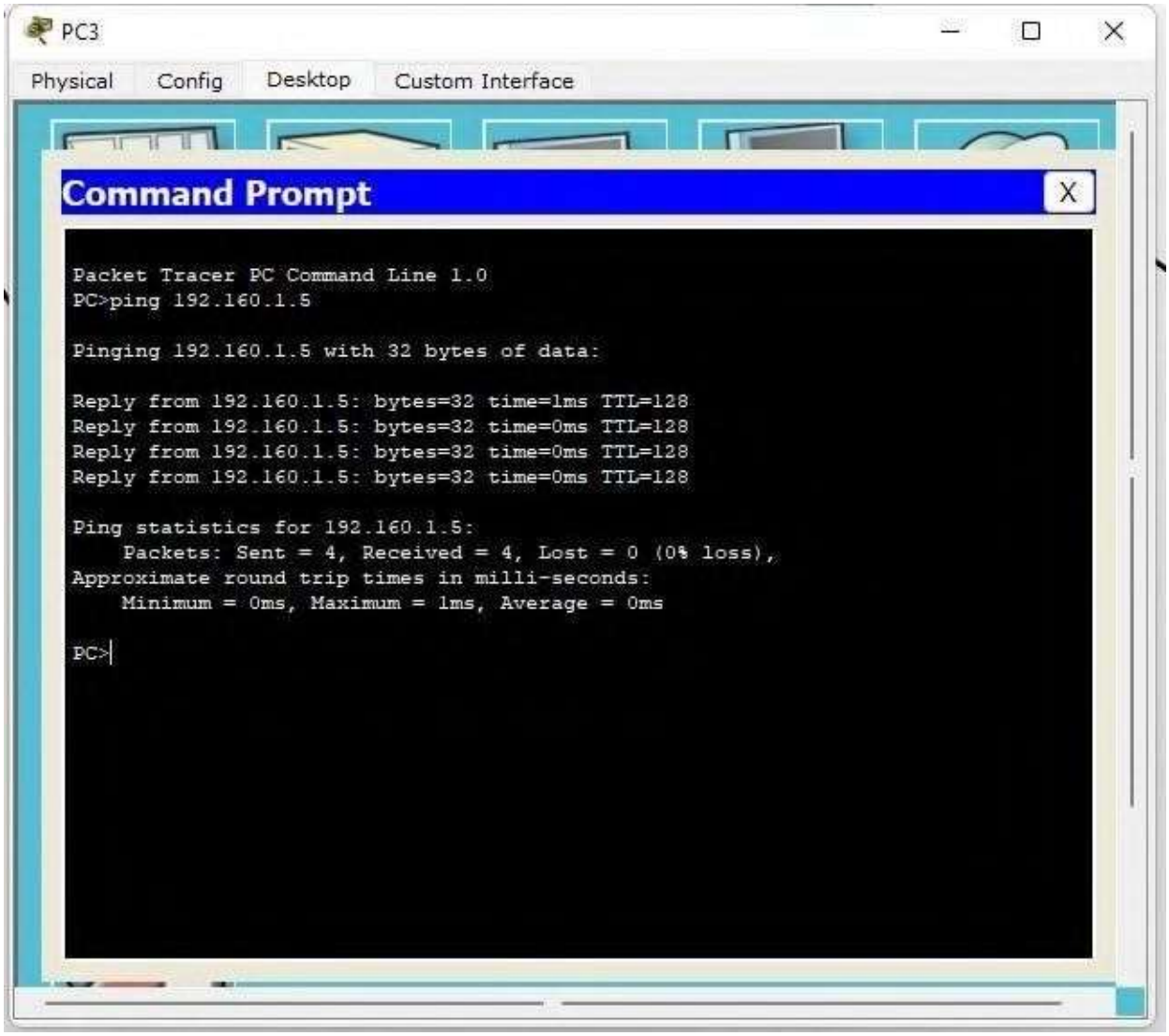
15/4/2022

TOPOLOGY:



OUTPUT:




PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Reply from 192.160.1.5: bytes=32 time=1ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Ping statistics for 192.160.1.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>

WEEK 2

Configure IP address to routers (one and three) in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply.

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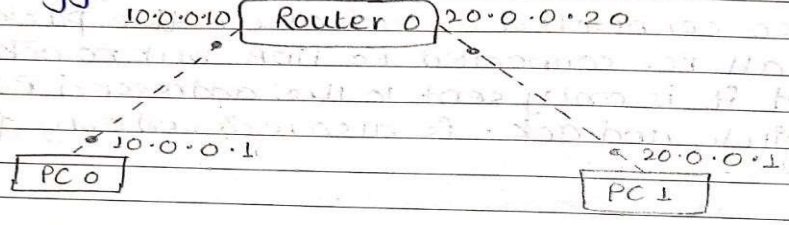
Configure IP address to routers in packet tracer. Explore the following messages: ping responses, destination unreachable, request timed out, reply.

→ Solution: '2.a'

Aim: To ~~config~~ configure IP address to routers in packet tracer and get ping responses - timed out, reply.

Topology:



Procedure:

- 2 PC's are connected to a router using copper cross-over.
- IP addresses are set for PC's and router.
- IP address for routers is set by giving following commands:

```
router >enable
router #config t
router (config)# interface fastethernet 0/0
router (config-if)# ip address 10.0.0.10
 255.0.0.0
router (config-if)# no shut
router (config-if)# exit
router (config)# interface fastethernet 1/0
router (config-if)# ip address 20.0.0.10
255.0.0.0
router (config-if)# no shut.
router (config-if)# exit.
```

- After all IP are set, ping message is sent.

Result PC > ping 20.0.0.10

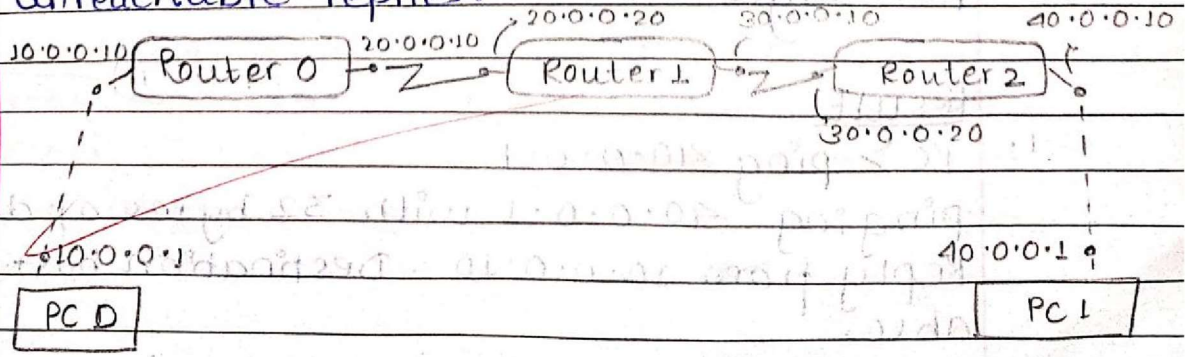
pinging 20.0.0.10 with 32 bytes of data
Request timed out.
Reply from 20.0.0.10 bytes = 32 time = 0ms TTL = 127
Reply from 20.0.0.10 bytes = 32 time = 0ms TTL = 127
Reply from 20.0.0.10 bytes = 32 time = 0ms TTL = 127
Ping statistics for 20.0.0.10.
Packets sent = 4, recieved = 3, lost = 1 (25% loss),
approximate round trip times in milli-seconds.
Minimum = 0ms, Maximum = 0ms, Average = 0ms.

Observation

PC 0 is in network 10.0.0.0 and PC 1 is in 20.0.0.0. Hence we use router to connect them when a ping message is sent from PC 10.0.0.1 to 20.0.0.1, if the message reaches the destination through router. When a message is sent, the router captures it and sends to the destination PC which is in another network.

Solution: 2b.

Aim: To configure IP address to routers in packet tracer and get ping responses, destination host unreachable replies.



Procedure.

- connect to corresponding routers using copper cross-over.
- connect routers using serial-DCE.
- set IP address for PC's
- configure IP address to routers by giving commands in CLI.
- After all IP's are set, ping PC to get destination host unreachable message.
- route the IP's to the adjacent IP's using following command -

for router 0 - router (config)# ip route 30.0.0.0 255.0.0.0 20.0.0.20

router (config)# ip route 40.0.0.0 255.0.0.0 20.0.0.20

for router 1 - router (config)# ip route 10.0.0.0 255.0.0.0 20.0.0.10

- router (config)# ip route 40.0.0.0 255.0.0.0 30.0.0.20

for router 2 - router (config)# ip route 10.0.0.0 255.0.0.0 30.0.0.10

router (config)# ip route 20.0.0.0 255.0.0.0 30.0.0.10

- After this is done, ping pc to get reply messages.

Result

1. PC> ping 40.0.0.1

Pinging 40.0.0.1 with 32 bytes of data.
Reply from 10.0.0.10 : Destination host unreachable.
Reply from 10.0.0.10 : Destination host unreachable.

Reply
Reply
Ping
pa

2. PC > P

Pinging
Reply
Reply
Reply
Reply
Ping (s
Packe
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Observa

PC 0 is
40.0.0.
initially
0 and 4
sent fro
the dest
router an
After
adjacent
message
desired
destinati

Reply from 10.0.0.10 Destination host unreachable.
Reply from 10.0.0.10 Destination host unreachable.
Ping statistics for 40.0.0.1:
packets: sent = 4, Received = 0, lost = 4 (100% loss)

2. PC > Ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data.
Reply from 10.0.0.10 bytes = 32 time = 16ms TTL = 128
Reply from 10.0.0.10 bytes = 32 time = 1ms TTL = 128
Reply from 10.0.0.10 bytes = 32 time = 2ms TTL = 128
Reply from 10.0.0.10 bytes = 32 time = 4ms TTL = 128
Ping statics for 10.0.0.1
Packets sent = 4, recieved = 4, loss = 0 (0% loss)
Approximate round trip times in mili-seconds.
Minimum = 1ms, maximum = 16ms, average = 6ms.

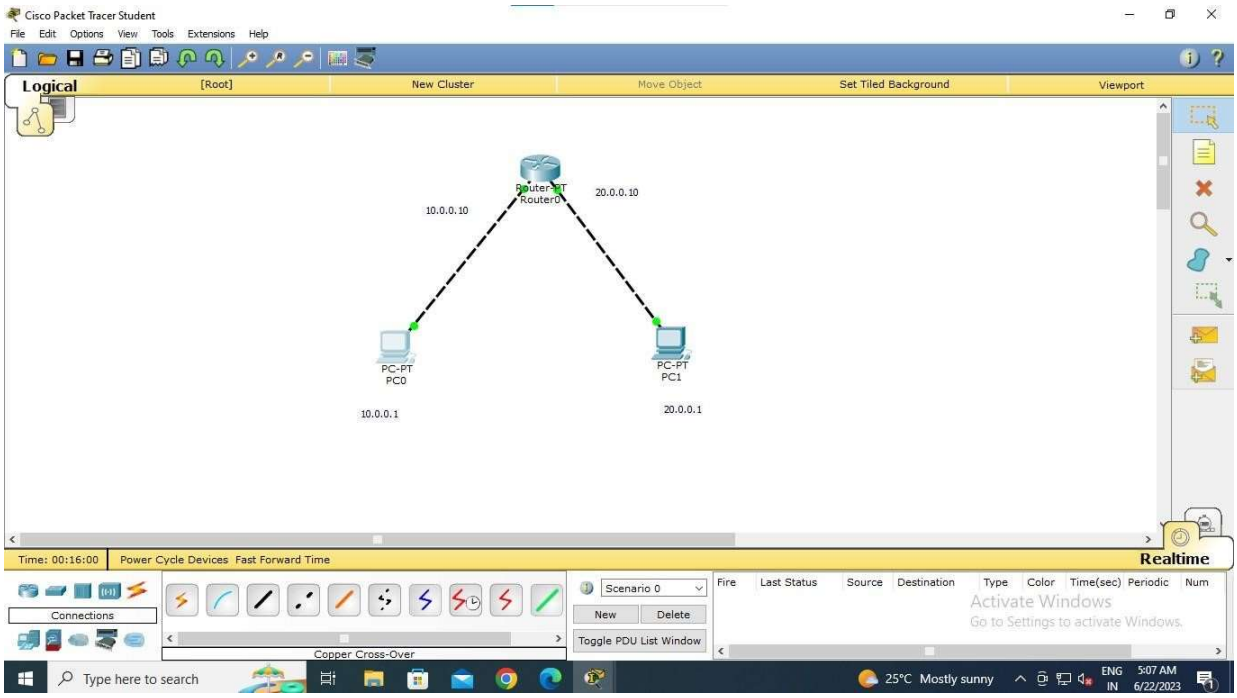
Observations

PC 0 is in network 10.0.0.0 and PC 1 is in network 40.0.0.0. There the 3 routers in between which initially directly connect 10.0.0.0, 20.0.0.0, 30.0.0.0 and 40.0.0.0. Hence when a ping message is sent from 10.0.0.1 to 40.0.0.1, it doesn't reach the destination. Instead it only reaches the first router and gives destination host unreachable msg.

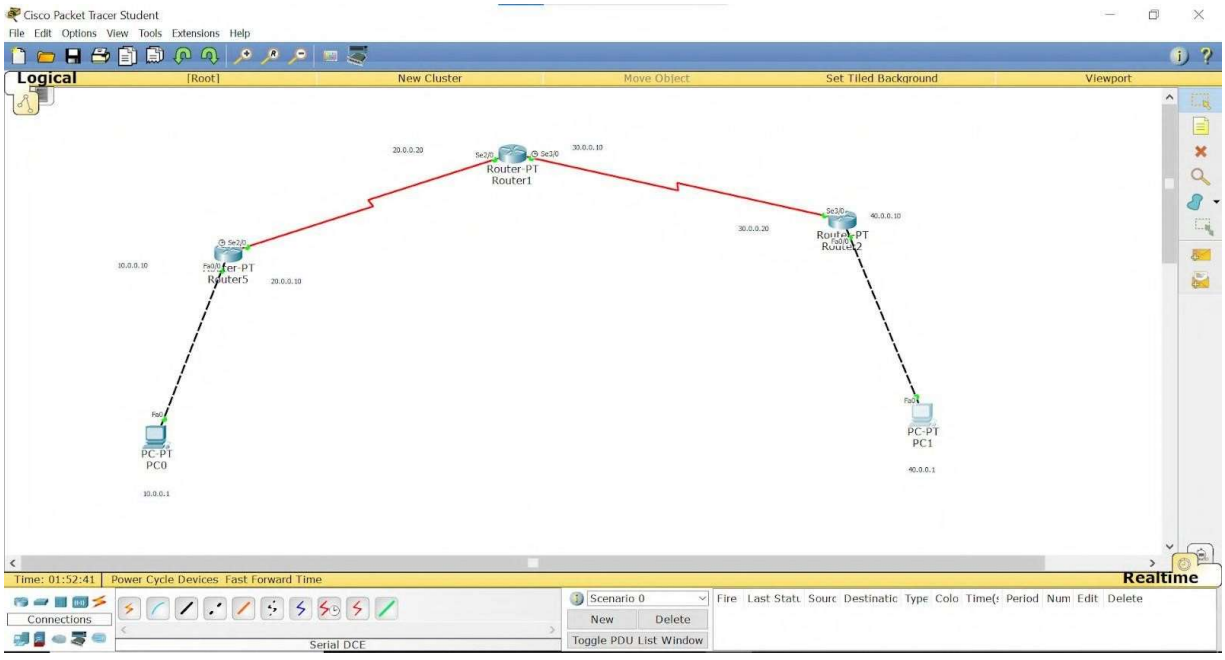
After letting the routers know about other adjacent networks, (next hop) we send a ping message from 40.0.0.1 to 10.0.0.1 to get desired result. The message reaches the destination.

TOPOLOGY:

PROGRAM 2.1

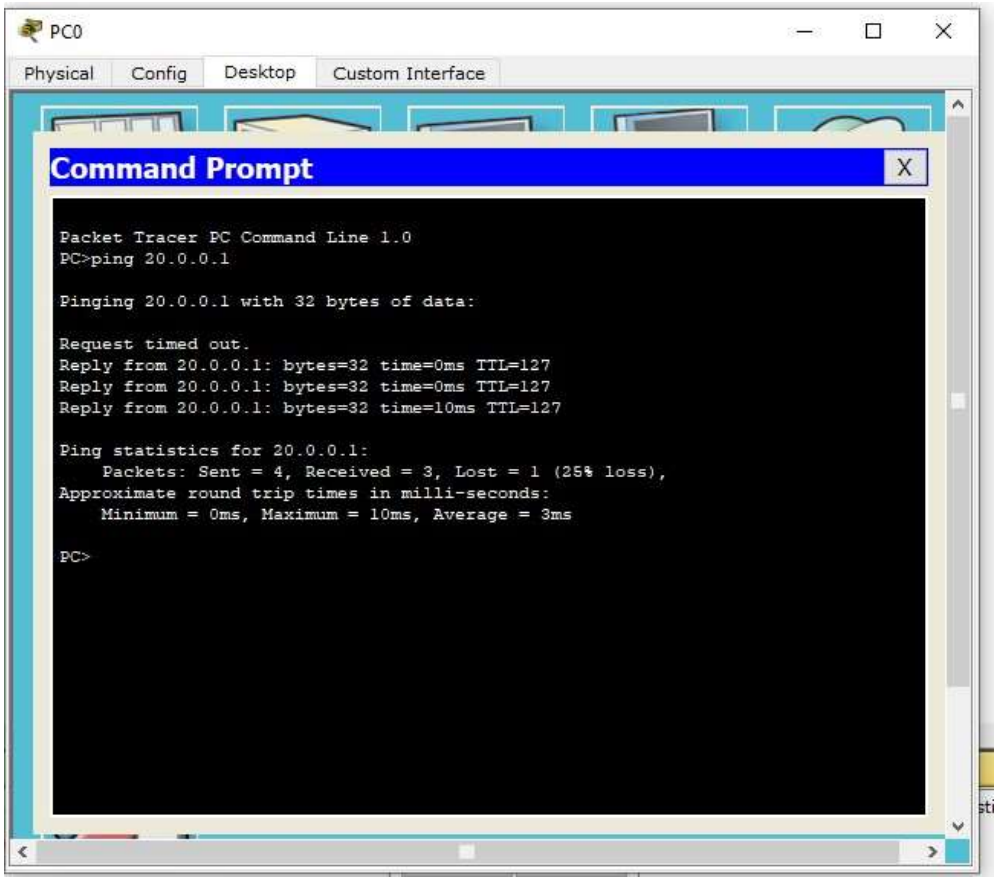


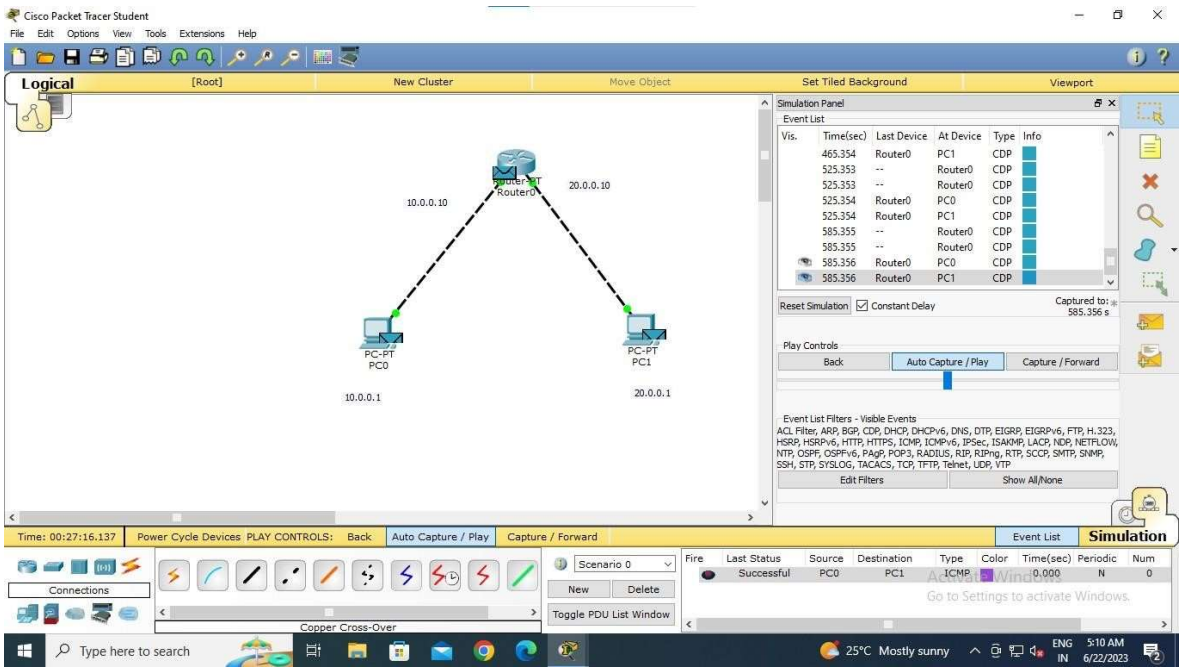
PROGRAM 2.2



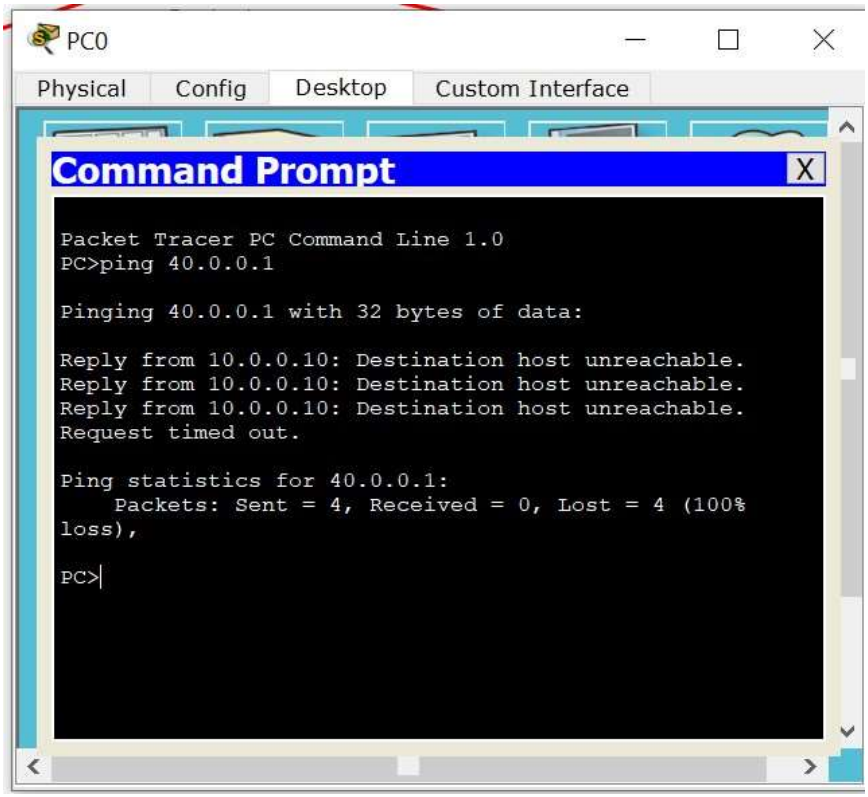
OUTPUT:

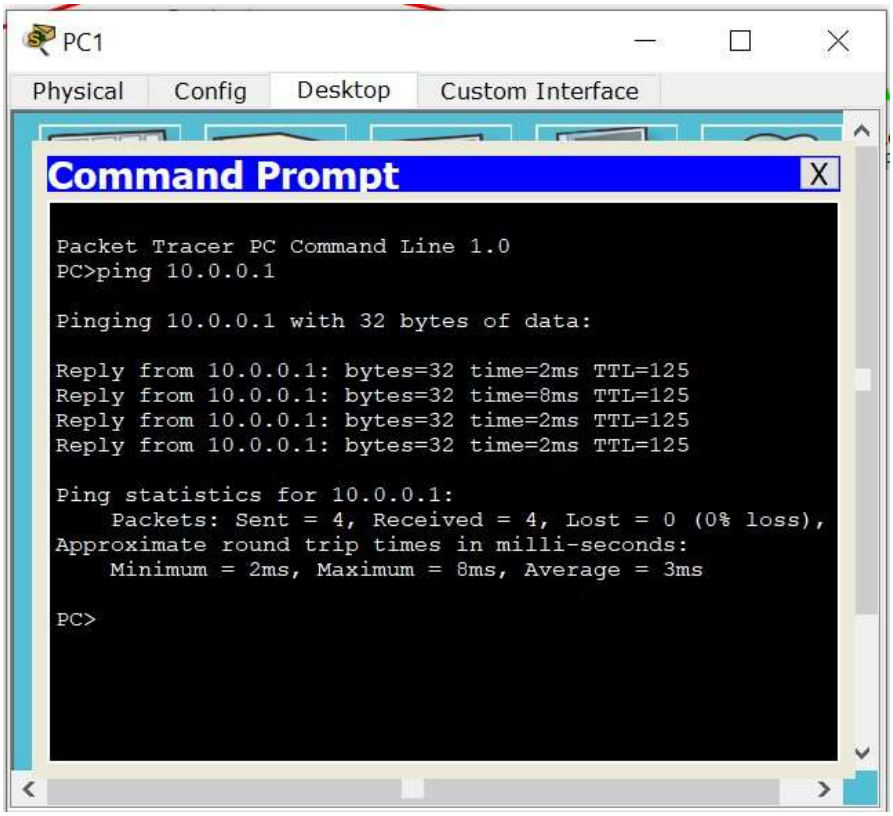
PROGRAM 2.1

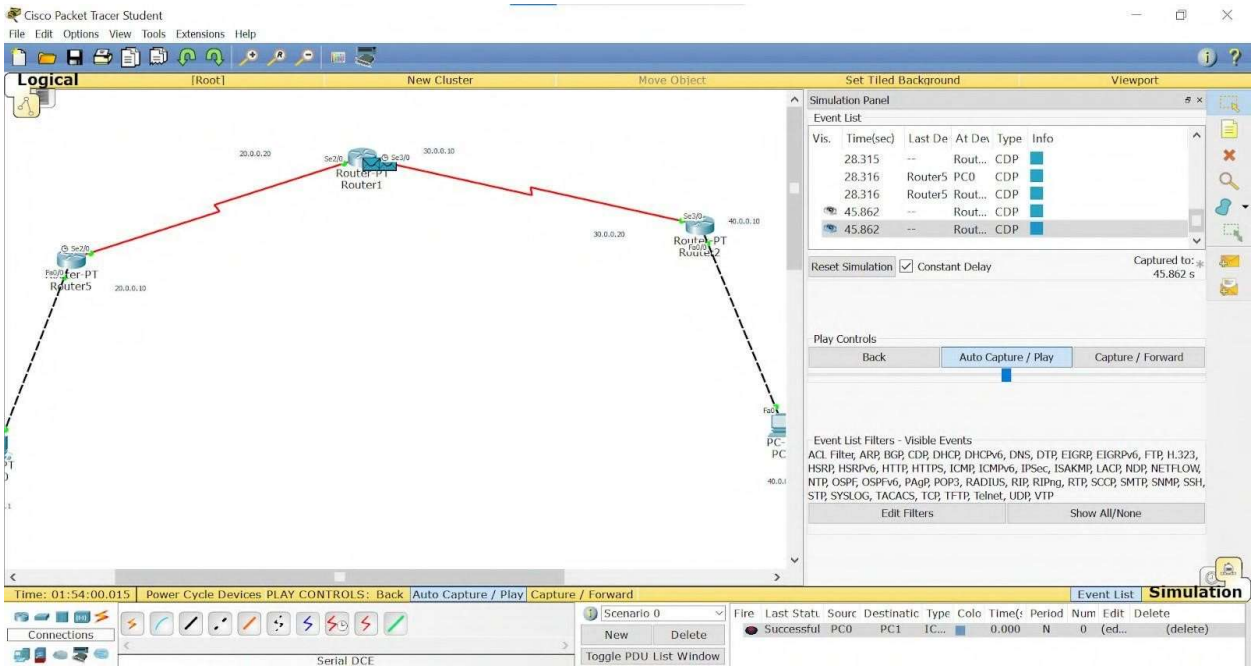




PROGRAM 2.2


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 10.0.0.10: Destination host unreachable.
Reply from 10.0.0.10: Destination host unreachable.
Reply from 10.0.0.10: Destination host unreachable.
Request timed out.
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100%
loss),
PC>


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 8ms, Average = 3ms
PC>


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router5
Router-PT
Router2
PC-PT
PC
20.0.0.20
30.0.0.10
30.0.0.20
40.0.0.10
20.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
28.315 -- Rout... CDP
28.316 Router5 PC0 CDP
28.316 Router5 Rout... CDP
45.862 -- Rout... CDP
45.862 -- Rout... CDP
Reset Simulation
Constant Delay
Captured to:
45.862 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 01:54:00.015
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

WEEK 3

Configure default route, static route to the Router.

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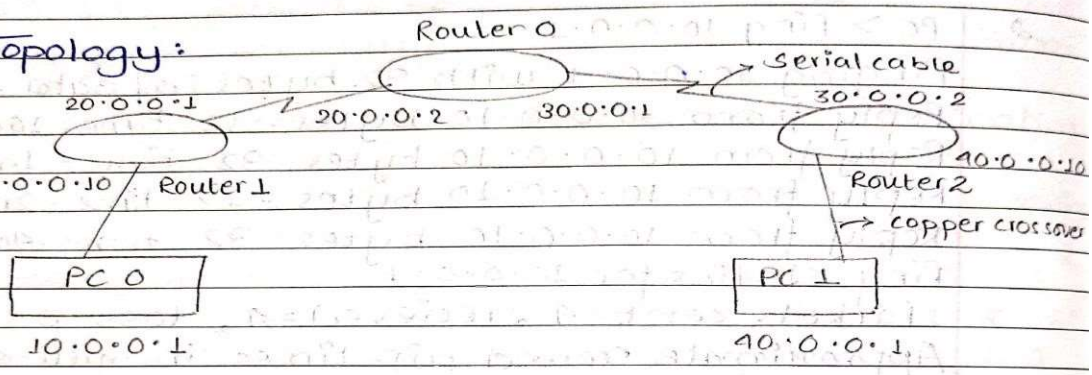
Configure default and static route for a connection of routers.

Aim: Configure default and static route for a connection of routers.

Topology:



Procedure.

1. Select 3 generic routers and two PCs as end devices. Connect the PC's to different routers with copper cross-over and connect both the routers to the main router with serial cable.
2. Set IP address for PC and gateways.
3. Set the gateway ~~in~~ addresses in all the routers taking as fastethernet for the PC's and serial for routers.
4. Connect the PC's to the interfaces.
5. Config-steps.

```
>enable (router 1)
# config t
# interface fastethernet 0/0.
# ip address 10.0.0.10 255.0.0.0
# no shut.
# exit
# interface serial 2/0.
```

IP address 20.0.0.1 255.0.0.0
no shut
exit.

similarly for router-0

>enable
config t
interface serial 2/0
ip address 20.0.0.2 255.0.0.0
no shut
exit
interface serial 3/0
ip address 30.0.0.1 255.0.0.0
no shut
exit.

for router-2

>enable
#config t
interface fastethernet 0/0
IP address 40.0.0.10 255.0.0.0
no shut
exit
interface serial 2/0.
ip address 30.0.0.2 255.0.0.0
no shut
exit.

6. we need to set IP routes for all routes via routers. For router-1 & router-2, we do default routing and for router-0, static routing is done.

For router-1

#config t
#ip route 0.0.0.0 0.0.0.0 20.0.0.2
no shut

#exit
show ip route
C 10.0.0.0/8 is directly connected, FastEthernet0/0
C 20.0.0.0/8 is directly connected, Serial 2/0.
S 0.0.0.0/0 [1/0] via 20.0.0.2

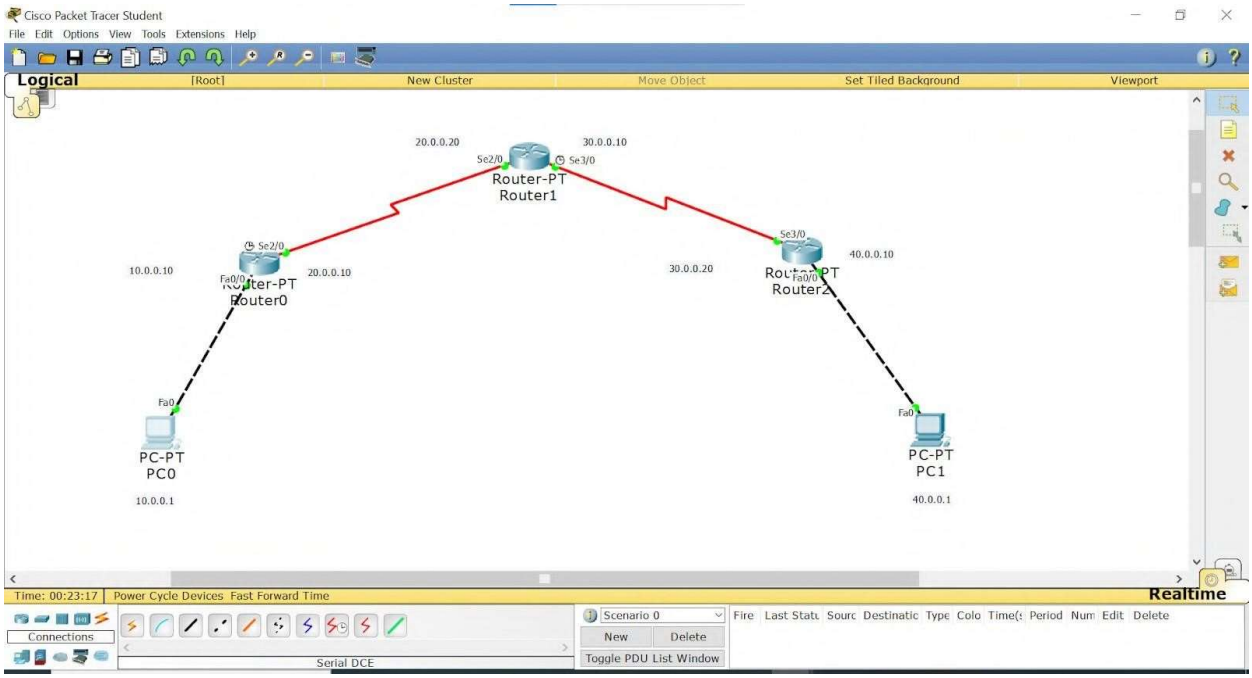
Primilarly for router 2
config t
ip route 0.0.0.0 0.0.0.0 30.0.0.1
exit.
Show ip route.

For router-0 (static routing)
#config t
ip route 10.0.0.0 255.0.0.0 20.0.0.0
ip route 40.0.0.0 255.0.0.0 30.0.0.0
exit.
show ip route.
S 10.0.0.0/8 [1/0] via 20.0.0.0
C 20.0.0.0/8 is directly connected, serial 2/0.
C 30.0.0.0/8 is directly connected, serial 3/0.
S 40.0.0.0/8 [1/0] via 30.0.0.0

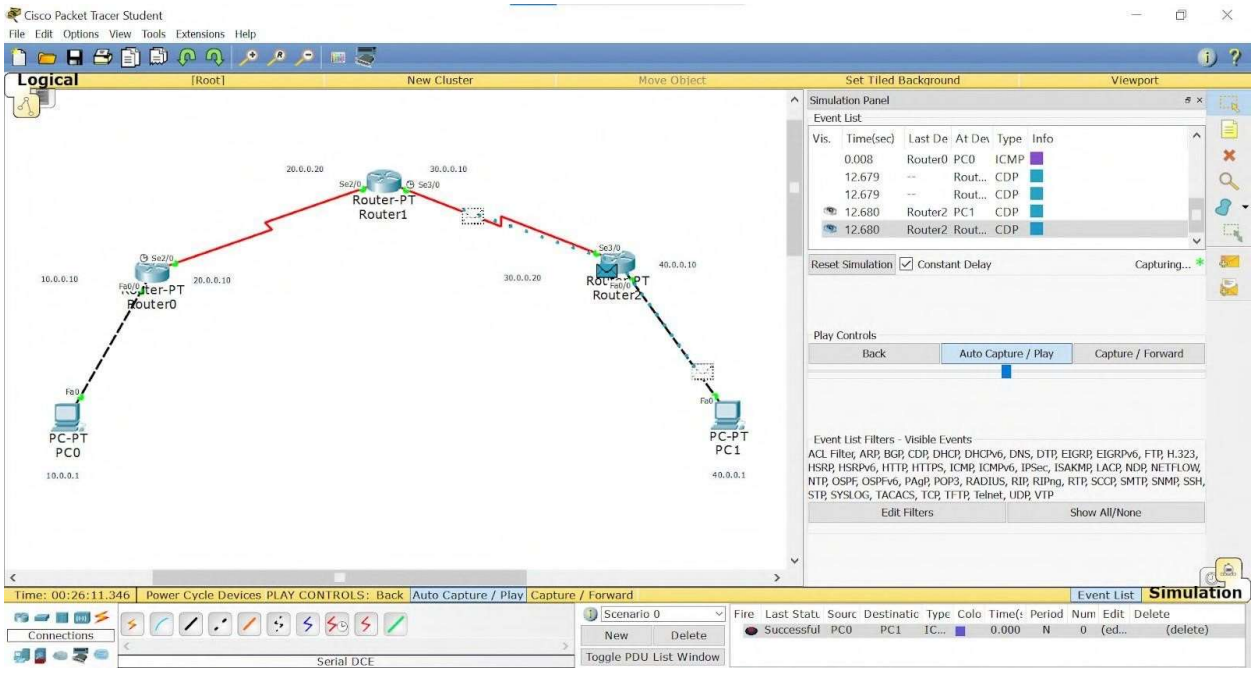
→ Now we ping 10.0.0.1 from the command prompt of 40.0.0.1.
Request timed out.
Reply from 40.0.0.1 bytes=32 time=2ms TTL=125
Reply from 40.0.0.1 bytes=32 time=2ms TTL=125
Reply from 40.0.0.1 bytes=32 time=2ms TTL=125
Ping status for 40.0.0.1
Packets sent=4, Recieved=3 (lost=1 (25% loss).

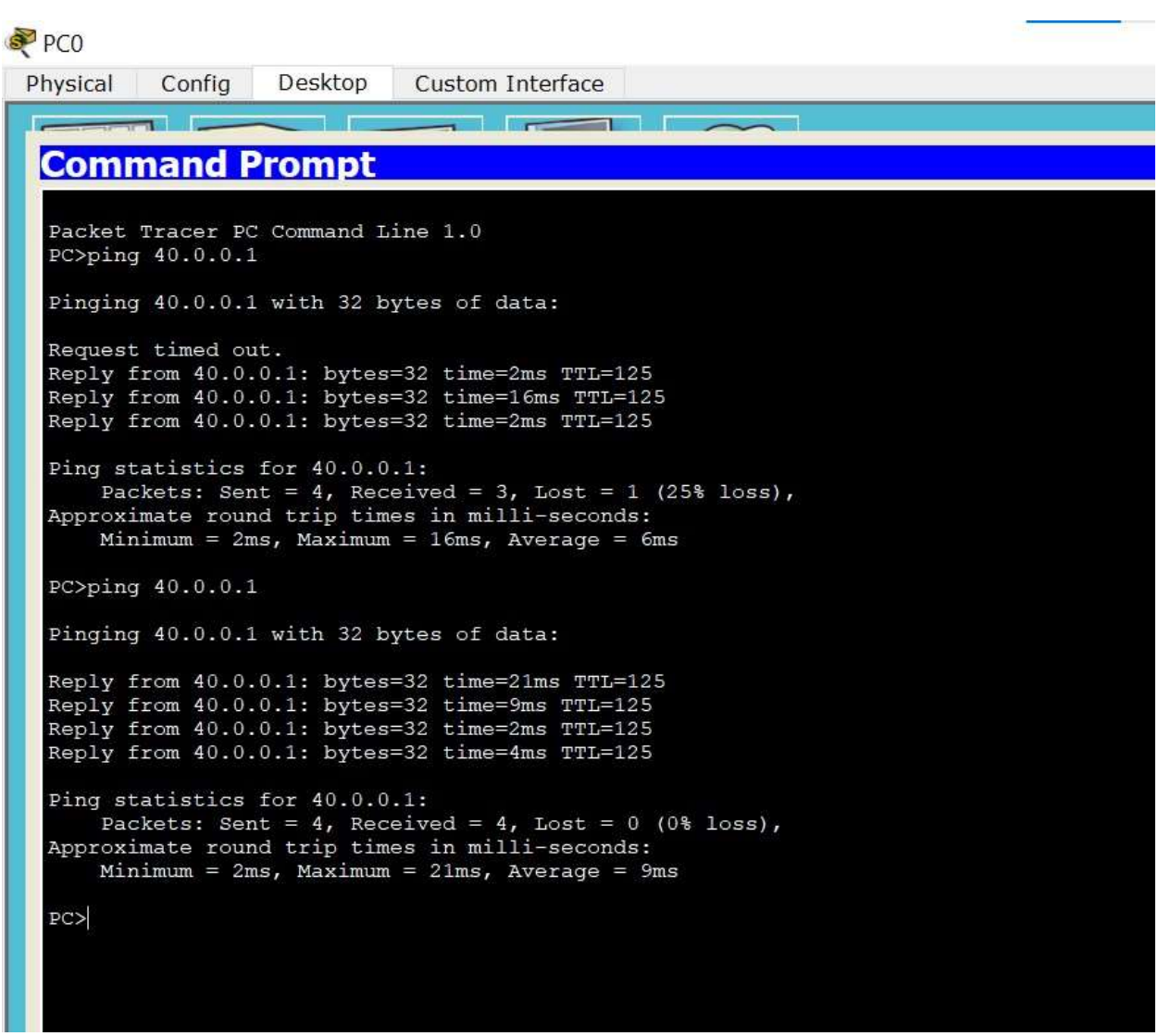
Observation
Through default routing we configure the network here.

TOPOLOGY:



OUTPUT:




PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=16ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 16ms, Average = 6ms
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Reply from 40.0.0.1: bytes=32 time=21ms TTL=125
Reply from 40.0.0.1: bytes=32 time=9ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=4ms TTL=125
Ping statistics for 40.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 21ms, Average = 9ms
PC>

WEEK 4

Configure DHCP within a LAN and outside LAN.

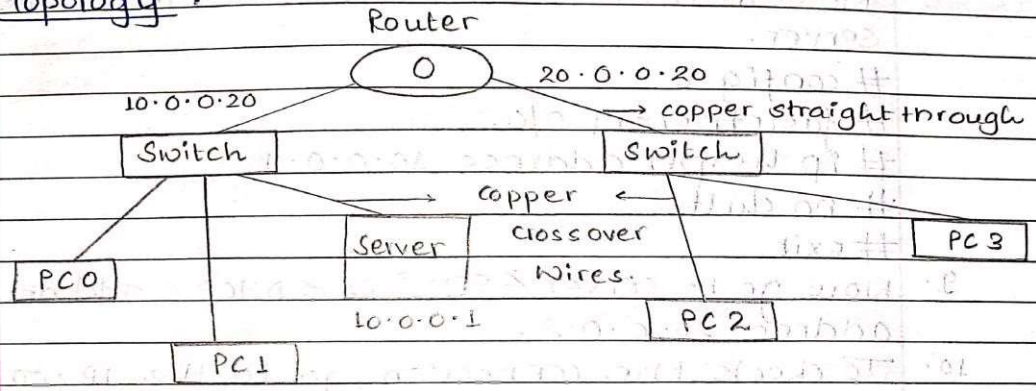
OBSERVATION:

Date / /
Page 15

Configure DHCP within a LAN and outside the LAN.

Aim : Connection of server LAN within and outside the network using switches and routers.

Topology :



Procedure

1. Select two or more PC and a server connecting to switch. and another network with only end devices and switch.
2. Connect both switches to router.
3. Set IP address of server as 10.0.0.1.
4. Now go to services < select DHCP < save the current IP address 20.0.0.2.
5. Now check the IP addresses of other devices in the network in the IP configuration in desktop.
6. Now in the CLI of router enable follow steps:

```
enable
# configt
# interface fastethernet 4/0.
# ip address 10.0.0.10 255.0.0.0
# no shut
# exit.
# interface fastethernet 0/0.
```

ip address 20.0.0.20 255.0.0.0
no shut
exit.

7. Go to server < config < gateway 10.0.0.20
8. Now in router, we need to set ip address of server.
config t
fastethernet 0/0.
ip helper address 10.0.0.1
no shut
exit
9. Now go to server < services < DHCP < add new IP address 20.0.0.2.
10. To check the connection, go to the IP configuration of PC outside the network and click on DHCP and IP gateway will be visible.

Result

From server - from PC2 to PC 0 whose ip address is 10.0.0.2

PC > ping 10.0.0.2
pinging 10.0.0.2 with 32 bytes of data:
Request timed out.

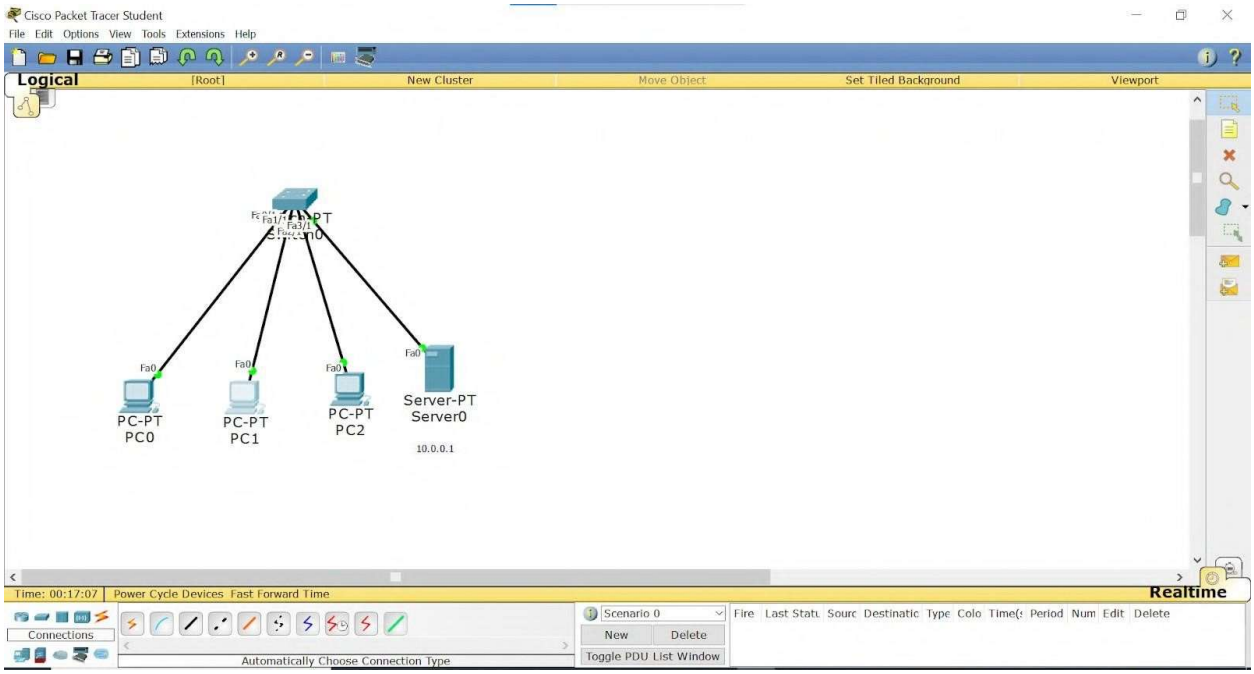
Reply from 10.0.0.2 : bytes = 32 time=6ms TTL = 125
Reply from 10.0.0.2 : bytes = 32 time = 2ms TTL = 125
Reply from 10.0.0.2 : bytes = 32 time = 12 ms TTL=125
ping statistics for 10.0.0.2
Packets : sent = 4, Received = 3, lost = 1
Approximate round trip time in milliseconds.
Minimum = 2ms, Maximum = 12 ms, Average = 6ms.

Observation

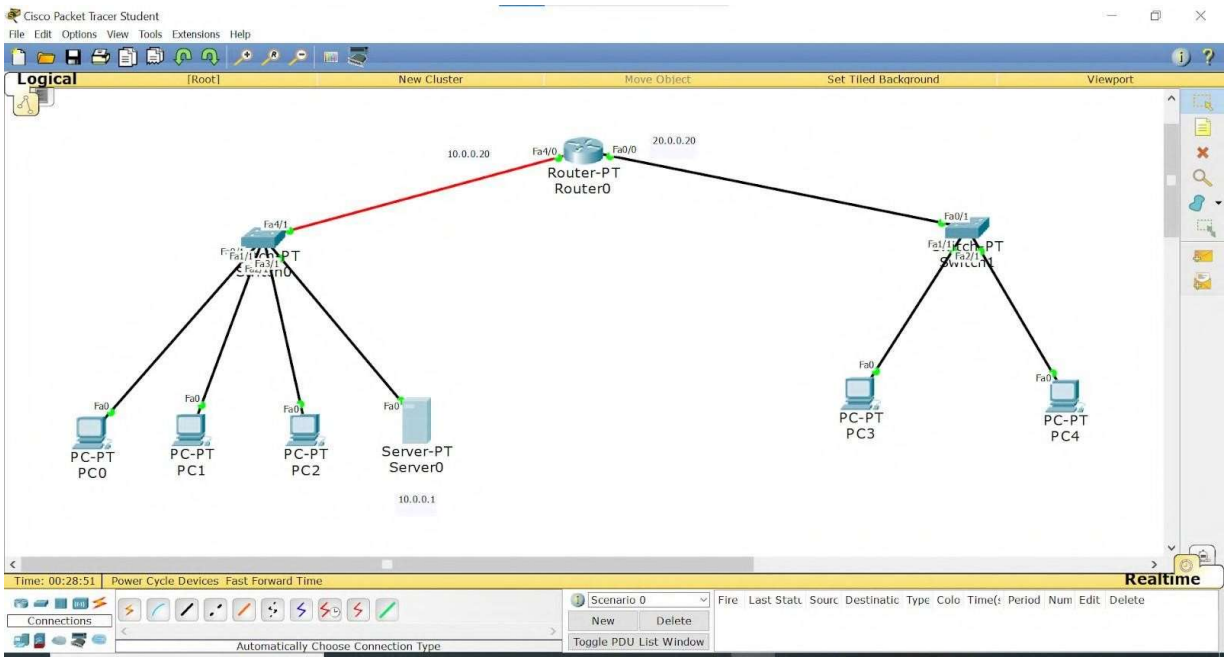
IP address of PC 2 and PC 3 are also automatically set by the server0. IP address of PC 2 to 20.0.0.2 and PC 3 to 20.0.0.3. we could successfully ping PC 2 to PC 0 without loss.

TOPOLOGY:

PROGRAM 4.1:

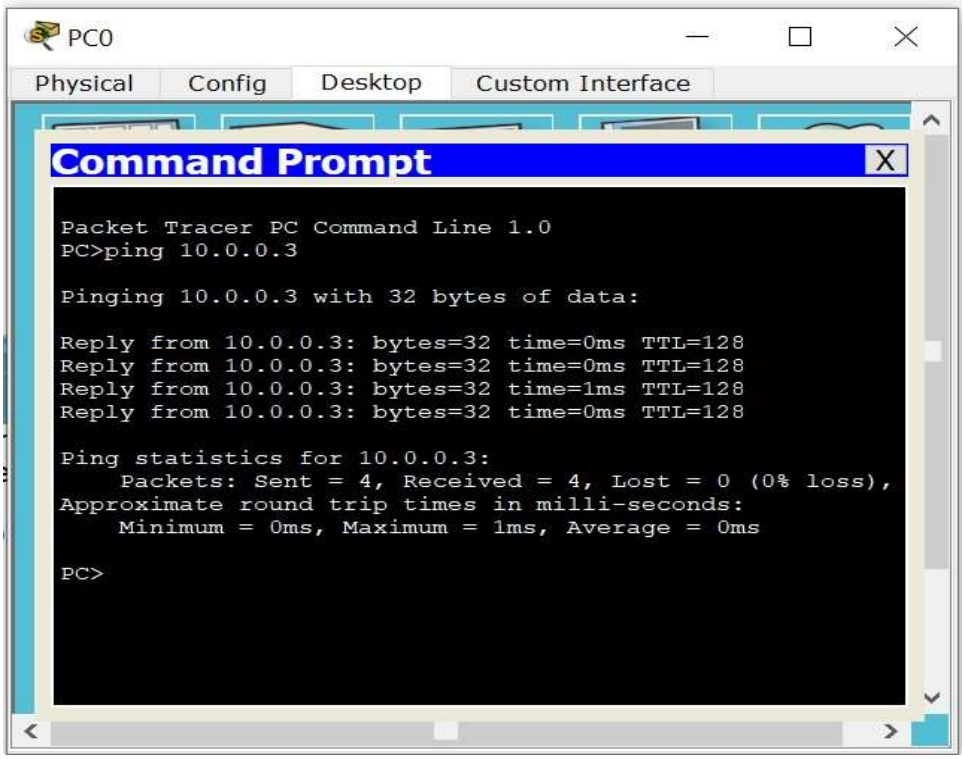


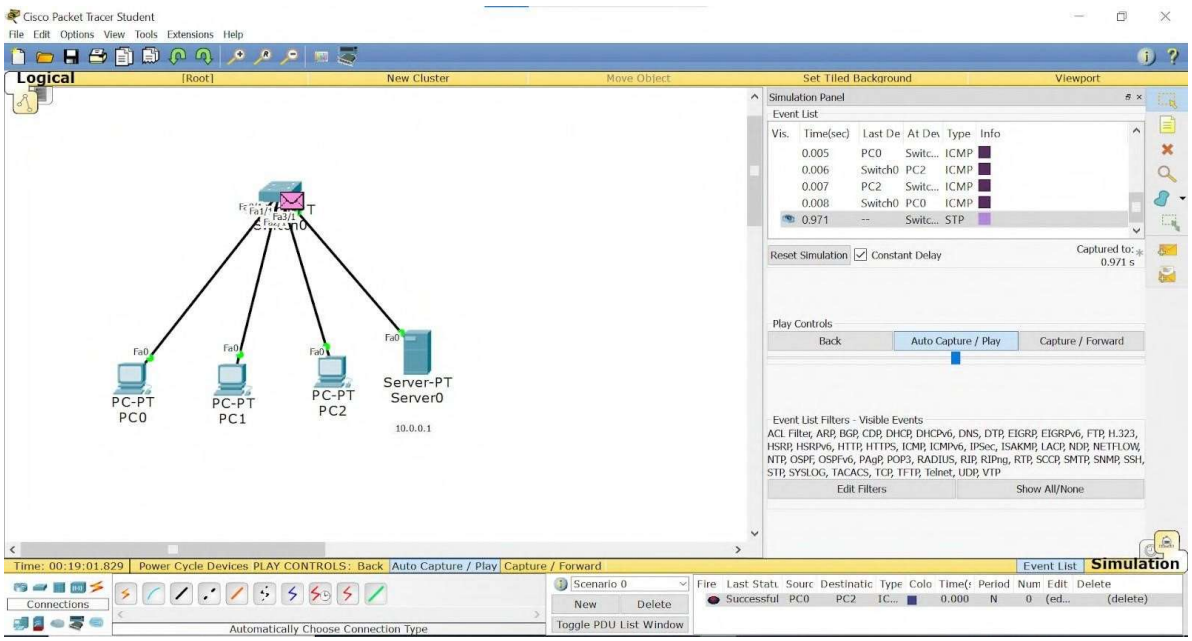
PROGRAM 4.2:



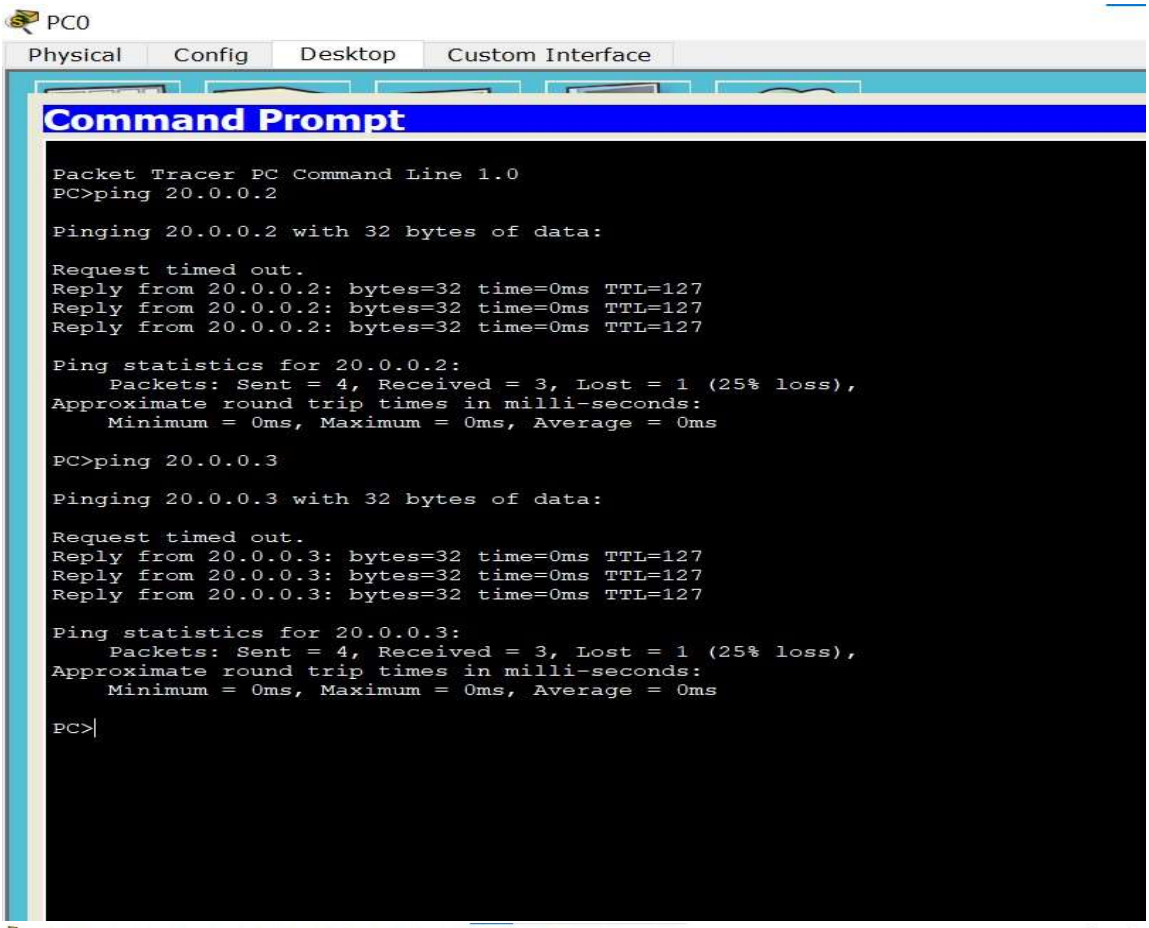
OUTPUT:

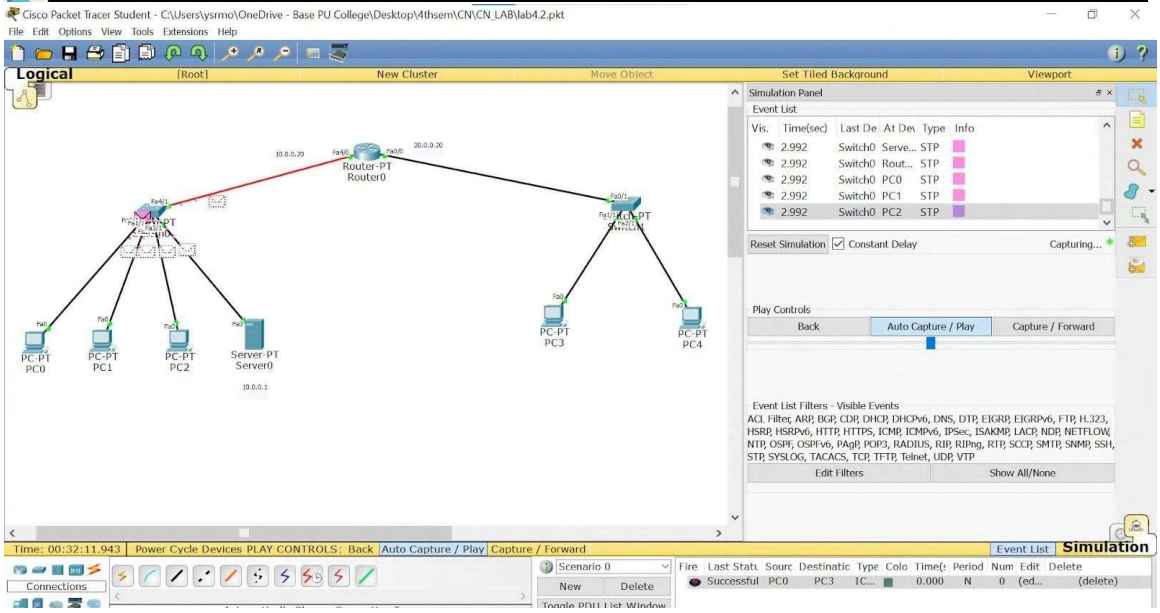
PROGRAM 4.1:





PROGRAM 4.2:

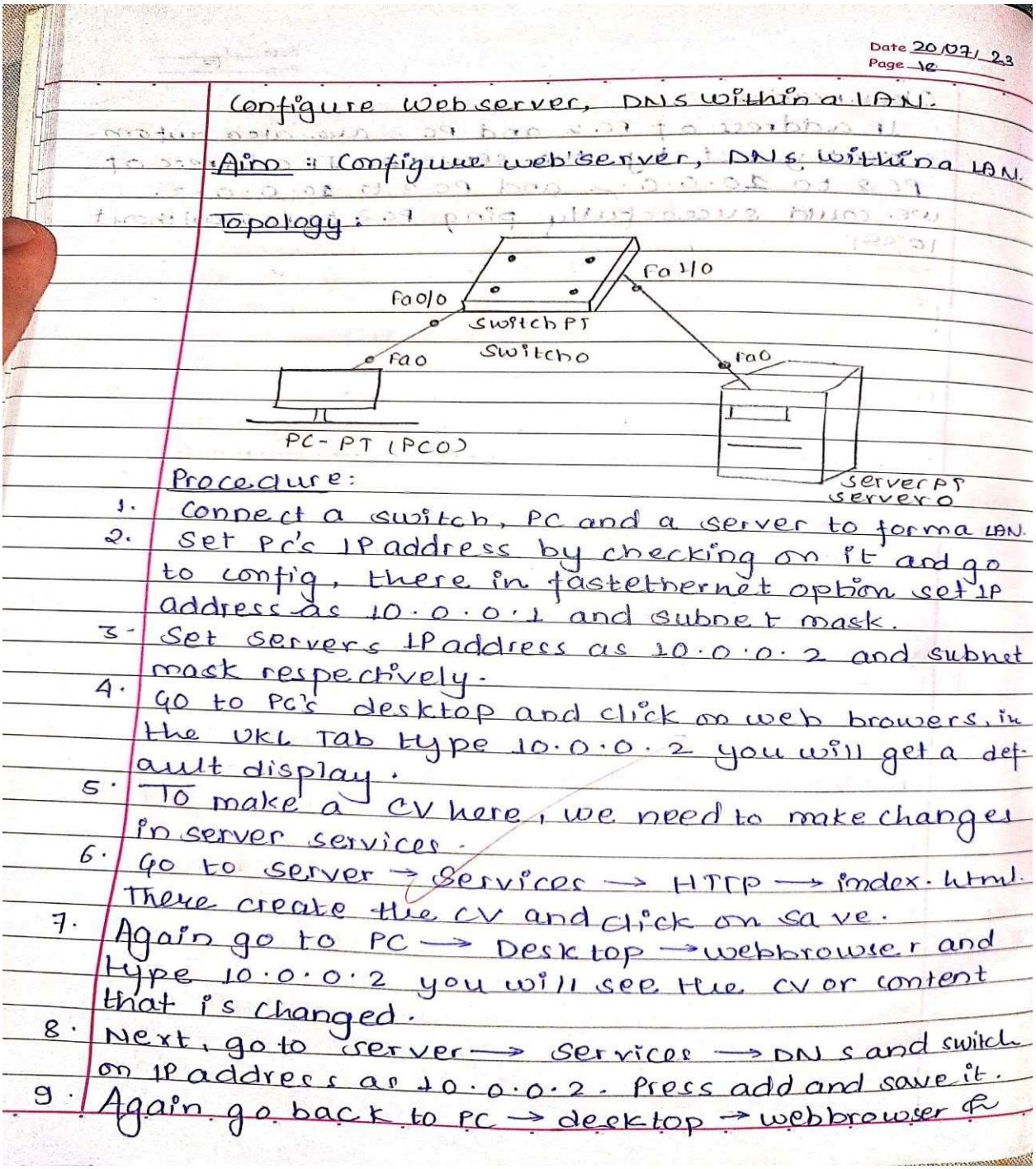

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Ping statistics for 20.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 20.0.0.3
Pinging 20.0.0.3 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Reply from 20.0.0.3: bytes=32 time=0ms TTL=127
Ping statistics for 20.0.0.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab4.2.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
PC-PT
PC3
PC-PT
PC4
Simulation Panel
Event List
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:32:11.943
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Scenario 0
New
Delete

WEEK 5

Configure Web Server, DNS within a LAN.

OBSERVATION:



Date 20/07/23
Page 12

Configure Web server, DNS within a LAN.

Aim : Configure web server, DNS within a LAN.

Topology :

Procedure:

1. Connect a switch, PC and a server to form a LAN.
2. Set PC's IP address by checking on it and go to config, there in fastethernet option set IP address as 10.0.0.1 and subnet mask.
3. Set servers IP address as 10.0.0.2 and subnet mask respectively.
4. Go to PC's desktop and click on web browers, in the URL Tab type 10.0.0.2 you will get a default display.
5. To make a CV here, we need to make changes in server services.
6. Go to server → Services → HTTP → index.html. There create the CV and click on save.
7. Again go to PC → Desktop → webbrowser and type 10.0.0.2 you will see the CV or content that is changed.
8. Next, go to server → Services → DNS and switch on IP address as 10.0.0.2. Press add and save it.
9. Again go back to PC → desktop → webbrowser &

type the given domain name. Here we can see the cv which had been created earlier.

Output

web browser

<	>	URL	http://dikshya cv	GO	stop

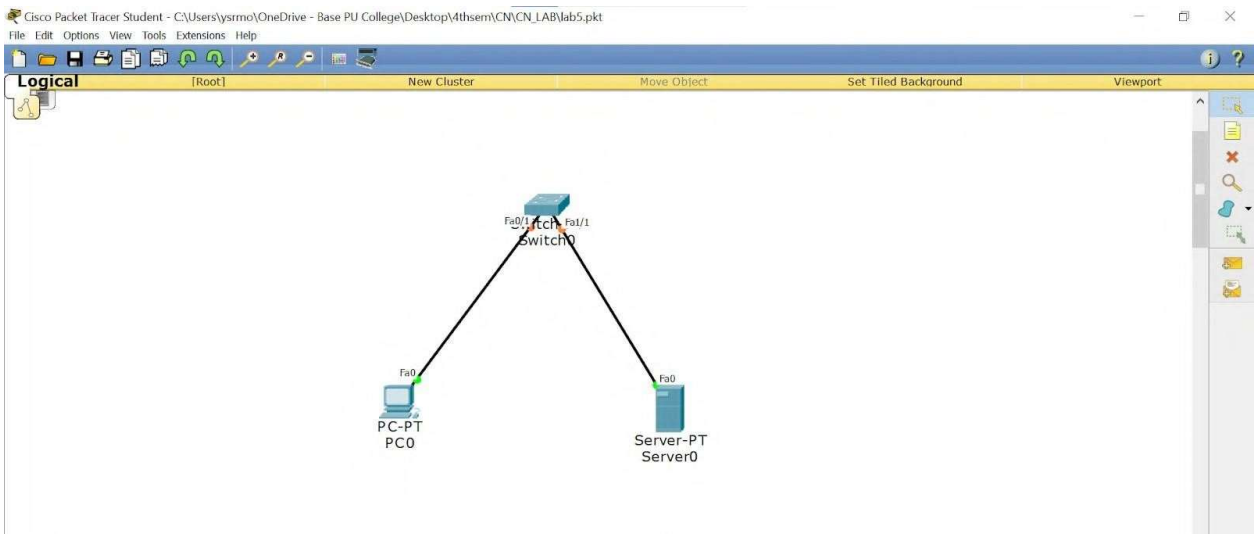
CV

Name: Dikshya Aryal
USN: 1BM21CS058
Languages: c/Java/php
Image:

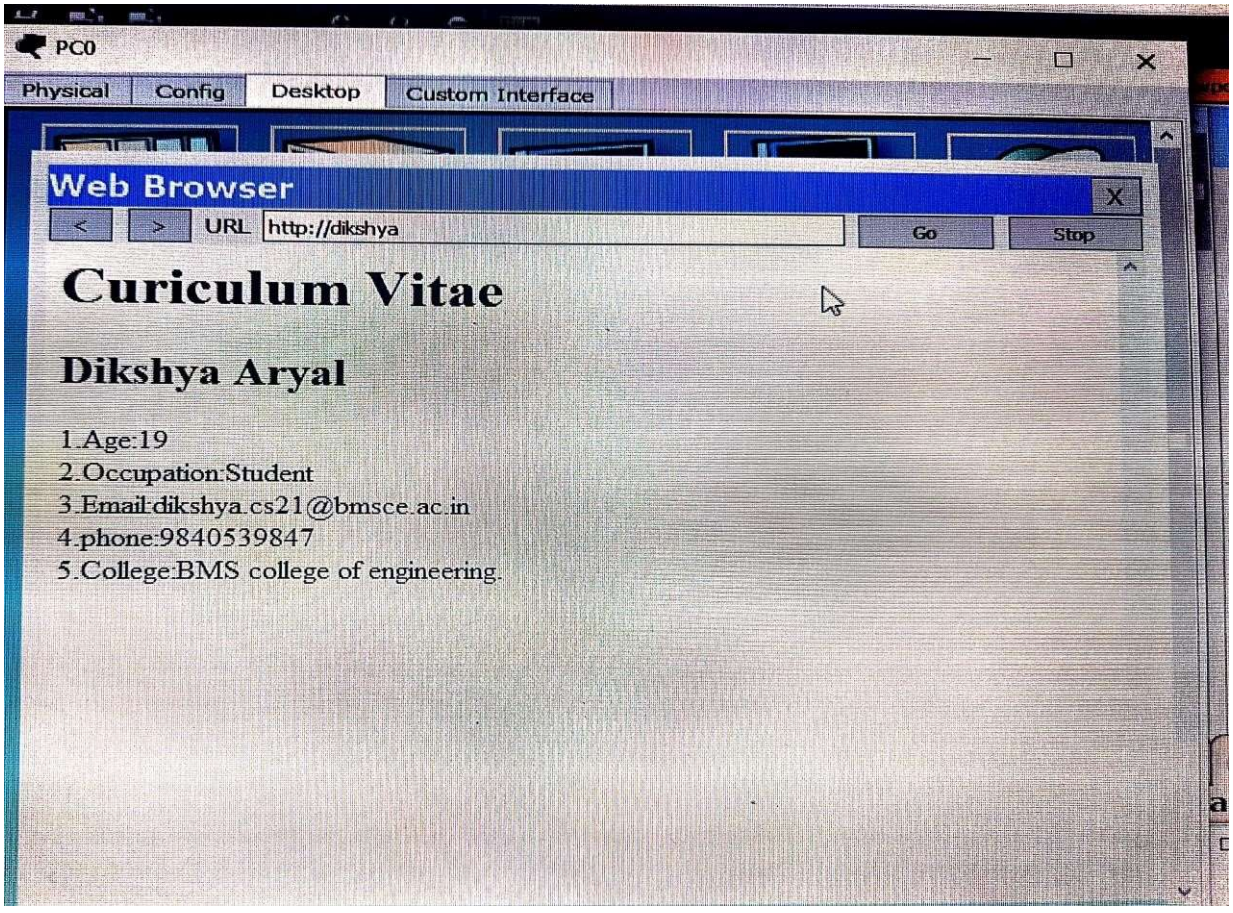
Observation.

1. If you wanted to go to a certain website you would open web browers ~~at~~ and type domain name of that website or else you can ~~go~~ also type the IP address insted of you know that website IP address.
2. Since we can't remember IP address of all websites DNS server will search through its cache to find a matching IP address for that domain name & when it finds a matching ~~IP add~~ it will resolve that domain name to IP address of website, once that is done then computer is able to communicate with a webserver & retrive the webpage.

TOPOLOGY:



OUTPUT:



WEEK 6

Configure RIP routing Protocol in Routers.

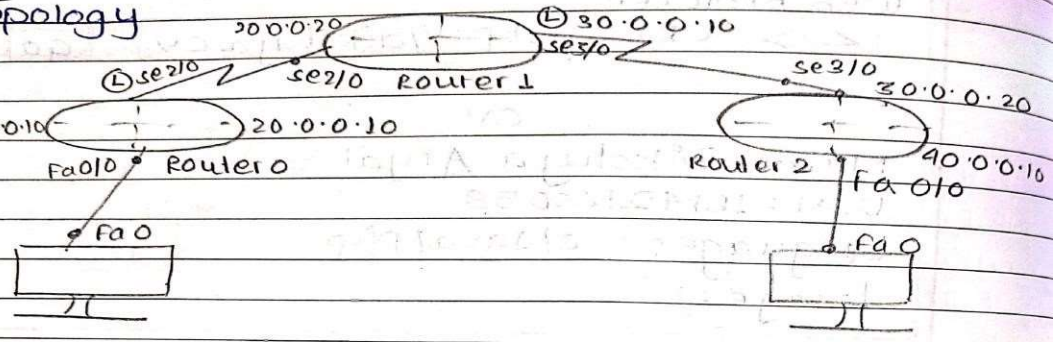
OBSERVATION:

Date / /
Page 20

Configure RIP routing Protocols in Routers.

Aim: configure RIP routing protocols in routers

Topology



Procedure

1. Create a Network using 3 routers and 2 PC's. connect routers using serial DCE cable and PC to router using copper-crossover cable.
2. Set the IP address and gateway no for both PC's as
   10.0.0.1 – IP 10.0.0.10 – gateway → PC 0
   40.0.0.1 – IP 40.0.0.10 – gateway → PC 1.
   respectively.
3. Go to router → CLI mode and execute following commands.
   1. No
   2. Enable
   3. config T
   4. Interface fast-Ethernet 0/0.
   5. IP address 10.0.0.10 255.0.0.0
   6. No shut
   7. Exit
   8. Interface se 2/0
   9. IP address 20.0.0.10 255.0.0.0

10. Encapsulation PPP.
11. clock rate 64000
12. No shut.

4. Here for router with fast ethernet execute only till step 9 and type no shut.
5. Only for router to router connection execute all steps, also execute the step 11 only for the router connection which has a clock symbolat start. Repeat the steps for all routers.
6. Again go to router 0 → clr mode and type these steps.
   1. config T
   2. router rip
   3. Network 10.0.0.0
   4. Network 20.0.0.0
   5. Exit.
7. Repeat these steps for all the routers.
8. At last now go to each router and type show IP route. Here the IP addresses associated with the router will be labelled as C and other IP addresses will be labelled as R.
9. Lastly go to PC0 and ping a message to PC1 using ping destination IP address command.

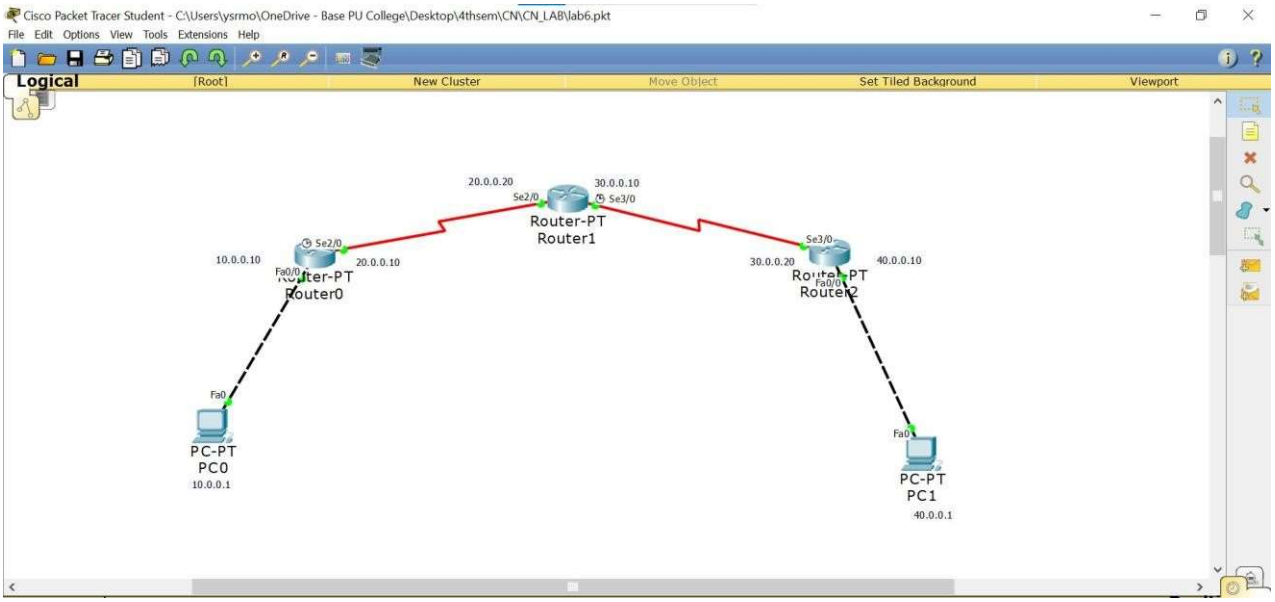
Ping output

Packet tracer PC command line 1.0
PC > Ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data
Request timed out
Reply from 40.0.0.1 bytes = 32 times = 8ms TTL=125
Reply from 40.0.0.1 bytes = 32 times = 5ms TTL=125
Reply from 40.0.0.1 bytes = 32 times = 10ms TTL=125

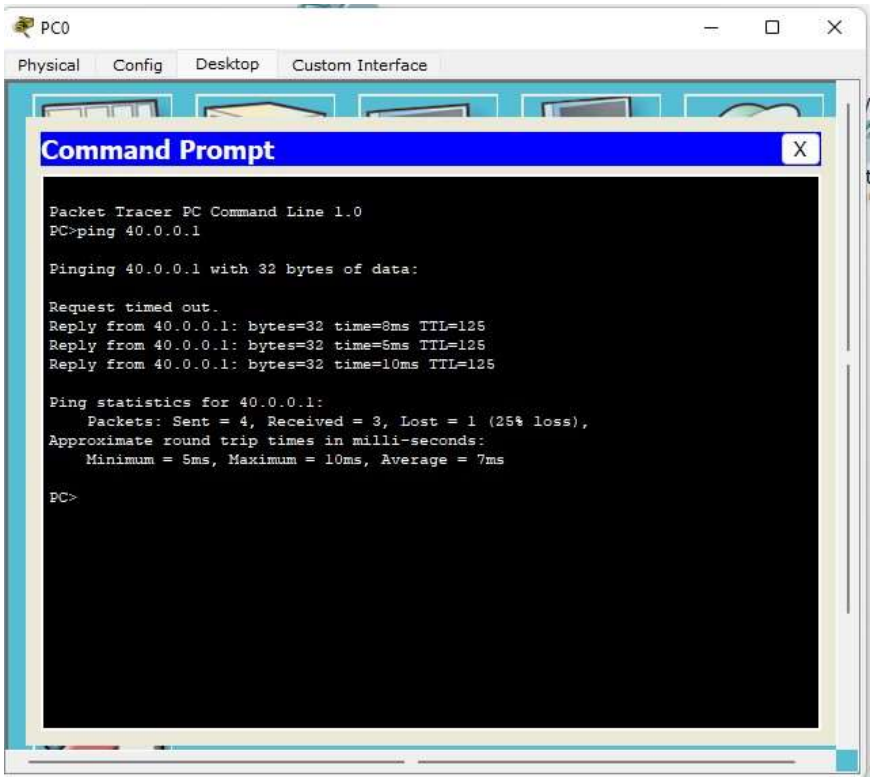
Ping statistics for 40.0.0.1
Packets: sent 4 recieved = 3 lost = 1 (25% loss)
Approx. round trip time & in miliseconds
Minimum = 5ms, Maximum = 10ms, Average = 7ms

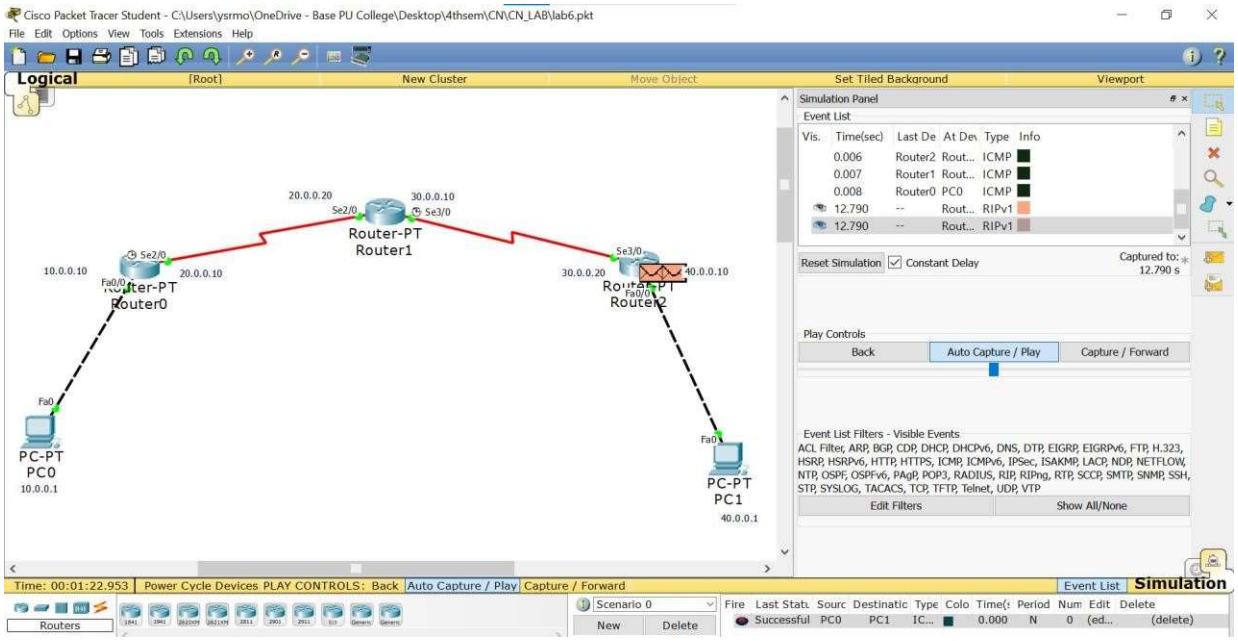
Observation:
Routing Info protocol is a dynamic routing protocol that uses hop count as a routing metric to find the best path between source and destination. It is a distana-vector routing protocol. Hop count is the no. of routers coming between the source and destination. The path with least hop count is selected.
Updates of network are exchanged periodically.
Updates of routing info are always broadcast.
Full routing tables are sent in updates.
Routers always trust routing info. recieved from neighbour routers.

TOPOLOGY:



OUTPUT:

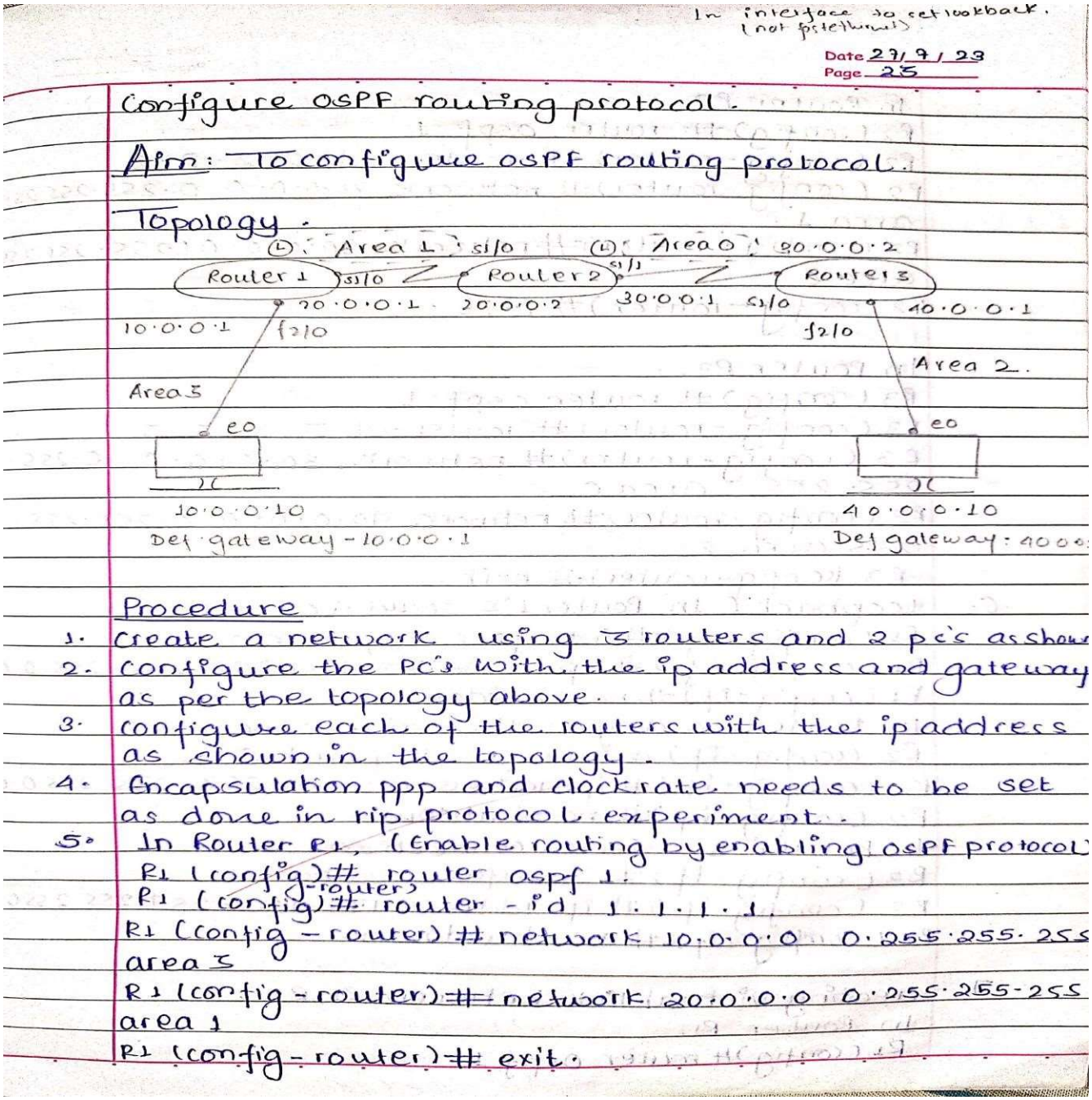



Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab6.pkt
File Edit Options View Tools Extensions Help
Logical
{Root}
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router-PT
Router0
Router-PT
Router2
PC-PT
PC0
10.0.0.1
PC-PT
PC1
40.0.0.1
20.0.0.20
30.0.0.10
10.0.0.10
20.0.0.10
30.0.0.20
40.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.006 Router2 Rout... ICMP
0.007 Router1 Rout... ICMP
0.008 Router0 PC0 ICMP
12.790 -- Rout... RIPv1
12.790 -- Rout... RIPv1
Reset Simulation
Constant Delay
Captured to: 12.790 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:01:22.953
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 PC1 IC... 0.000 N 0 (ed... (delete)

WEEK 7

Configure OSPF routing protocol.

OBSERVATION:



In interface to set loopback. (not fastethernet)

Date 27/9/23
Page 25

Configure OSPF routing protocol.

Aim: To configure OSPF routing protocol.

Topology.

Procedure

1. Create a network using 3 routers and 2 pc's as shown
2. Configure the PC's with the ip address and gateway as per the topology above.
3. Configure each of the routers with the ip address as shown in the topology.
4. Encapsulation ppp and clockrate needs to be set as done in rip protocol experiment.
5. In Router R1, Enable routing by enabling ospf protocol

```
R1 (config)# router ospf 1
R1 (config)# router-id 1.1.1.1
R1 (config-router)# network 10.0.0.0 0.255.255.255
area 5
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 0.255.255.25
area 1.
R2 (config-router)#network 30.0.0.0 0255.255.25
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.

6. Loopback (In Router 1's seaeial connection).
R1 (config-if)# interface loopback 0
R1 (config-if)# ip address 172.16.1.252 255.255.0.0
R1 (config-if)# no shutdown.
In Router 2's any of the serial connection)
R2 (config-if)# interface loopback 0
R2 (config-if)# ip address 172.16.1.253 255.255.0.0
R2 (config-if)# no shutdown.
In Router 3's serial connection.
R3 (config-if)# interface loopback 0
R3 (config-if)# ip address 172.16.1.254 255.255.0.0
R3 (config-if)# no shutdown.

7. Creating virtual link between R1, R2.
In Router R1.
R1 (config)# router ospf 1

R1 (config-router)# area 1 virtual-link 2.2.2.2
some info appears. R2 (config#)

In Router 2.
R2 (config)# router ospf 1.
R2 (config-router)# area 1 virtual link 1.1.1.1
R2 (config-router)# exit.
R2 (config#) some info.

8. For every router, we do show ip-route command.

Output

PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data.

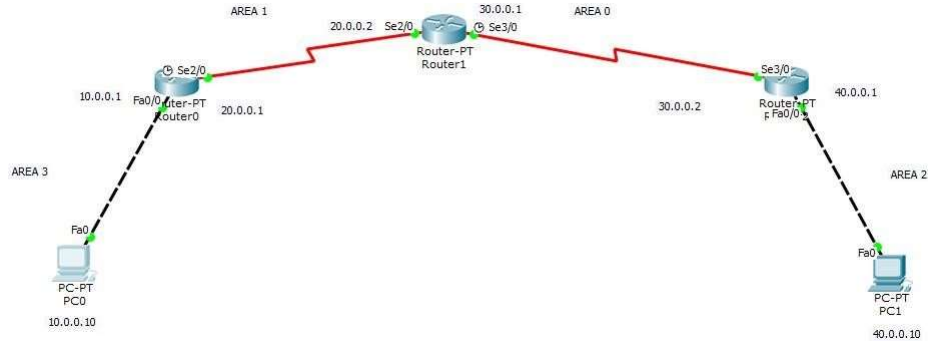
Reply from 40.0.0.10 bytes=32 time=11ms TTL=125
Reply from 40.0.0.10 bytes=32 time=8ms TTL=125
Reply from 40.0.0.10 bytes=32 time=2ms TTL=125
Reply from 40.0.0.10 bytes=32 time=8ms TTL=125

Ping statistics for 40.0.0.10
Packets: sent = 4 Recieved = 4 Lost = 0 (0% loss)
Approximate round trip time in milliseconds.
Minimum = 2ms Maximum = 11ms Average = 7ms.

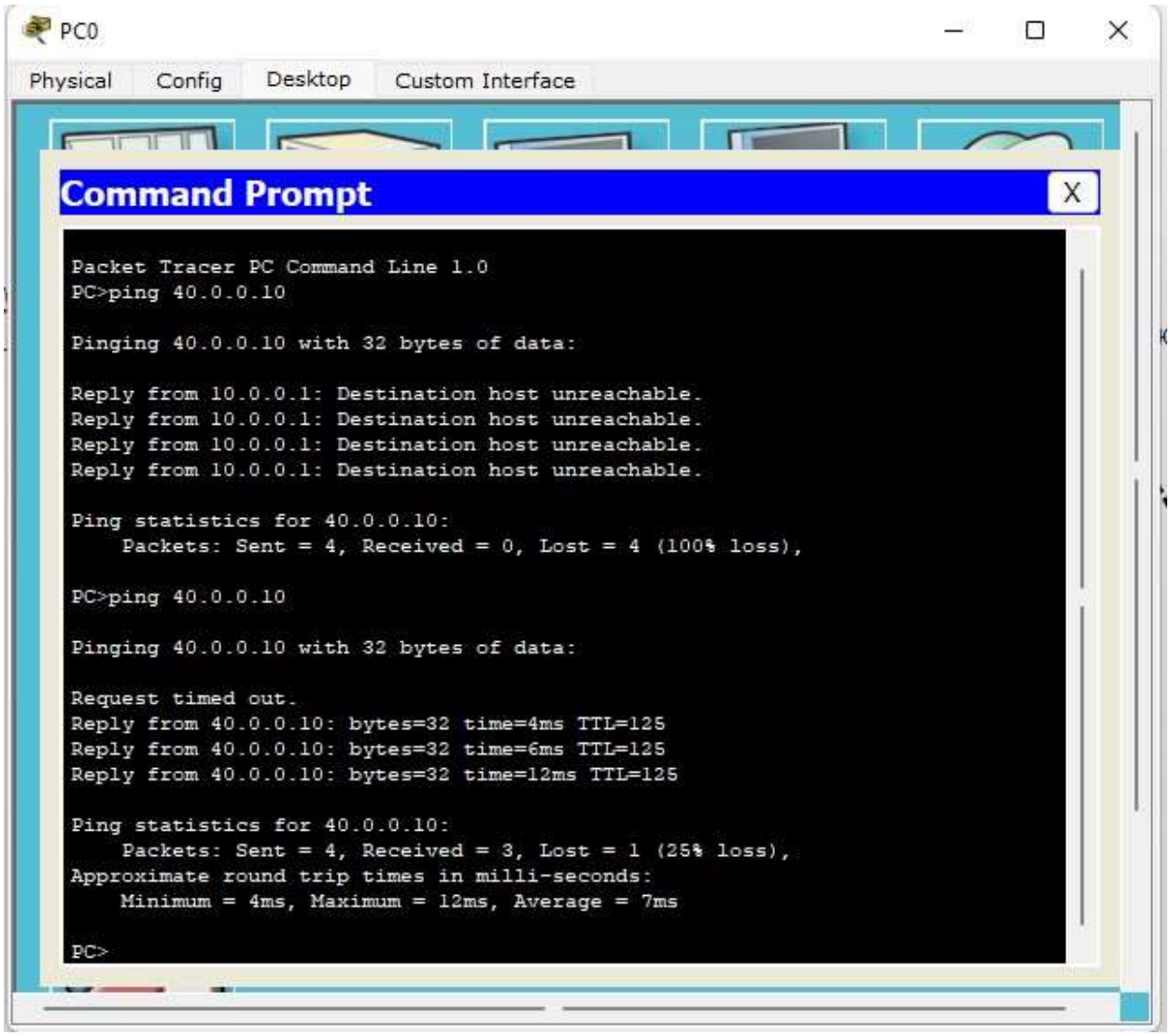
Observation - Link.

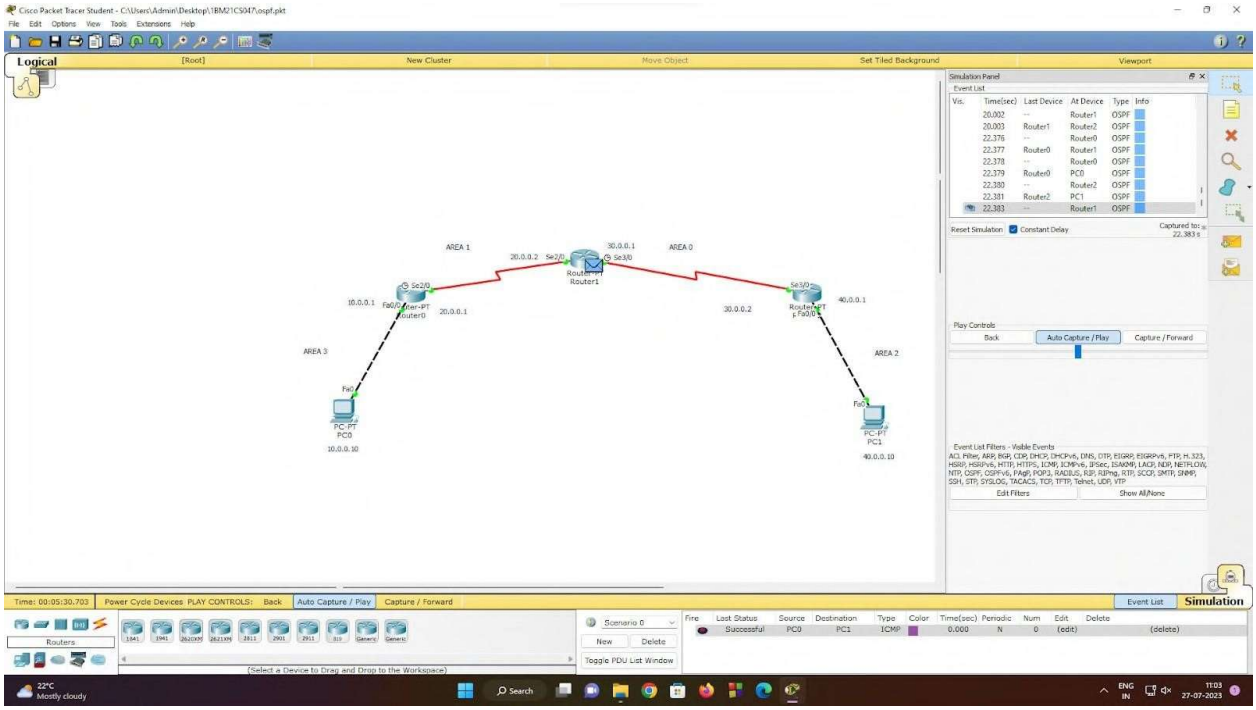
- Os is a state routing protocol that is used to find the best path between source and destination ~~state~~ router using its own ~~protocol~~ algorithm.
- This network is divided into 4 ~~areas~~ where area0 is the backbone.
- After we make the virtual-link between the area which isn't connected to the backbone area, we can ping messages sucessfully.

TOPOLOGY:


AREA 1
20.0.0.2
Se2/0
30.0.0.1
Se3/0
AREA 0
Router-PT
Router1
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
Se3/0
30.0.0.2
Router-PT
Fa0/0
40.0.0.1
AREA 3
AREA 2
Fa0
PC-PT
PC0
10.0.0.10
Fa0
PC-PT
PC1
40.0.0.10

OUTPUT:

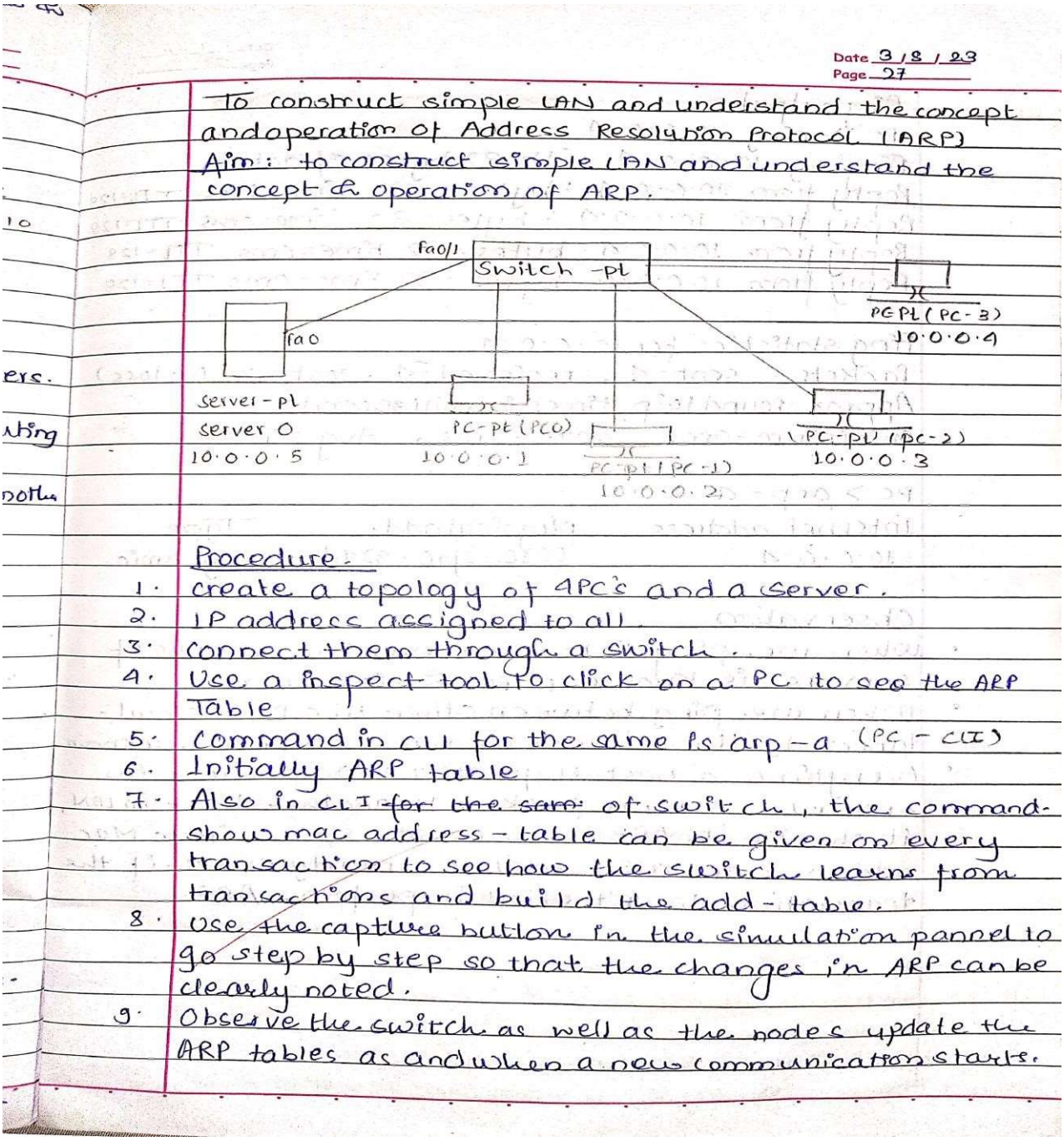

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Reply from 10.0.0.1: Destination host unreachable.
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 40.0.0.10
Pinging 40.0.0.10 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.10: bytes=32 time=4ms TTL=125
Reply from 40.0.0.10: bytes=32 time=6ms TTL=125
Reply from 40.0.0.10: bytes=32 time=12ms TTL=125
Ping statistics for 40.0.0.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 4ms, Maximum = 12ms, Average = 7ms
PC>


Cisco Packet Tracer Student - C:\Users\Admin\Desktop\1BM21CS047\ospf.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
AREA 1
AREA 0
AREA 3
AREA 2
20.0.0.2
Se2/0
30.0.0.1
Se3/0
Router1
Router0
10.0.0.1
Fa0/0
20.0.0.1
30.0.0.2
40.0.0.1
PC-PT PC0
10.0.0.10
PC-PT PC1
40.0.0.10
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
20.002 -- Router1 OSPF
20.003 Router1 Router2 OSPF
22.376 -- Router0 OSPF
22.377 Router0 Router1 OSPF
22.378 -- Router0 OSPF
22.379 Router0 PC0 OSPF
22.380 -- Router2 OSPF
22.381 Router2 PC1 OSPF
22.383 -- Router1 OSPF
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:05:30.703
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC1 ICMP 0.000 N 0 (edit) (delete)
22°C
Mostly cloudy
Search
ENG
IN
11:03
27-07-2023

WEEK 8

To construct a simple LAN and understand the concept and operation of Address Resolution Protocol (ARP).

OBSERVATION:



Date 3/8/23
Page 27

To construct simple LAN and understand the concept and operation of Address Resolution Protocol (ARP)

Aim: to construct simple LAN and understand the concept & operation of ARP.

Procedure:

1. create a topology of 4PC's and a server.
2. IP address assigned to all.
3. connect them through a switch.
4. Use a inspect tool to click on a PC to see the ARP Table
5. Command in CLI for the same is arp -a (PC - CLI)
6. Initially ARP table
7. Also in CLI ~~for the same~~ of switch, the command show mac address - table can be given on every transaction to see how the switch learns from transactions and build the add - table.
8. Use the capture button in the simulation pannel to go step by step so that the changes in ARP can be clearly noted.
9. Observe the switch as well as the nodes update the ARP tables as and when a new communication starts.

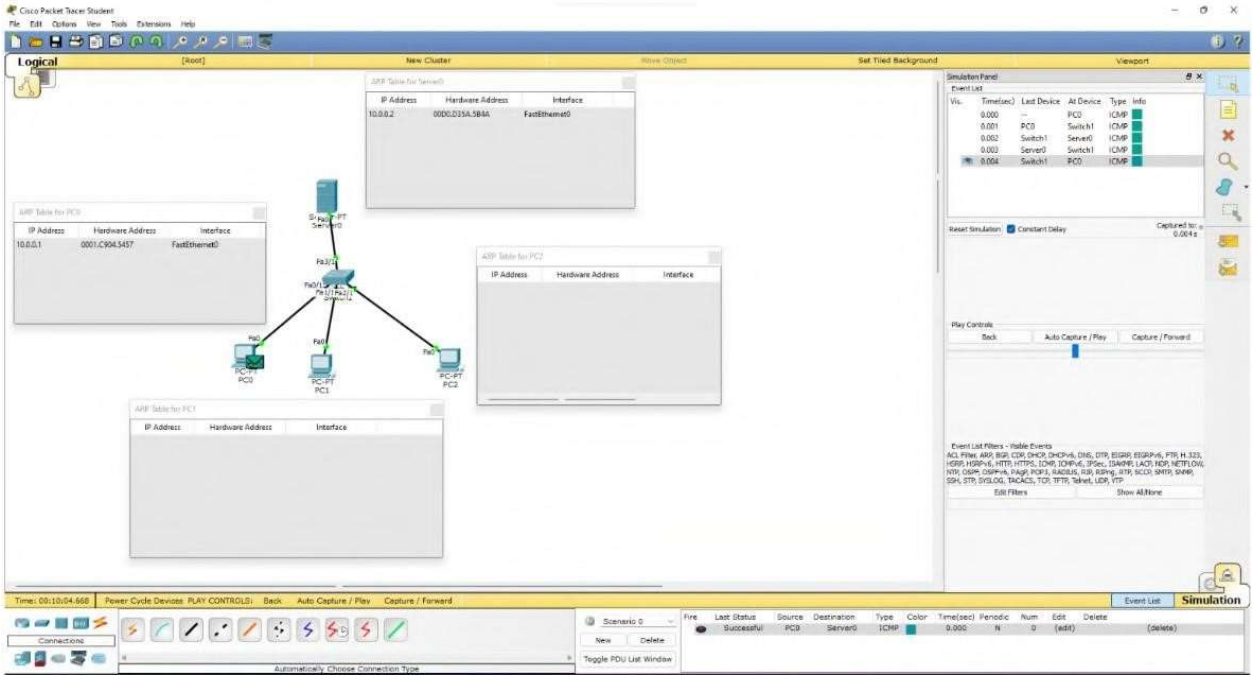
Ping output

```
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 = 0ms TTL=128
Reply from 10.0.0.4 : bytes = 32 time=0ms TTL=128
Reply from 10.0.0.4 : bytes = 32 time=0ms TTL=128
Reply from 10.0.0.4 : bytes = 32 time=0ms TTL=128

Ping statistics for 10.0.0.4.
Packets : sent=4, recieved=4, lost = 0 (0% loss)
Approx round trip times in milliseconds:
minimum=0ms, max = 0ms, Avg = 0ms.

PC > arp-a
Internet address      physical add.      Type
10.0.0.4              0060.2fa0.324d     dynamic.
```

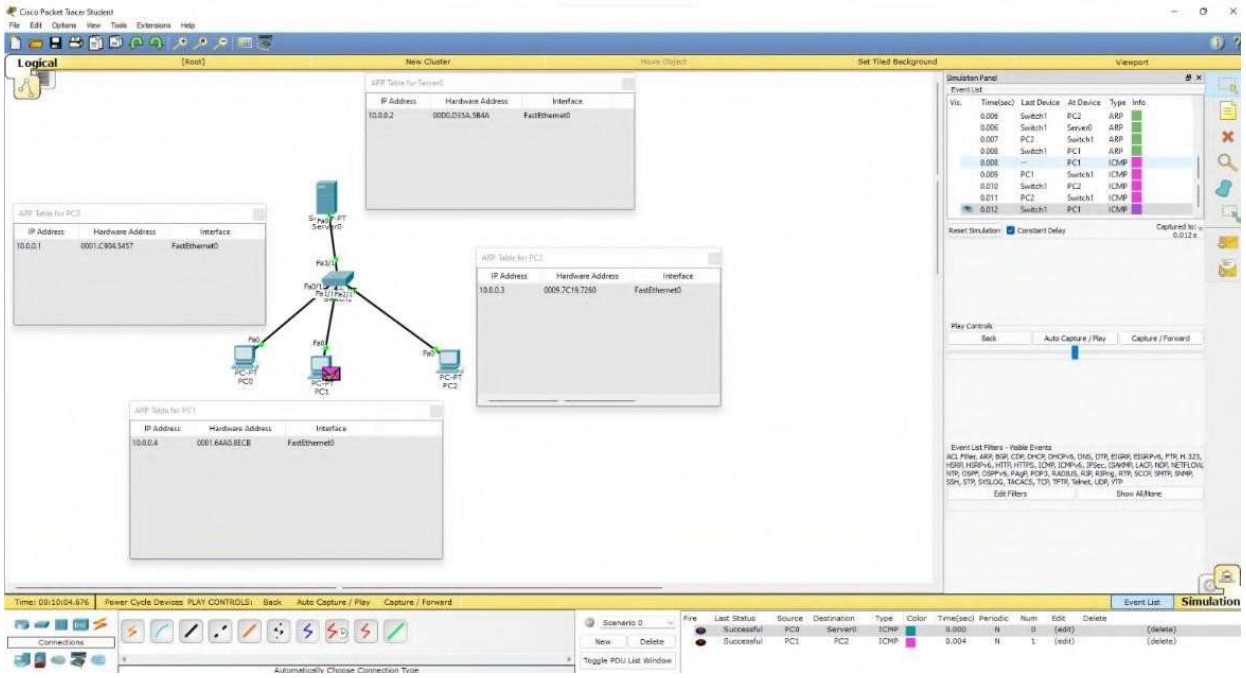
Observation

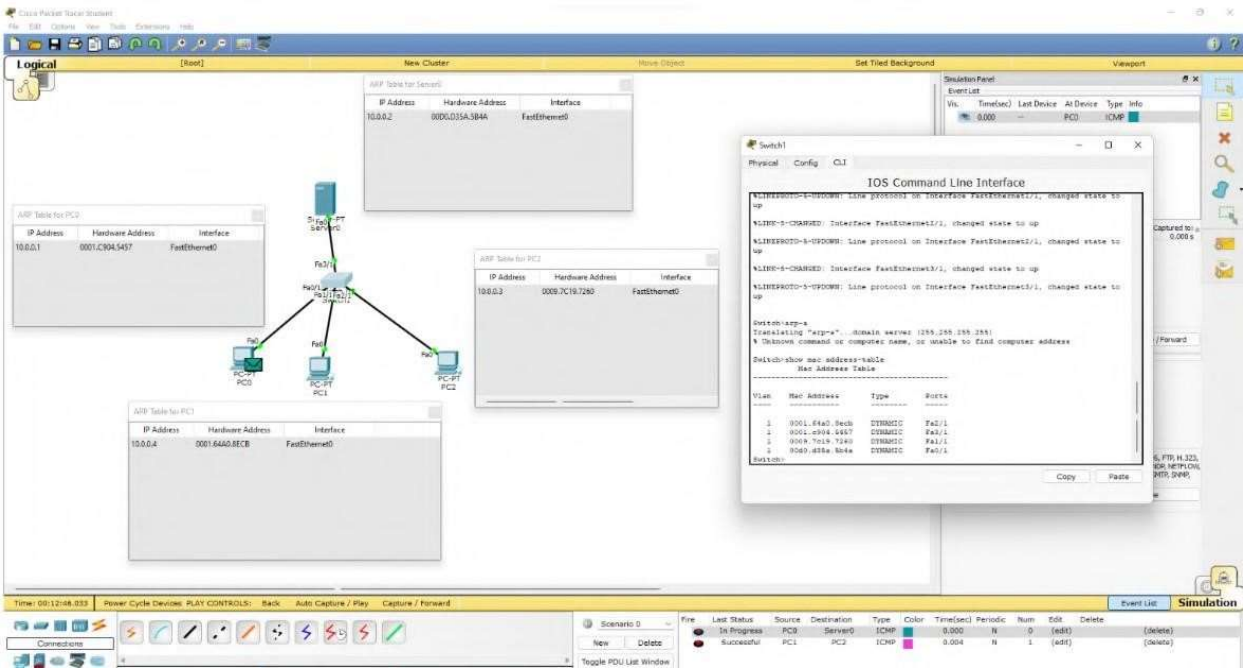
- When we ping 1 PC & server the address of servers is known to PC & vice versa.
- When we ping between other two PC's simultaneously the address of each other are unknown.
- Everytime a host requests a MAC address in order to send a packet to another host in LAN, it checks its ARP cache to see if the ip to Mac address translation address already exists. if the translation doesn't exists it performs ARP.

TOPOLOGY:



OUTPUT:

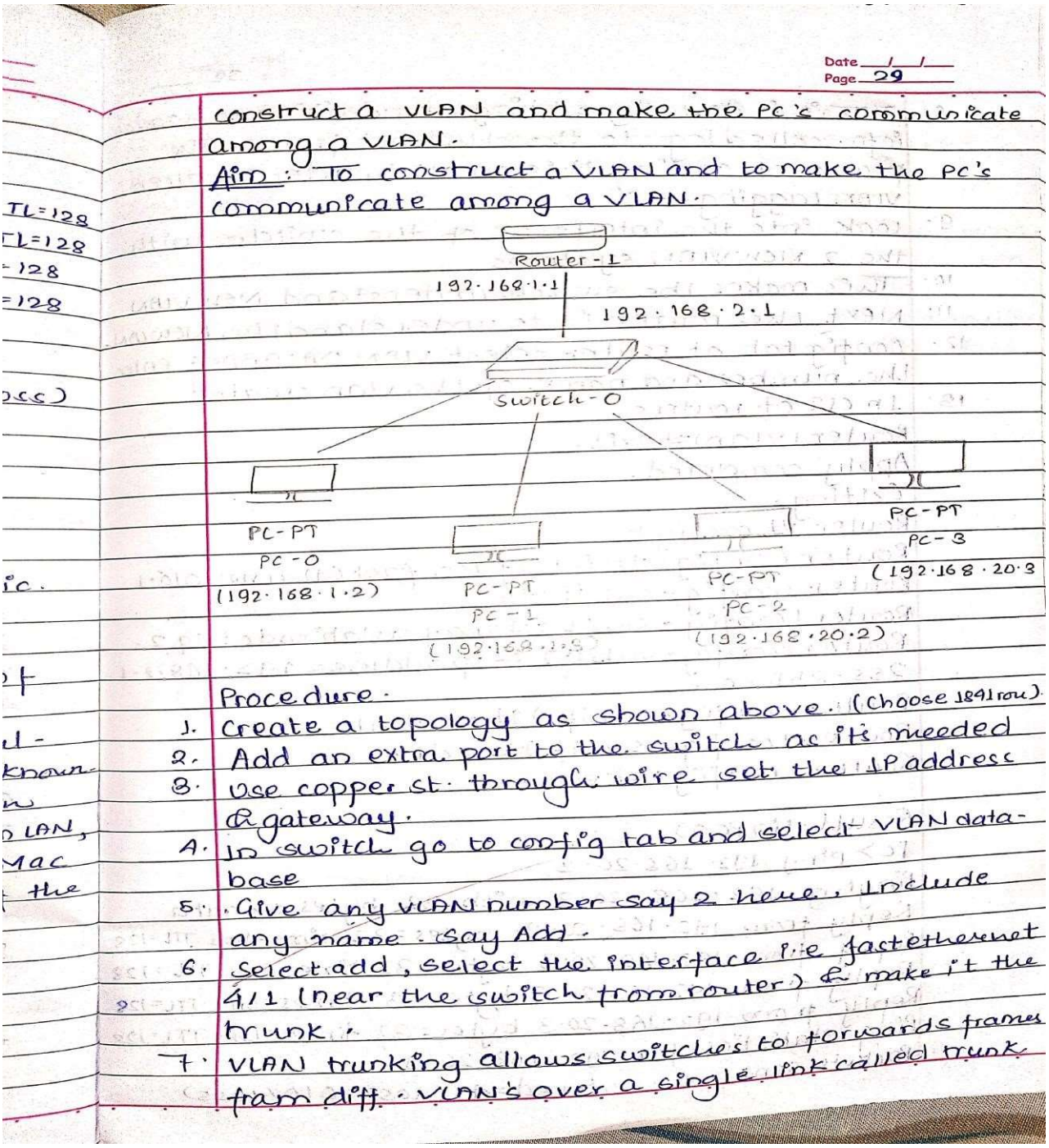



Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Switch1
Physical
Config
CLI
IOS Command Line Interface
Copy
Paste
Simulation Panel
Event List
Time(sec)
Last Device
At Device
Type
Info
Simulation
Event List
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Connections
Scenario 0
New
Delete
Toggle PDU List Window

WEEK 9

To construct a VLAN and make a pc communicate among VLAN.

OBSERVATION:



Date / /
Page 29

construct a VLAN and make the PC's communicate among a VLAN.

Aim: To construct a VLAN and to make the PC's communicate among a VLAN.

Procedure.

1. Create a topology as shown above. (Choose 1841 rou)
2. Add an extra port to the switch as it's needed
3. Use copper st. through wire set the IP address & gateway.
4. In switch go to config tab and select VLAN data-base
5. Give any VLAN number say 2 here, Include any name: say Add.
6. Select add, select the interface i.e fastethernet 4/1 (near the switch from router) & make it the trunk.
7. VLAN trunking allows switches to forwards frames from diff. VLAN's over a single link called trunk.

8. This is done by adding an additional header into called tag to the ethernet frame. The process of adding this small header is called VLAN tagging.
9. Look into the interfaces of the switches with the 2 NEWVLAN systems
10. This makes the switch understand NEWVLAN.
11. Next the router 1's to understand the NEWVLAN
12. Config tab of router select VLAN DATABASE enter the number and name of the vlan created
13. In CLI of routers,

Router (vlan) # exit.
Apply completed.
Exiting.
Router # config t
Router (config) # interface fast Ethernet 0/0.1
Router (config-subif) #
Router (config-subif) # encapsulation dot1q 2.
Router (config-subif) # ip address 192.168.2.1 255.255.0.
Router (config-subif) # no shut.
Router (config-subif) # exit.
Router (config) # exit.

Result. (in PC0)

PC> ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data
Reply from 192.168.20.3 bytes = 32 time = 1ms TTL = 128
Reply from 192.168.20.3 bytes = 32 time = 0ms TTL = 128
Reply from 192.168.20.3 bytes = 32 times = 0ms TTL = 128
Reply from 192.168.20.3 bytes = 32 times = 0ms TTL = 128
Ping statistics for 192.168.20.3.
Packets sent = 4, recieved = 4, lost = 0 (0% loss)

Date __/__/__
Page 31.

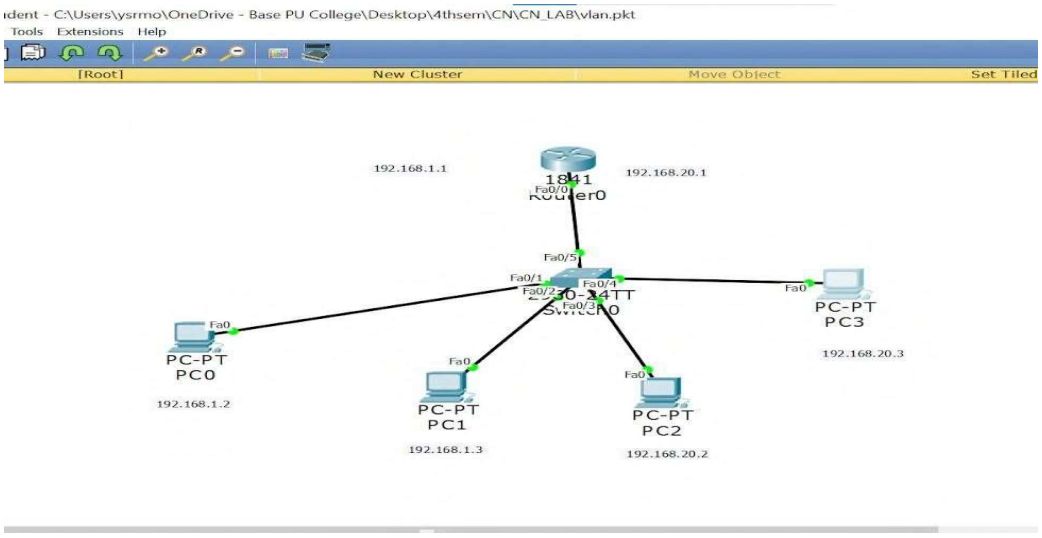
Approximate round trip times in milliseconds
minimum = 0ms, maximum = 1ms, Average = 0ms.

Observation

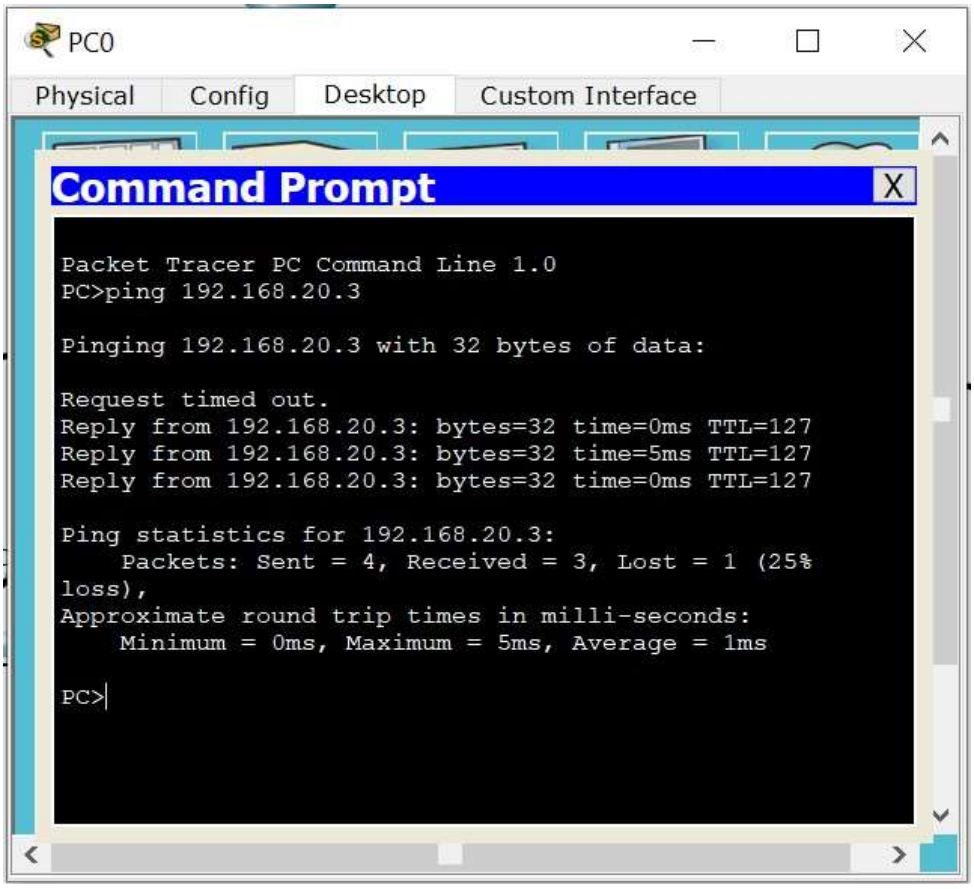
(i) VLAN - virtual local area network is any broadcast domain that is partitioned and isolated in a computed network at the data link layer.

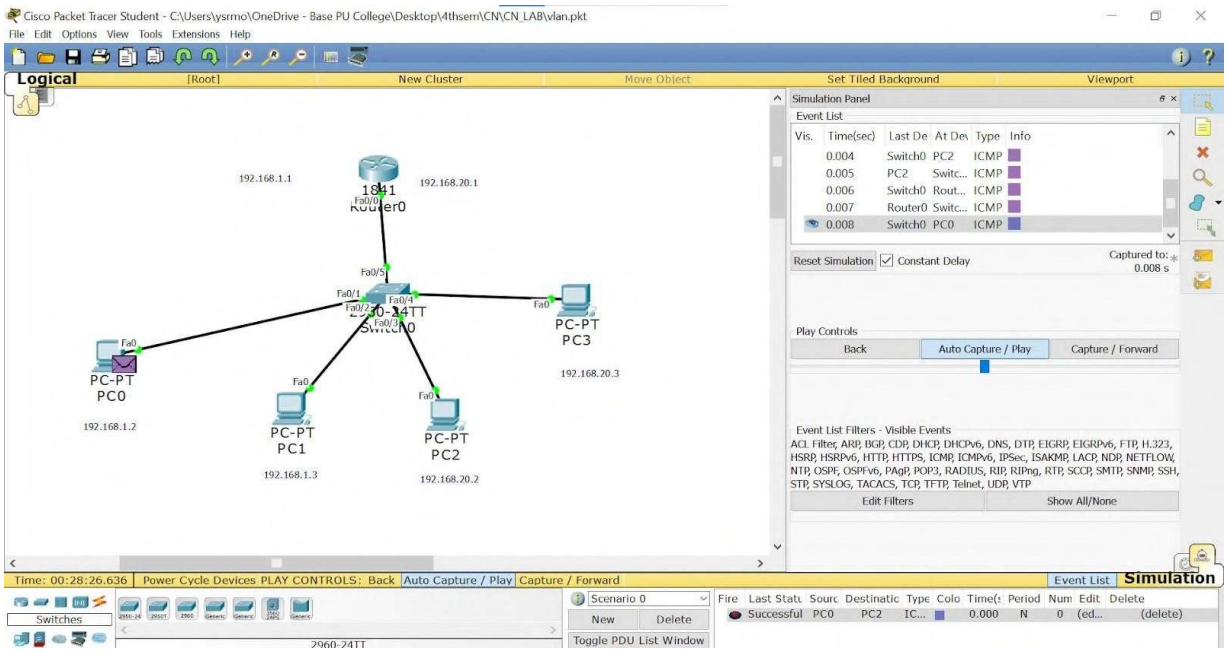
(ii) It is virtualized connection that connects multiple devices and network nodes from diff. LANs into one logical network.

TOPOLOGY:



OUTPUT:

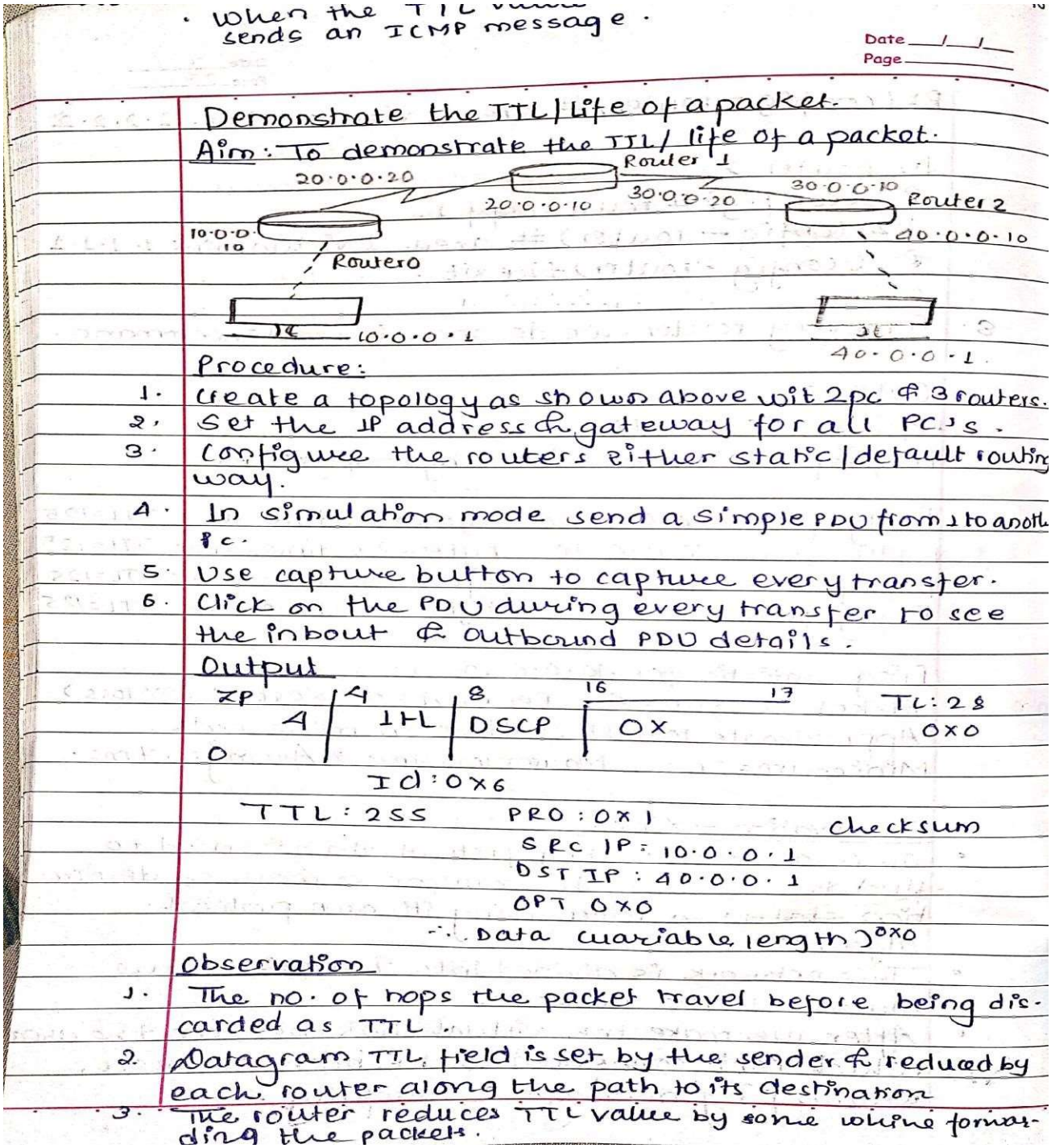

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Reply from 192.168.20.3: bytes=32 time=5ms TTL=127
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Ping statistics for 192.168.20.3:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 1ms
PC>


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\vlan.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.1
192.168.20.1
Router0
Switch0
PC-PT PC0
192.168.1.2
PC-PT PC1
192.168.1.3
PC-PT PC2
192.168.20.2
PC-PT PC3
192.168.20.3
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:28:26.636
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Switches
Scenario 0
New
Delete
Toggle PDU List Window

WEEK 10

Demonstrate the TTL/ Life of a Packet.

OBSERVATION:



• When the TTL ... sends an ICMP message.

Date __/__/__
Page

Demonstrate the TTL/life of a packet.

Aim: To demonstrate the TTL/ life of a packet.

Procedure:

1. Create a topology as shown above wit 2pc & 3 routers.
2. Set the IP address & gateway for all PC's.
3. Configure the routers either static/default routing way.
4. In simulation mode send a simple PDU from 1 to another pc.
5. Use capture button to capture every transfer.
6. Click on the PDU during every transfer to see the inbout & outbound PDU details.

Output

0	4	8	16	17	TL: 28
4	IHL	DSCP	0X		0X0

Id: 0X6

TTL: 255 PRO: 0X1 Checksum

SRC IP: 10.0.0.1

DST IP: 40.0.0.1

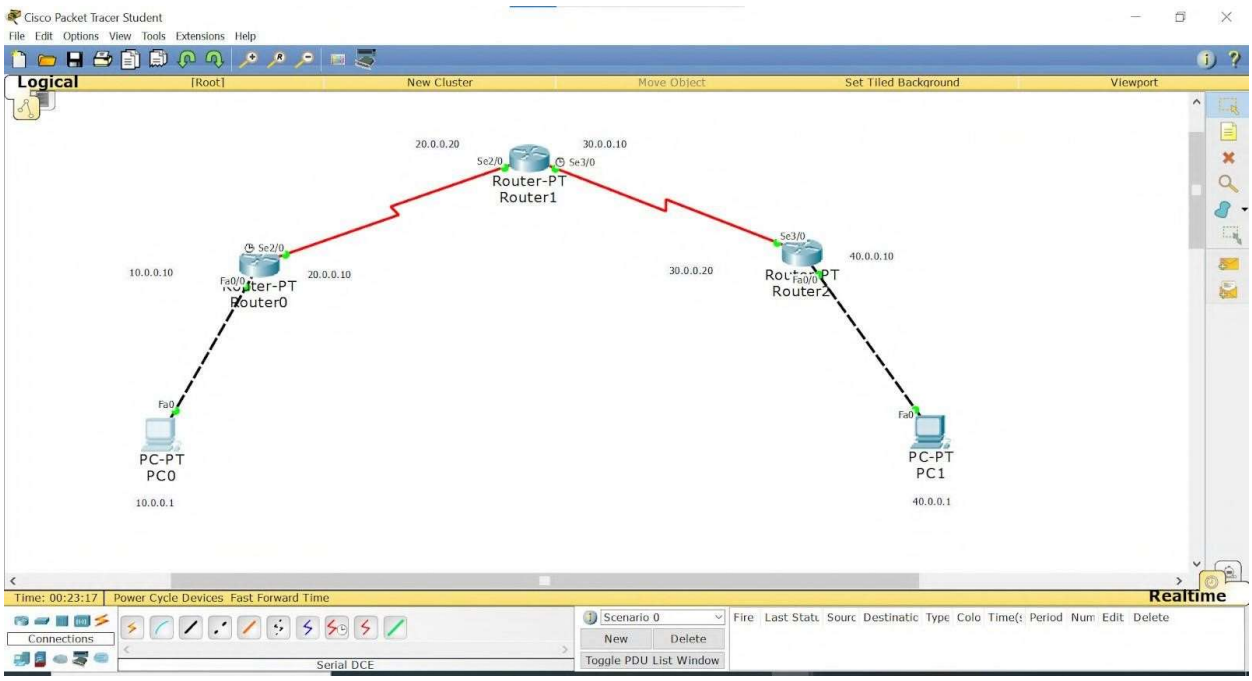
OPT 0X0

∴ Data (variable length) 0X0

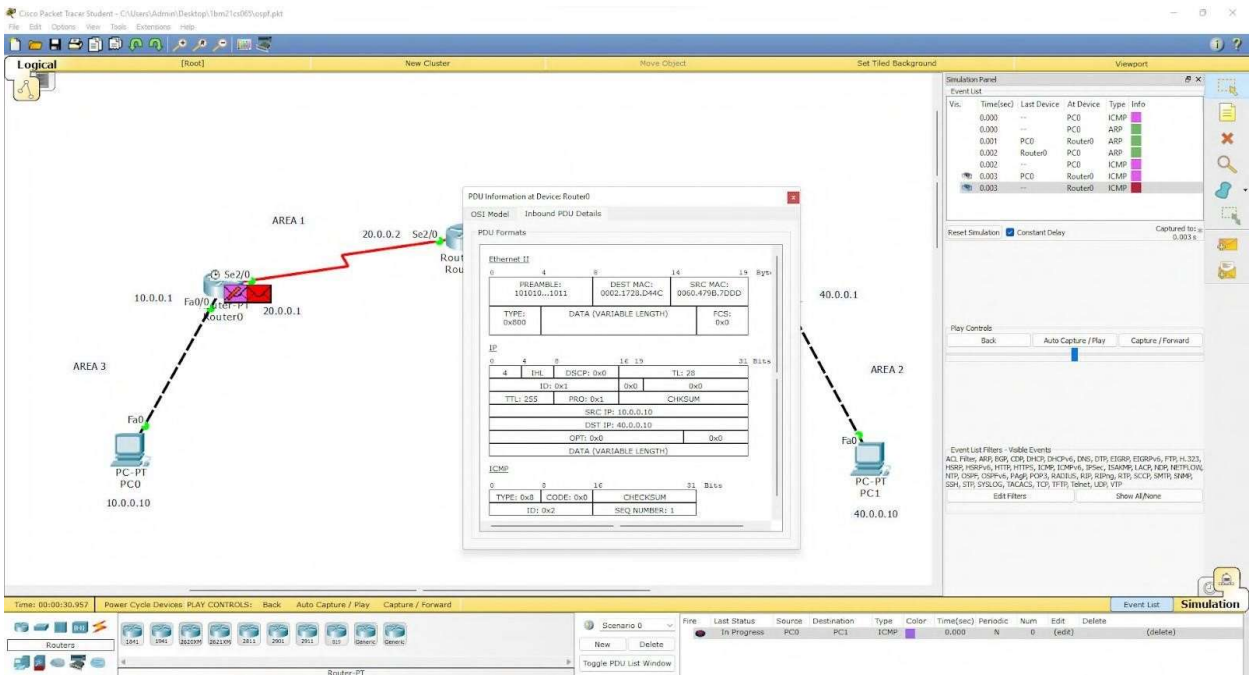
Observation

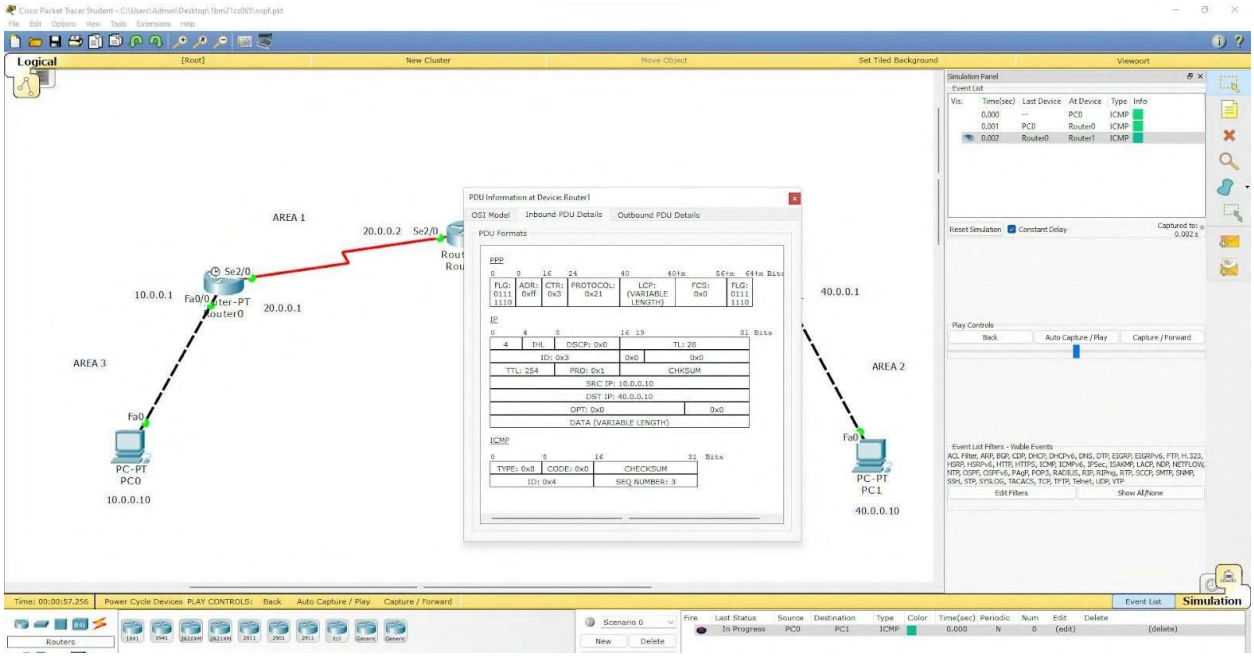
1. The no. of hops the packet travel before being discarded as TTL.
2. Datagram TTL field is set by the sender & reduced by each router along the path to its destination.
3. The router reduces TTL value by some value forwarding the packets.

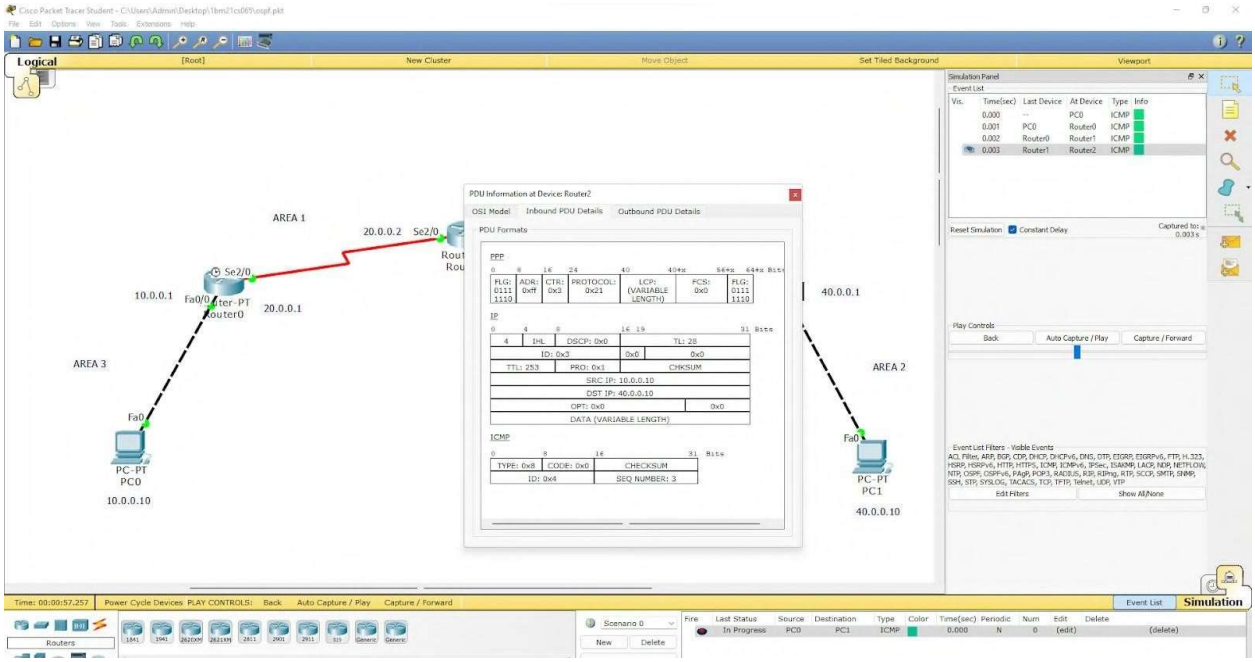
TOPOLOGY:

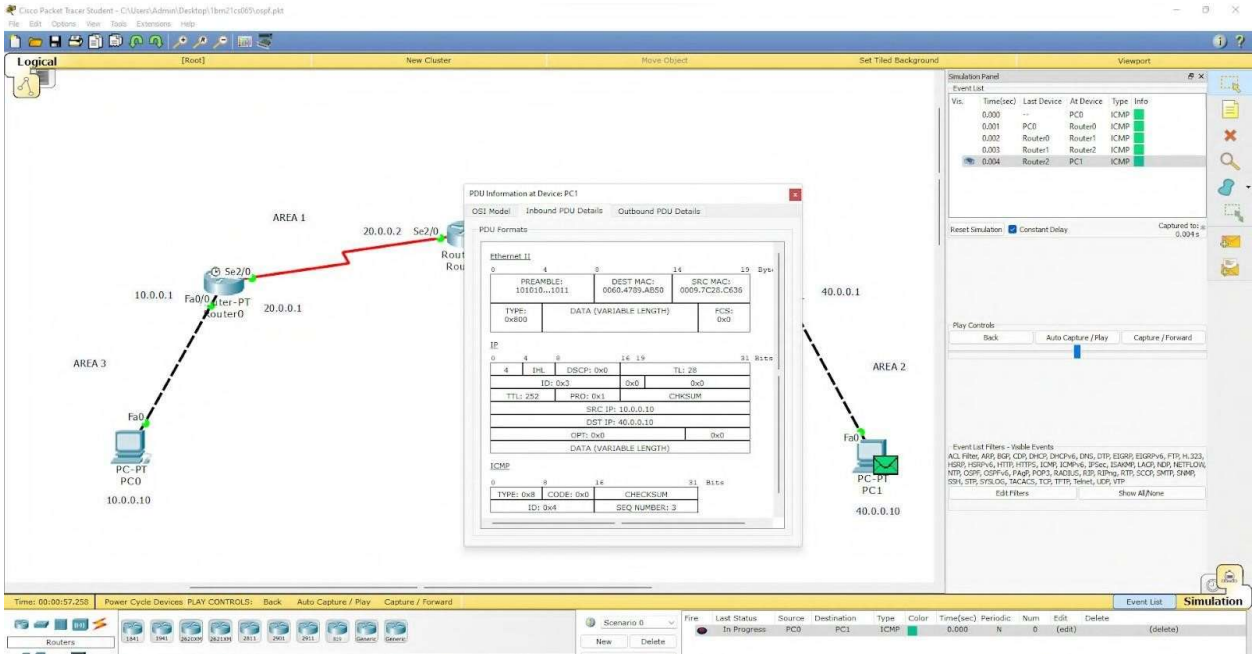


OUTPUT:




Logical
AREA 1
AREA 2
AREA 3
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:00:57.256
Power Cycle Devices
PLAY CONTROLS:
Simulation
Scenario 0
New
Delete
In Progress
PC0
PC1
ICMP

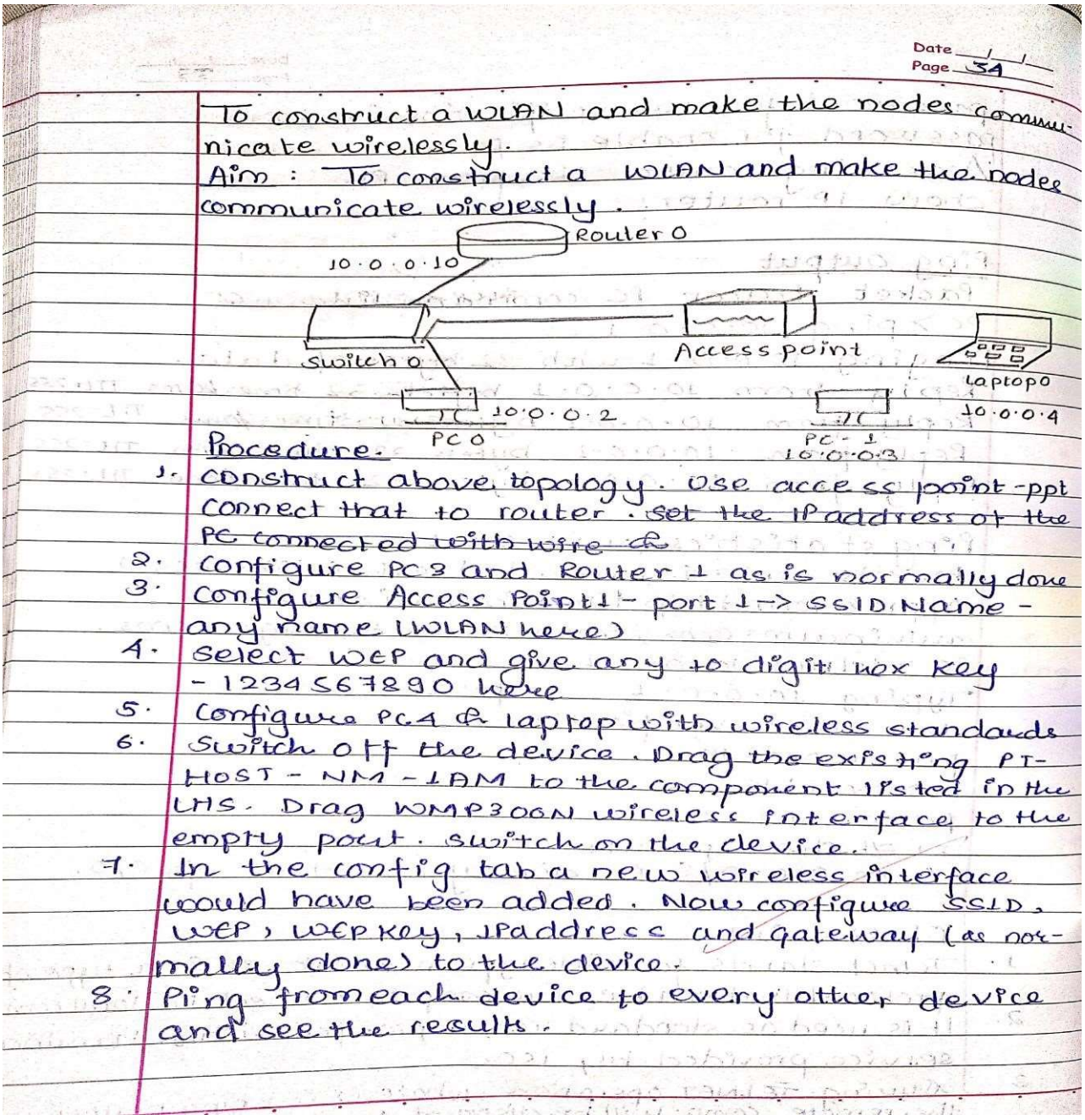

Logical
AREA 1
AREA 2
AREA 3
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:00:57.257
Power Cycle Devices
PLAY CONTROLS:
Simulation
Scenario 0
New
Delete
In Progress
PC0
PC1
ICMP


Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
AREA 1
20.0.0.2
Se2/0
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
AREA 2
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
Fa0
PC-PT
PC1
40.0.0.10
PDU Information at Device: PC1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0060.4789.AB50
SRC MAC: 0009.7C28.C636
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
IHL
DSCP: 0x0
TL: 28
ID: 0x3
0x0
0x0
TTL: 252
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
Info
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 Router2 ICMP
0.004 Router2 PC1 ICMP
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Time: 00:00:57.258
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Routers
Scenario 0
New
Delete
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
In Progress
PC0
PC1
ICMP
0.000
N
0
(edit)
(delete)

WEEK 11

To construct a WLAN and make the nodes communicate wirelessly

OBSERVATION:



Date / /
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To construct a WLAN and make the nodes communicate wirelessly.

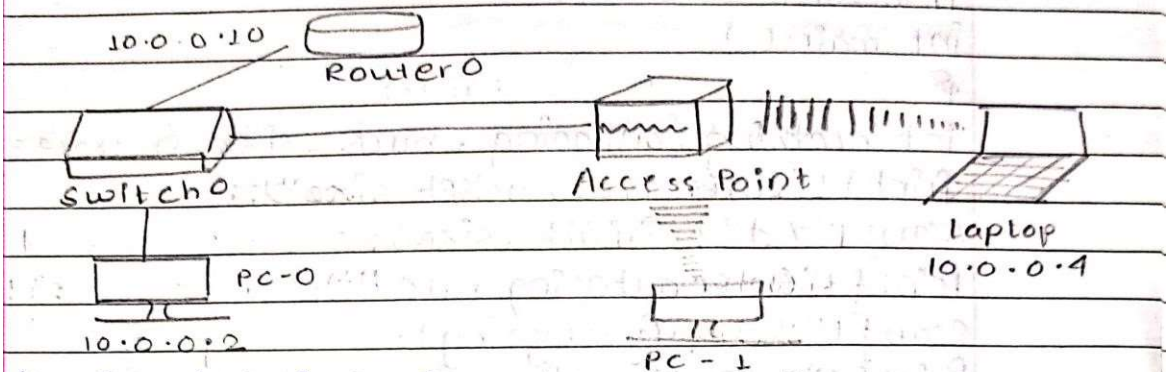
Aim : To construct a WLAN and make the nodes communicate wirelessly.

Procedure.

1. Construct above topology. Use access point-ppt connect that to router. Set the IP address of the PC connected with wire ~~&~~
2. Configure PC 3 and Router 1 as is normally done
3. Configure Access Point 1 - port 1 -> SSID Name - any name (WLAN here)
4. Select WEP and give any 10 digit hex key - 1234567890 here
5. Configure PC 4 & laptop with wireless standards
6. 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.
7. 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.
8. Ping from each device to every other device and see the results.

Result

Topology



In PC0 (10.0.0.2)

Pc > ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data

Reply from 10.0.0.3 bytes = 32 time = 11 ms TTL = 120

Reply from 10.0.0.3 bytes = 32 time = 13ms TTL = 120

Reply from 10.0.0.3 bytes = 32 time = 6ms TTL = 120

Reply from 10.0.0.3 bytes = 32 time = 0ms TTL = 120

Ping statistics for 10.0.0.3

Packets: Sent = 4, Recieved = 4, Lost = 6

Approx round trip time in milliseconds

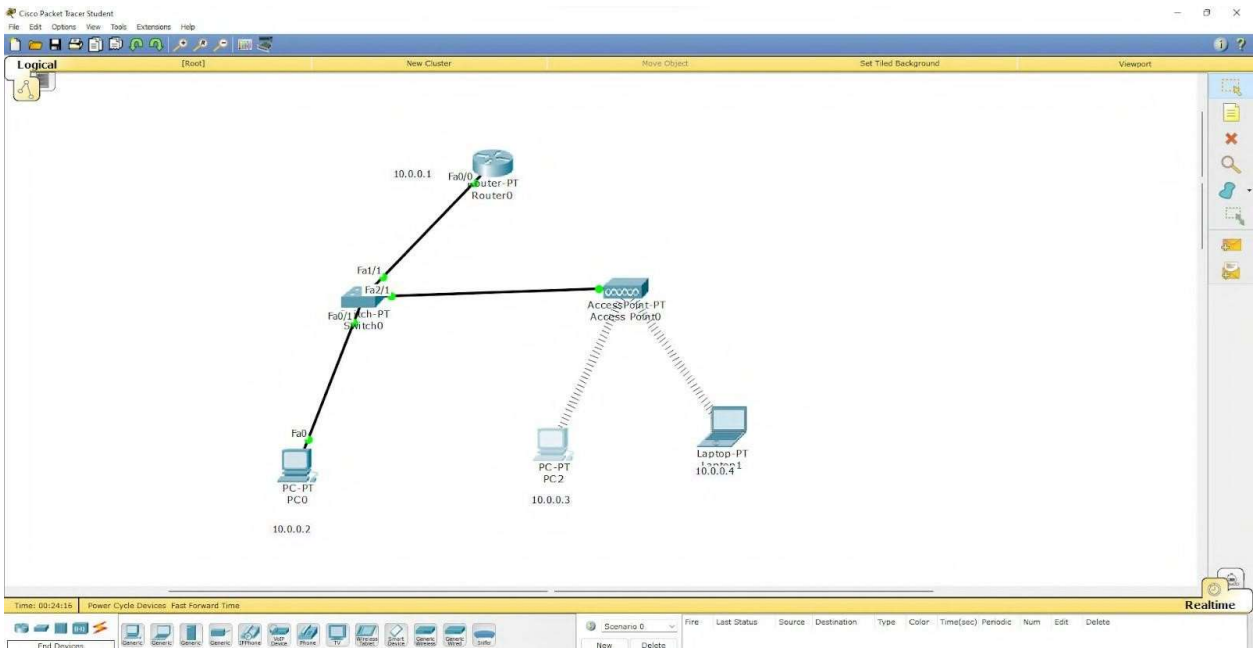
minimum = 6ms, Max = 21ms, Avg = 12 ms.

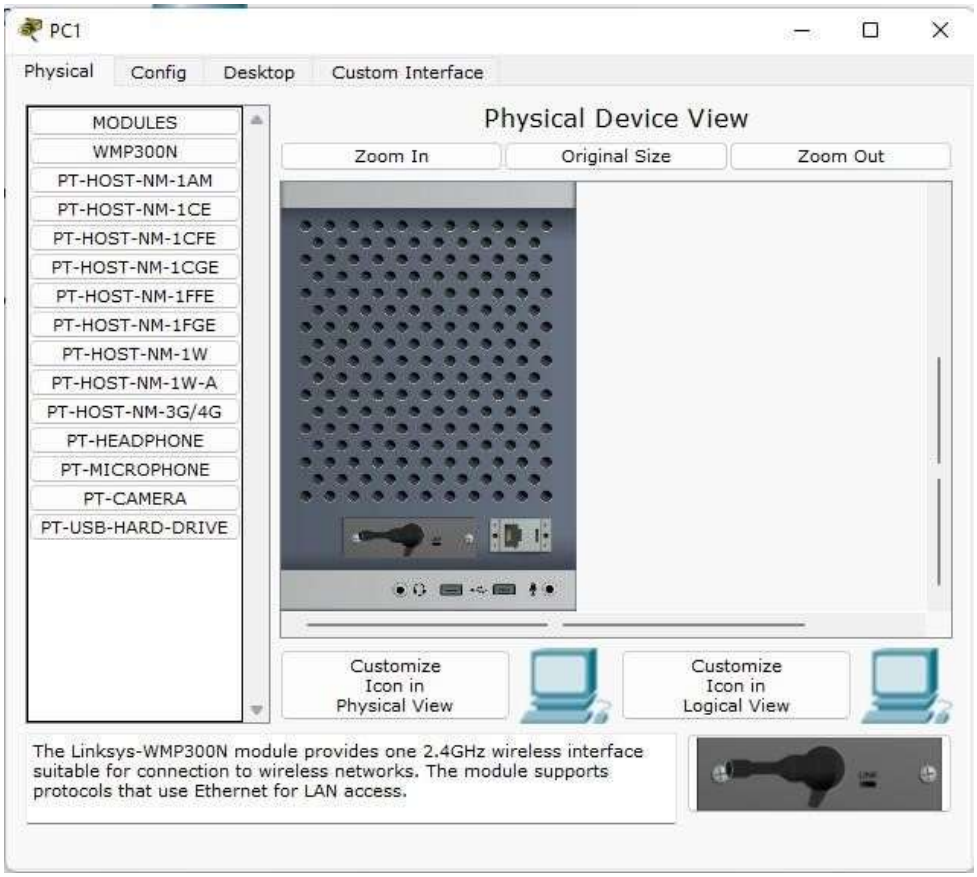
Observation.

Wireless local area network (WLAN) is a group of wlocated computers or other devices that form a network based on radio transmission rather than wire connections.

After the WLAN is set up, the lined connection appears in the topology from the access point

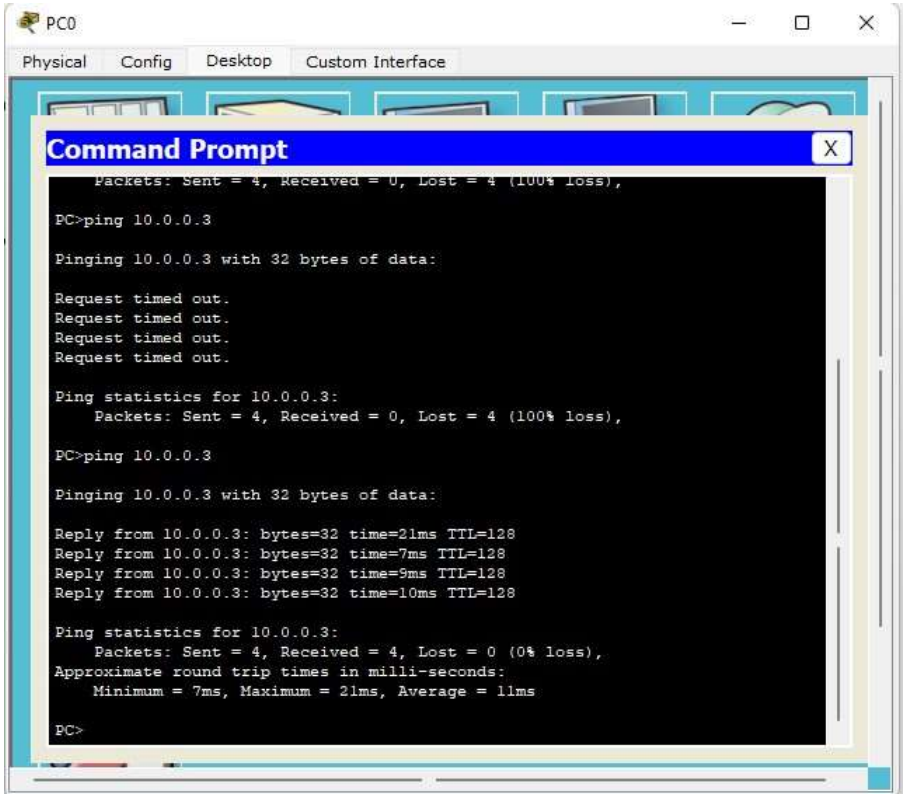
TOPOLOGY:


Logical
10.0.0.1
Fa0/0
Router-PT
Router0
Fa1/1
Fa2/1
Fa0/1
Switch-PT
Switch0
Access Point-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC2
10.0.0.3
Laptop-PT
10.0.0.4
Realtime


PC1
Physical
Config
Desktop
Custom Interface
MODULES
WMP300N
PT-HOST-NM-1AM
PT-HOST-NM-1CE
PT-HOST-NM-1CFE
PT-HOST-NM-1CGE
PT-HOST-NM-1FFE
PT-HOST-NM-1FGE
PT-HOST-NM-1W
PT-HOST-NM-1W-A
PT-HOST-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WMP300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.


Laptop0
Physical
Config
Desktop
Custom Interface
MODULES
WPC300N
PT-LAPTOP-NM-1AM
PT-LAPTOP-NM-1CE
PT-LAPTOP-NM-1CFE
PT-LAPTOP-NM-1CGE
PT-LAPTOP-NM-1FFE
PT-LAPTOP-NM-1FGE
PT-LAPTOP-NM-1W
PT-LAPTOP-NM-1W-A
PT-LAPTOP-NM-3G/4G
PT-HEADPHONE
PT-MICROPHONE
PT-CAMERA
PT-USB-HARD-DRIVE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The Linksys-WPC300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.

OUTPUT:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=21ms TTL=128
Reply from 10.0.0.3: bytes=32 time=7ms TTL=128
Reply from 10.0.0.3: bytes=32 time=9ms TTL=128
Reply from 10.0.0.3: bytes=32 time=10ms TTL=128
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 7ms, Maximum = 21ms, Average = 11ms
PC>

WEEK 12

To understand the operation of TELNET by accessing the router in server room from a PC in IT office.

OBSERVATION:

Date 10/8/23
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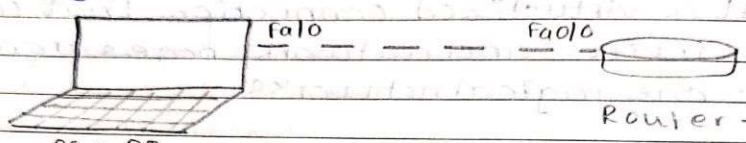
To understand the operation of TELNET by accessing the router in server room from a PC in IT office.

Aim : To understand the operation of TELNET by accessing the router in server room from a PC in IT office.

Topology



Procedure

1. Create a topology as shown above.
2. Configure the IP address & gateway for PC0
3. Configure the router by executing the following commands:
   1. Enable.
   2. config T
   3. Host name R1
   4. enable secret P1
   5. interface fastethernet 0/0.
   6. IP address 10.0.0.1 255.0.0.0
   7. No shut.
   8. time vty 05
   9. login
   10. pass word P0
   11. Exit, Exit.
   12. WR

Ping message to router.

password for user verification is p0
password for enable is p1.
Accessing router cli from PC
show IP route.

Ping output

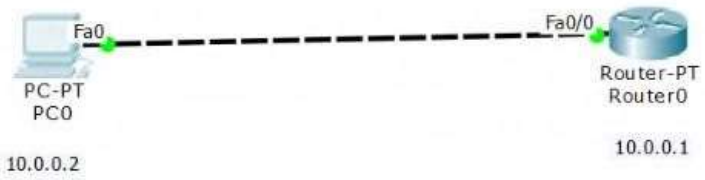
Packet tracer PC command line 1.0
PC > ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data.
Reply from 10.0.0.1 bytes = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 bytes = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 bytes = 32 time = 0ms TTL = 255
Reply from 10.0.0.1 bytes = 32 time = 0ms TTL = 255

Ping statistics for 10.0.0.1
Packets sent = 4 recieved = 4 lost = 0 (0% loss)
Approx round trip times in milliseconds.
minimum = 0ms, max = 0ms, Average = 0ms.
PC > telnet 10.0.0.1
Typing 10.0.0.1 ... open
user access verification
password: p0
p1 > enable
password: p1
r1 # show ip route
C 10.0.0.0/8 is directly connected, fa 0/0.

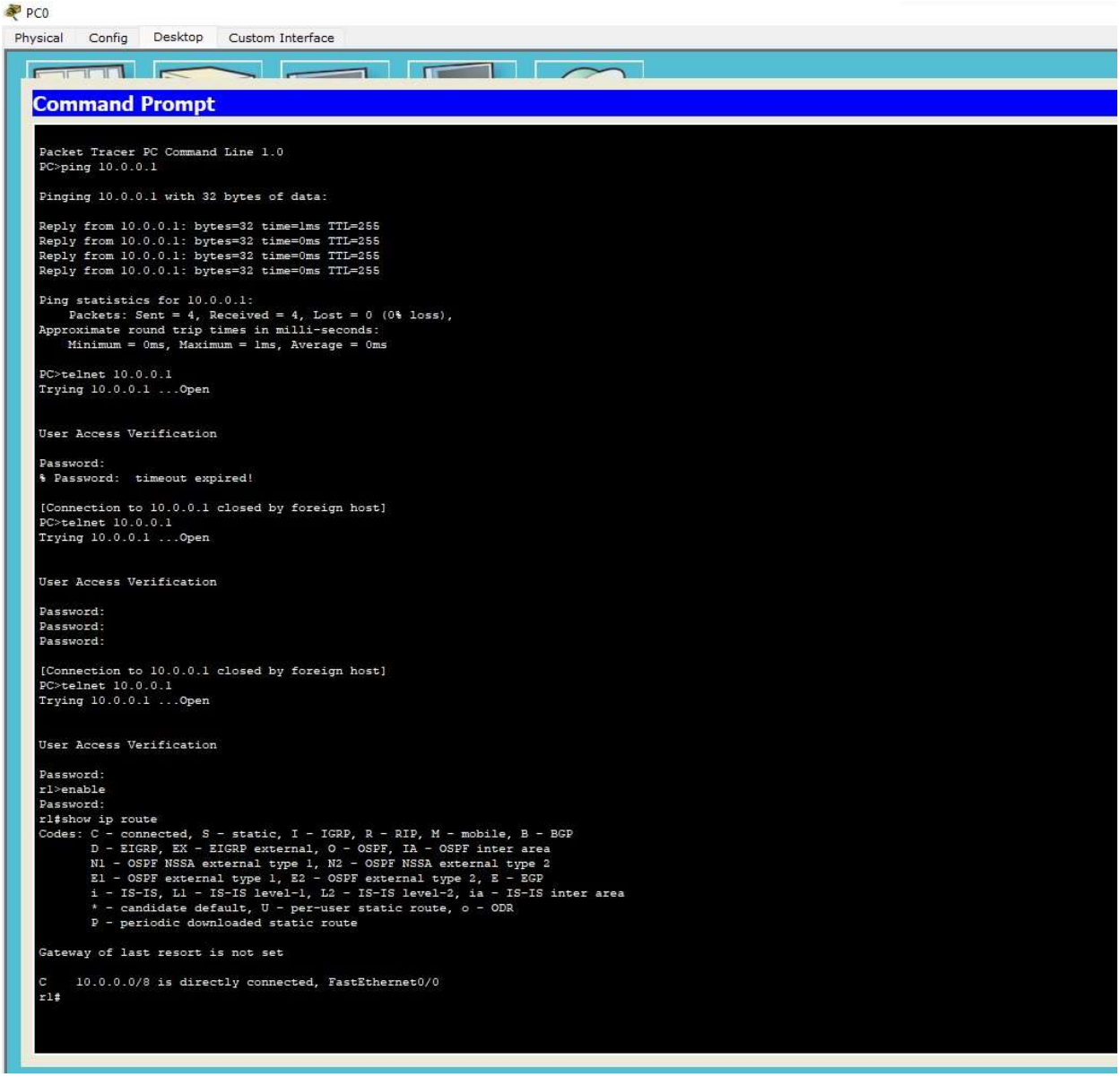
Observation

1. Telnet stands for Teletype network, it is a type of protocal that enables one comp to connect to local comp.
2. It is used as standard TCP/IP pro. for virtual terminal service provided by ISO.
3. During TELNET operation, whatever is being performed on the remote comp. will be displayed by local comp. Telnet

TOPOLOGY:



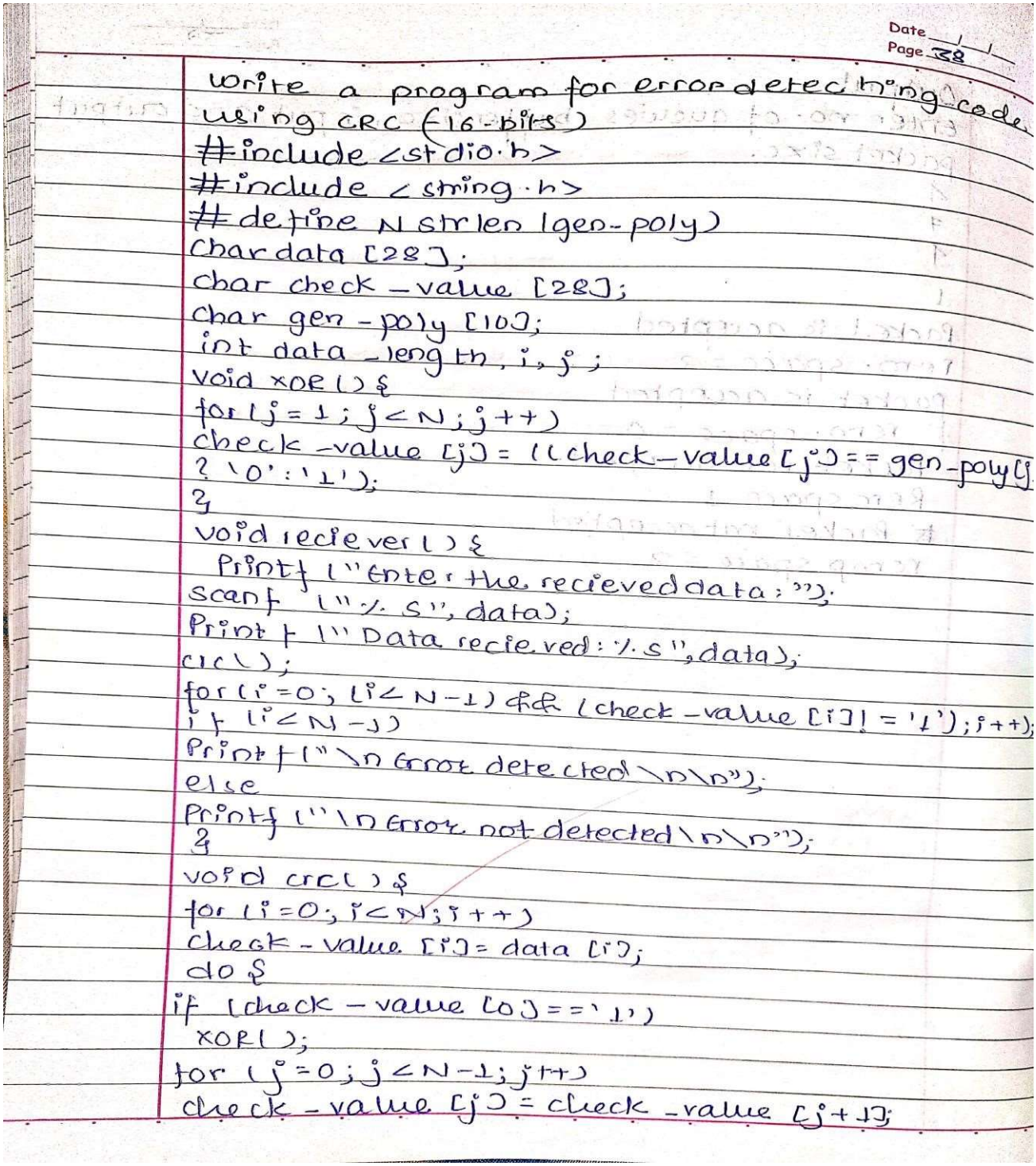
OUTPUT:


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=1ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Reply from 10.0.0.1: bytes=32 time=0ms TTL=255
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
% Password: timeout expired!
[Connection to 10.0.0.1 closed by foreign host]
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
Password:
Password:
[Connection to 10.0.0.1 closed by foreign host]
PC>telnet 10.0.0.1
Trying 10.0.0.1 ...Open
User Access Verification
Password:
r1>enable
Password:
r1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
C 10.0.0.0/8 is directly connected, FastEthernet0/0
r1#

WEEK 13

Write a program for error detecting code using CRC- CCITT (16-bits).

OBSERVATION:



```
Write a program for error detecting code
using CRC (16-bits)
#include <stdio.h>
#include <string.h>
#define N strlen(gen-poly)
char data[28];
char check-value[28];
char gen-poly[10];
int data-length, i, j;
void XOR(){
for(j=1;j<N;j++)
check-value[j]=((check-value[j]==gen-poly[j]
?'0':'1');
}
void recieve(){
 Printf("Enter the recieved data:");
scanf("%s",data);
Printf("Data recieved:%s",data);
crc();
for(i=0;i<N-1)&&(check-value[i]!='1');i++);
if(i<N-1)
Printf("\n Error detected\n\n");
else
Printf("\n Error not detected\n\n");
}
void crc(){
for(i=0;i<N;i++)
check-value[i]=data[i];
do{
if(check-value[0]=='1')
 XOR();
for(j=0;j<N-1;j++)
check-value[j]=check-value[j+1];
```

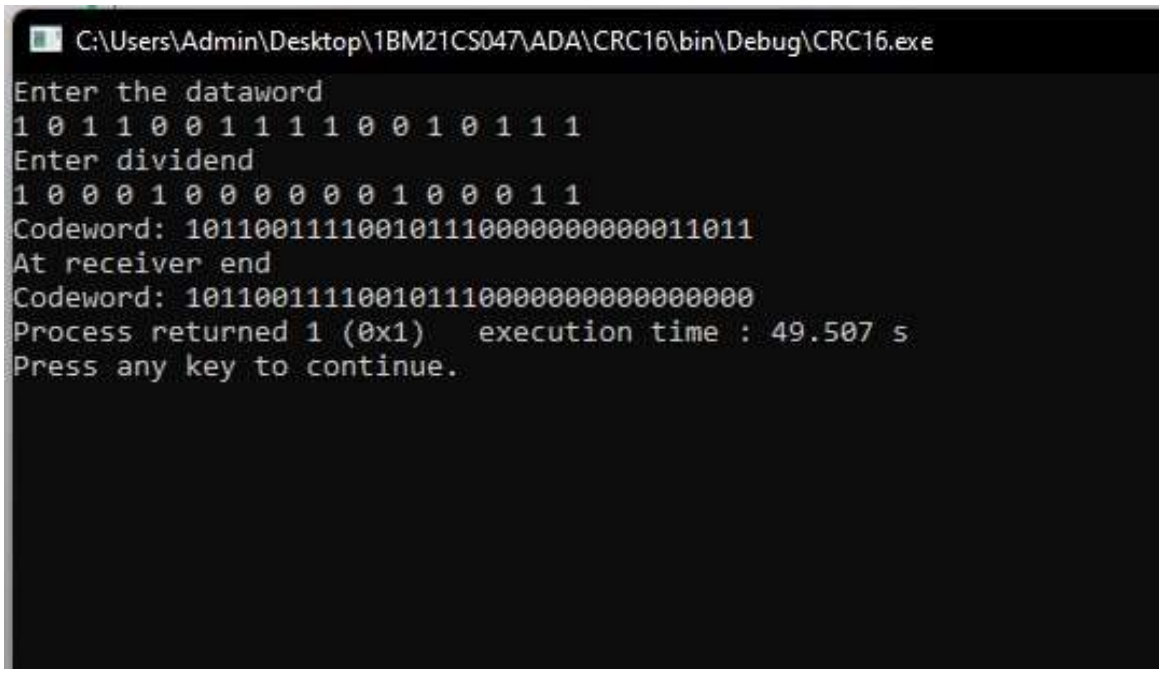
```
check-value[j] = data[i++];
} while(i <= data-length + N-1);
}
int main()
{
Printf("\n Enter data to be transmitted \n");
scanf("%s", &data);
Printf("\n Enter the divisor polynomial \n");
scanf("%s", &gen-poly);
data-length = strlen(data);
for(i=data-length; i<data length+N-1; i++)
 data[i]='0';
Printf("\n Data Padded with n-1 zero : %s", data);
crc();
Printf("\n CRC value is : %s", check-value);
for(i=data-length; i<data-length+N-1; i++)
data[i] = check-value[i-data-length];
Printf("\n Final codeword to be sent : %s", data);
Printf("\n ---.---.---.\n");
recieverl();
return 0;
}
```

Output

Enter the dataword: 1100101011001001

Calculated CRC = 1110100101111001

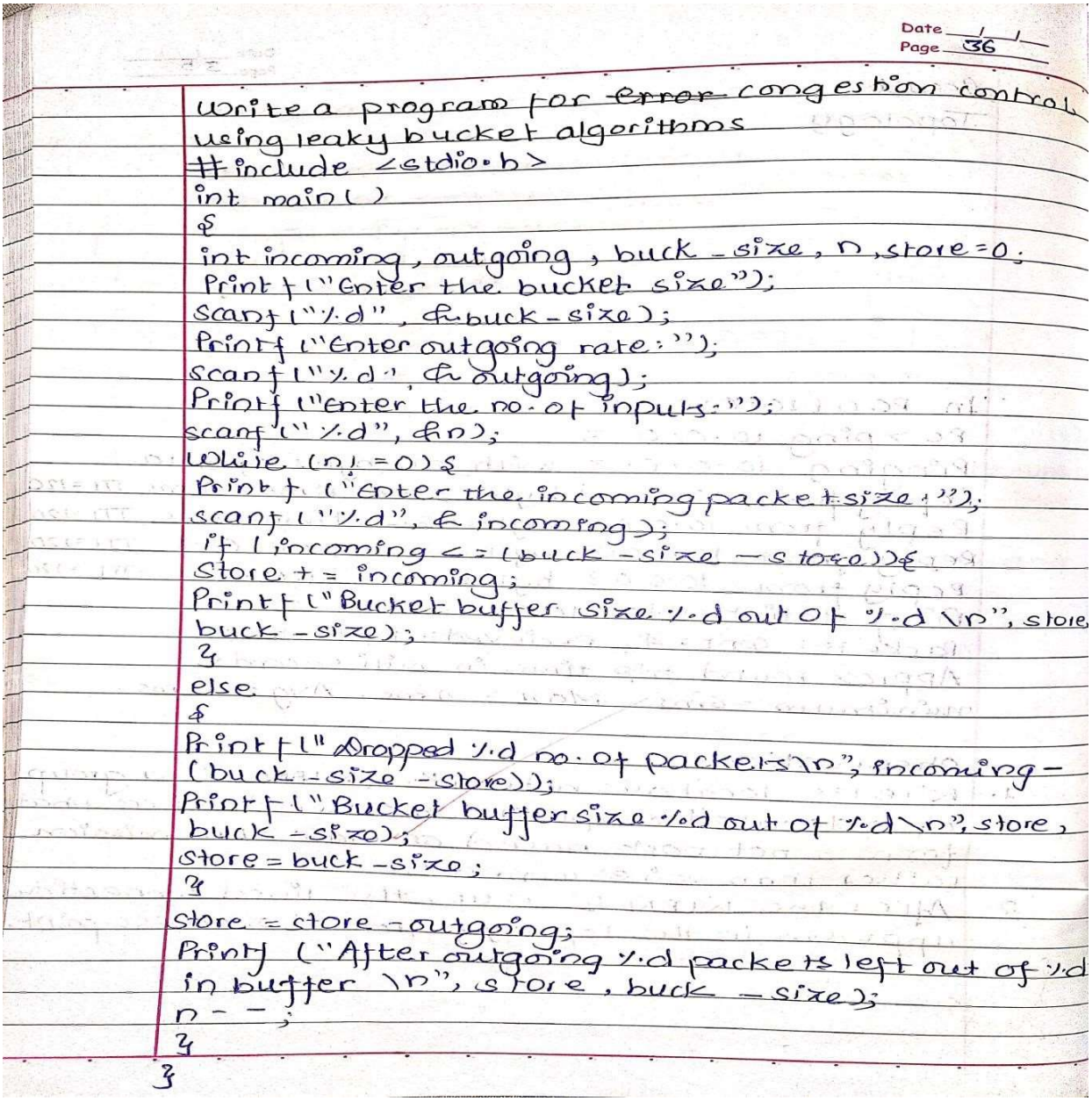
OUTPUT:


C:\Users\Admin\Desktop\1BM21CS047\ADA\CRC16\bin\Debug\CRC16.exe
Enter the dataword
1 0 1 1 0 0 1 1 1 1 0 0 1 0 1 1 1
Enter dividend
1 0 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1
Codeword: 10110011110010111000000000011011
At receiver end
Codeword: 10110011110010111000000000000000
Process returned 1 (0x1)   execution time : 49.507 s
Press any key to continue.

WEEK 14

Write a program for congestion control using leaky bucket algorithm

CODE:



Date / /
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Write a program for ~~error~~ congestion control using leaky bucket algorithms

```
#include <stdio.h>
int main()
{
int incoming, outgoing, buck_size, n, store=0;
Printf("Enter the bucket size");
scanf("%d", &buck_size);
Printf("Enter outgoing rate:");
scanf("%d", &outgoing);
Printf("Enter the no. of inputs:");
scanf("%d", &n);
while (n!=0){
Printf("Enter the incoming packet size:");
scanf("%d", &incoming);
if (incoming <= (buck_size - store)){
store += incoming;
Printf("Bucket buffer size %d out of %d \n", store,
buck_size);
}
else
{
Printf("Dropped %d no. of packets\n", incoming-
(buck_size -store));
Printf("Bucket buffer size %d out of %d\n", store,
buck_size);
store = buck_size;
}
store = store -outgoing;
Printf("After outgoing %d packets left out of %d
in buffer \n", store, buck_size);
n--;
}
}
```

Output

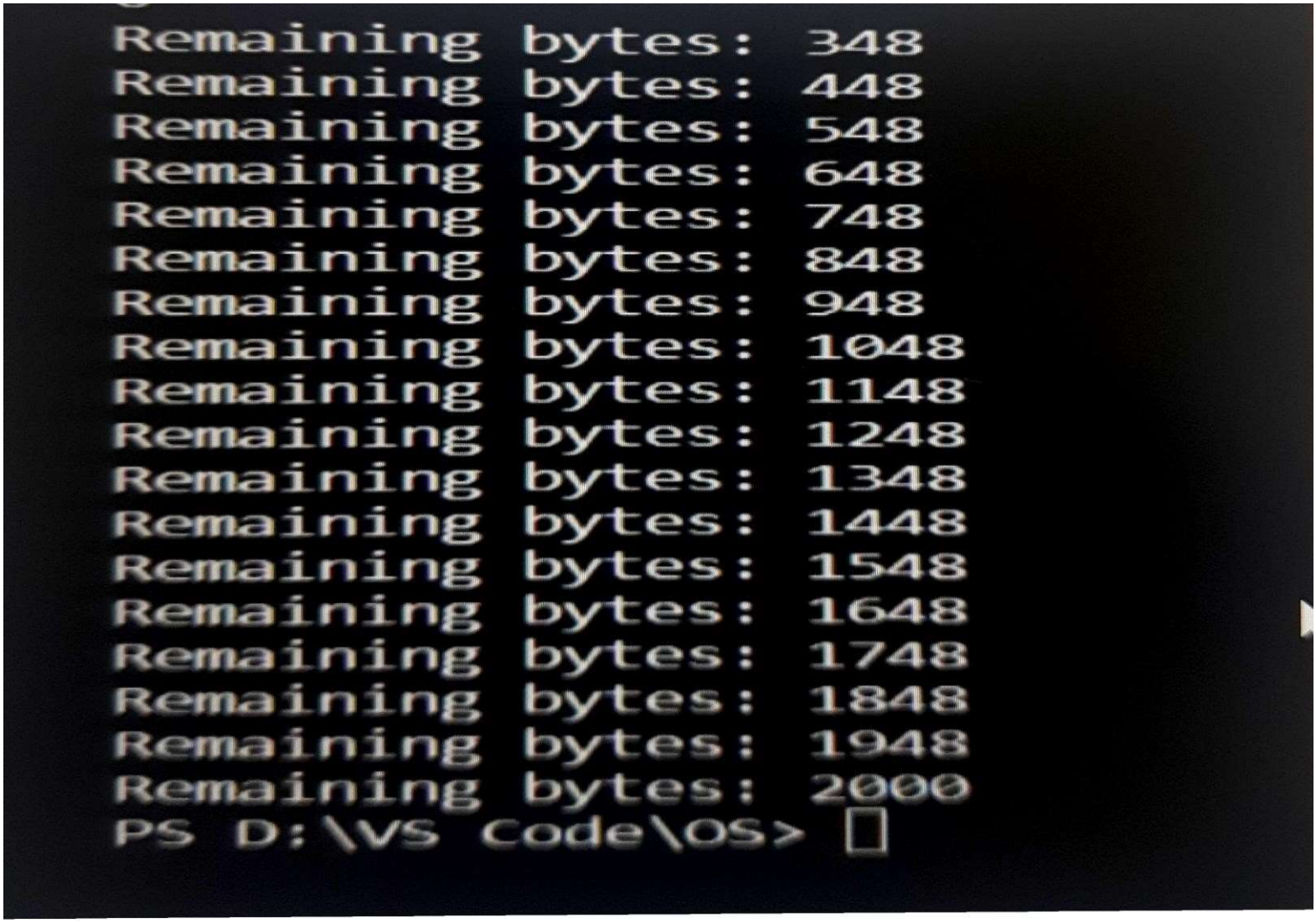
Enter no. of queries, buffer size, input and output packet size

4
7
4

1

Packet is accepted
rem. space = 3
Packet is accepted
rem. space = 0
Packet not accepted.
Rem space 1
Packet not accepted
remp. space = 2

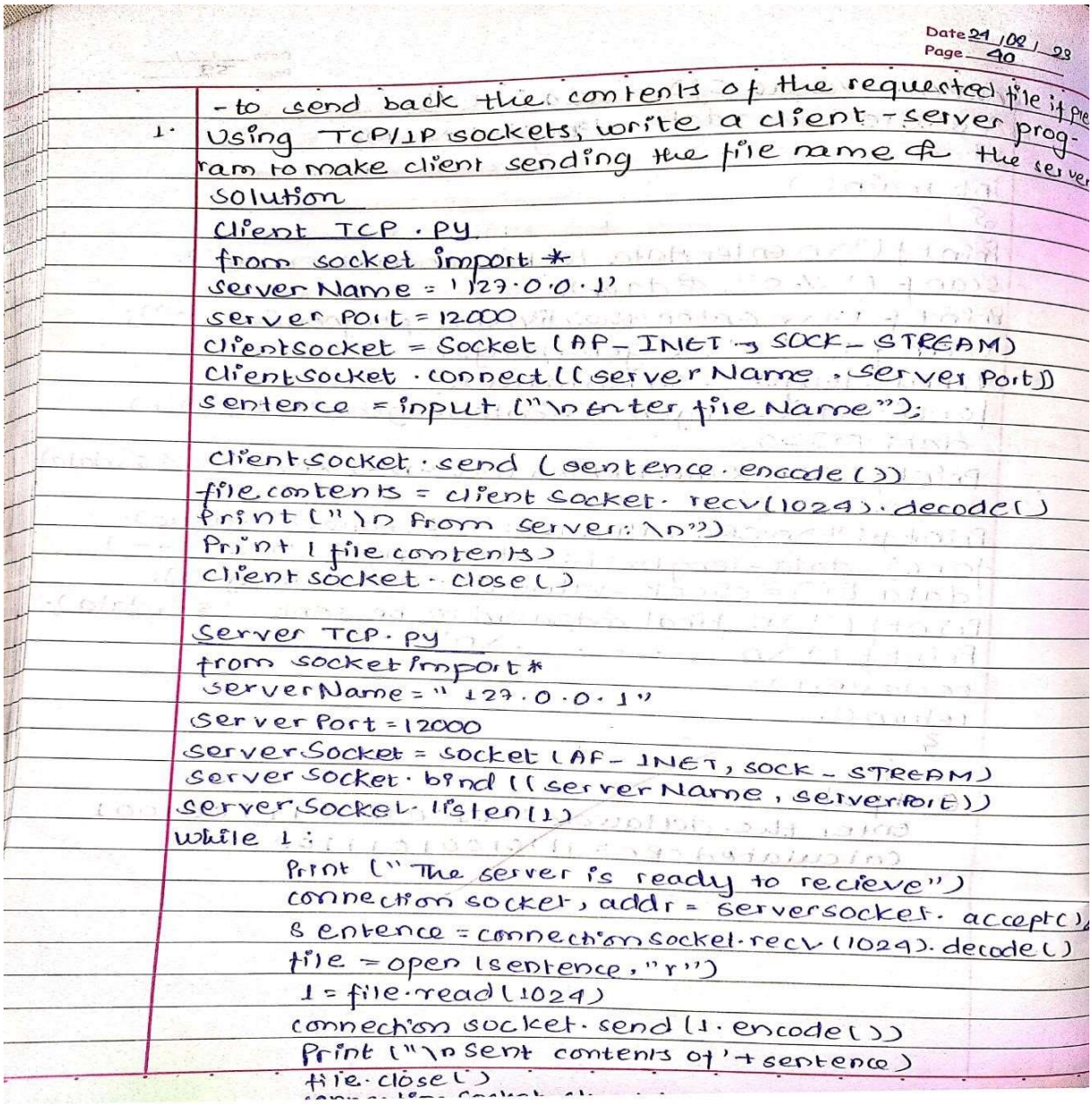
```
PS D:\VS Code> cd "d:\VS Code\OS\" ; if ($?) { gcc bucket.c -o bucket } ; if ($?) { .\bucket }
Enter Bucket size and outstream size
2000
100
Packet of 41 bytes accepted
Remaining bytes: 2000
If you want to stop input, press 0, otherwise, press 1
1
Packet of 467 bytes accepted
Remaining bytes: 1633
If you want to stop input, press 0, otherwise, press 1
1
Packet of 334 bytes accepted
Remaining bytes: 1399
If you want to stop input, press 0, otherwise, press 1
1
Packet of 500 bytes accepted
Remaining bytes: 999
If you want to stop input, press 0, otherwise, press 1
1
Packet of 169 bytes accepted
Remaining bytes: 930
If you want to stop input, press 0, otherwise, press 1
1
Packet of 724 bytes accepted
Remaining bytes: 306
If you want to stop input, press 0, otherwise, press 1
1
Packet of 478 bytes is discarded
Remaining bytes: 406
If you want to stop input, press 0, otherwise, press 1
1
Packet of 358 bytes accepted
Remaining bytes: 148
If you want to stop input, press 0, otherwise, press 1
1
Packet of 962 bytes is discarded
Remaining bytes: 248
If you want to stop input, press 0, otherwise, press 1
0
Remaining bytes: 348
Remaining bytes: 448
Remaining bytes: 548
Remaining bytes: 648
Remaining bytes: 748
```


Remaining bytes: 348
Remaining bytes: 448
Remaining bytes: 548
Remaining bytes: 648
Remaining bytes: 748
Remaining bytes: 848
Remaining bytes: 948
Remaining bytes: 1048
Remaining bytes: 1148
Remaining bytes: 1248
Remaining bytes: 1348
Remaining bytes: 1448
Remaining bytes: 1548
Remaining bytes: 1648
Remaining bytes: 1748
Remaining bytes: 1848
Remaining bytes: 1948
Remaining bytes: 2000
PS D:\VS Code\OS>

WEEK 15

Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back the contents of the requested file if present.

OBSERVATION:



Date 21/09/23
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1. Using TCP/IP sockets, write a client-server program to make client sending the file name & the server to send back the contents of the requested file if pre

Solution

Client TCP.py

```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
clientSocket = Socket (AF_INET, SOCK_STREAM)
clientSocket.connect ((serverName, serverPort))
sentence = input ("\n Enter file Name");

clientSocket.send (sentence.encode())
file contents = clientSocket.recv(1024).decode()
print ("\n From Server: \n")
Print (file contents)
client socket.close()
```

Server TCP.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 recieve")
        connectionSocket, addr = serverSocket.accept()
        Sentence = connectionSocket.recv(1024).decode()
        file = open (sentence, "r")
        l = file.read(1024)
        connectionSocket.send (l.encode())
        Print ("\n Sent contents of" + sentence)
        file.close()
```

Date / /
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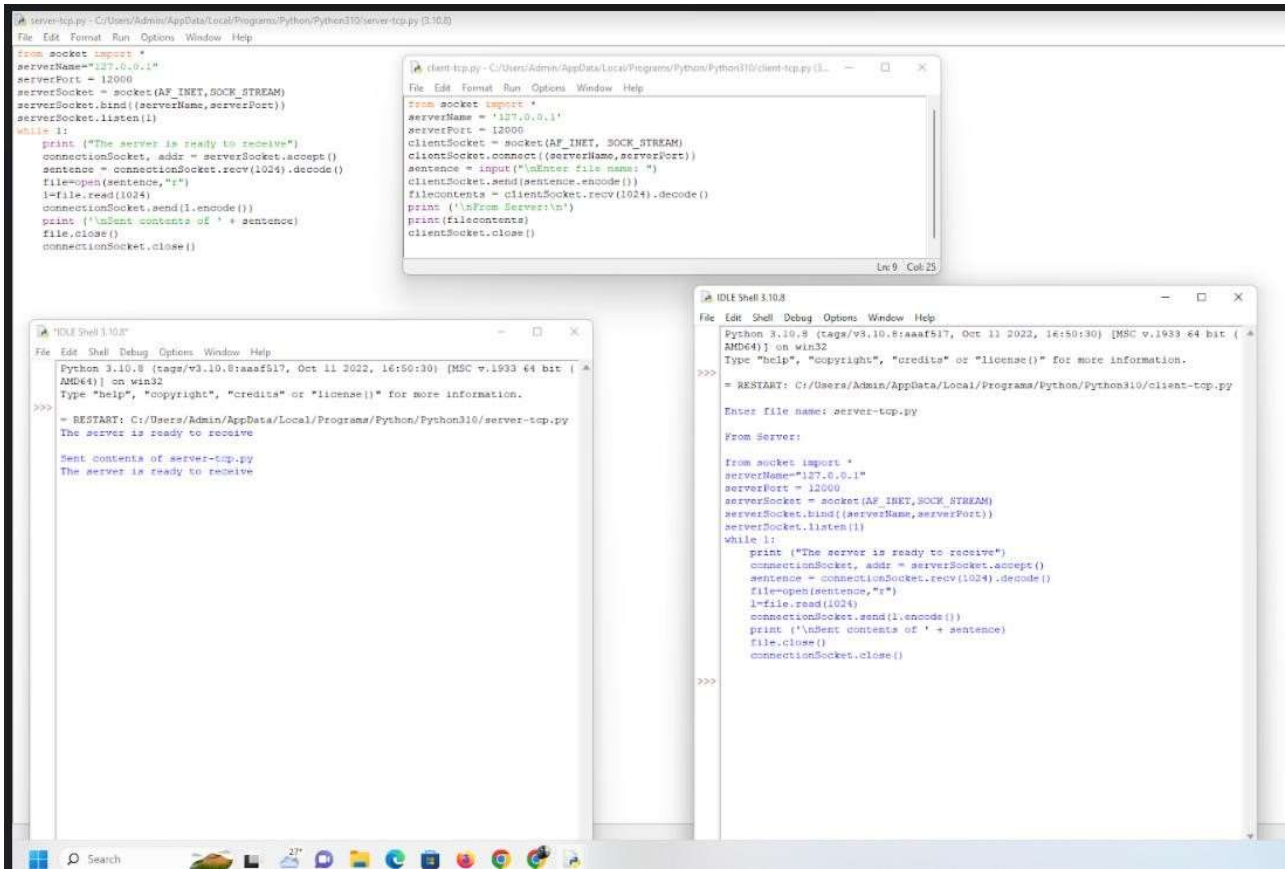
Output

= Restart : C: /Users/ Admin /AppData / Local / Programs / Python / Python 3.10 / server - tcp . py
The Server is ready to recieve .
Sent contents of server - tcp . py
The server is ready to recieve .

= Restart : c : /Users/Admin / AppData / Local / Programs) Python / Python 310/ client - tcp . py .
Enter file name : server - tcp . py .
from socket import *
Server Name = "127 . 0.0.1 "
server Port = 12000
Server Socket = Socket (AF - INET, SOCK - STREAM)
⇒ Contents sent by the server displayed here .

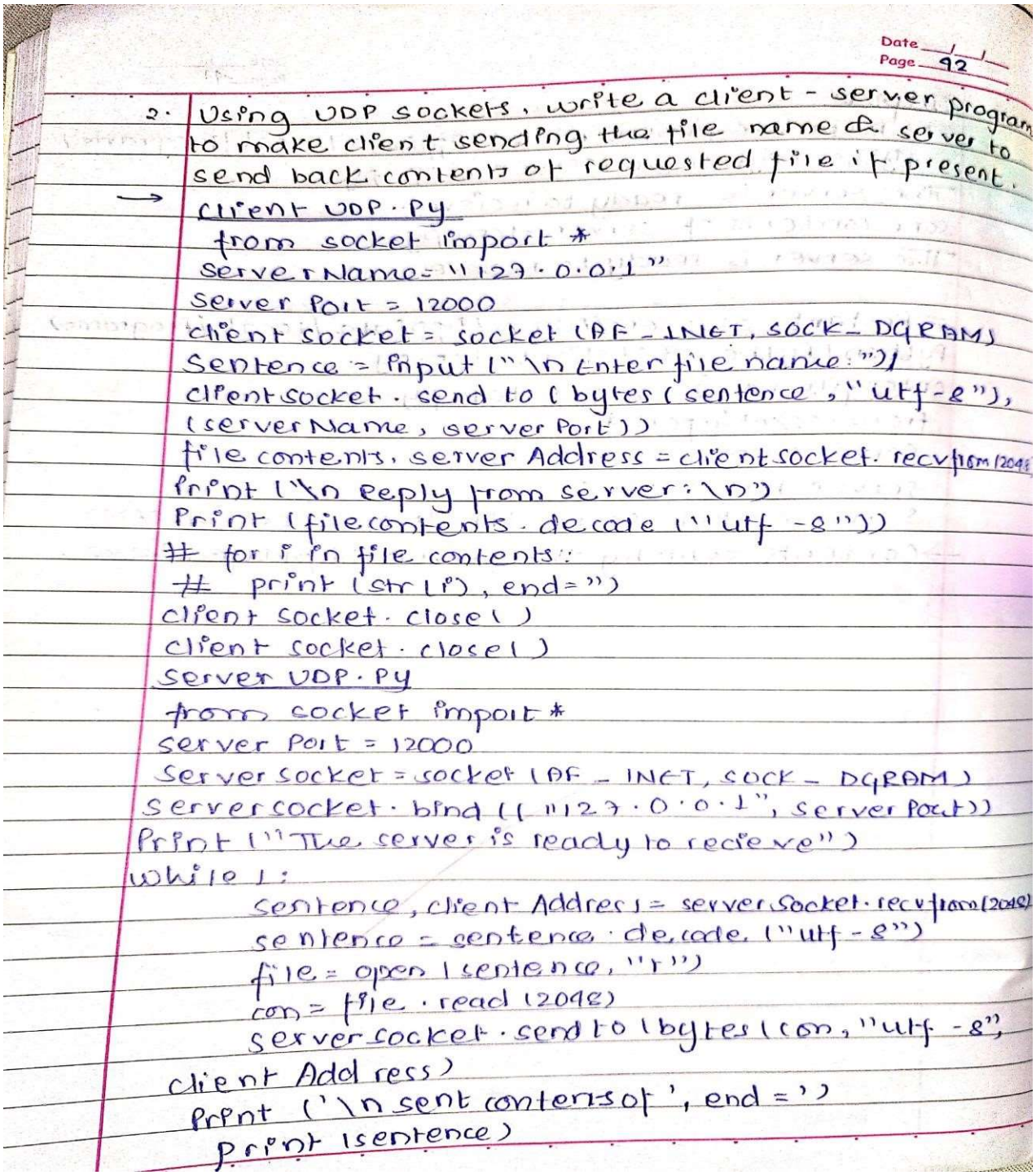
OUTPUT:


server-tcp.py - C:/Users/Admin/AppData/Local/Programs/Python/Python310/server-tcp.py (3.10.8)
File Edit Format Run Options Window Help
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()
client-tcp.py - C:/Users/Admin/AppData/Local/Programs/Python/Python310/client-tcp.py (3...
File Edit Format Run Options Window Help
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()
Ln: 9 Col: 25
IDLE Shell 3.10.8
File Edit Shell Debug Options Window Help
Python 3.10.8 (tags/v3.10.8:aaaf517, Oct 11 2022, 16:50:30) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/server-tcp.py
The server is ready to receive
Sent contents of server-tcp.py
The server is ready to receive
IDLE Shell 3.10.8
File Edit Shell Debug Options Window Help
Python 3.10.8 (tags/v3.10.8:aaaf517, Oct 11 2022, 16:50:30) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python310/client-tcp.py
Enter file name: server-tcp.py
From Server:
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()
>>>
Search

WEEK 16

Using UDP sockets, write a client-server program to make the client send the file name and the server to send back the contents of the requested file if present.

OBSERVATION:



Date / /
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2. Using UDP sockets, write a client - server program to make client sending the file name & server to send back contents of requested file if present.

→ client UDP.py

```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_DGRAM)
Sentence = input("\n Enter file name: ")
clientSocket.sendto(bytes(sentence, "utf-8"),
(serverName, serverPort))
fileContents, serverAddress = clientSocket.recvfrom(2048)
print("\n Reply from server: \n")
Print(fileContents.decode("utf-8"))
# for i in fileContents:
# print(str(i), end="")
clientSocket.close()
clientSocket.close()
```

server UDP.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(2048)
    sentence = sentence.decode("utf-8")
    file = open(sentence, "r")
    con = file.read(2048)
    serverSocket.sendto(bytes(con, "utf-8",
clientAddress)
    print('\n sent contents of ', end = '')
    print(sentence)
```

# for i in sentence:
# print (str(i), end="")
file.close()

Output

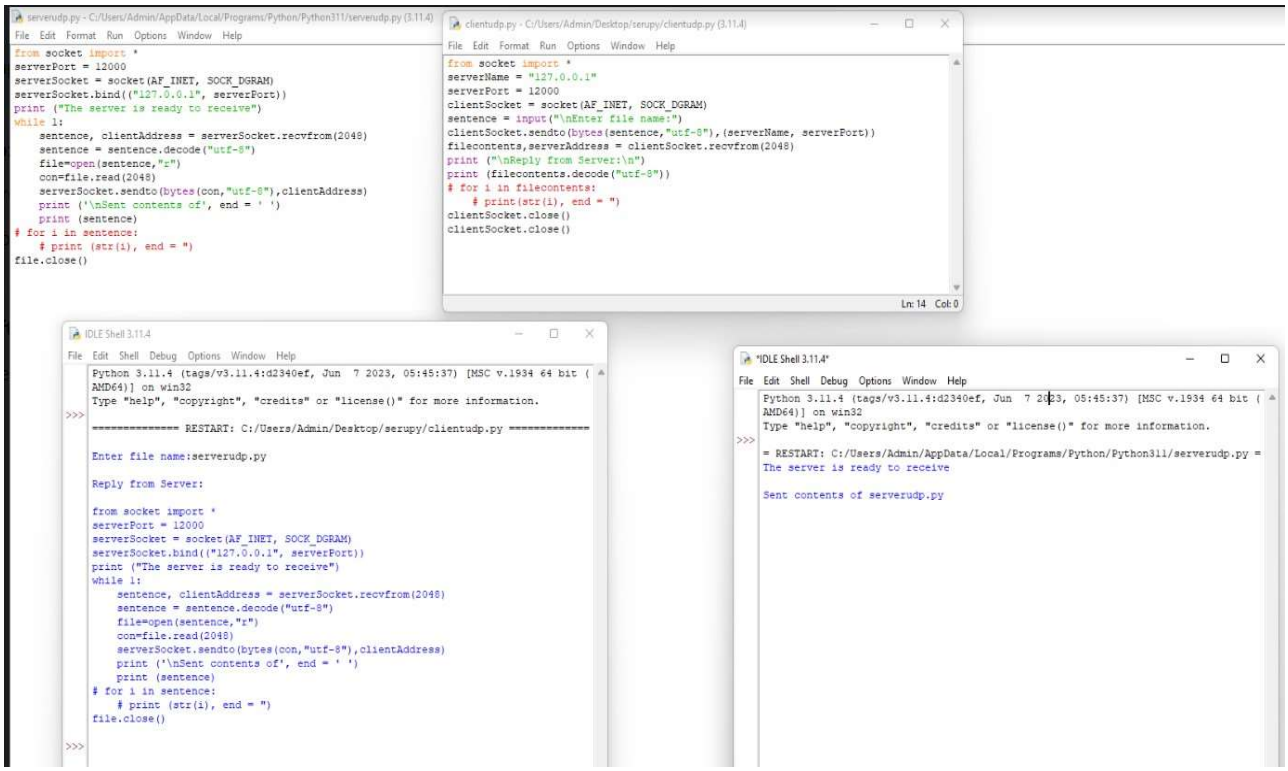
server

The server is ready to recieve.
sent contents of server UDP-py
server is ready to recieve.

client

The contents requested by server is displayed.

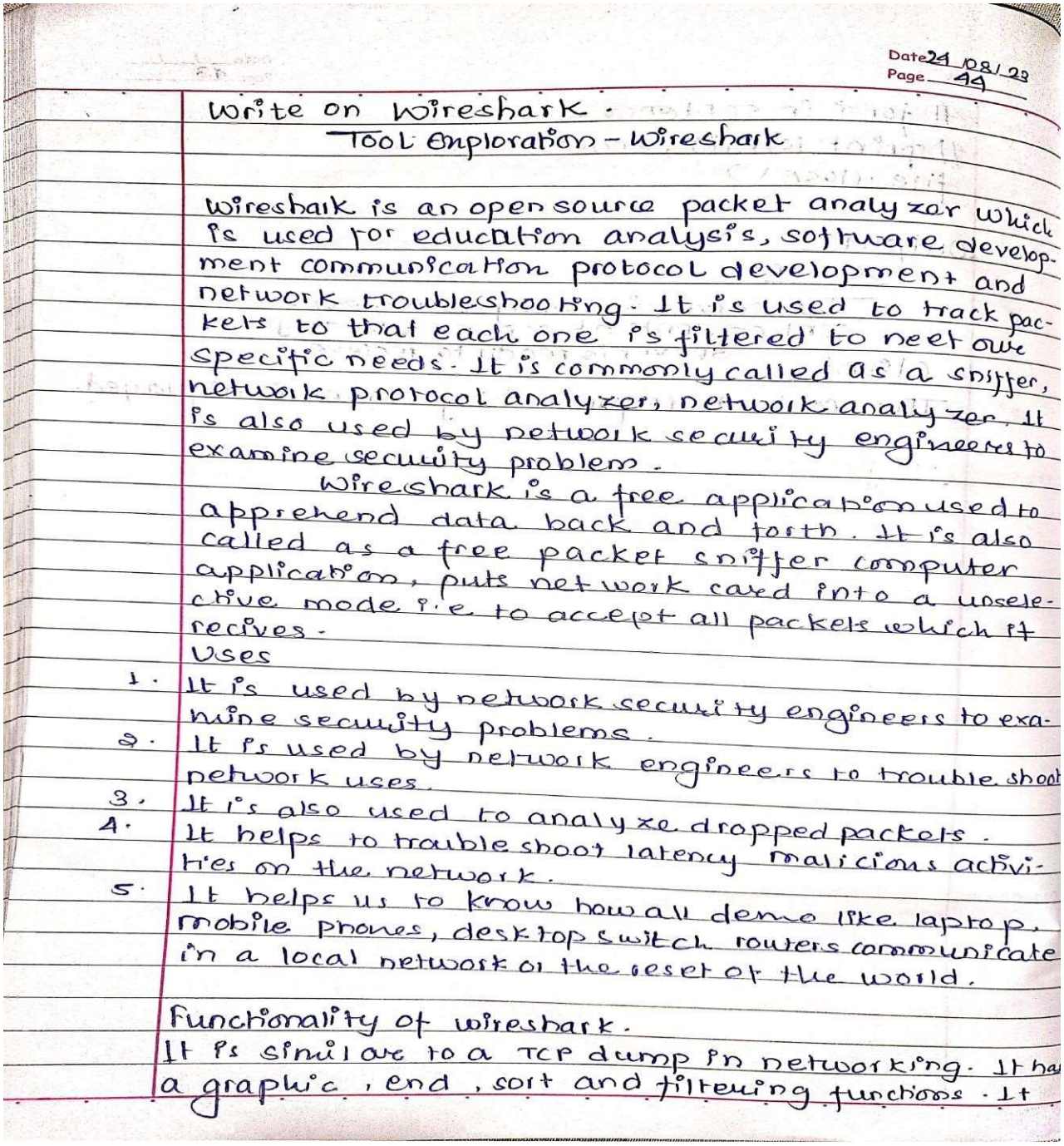
OUTPUT:


serverudp.py - C:/Users/Admin/AppData/Local/Programs/Python/Python311/serverudp.py (3.11.4)
File Edit Format Run Options Window Help
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(2048)
sentence = sentence.decode("utf-8")
file=open(sentence,"r")
con=file.read(2048)
serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
print ('\nSent contents of', end = ' ')
print (sentence)
# for i in sentence:
# print (str(i), end = '')
file.close()
clientudp.py - C:/Users/Admin/Desktop/serupy/clientudp.py (3.11.4)
File Edit Format Run Options Window Help
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(2048)
print ("\nReply from Server:\n")
print (filecontents.decode("utf-8"))
# for i in filecontents:
# print(str(i), end = '')
clientSocket.close()
clientSocket.close()
Ln: 14 Col: 0
IDLE Shell 3.11.4
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/Admin/Desktop/serupy/clientudp.py ==========
Enter file name:serverudp.py
Reply from Server:
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(2048)
sentence = sentence.decode("utf-8")
file=open(sentence,"r")
con=file.read(2048)
serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
print ('\nSent contents of', end = ' ')
print (sentence)
# for i in sentence:
# print (str(i), end = '')
file.close()
>>>
IDLE Shell 3.11.4
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (
AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/Admin/AppData/Local/Programs/Python/Python311/serverudp.py =
The server is ready to receive
Sent contents of serverudp.py

WEEK 17

Tool Exploration -Wireshark

OBSERVATION:



Date 24/08/23
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Write on Wireshark.

Tool Exploration – Wireshark

Wireshark is an open source packet analyzer which is used for education analysis, software development communication protocol development and network troubleshooting. It is used to track packets to that each one is filtered to meet our specific needs. It is commonly called as a sniffer, network protocol analyzer, network analyzer. It is also used by network security engineers to examine security problem.

Wireshark is a free application used to apprehend data back and forth. It is also called as a free packet sniffer computer application, puts network cared into a unselective mode i.e. to accept all packets which it recives.

Uses

1. It is used by network security engineers to examine security problems.
2. It is used by network engineers to trouble shoot network uses.
3. It is also used to analyze dropped packets.
4. It helps to trouble shoot latency malicions activities on the network.
5. It helps us to know how all demo like laptop, mobile phones, desktop switch routers communicate in a local network or the reset of the world.

Functionality of wireshark.

It is similare to a TCP dump in networking. It ha a graphic, end, sort and filtering functions. It

Date __/__/__
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also monitors the unicast traffic which is not sent to network's MAC address interface. The port mirroring is a method to monitor the network traffic. When it is enabled switch sends copies of all network packets present at one port to another port.

Features of wireshark:

- It is a multiplatform software i.e it can run on the Linux, windows, OS X, True BSD, Net BSD, etc.
- It is a standard three pane packet browser.
- It performs deep inspection of hunk of protocols.
- It even has sort and filter option which makes ease to user to view the data.
- It can capture raw USB traffic.
- It is useful in IP analysis.
- It also involves live analysis i.e from different types of network like ethernet, loopback etc through which we can read live data.