VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

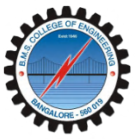
LAB REPORT
on

COMPUTER NETWORKS

Submitted by

GAMANA YELURI R (1BM21CS065)

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
JUN-2023 to SEP-2023

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 **GAMANA YELURI R (1BM21CS065),** 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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BMSCE, Bengaluru

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Professor and Head
Department of CSE
BMSCE, Bengaluru

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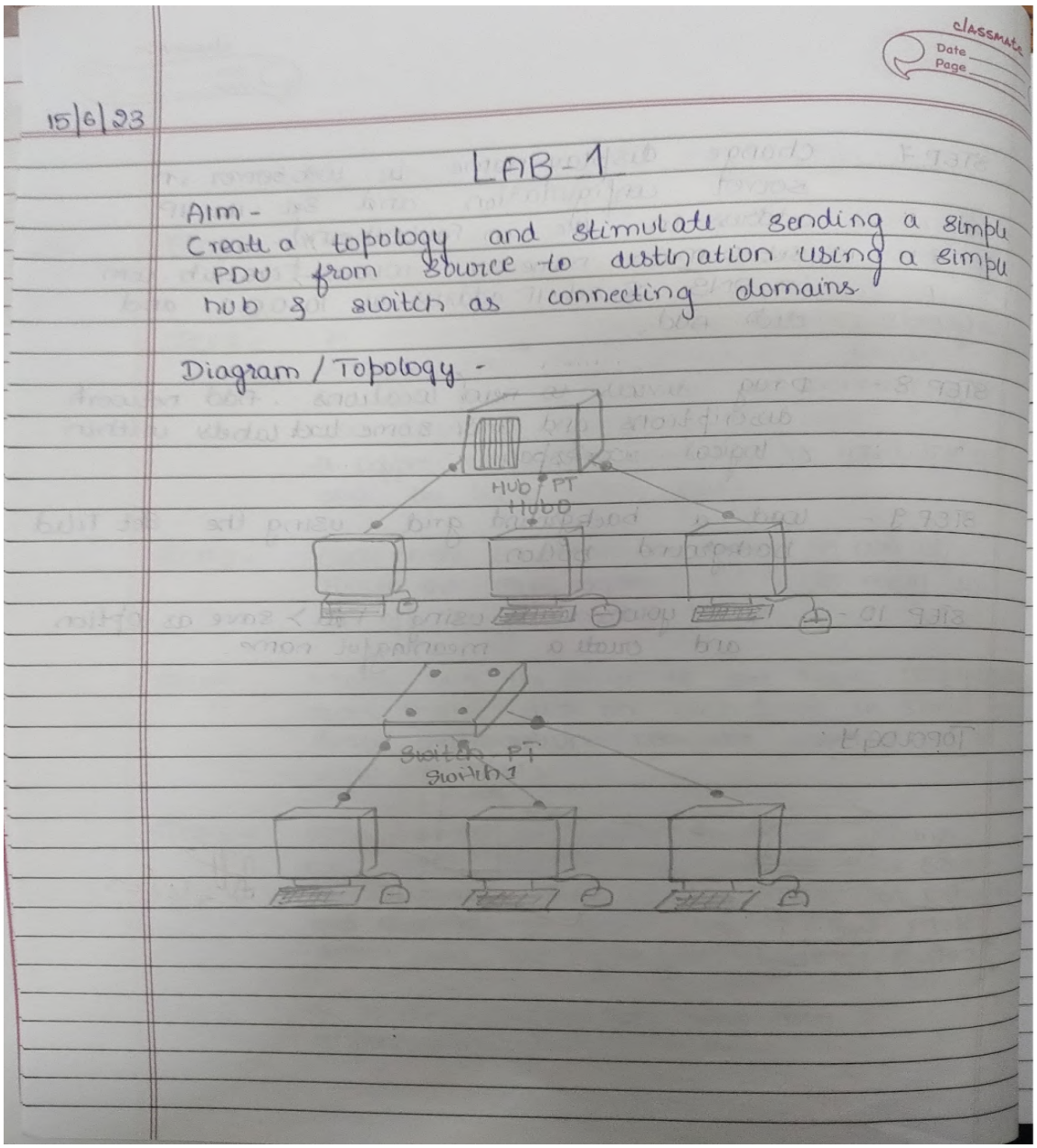
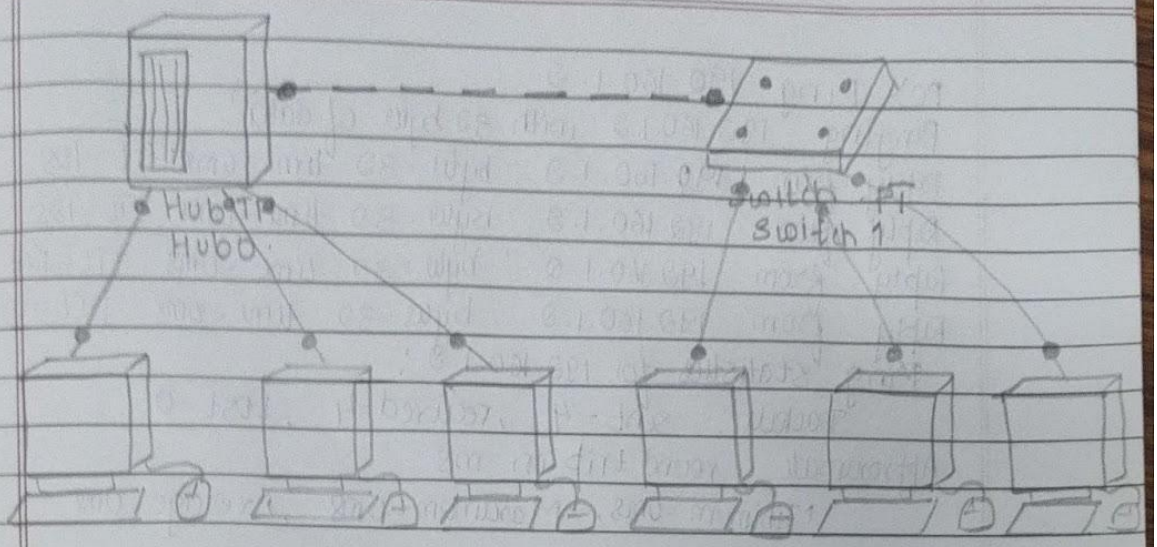
WEEK 1

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

OBSERVATION:





Procedure -

- Select a Generic hub from Hubs and place it.
- Select 3 PC's from End-devices.
- Connect hub and 3 PC's using copper straight through
- Select a switch and place it next to hub.
- Select 3 PCs from End-devices & place it.
- Connect switches & PC's using copper straight through.
- Connect switch & hub using copper crossover.

Ping - output -

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=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

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,

Approximate round trips in ms :

Minimum = 0ms, Maximum = 0ms, Average = 0ms.

PC> Ping 192.160.1.2

Ringing 192.160.1.2 with 32 bytes of data:

Reply from 192.160.1.2 : bytes=32 time=0ms TTL=128

Reply from 192.160.1.2 : bytes=32 time=0ms TTL=128

Reply from 192.160.1.2 : bytes=32 time=0ms TTL=128

Reply from 192.160.1.2 : bytes=32 time=0ms TTL=128

Ping statistics for 192.160.1.2:

Packets: sent=4, received=4, Lost=0

Approximate round trip in ms:

Minimum=0ms, Maximum=0ms, Average=0ms

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=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

Reply from 192.160.1.5 : bytes=32 time=0ms TTL=128

Ping statistic for 192.160.1.2:

Packets: sent=4, received=4, Lost=0

Approx roundtrip in ms:

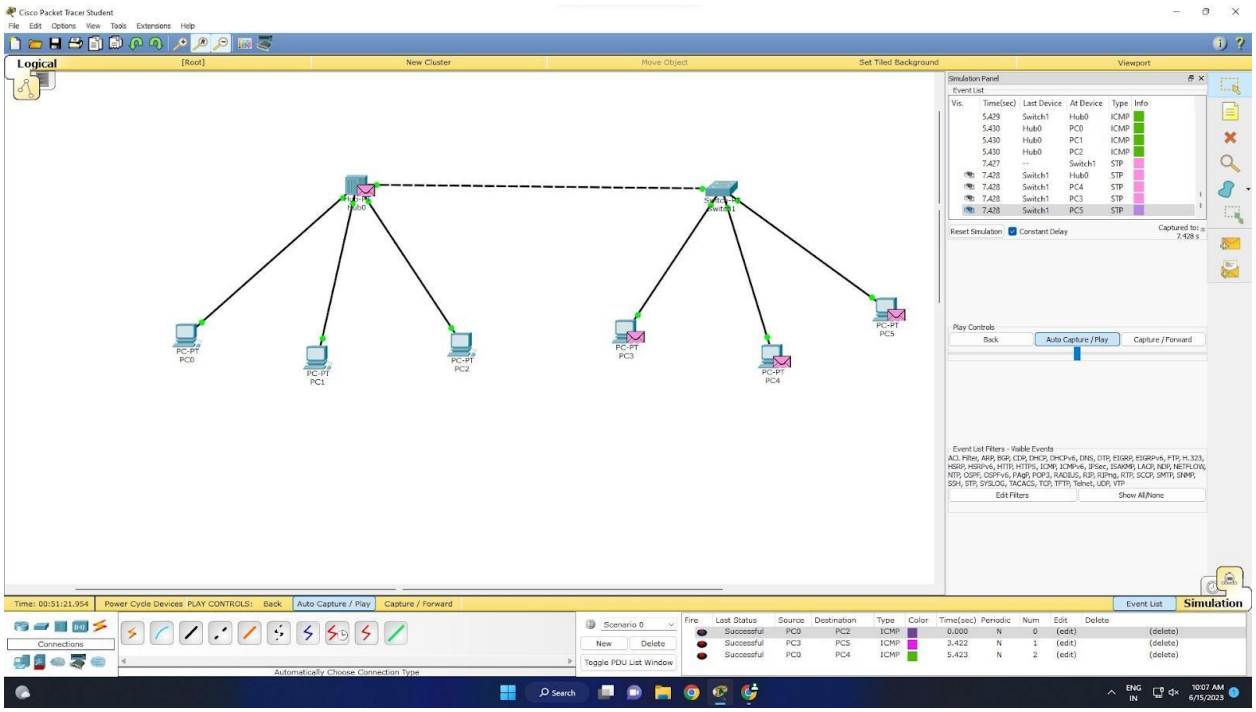
Minimum=0ms, Maximum=0ms, Average=0ms

Observation:

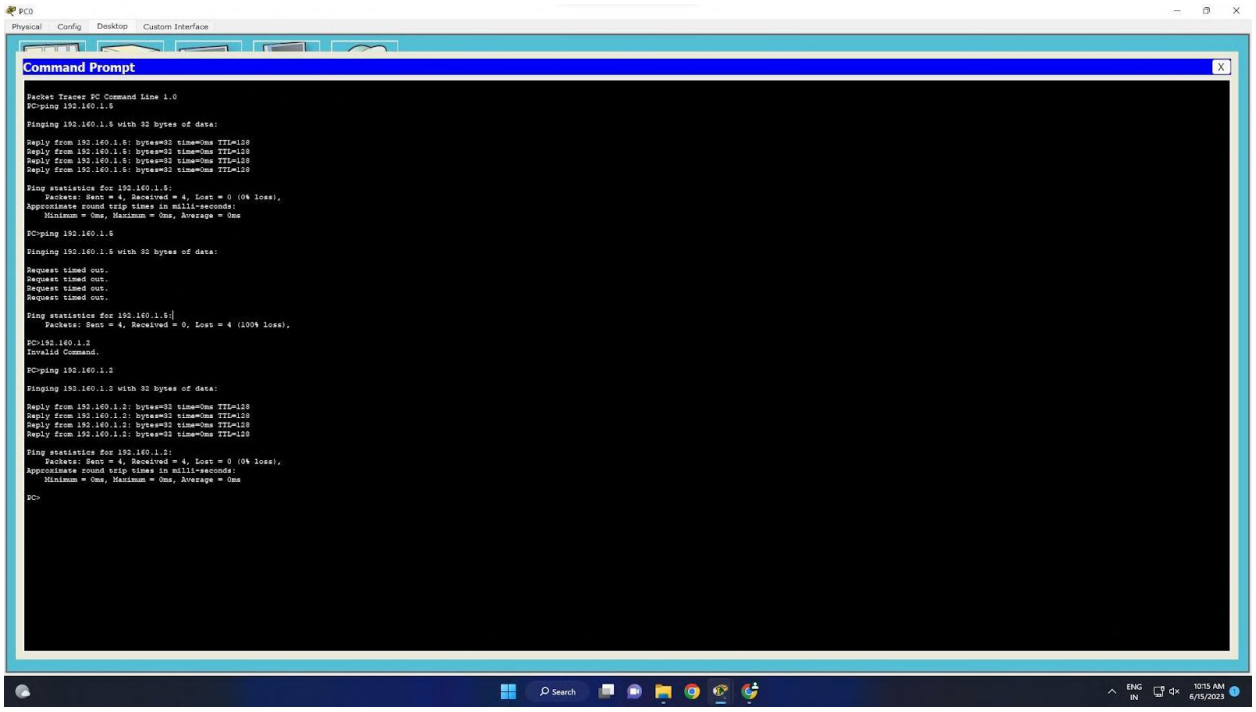
→ Switch broadcasts the packets to all the devices during first itatation & records the IP addresses of the intended destination device & send the packet to that specified destination next time.

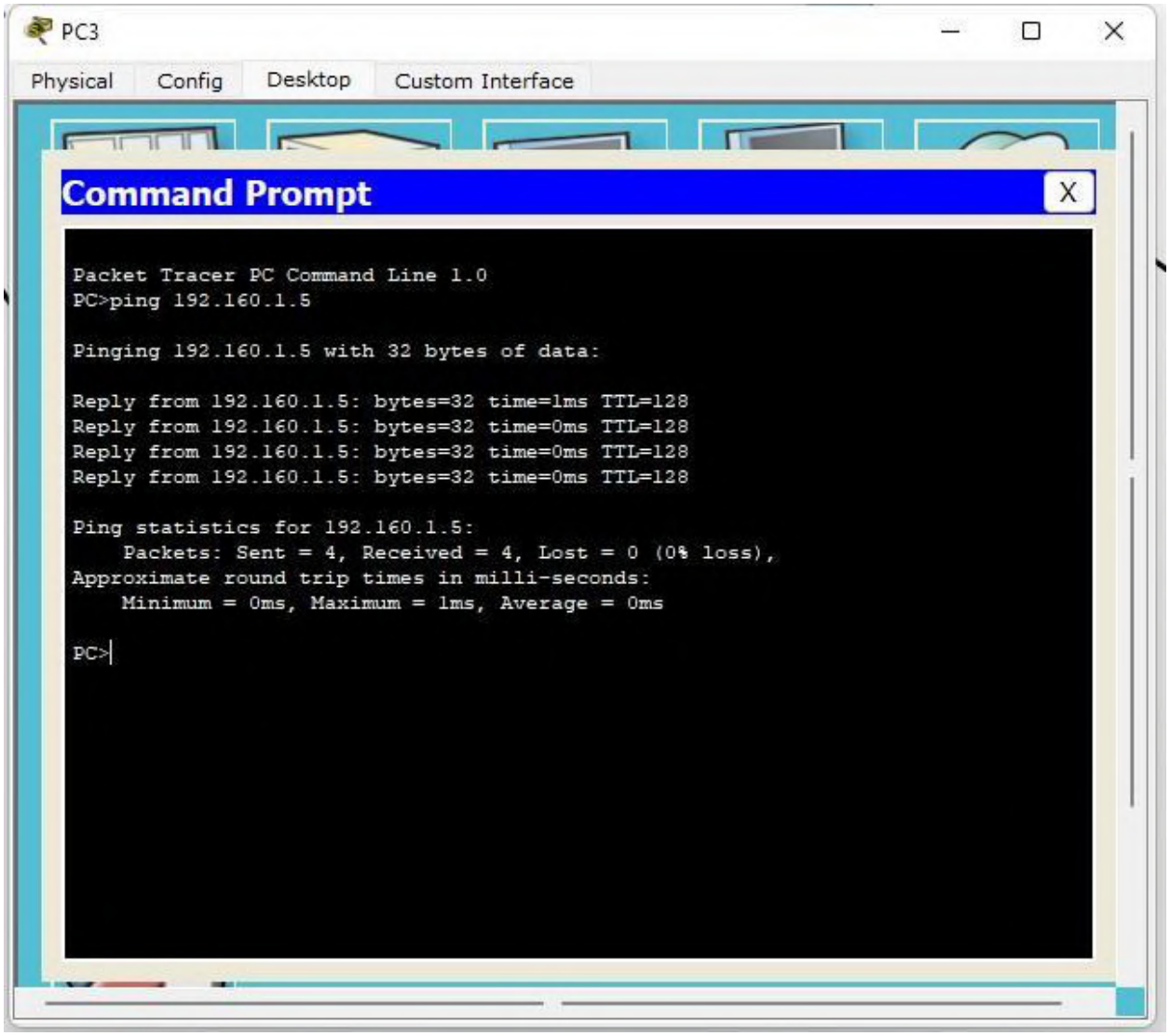
→ Hub broadcasts the packets to all the end devices & the device which are not intended to receive the packet discards the packet & the intended devices receives the packet & sends packets acknowledgment.

TOPOLOGY:



OUTPUT:

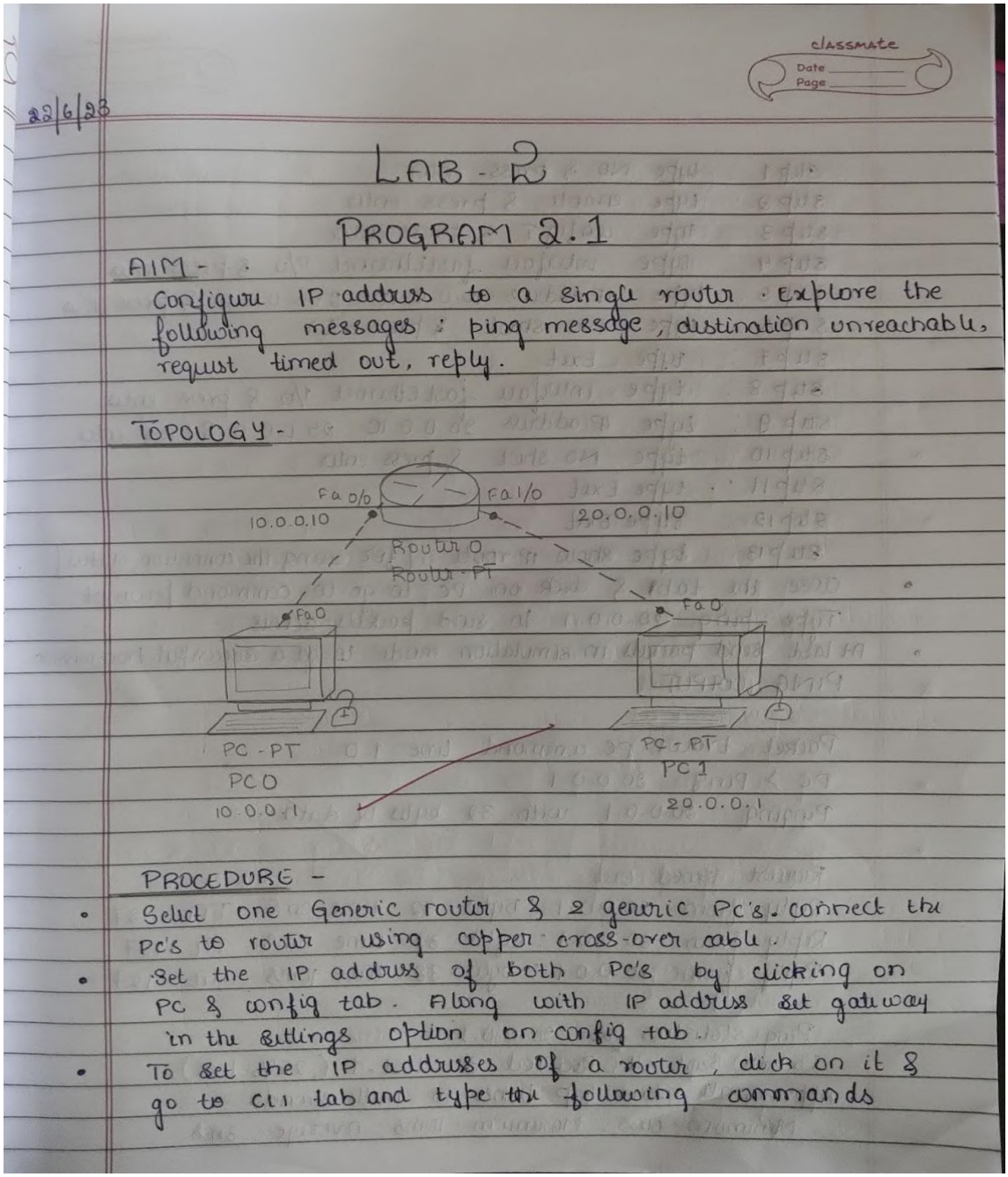



PC3
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Reply from 192.160.1.5: bytes=32 time=1ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms TTL=128
Reply from 192.160.1.5: bytes=32 time=0ms 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.

OBSERVATION:



step 1 : type No & press enter.
step 2 : type enable & press enter
step 3 : type config T & press enter
step 4 : type interface fastEthernet 0/0 & press enter
step 5 : type IP address 10.0.0.10 255.0.0.0 & press enter
step 6 : type No shut & press enter
step 7 : type Exit
step 8 : type interface fastEthernet 1/0 & press enter
step 9 : type IP address 20.0.0.10 25.0.0.0 & press enter
step 10 : type No shut & press enter
step 11 : type Exit
step 12 : type Exit
step 13 : type show IP route [for seeing the connection status]

- Close the tab & click on PC to go to command prompt.
  Type ping 20.0.0.1 to send packets across.
- At last send packets in simulation mode to get a successful transmission

PING OUTPUT!

Packet tracer PC command line 1.0
PC > Ping 20.0.0.1
Pinging 20.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.1 : bytes = 32 time = 0ms TTL = 127
Reply from 20.0.0.1 : bytes = 32 time = 0ms TTL = 127
Reply from 20.0.0.1 : bytes = 32 time = 10ms TTL = 127

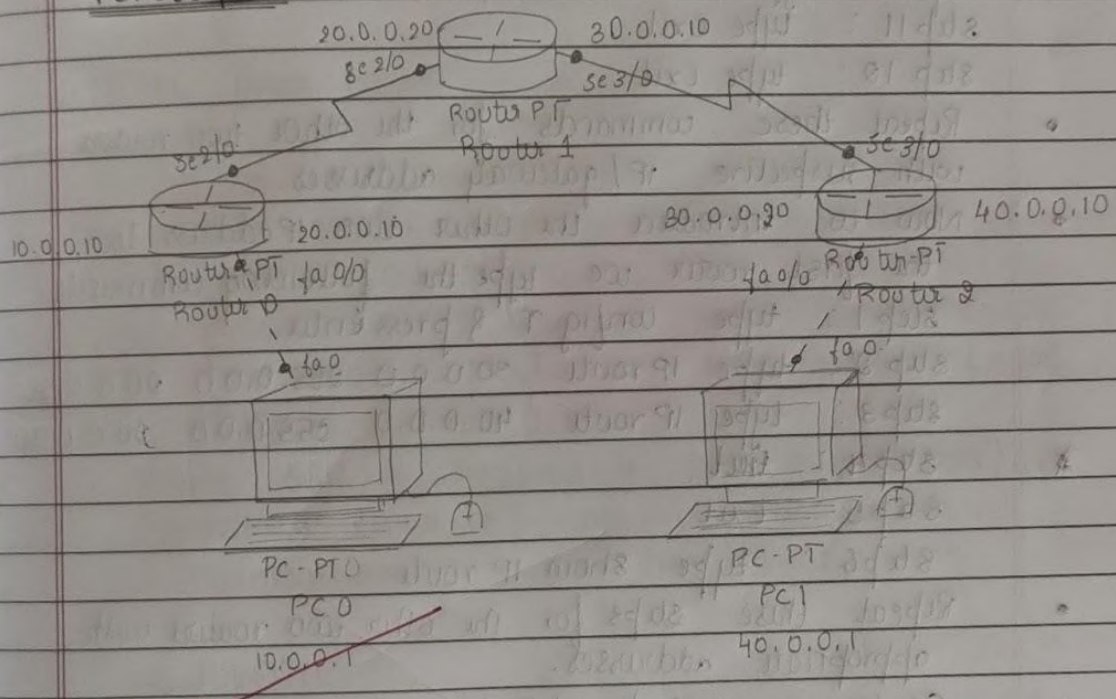
Ping statistics for 20.0.0.1:
Packets : Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 10ms, Average = 3ms

PROGRAM 2.2

AIM -

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

TOPOLOGY -



PROCEDURE -

- Connect 2 PC's & 3 routers using copper cross over cable for PC to router and serial DCE cable to connect the routers to routers.
- Set the IP address of both PC's and gateway numbers.
- Now for setting IP address & gateway number to routers select one router and perform the following commands

Step 1: type No & press enter
Step 2: type Enable & press enter
Step 3: type config T & press enter

step4: type Interface fastEthernet 0/0 & press Enter
step5: type IP address 10.0.0.10 255.0.0.0 & press enter
step6: type No shut & press enter
step 7: type Exit
step 8: type interface se 2/0 & press enter
step 9: type IP address 20.0.0.10 255.0.0.0 & press enter
step 10: type No shut & press enter
step 11: type Exit
step 12: type Exit

- Repeat these commands for the other two routers with respective IP/gateway addresses.
- Now to introduce the other two IP address to the first router we type the following commands
  step 1: type config T & press enter
  step 2: type IP route 30.0.0.0 255.0.0.0 20.0.0.20
  step 3: type IP route 40.0.0.0 255.0.0.0 20.0.0.20
  step 4: Exit
  step 5: Exit
  step 6: type show IP route
- Repeat these steps for the other two routers with appropriate addresses.
- Go to command prompt by clicking on PC & config tab. Type Ping message to send packets to the destination address.

PING OUTPUT:

output - 1:

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, Recived = 0, lost = 4 (100% loss).

output 2.
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 = 8ms TTL = 125
Reply from 10.0.0.1 : bytes = 32 time = 8ms TTL = 125
Ping statistics for 10.0.0.1 :
Packets : Sent = 4, Recived = 4, lost = 0 (0% loss),
Approximate round trip times in milli-seconds :
Minimum = 2ms, Maximum = 8ms, Average = 3ms

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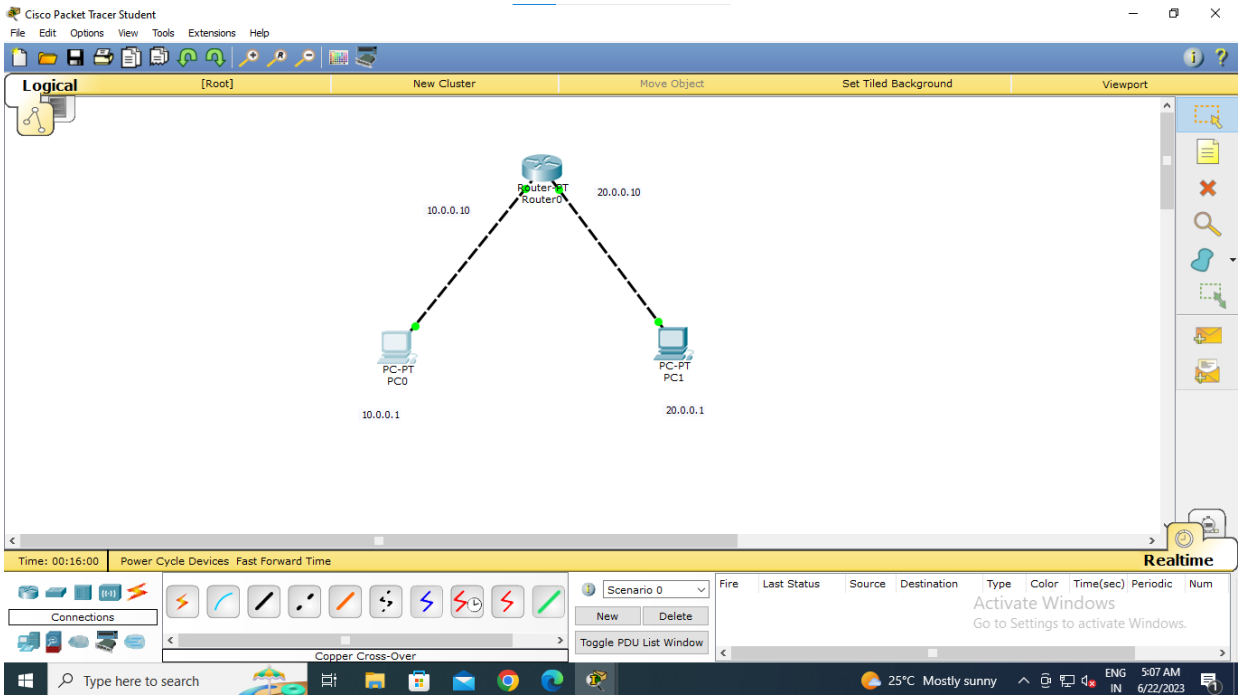
OBSERVATION -

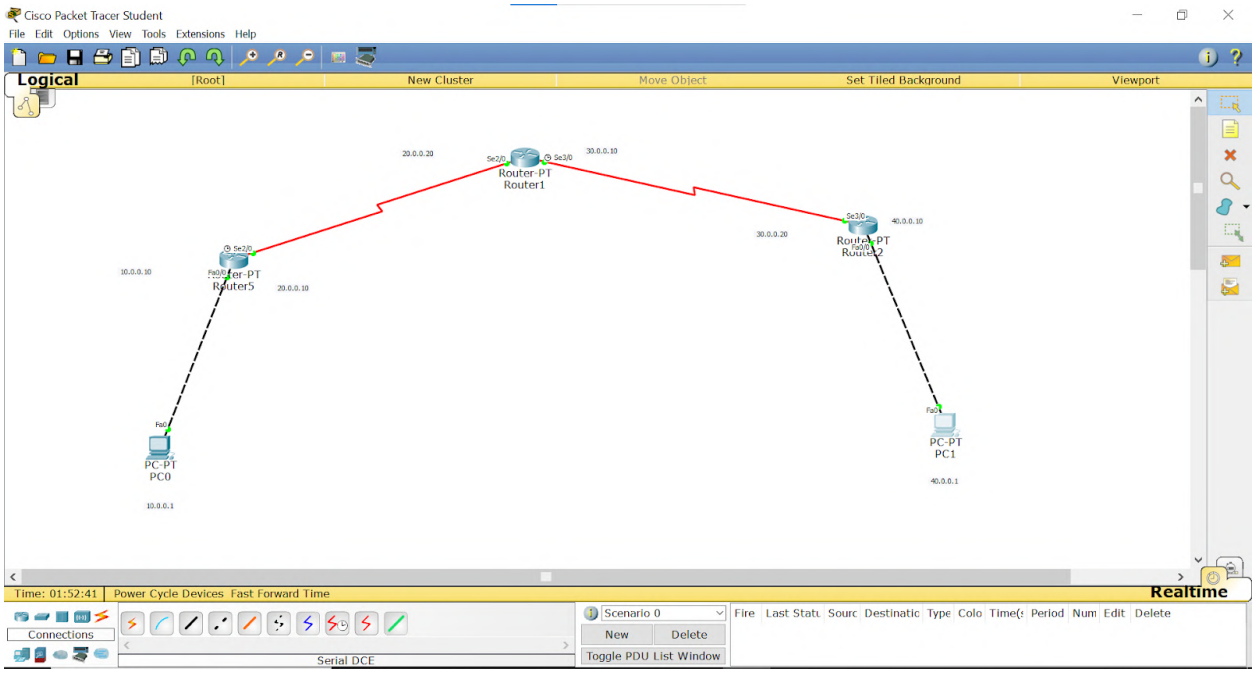
- In program 9.1 when we ping the distination address we get allocated with 32 bytes. In this first 8 bytes are used to learn about the router and their addresses. Rest bytes are used for sending packets to distination address. Then, again if we ping all bytes are used for message sending and there will be no timed-out message.
- In program 9.0 when the routers doesn't know about the remaining addresses, and we ping a message we get host unreachable message. once the routers have access / knowledge about other addresses, messages will be sent succesfully.

TOPOLOGY:

PROGRAM 2.1

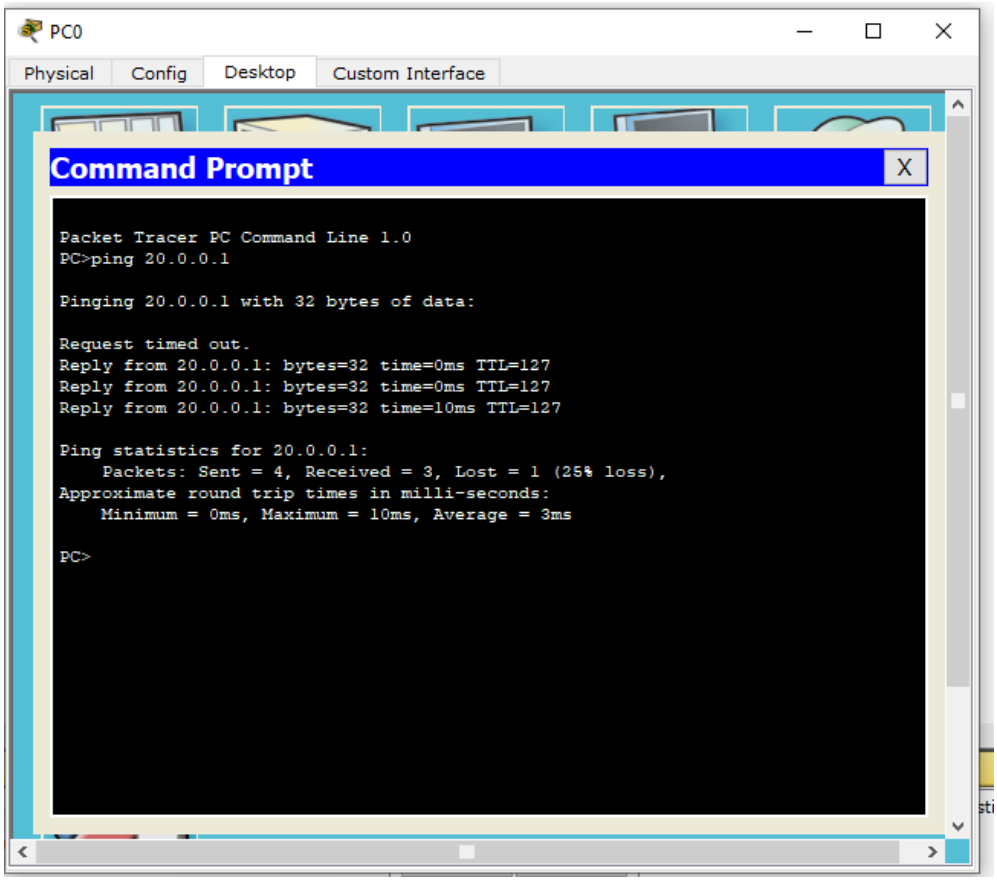


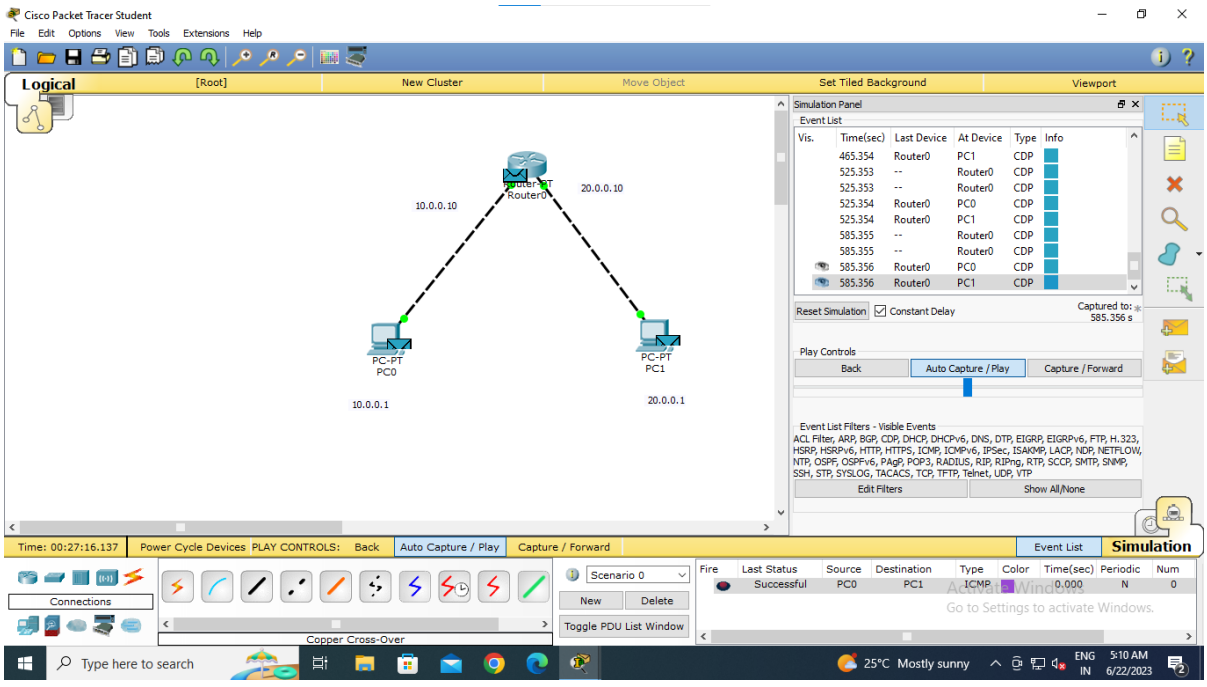
PROGRAM 2.2



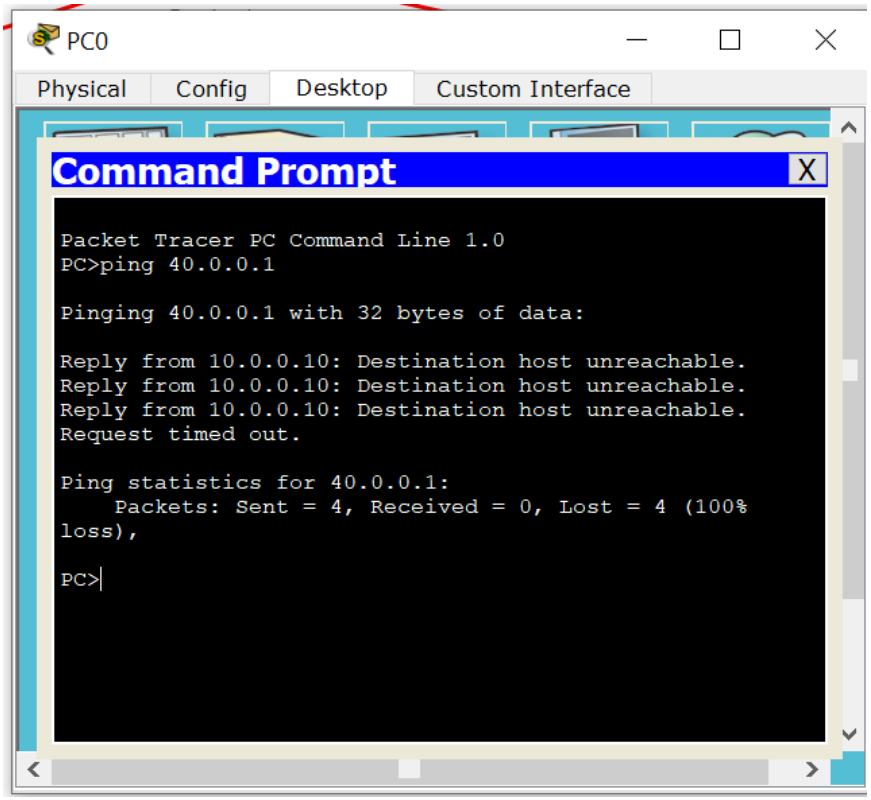
OUTPUT:

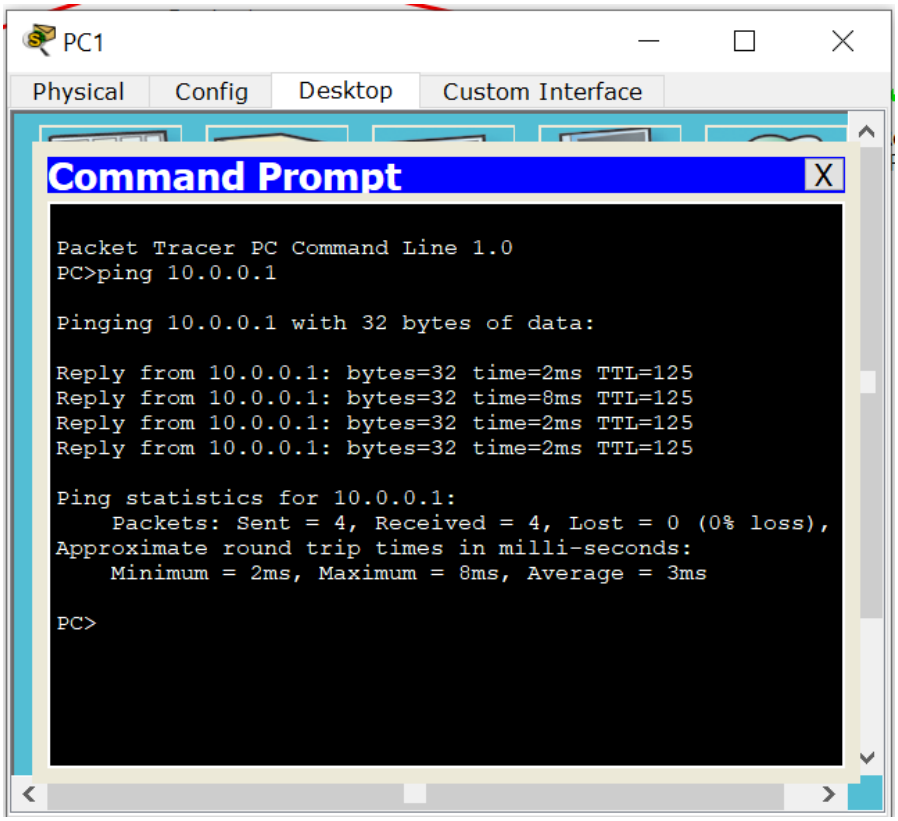
PROGRAM 2.1

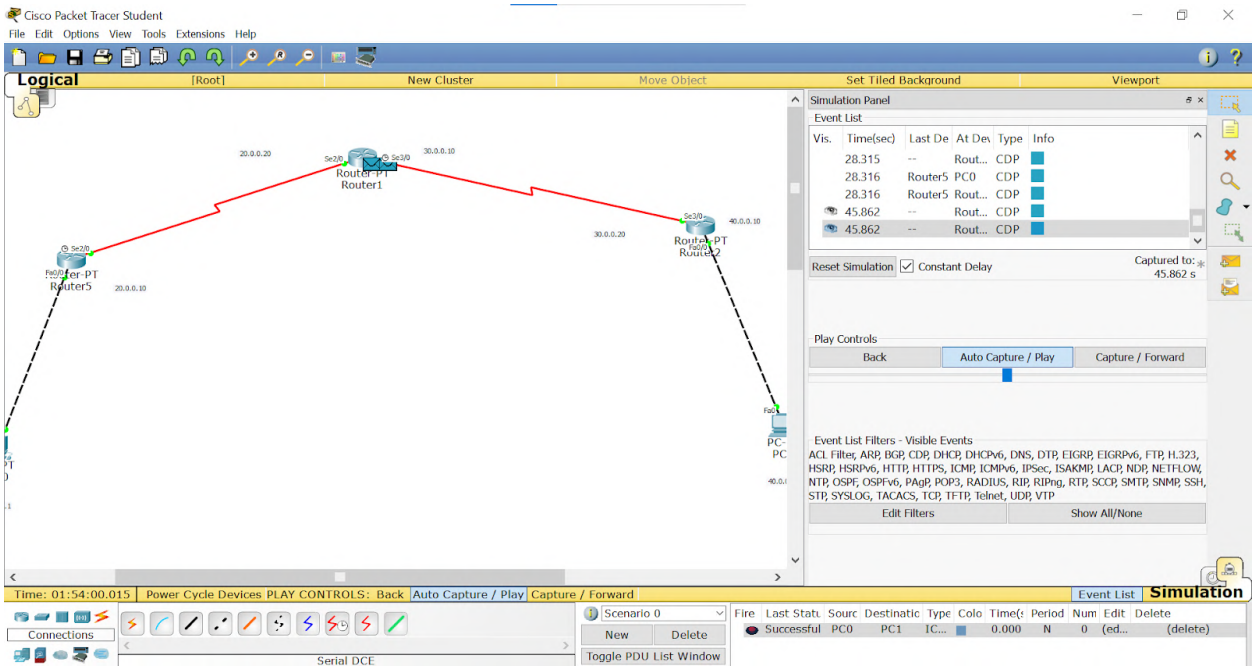




PROGRAM 2.2


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>

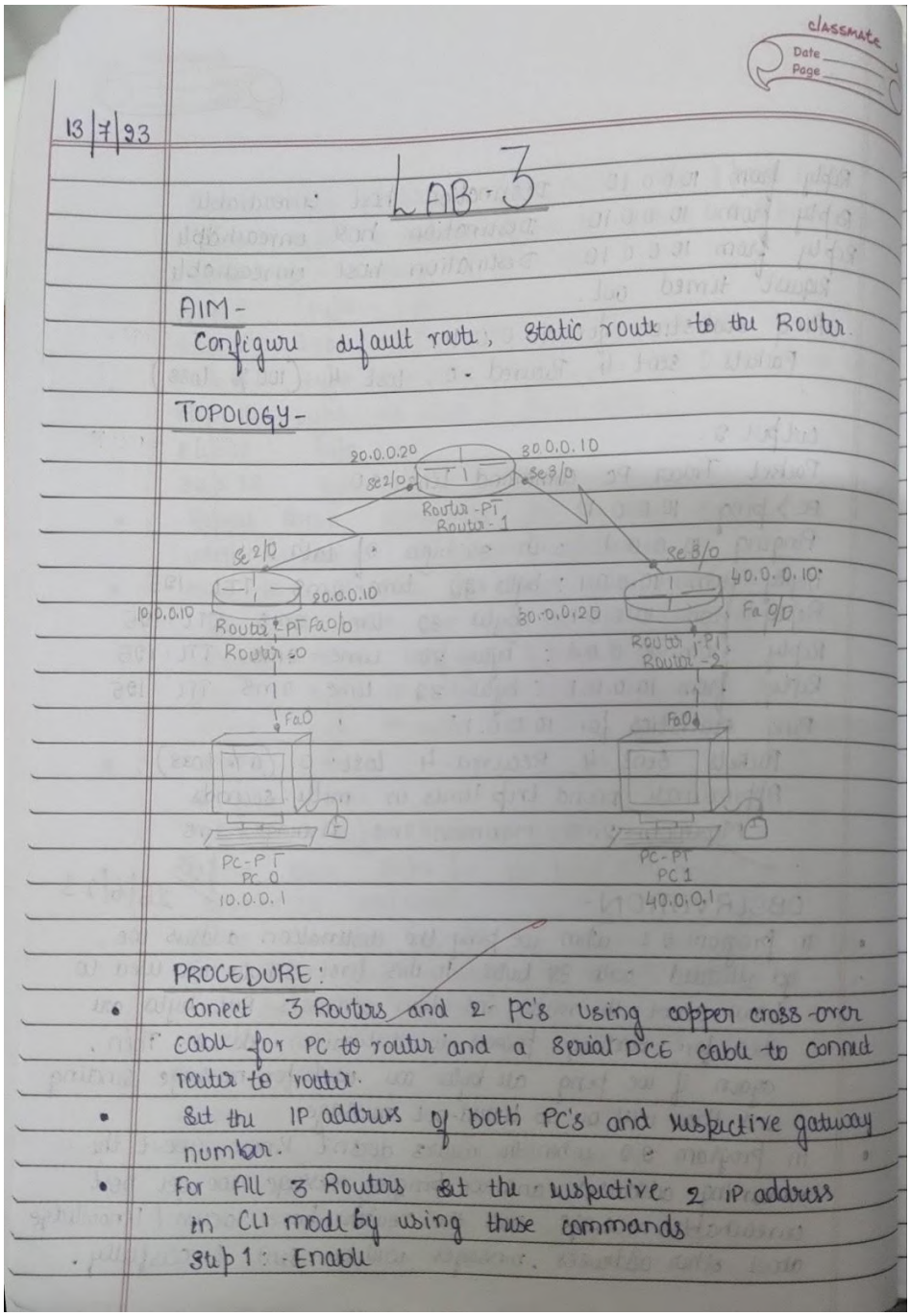

PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 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
Router1
Router5
Router2
PC-PC
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev 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.

OBSERVATION:



Step 2: Config T
Step 3: Interface fastEthernet 0/0
Step 4: IP address 10.0.0.10 255.0.0.0
Step 5: No shut
Step 6: Exit
Step 7: Interface se 2/0
Step 8: IP address 20.0.0.10 : 255.0.0.0
Step 9: No shut
Step 10: Exit
Step 11: Exit

- Repeat these commands for other two routers with their respective IP addresses.
- For Router 1, set the IP route of other IP addresses statically by using following steps
  Step 1: Config T
  Step 2: IP route 10.0.0.0 255.0.0.0 20.0.0.10
  Step 3: IP route 40.0.0.0 255.0.0.0 30.0.0.20
  Step 4: Exit
  Step 5: Exit
  Step 6: Show IP route.
- For Router 0 & Router 2 we set default IP routes which means it can access any IP address with any subnet mask.
- Set the default IP route by following these commands
  Step 1: Config T
  Step 2: IP route 0.0.0.0 0.0.0.0 20.0.0.20
  Step 3: IP route 0.0.0.0 0.0.0.0 30.0.0.10
- Step 2 is given for Router 0 & Step 3 command for Router 1.
- Go to PC's command Prompt and type ping message to send packets across.

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:

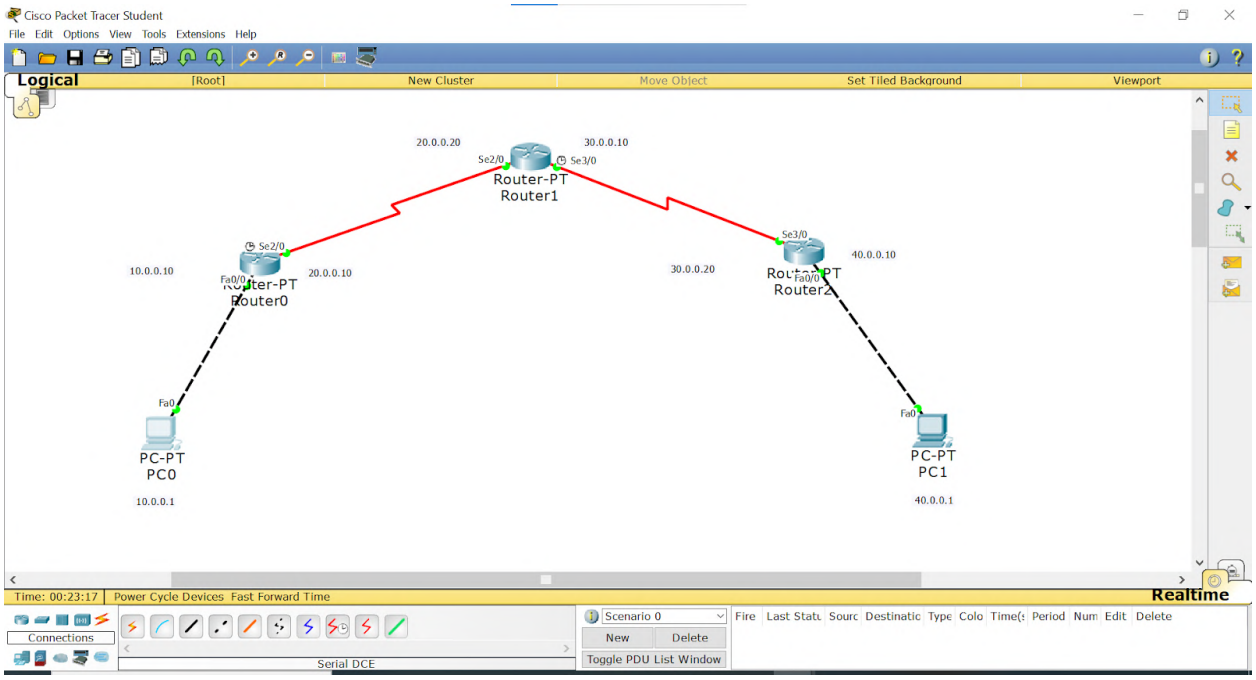
Request timed out.
Reply from 40.0.0.1 : bytes = 32 time = 2ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 16ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 9 ms TTL = 125

Ping statistics for 40.0.0.1 :
Packets : Sent = 4, Recived = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 16ms, Average = 6ms

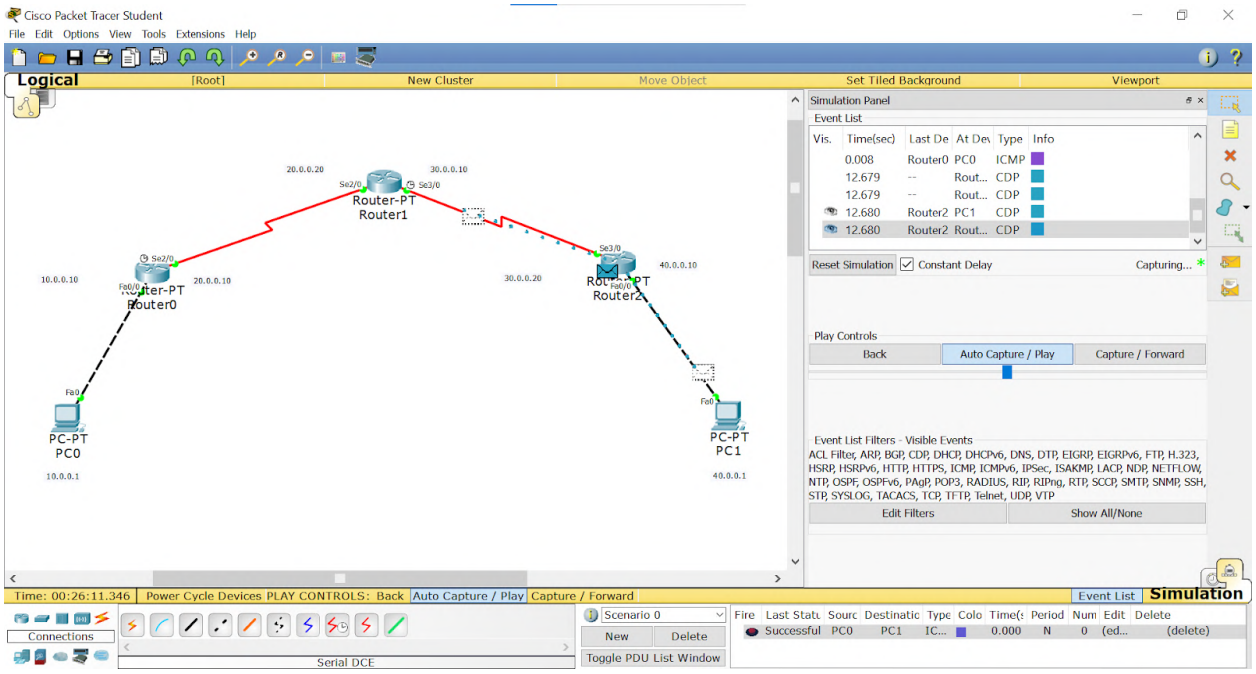
OBSERVATION:

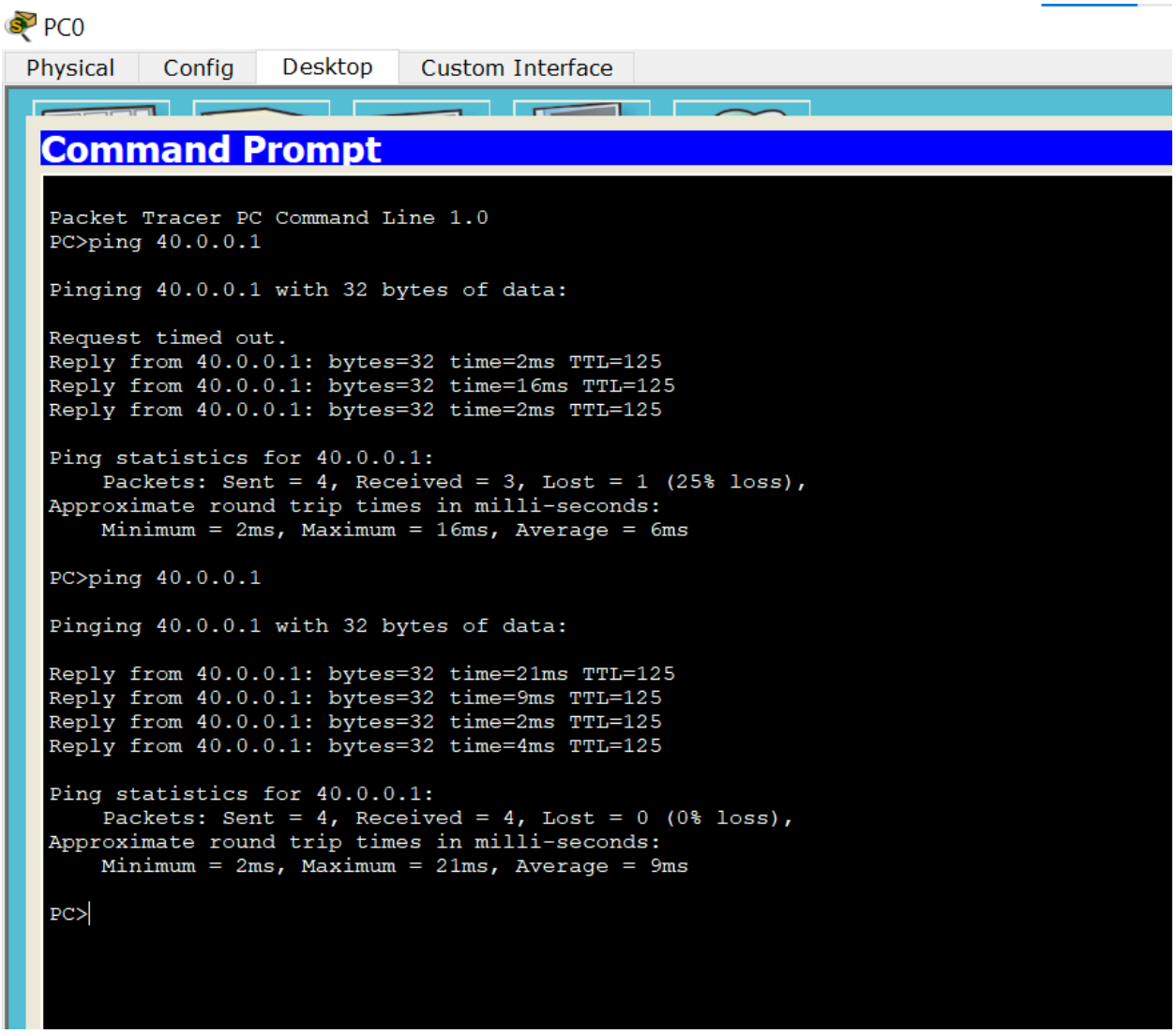
- A default route is the route which takes effect when no other route is available for an IP address destination.
- If a packet is recived, the device first checks the IP destination address, if the IP destination address is not local the device checks its routing table.
- If the remote destination subnet is not listed then the packet is forwarded to the next hop toward the destination using the default route.
- The process repeats until the packet is delivered.

TOPOLOGY:



OUTPUT:

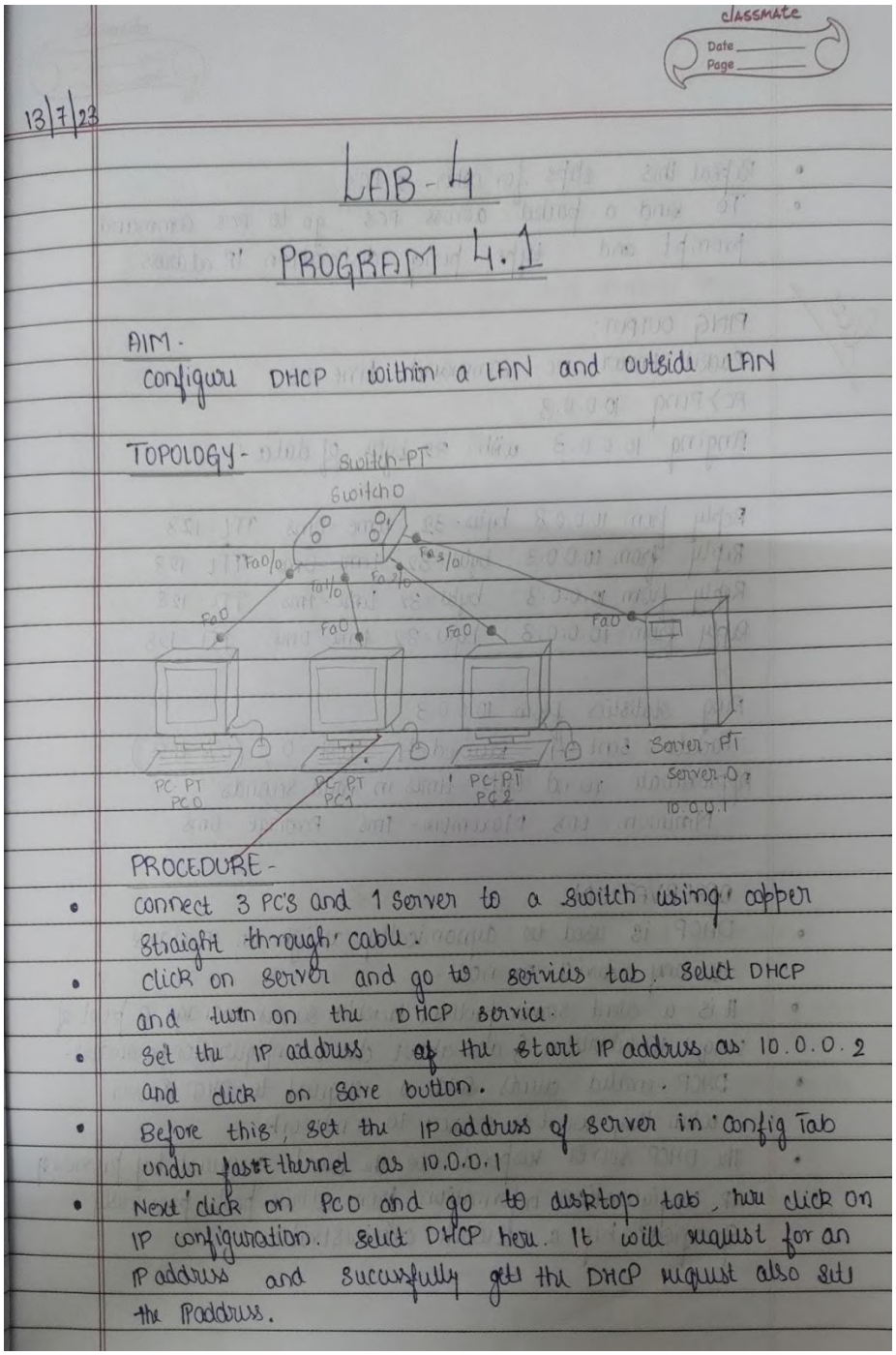



PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 40.0.0.1
Pinging 40.0.0.1 with 32 bytes of data:
Request timed out.
Reply from 40.0.0.1: bytes=32 time=2ms TTL=125
Reply from 40.0.0.1: bytes=32 time=16ms TTL=125
Reply from 40.0.0.1: bytes=32 time=2ms 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:



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LAB-4

PROGRAM 4.1

AIM-

Configure DHCP within a LAN and outside LAN

TOPOLOGY-

PROCEDURE-

- Connect 3 PC's and 1 server to a switch using copper straight through cable.
- Click on server and go to services tab. Select DHCP and turn on the DHCP service.
- Set the IP address of the start IP address as 10.0.0.2 and click on Save button.
- Before this, set the IP address of server in config Tab under fastEthernet as 10.0.0.1
- Next click on PC0 and go to desktop tab, here click on IP configuration. Select DHCP here. It will request for an IP address and successfully get the DHCP request also sets the IPaddress.

- Repeat this steps for other 2 PC's.
- To send a packet across PC's, go to PC's command prompt and type ping destination IP address.

PING OUTPUT:

Packet tracer PC command Line 1.0

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=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=0ms TTL=128

Ping statistics from 10.0.0.3:
Packets: Sent=4, Recived=4, Lost=0, (0% loss)
Approximate round trip times in milli-seconds:
Minimum=0ms, Maximum=1ms, Average=0ms.

OBSERVATION.

- DHCP is used to dynamically assign an IP address to any device or node.
- It is a client-server protocol in which servers manage a pool of unique IP addresses & also about client configuration parameters.
- DHCP-enabled clients sends a request to DHCP server when they want to connect to a network.
- The DHCP server responds to the client request by providing IP configuration information from address pools, previously specified by a network administrator.

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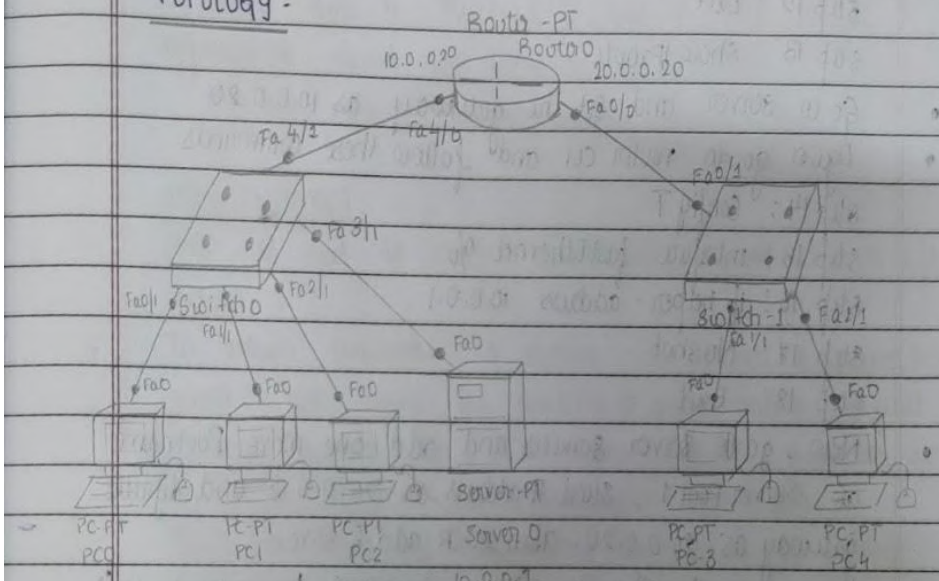
PROGRAM 4.2

AIM -

Configure DHCP within a LAN and outside lan:

TOPOLOGY -



PROCEDURE -

- Add a Router, a switch and 2 PC's to 4.1 program Network & connect the router to both switches.
- Set the server IP address of server and with the help of server set the first 3 PC's IP address through DHCP.
- Now set the Router IP address with the following commands statically.

Step 1 : No

Step 2 : Enable

Step 3 : config T

Step 4 : interface fastEthernet 4/0

Step 5 : ip address 10.0.0.20 255.0.0.0

Step 6: No shut
Step 7: Exit
Step 8: interface fastEthernet 0/0
Step 9: ip address 20.0.0.20 255.0.0.0
Step 10: No shut
Step 11: Exit
Step 12: Exit
Step 13: show IProute

- Go to server and set the gateway as 10.0.0.20
- Again go to router CLI and follow these commands

Step 14: Config T
Step 15: interface fastEthernet 0/0
Step 16: ip helper-address 10.0.0.1
Step 17: No shut
Step 18: Exit

- Now, go to Server Sirvices and add one more Poolname as Server Pool 1, Start IP address as 20.0.0.2 and default gateway as 20.0.0.20. Then click add & save.
- Now set the other two Pc's IP address by going to their Desktop → IP configuration and selecting DHCP which will automatically generate its IP address.
- Now the network is complete and can send packets from any PC to other by typing Ping distination IP address in their respective command prompts.

PING OUTPUT:

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

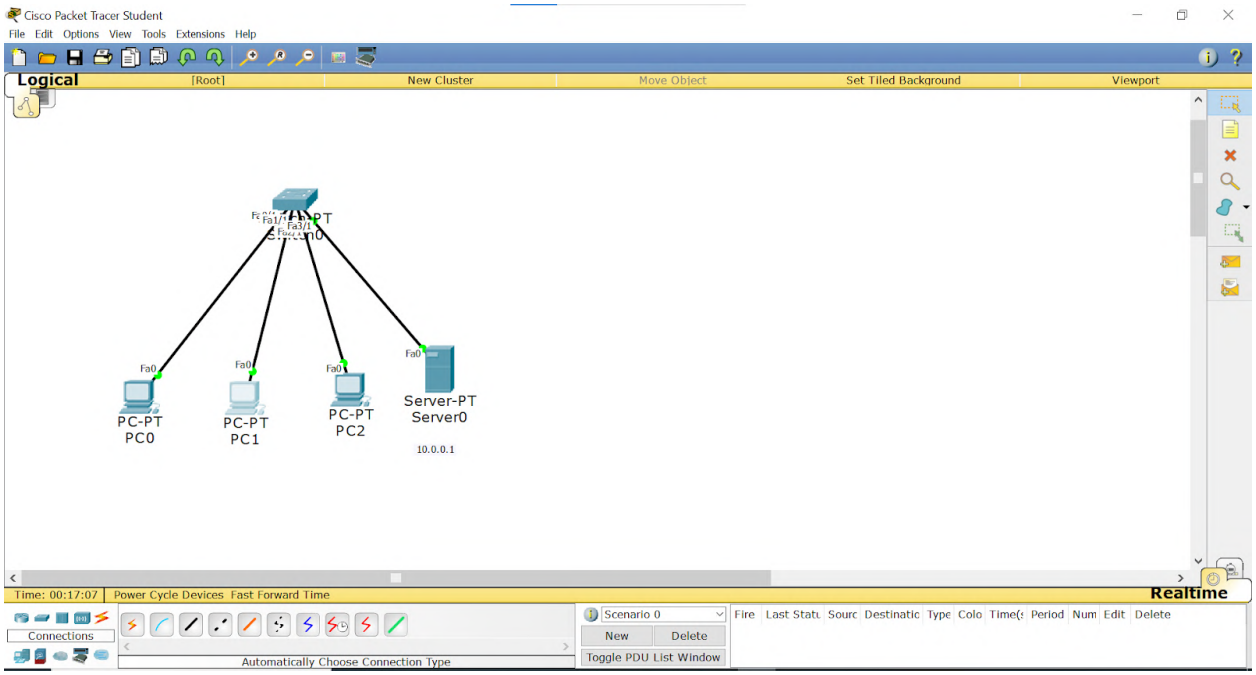
Ping statistics for 20.0.0.2:
Packets sent = 4, Received = 3, Lost = 1 (25% loss).
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms.

OBSERVATION:
DHCP is used to assign IP addresses dynamically to different devices.
To assign continous IP address we create a server pool where we assign the starting IP address and a dfault gateway number. For PC's under different switches we create a different server pool again and start.
This takes care of delivering the packets to correct destination IP address and also sends back the ACK to the initial device.

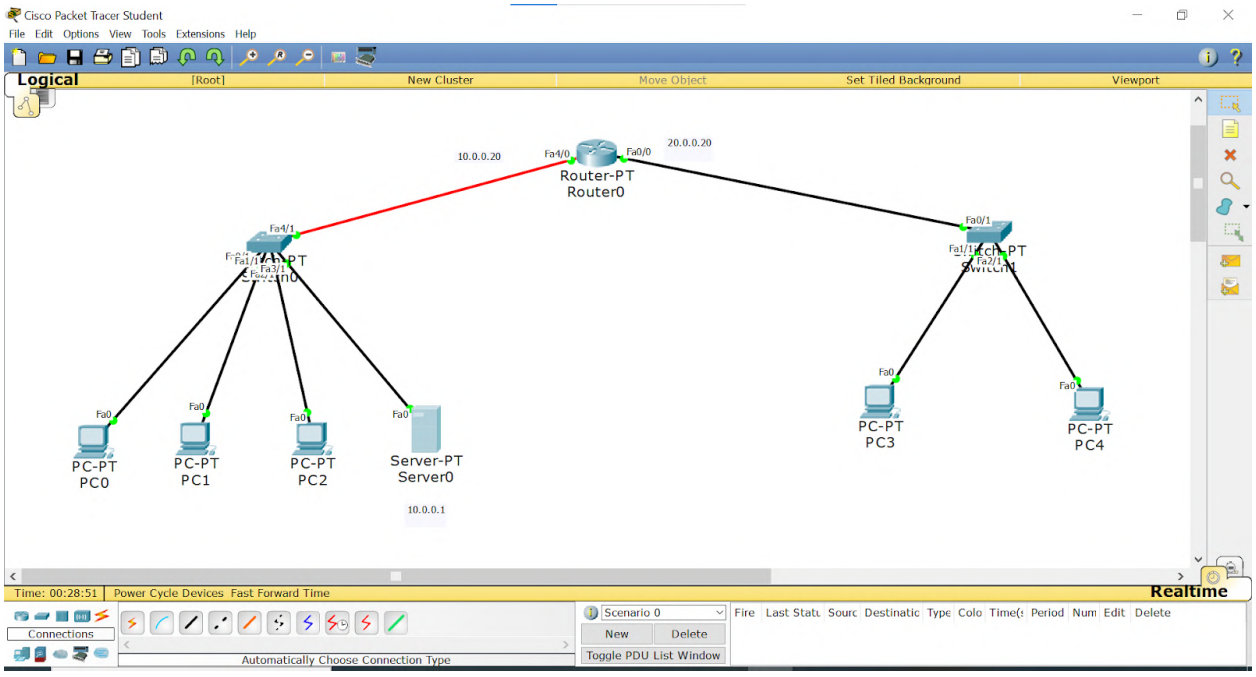
Lee
18/7/23

TOPOLOGY:

PROGRAM 4.1:

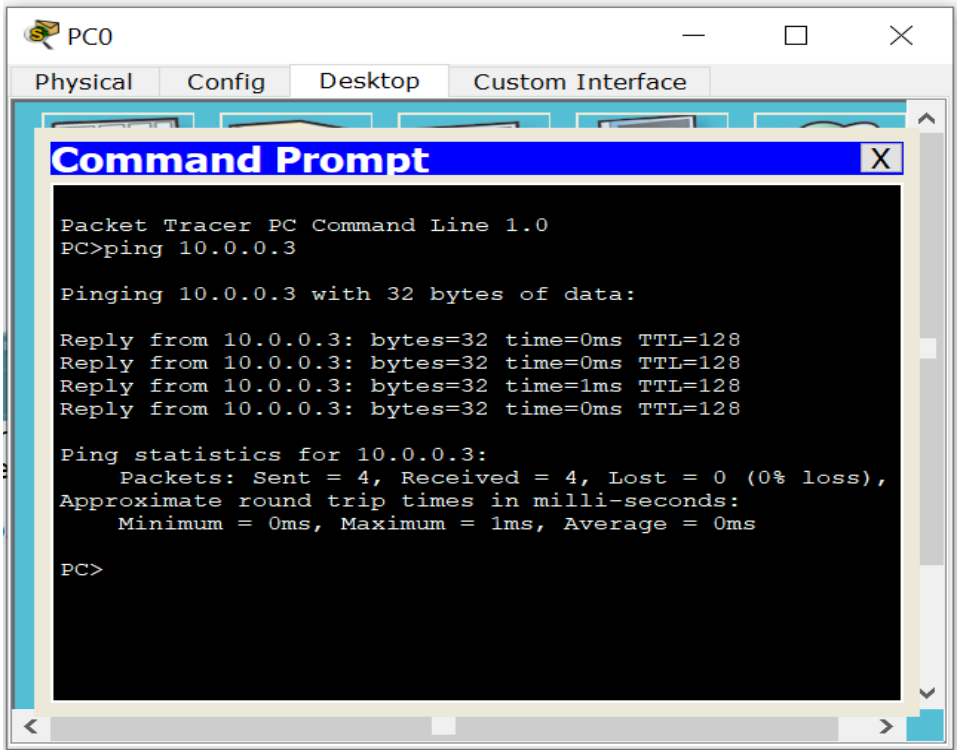


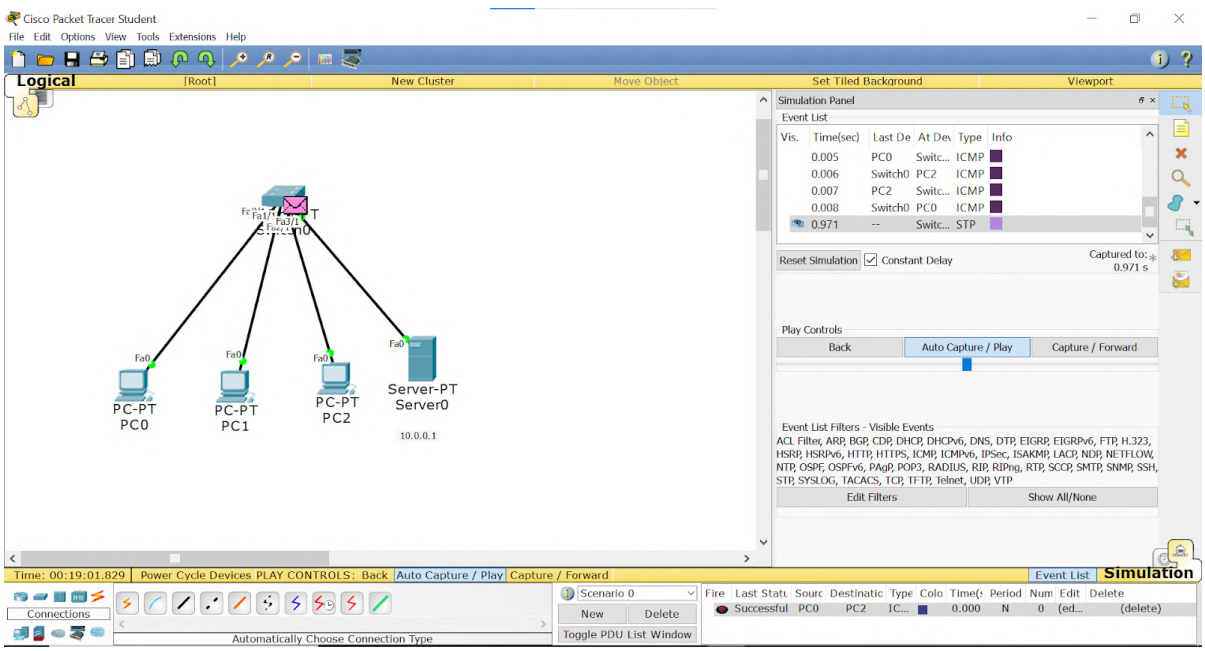
PROGRAM 4.2:



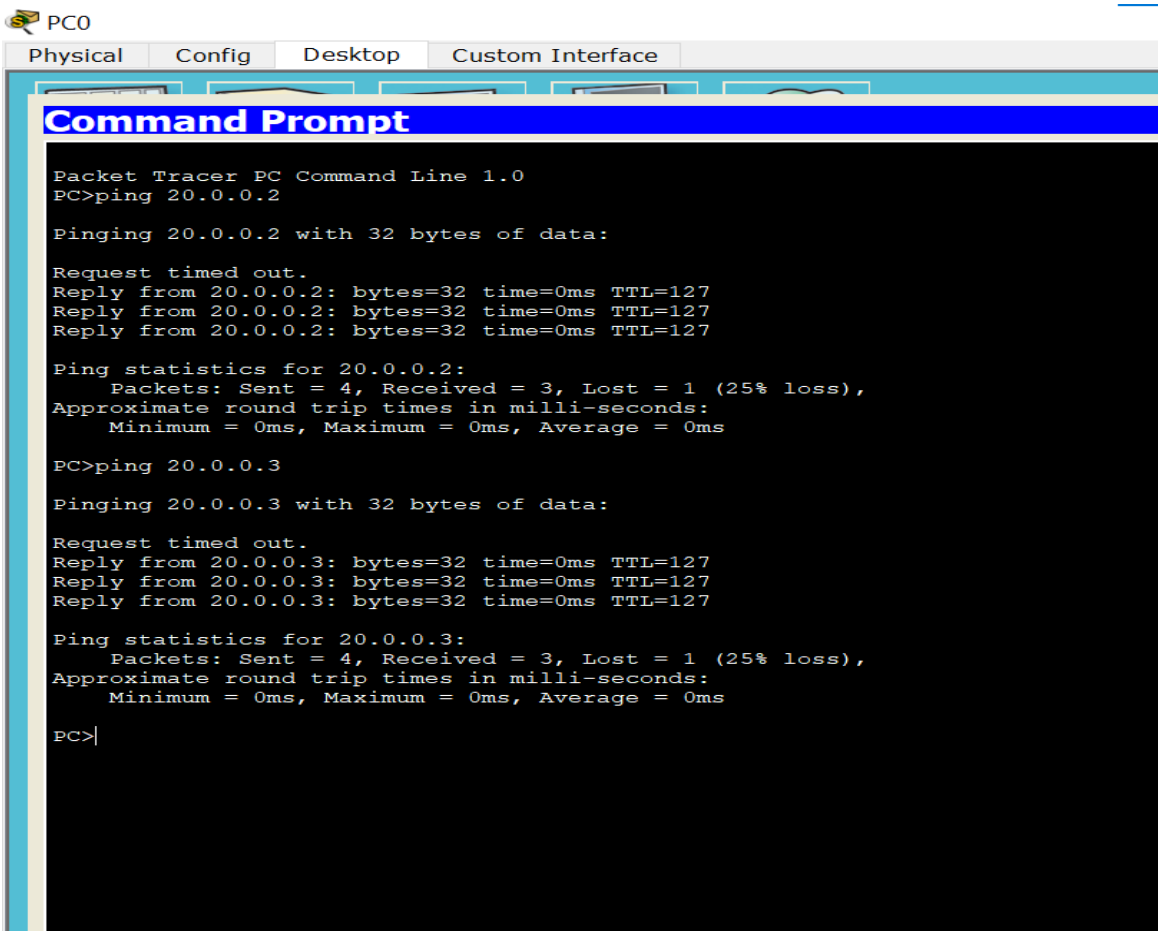
OUTPUT:

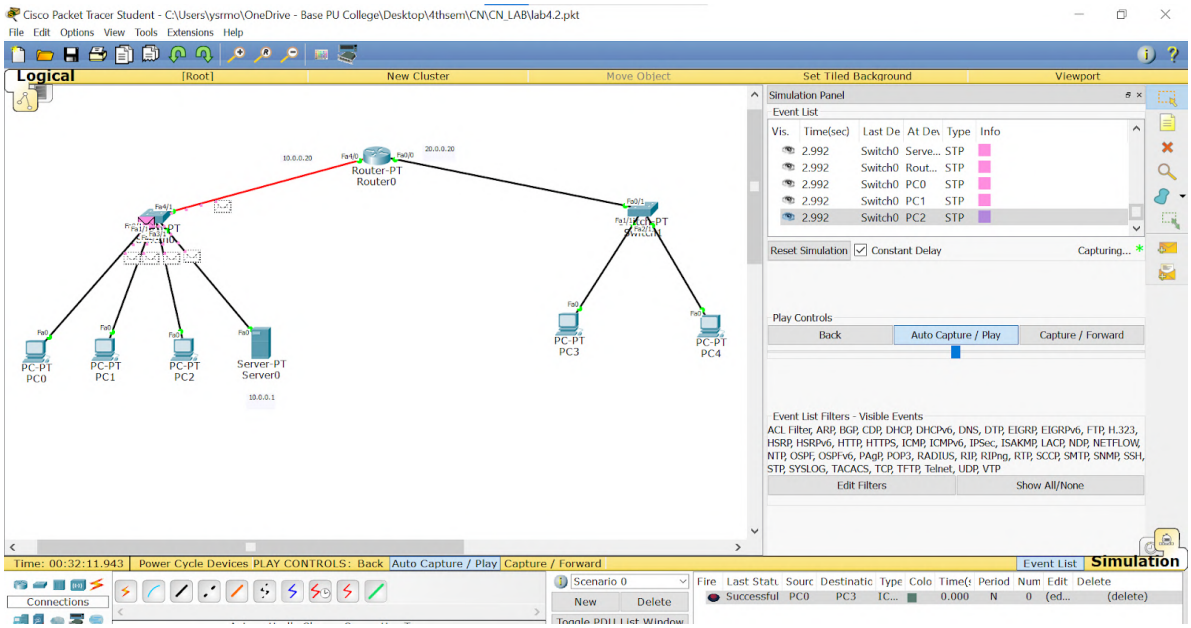
PROGRAM 4.1:





PROGRAM 4.2:

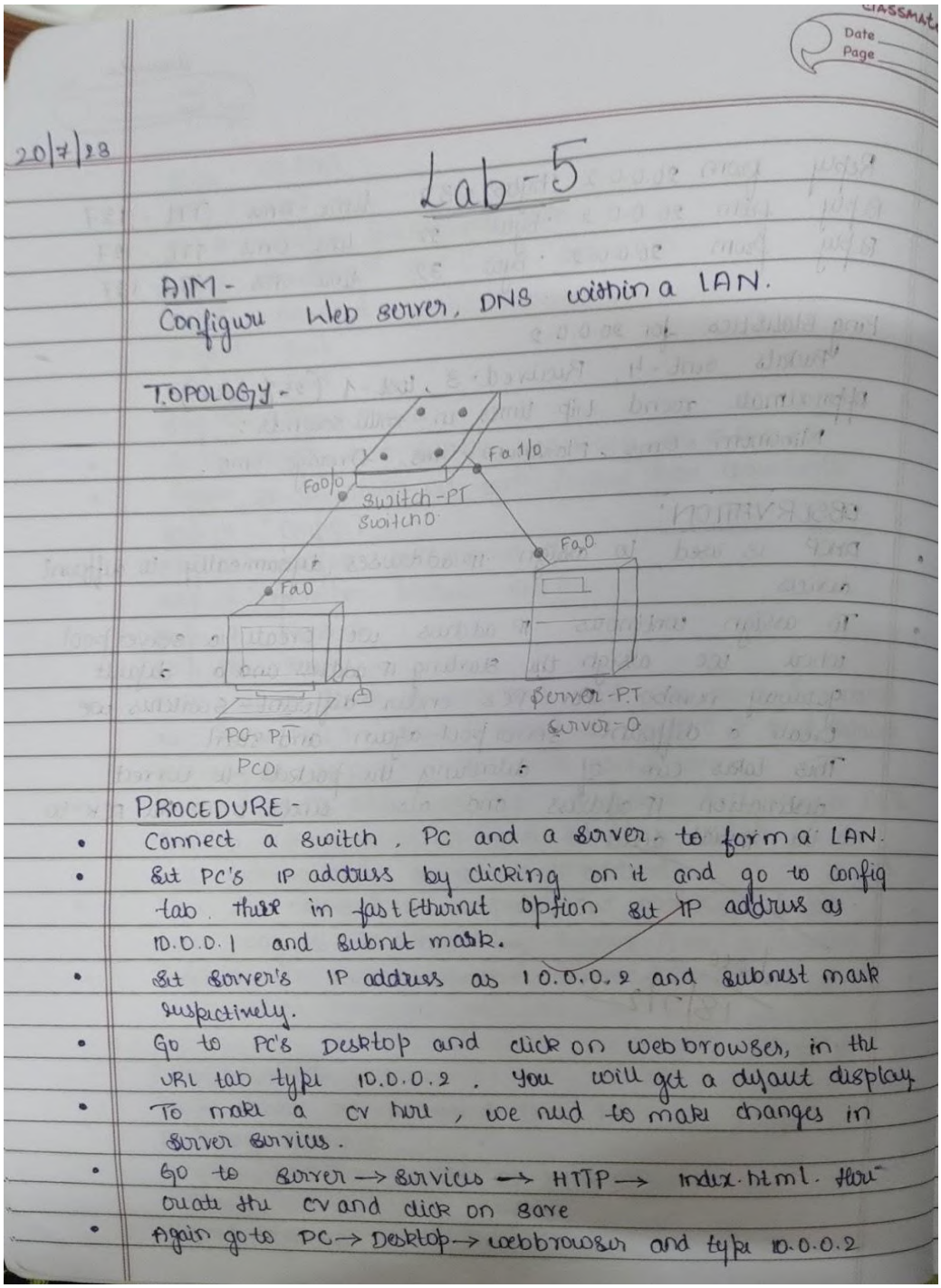

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2
Pinging 20.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms TTL=127
Reply from 20.0.0.2: bytes=32 time=0ms 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
10.0.0.20
20.0.0.20
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
10.0.0.1
PC-PT
PC3
PC-PT
PC4
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
2.992 Switch0 Serve... STP
2.992 Switch0 Rout... STP
2.992 Switch0 PC0 STP
2.992 Switch0 PC1 STP
2.992 Switch0 PC2 STP
Reset Simulation
Constant Delay
Capturing...
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: 00:32:11.943
Power Cycle Devices PLAY CONTROLS: Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(: Period Num Edit Delete
Successful PC0 PC3 IC... 0.000 N 0 (ed... (delete)

WEEK 5

Configure Web Server, DNS within a LAN.

OBSERVATION:



you will the CV or content that is changed.

- Next, go to Server → Servius → DNS and switch on the Services. Now add a Domain name and type the IP address as 10.0.0.2. Press add & save it.
- Again Go back to PC → Desktop → webbrowser and type the given domain name. Here we can see the CV which had been created earlier.

OUTPUT:

Web browser

< > URL http://gamana Go Stop

CV

Gamana Yeluri R

USN: 1BM21CS065

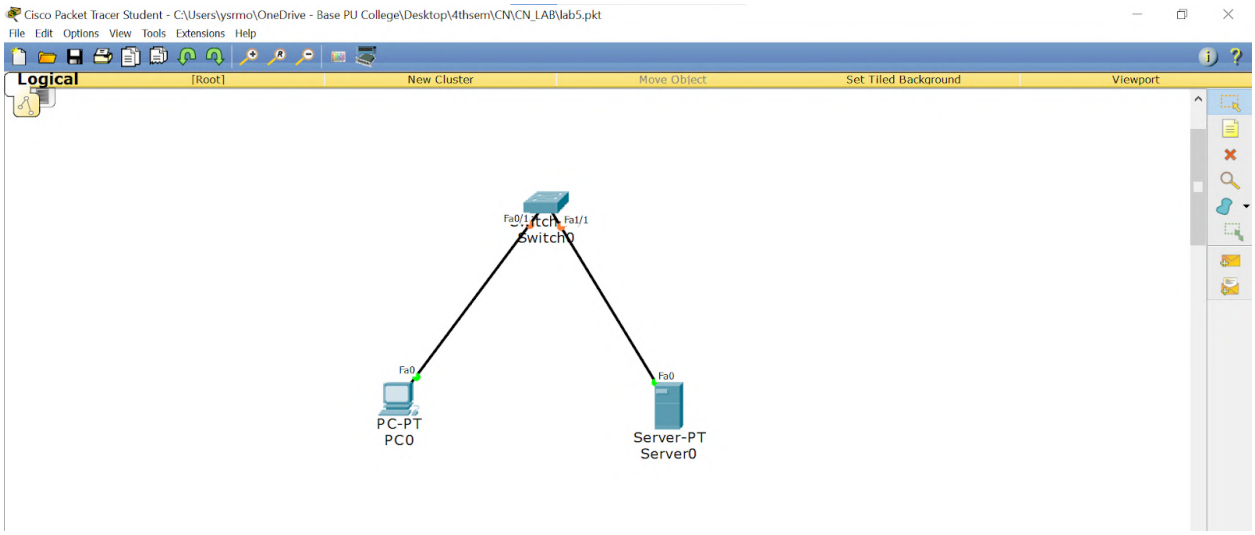
Languages: C/C#/Java

Image:

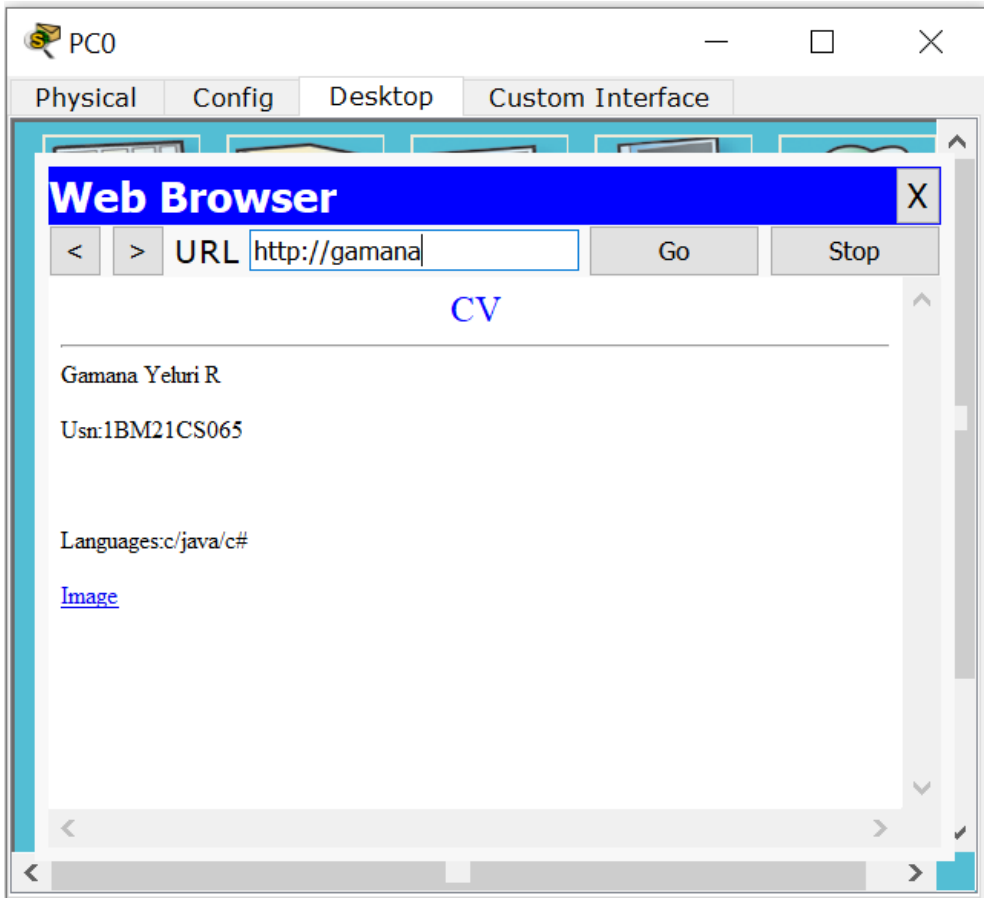
OBSERVATION:

- If you wanted to go to a certain website you would open web browser and type domain name of that website. or else you can also type the IP address instead if you know that website IP address.
- Since we can't remember IP addresses of all websites DNS server will search through its cache to find a matching IP address for that Domain name & when it finds it will resolve that domain name to IP address of website, once that is done then computer is able to communicate with a webserver & retrieve the webpage.

TOPOLOGY:



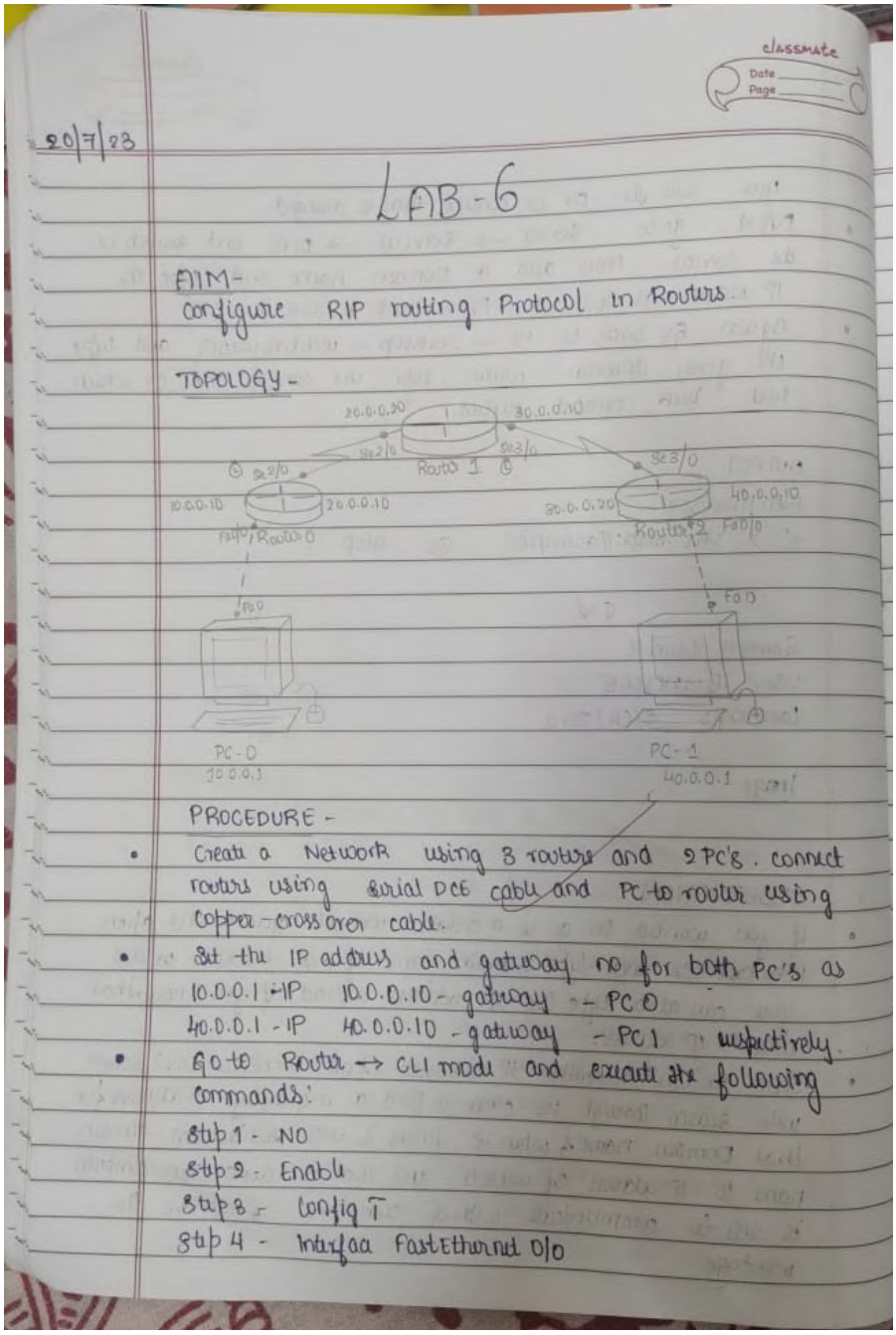
OUTPUT:



WEEK 6

Configure RIP routing Protocol in Routers.

OBSERVATION:



20/7/23

LAB-6

AIM-
configure RIP routing Protocol in Routers

TOPOLOGY-

PROCEDURE -

- Create a Network using 3 routers and 2 PC's. connect routers using Serial DCE cable and PC to router using copper-cross over cable.
- 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
- Go to Router → CLI mode and execute the following commands:

Step 1 - NO
Step 2 - Enable
Step 3 - Config T
Step 4 - Interface FastEthernet 0/0

step 5 - IP address 10.0.0.10 255.0.0.0
step 6 - No shut
step 7 - Exit
step 8 - Interface se 2/0
step 9 - IP address 20.0.0.10 255.0.0.0
step 10 - Encapsulation ppp
step 11 - Clock rate 64000
step 12 - No shut

- Here for Router with FastEthernet execute only till step 9 and type No shut.
- Only for Router to Router connection execute all steps, also execute the step 11 only for the router connection which has a clock symbol at start. Repeat these steps for all routers.
- Again go to Router 0 → CLI mode and type these steps:
  step 1: config T
  step 2: router rip
  step 3: Network 10.0.0.0
  step 4: Network 20.0.0.0
  step 5: Exit.
- Repeat these steps for all routers.
- At last now go to each router and type show IP route. Here the IP addresses associated with that router will be labelled as C and other IP addresses are labelled as R.
- Lastly go to PC0 and ping a message to PC1 using ping distination 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 time : 8ms TTL = 125

Reply from 40.0.0.1 : bytes = 32 time : 5ms TTL = 125

Reply from 40.0.0.1 : bytes = 32 time : 10ms TTL = 125

Ping statistics for 40.0.0.1:

Packets: Sent = 4, Recived = 3, Lost = 1 (25% loss),

Approximate round trip times in milli seconds:

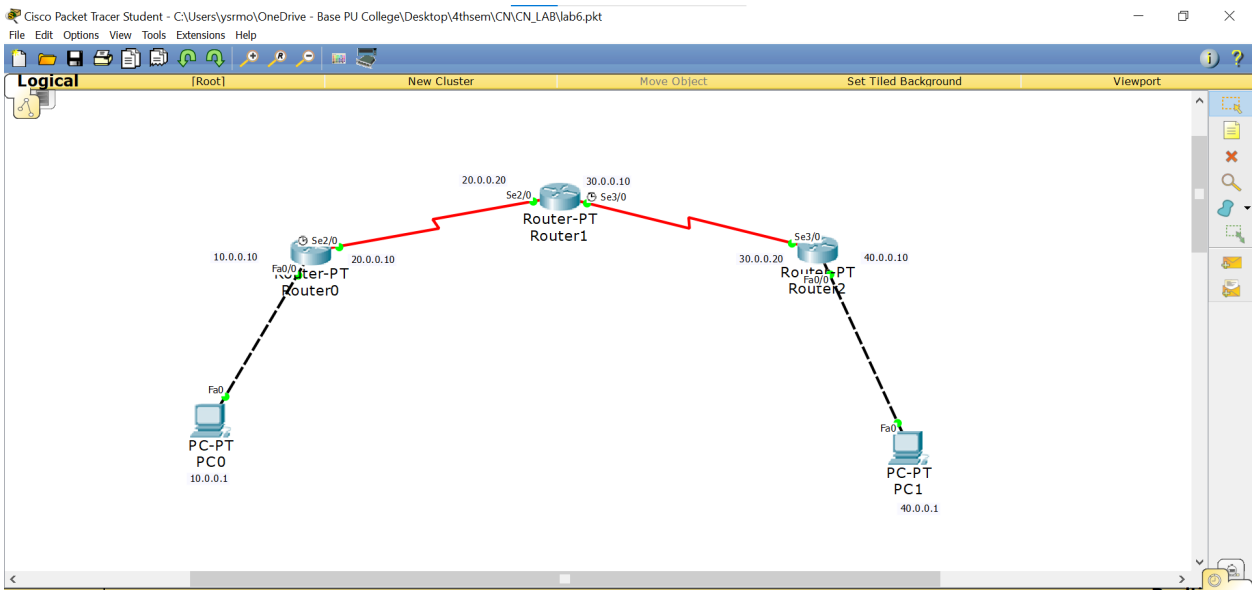
Minimum = 5ms, Maximum = 10ms, Average = 7ms

OBSERVATION:

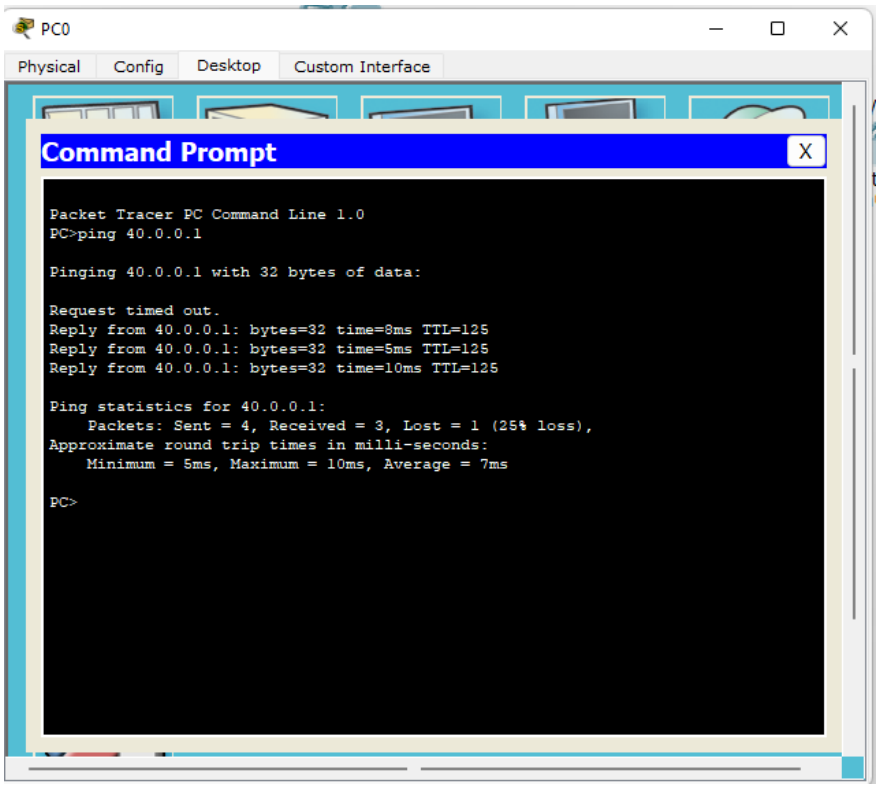
- Routing information protocol (rip) is a dynamic routing protocol that uses hop count as a routing metric to find the best path between source and destination. It is a distance-vector routing protocol.
- Hop count is the no of routes coming in between source and destination. The path with least hop count is selected.
- updates of the NETWORK are exchanged periodically.
- updates of routing information are always broadcast.
- Full routing tables are sent in updates.
- Routers always trust routing information recived from neighbor routers.

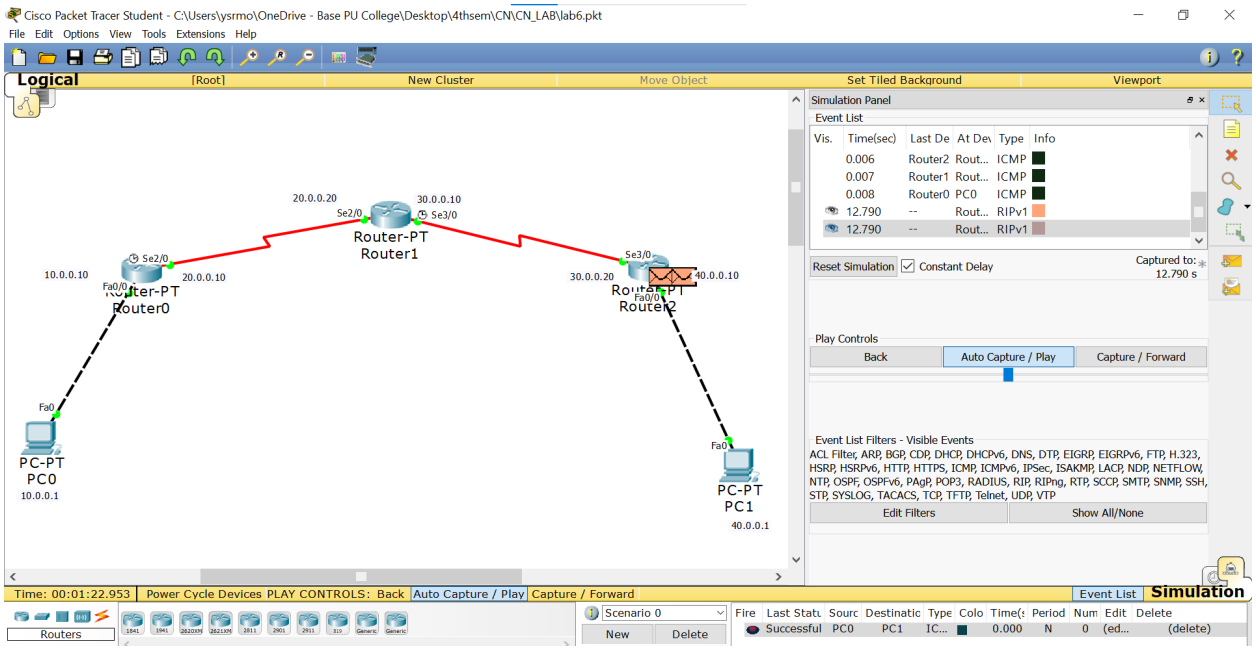
Lab 24/7/23

TOPOLOGY:



OUTPUT:

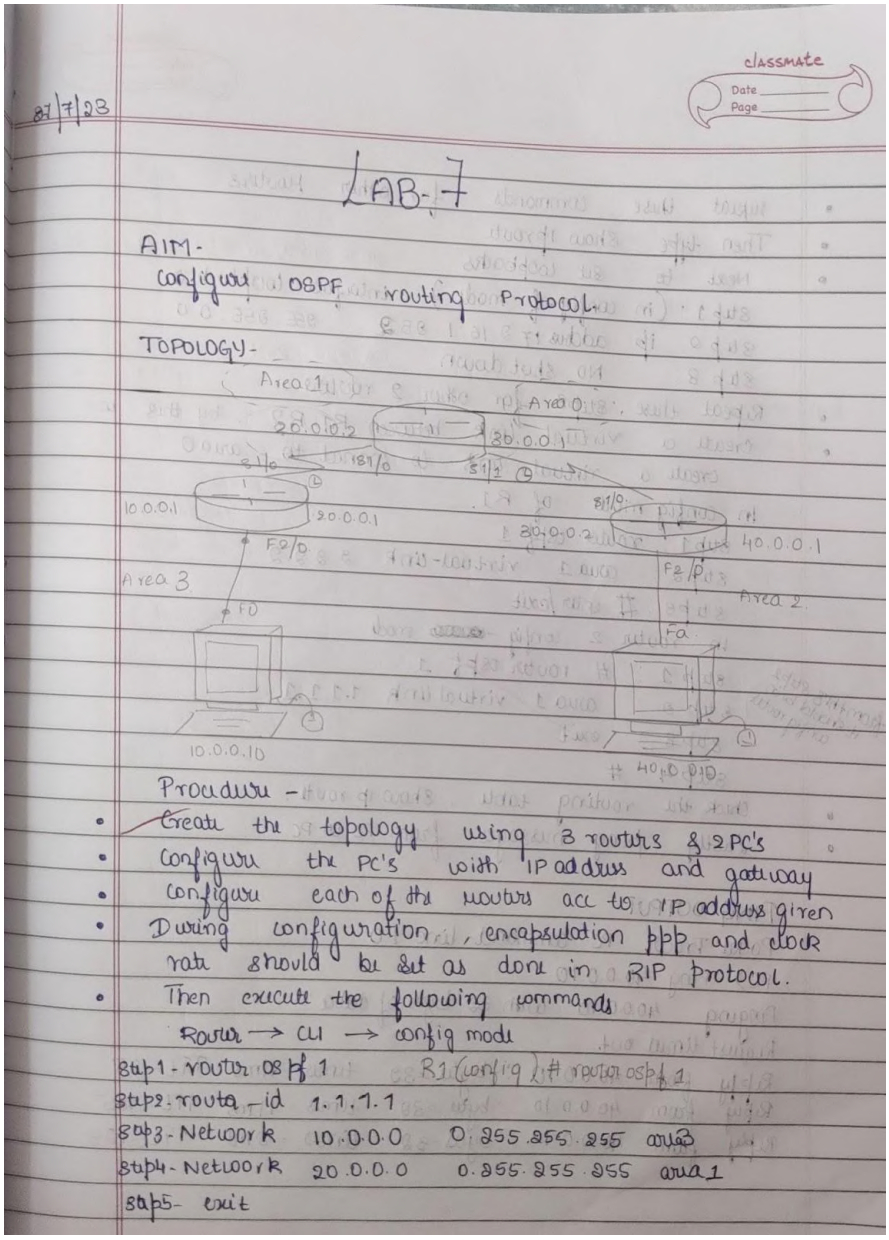



Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab6.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
20.0.0.20
Se2/0
30.0.0.10
Se3/0
Router0
10.0.0.10
20.0.0.10
Router2
30.0.0.20
40.0.0.10
PC-PT
PC0
10.0.0.1
PC-PT
PC1
40.0.0.1
Fa0
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:



27/7/23

LAB-7

AIM-
Configure OSPF routing Protocol.

TOPOLOGY-

Procedure -

- Create the topology using 3 routers & 2 PC's
- Configure the PC's with IP address and gateway
- Configure each of the routers acc to IP address given
- During configuration, encapsulation ppp and clock rate should be set as done in RIP protocol.
- Then execute the following commands

Router → CLI → config mode

step1 - router ospf 1 R1(config)# router ospf 1
step2 - router-id 1.1.1.1
step3 - Network 10.0.0.0 0.255.255.255 area 0
step4 - Network 20.0.0.0 0.255.255.255 area 1
step5 - exit

- Repeat these commands for other Routers.
- Then type show ip route.
- Next to set loopbacks go to interface s1/0, & then go this
  step 1 : (in config-if mode) interface loopback 0
  step 2 : ip address 172.16.1.252 255.255.0.0
  step 3 : NO shut down
- Repeat these steps for other 2 routers
- Create a virtual link between R1-R2, by this we create a virtual link to connect to area 0.

  In config mode of R1.
  step 1 : router ospf 1
  step 2 : area 1 virtual-link 2.2.2.2
  step 3 : # enter/exit

  In router 2 config - mode
  step 1 : # router ospf 1.
  step 2 : area 1 virtual link 1.1.1.1
  step 3 : exit.
  step 4 : #

  (on this step2 it should be in config router)
- Check the routing table, show ip route.
- Lastly ping messages from PC to PC

PING OUTPUT-

Packet Tracer PC command-line 1.0
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=11ms TTL=125
Reply from 40.0.0.10 : bytes=32 time=11ms TTL=125
Reply from 40.0.0.10 : bytes=32 time=8ms TTL=125

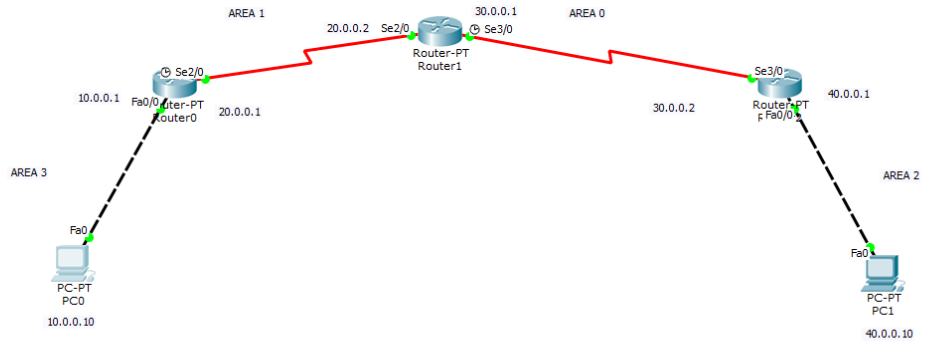
Ping statistics for 40.0.0.10:
Packets sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 11ms, Average = 10ms

OBSERVATION:

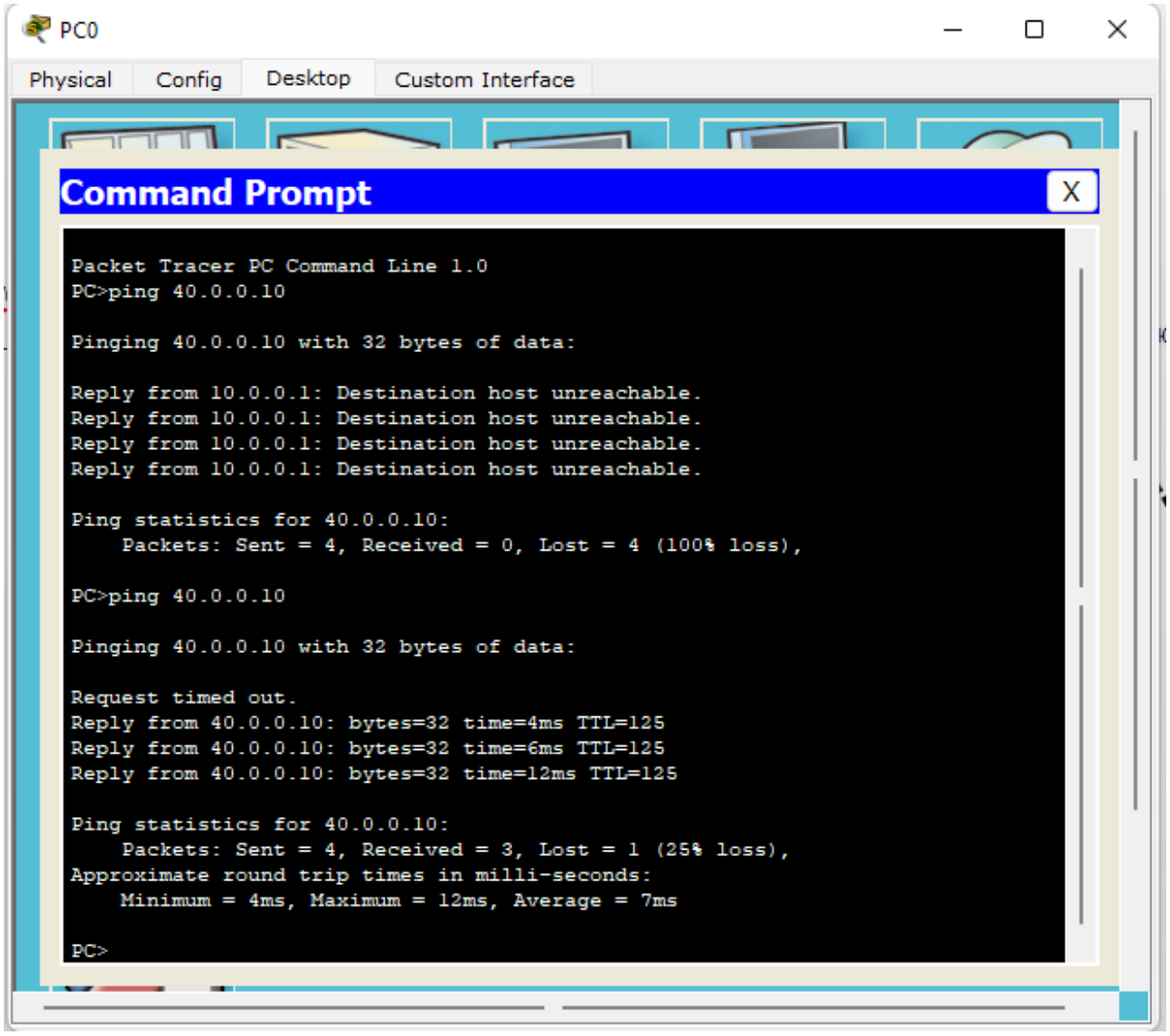
- OSPF is a link-state routing protocol that is used to find the best path between source & destination router using its own SPF Algorithm.
- This network is divided into 4 areas. where area0 is the backbone.
- After we make the virtual-link between the area which is not connected to the backbone area, we can ping messages succesfully.

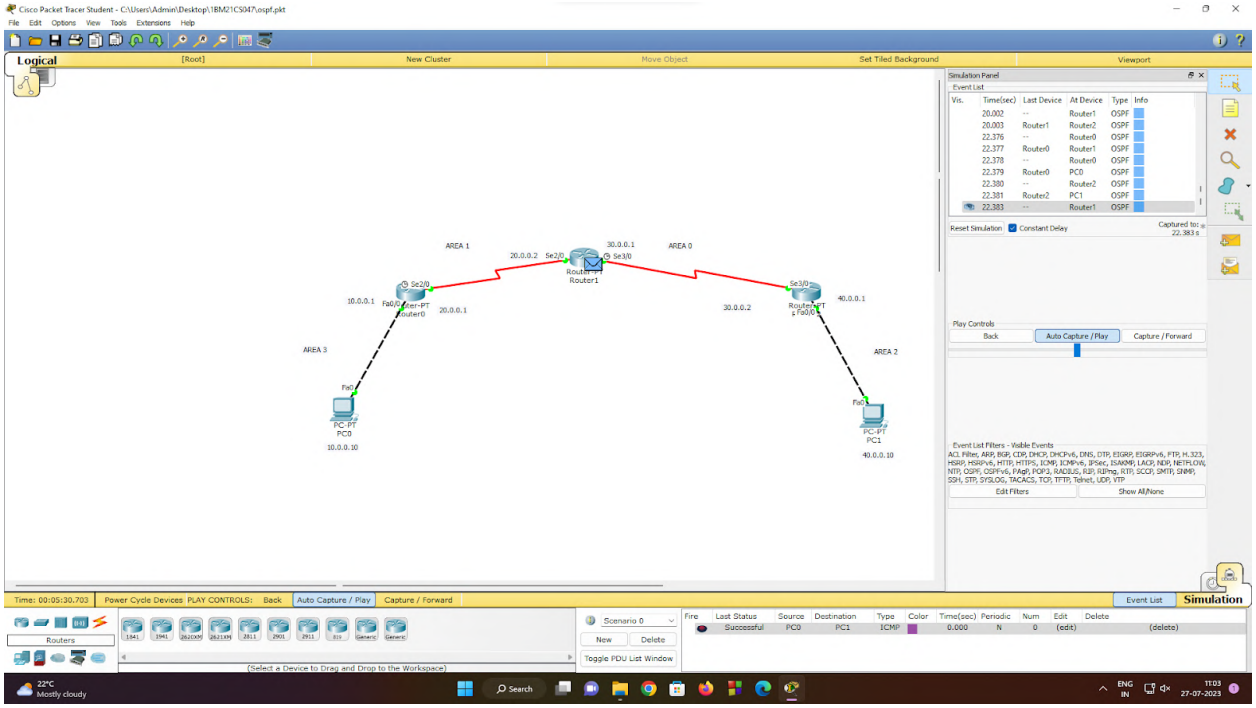
27/7/25

TOPOLOGY:



OUTPUT:

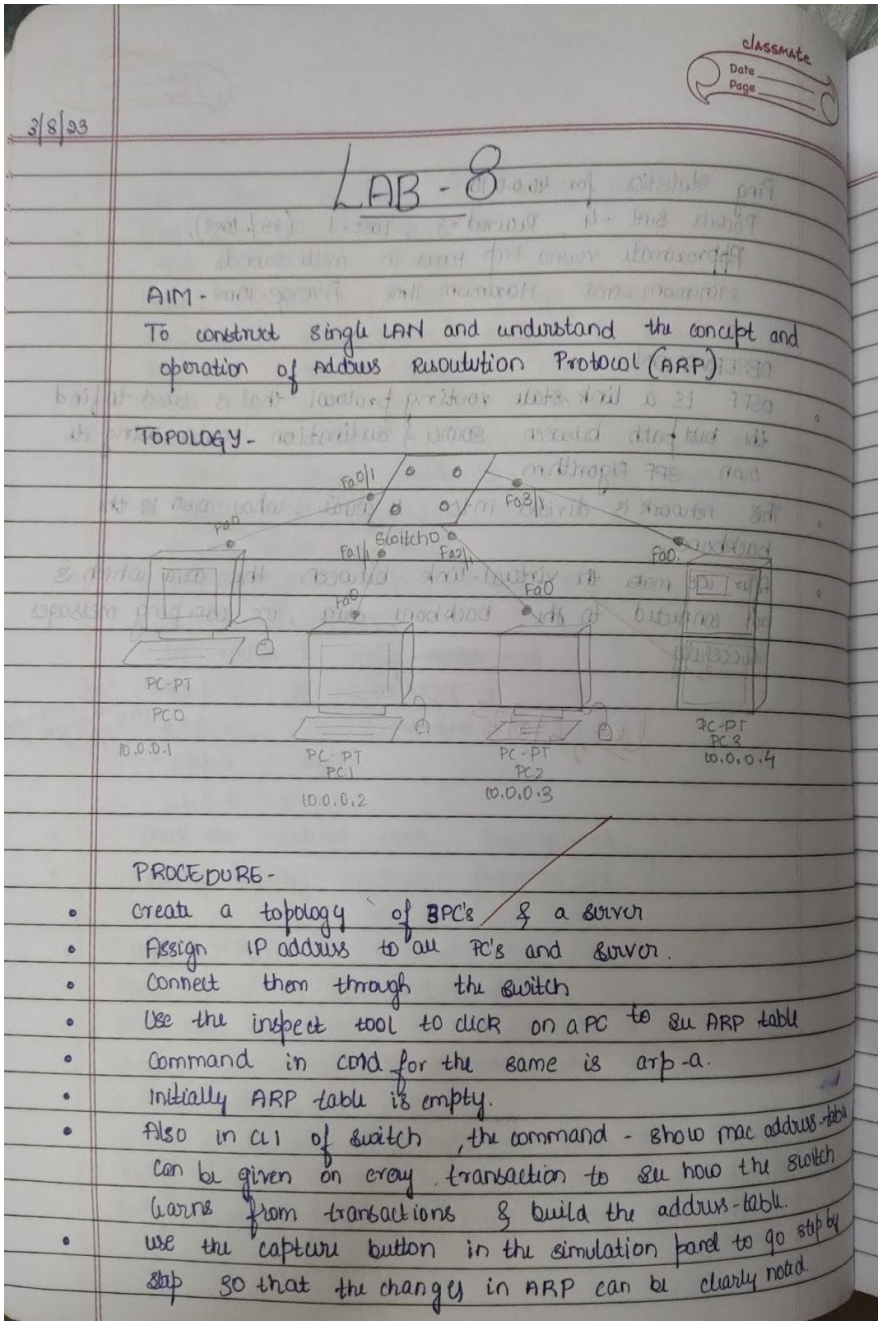



Cisco Packet Tracer Student - C:\Users\Admin\Desktop\1BM21CS047\ospf.pkt
Logical
AREA 1
AREA 0
AREA 3
AREA 2
20.0.0.2
30.0.0.1
10.0.0.1
20.0.0.1
30.0.0.2
40.0.0.1
10.0.0.10
40.0.0.10
Router1
Router0
PC0
PC1
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Simulation
Routers
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)
Mostly cloudy
Search
ENG
IN
27-07-2023

WEEK 8

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

OBSERVATION:



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, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milliseconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC> arp -a

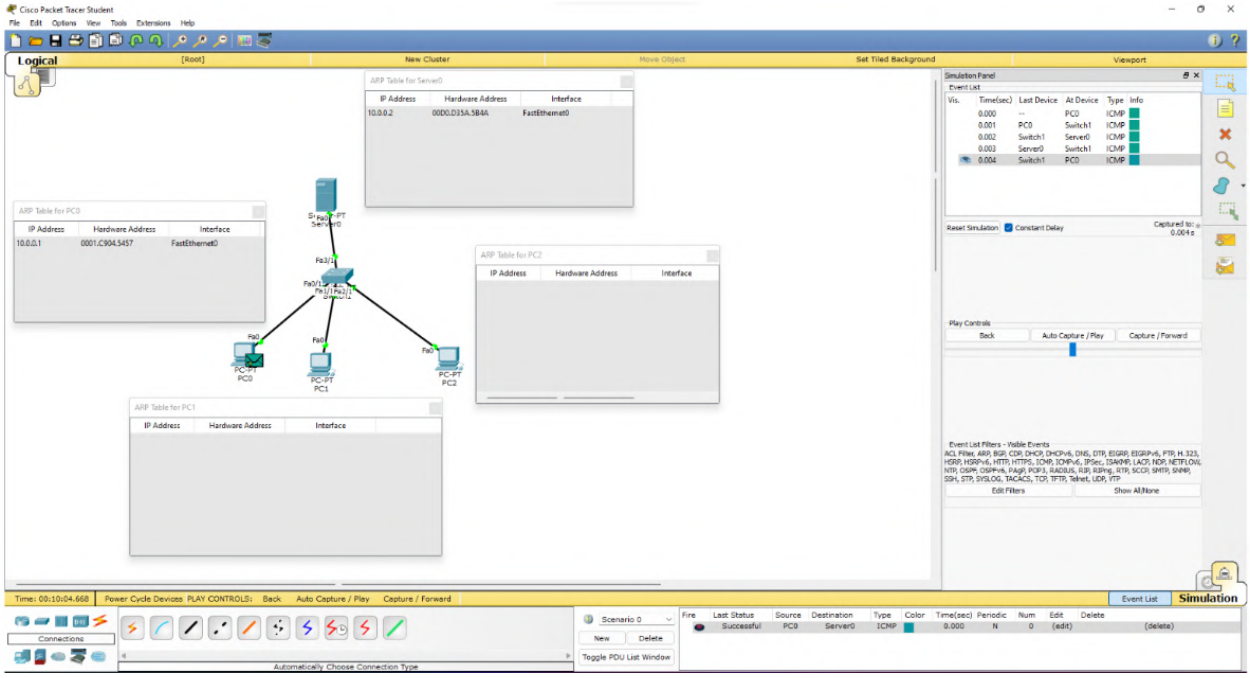
Internet address	physical Address	Type
10.0.0.4	0060.2f00.3a4d	dynamic.

OBSERVATION:-

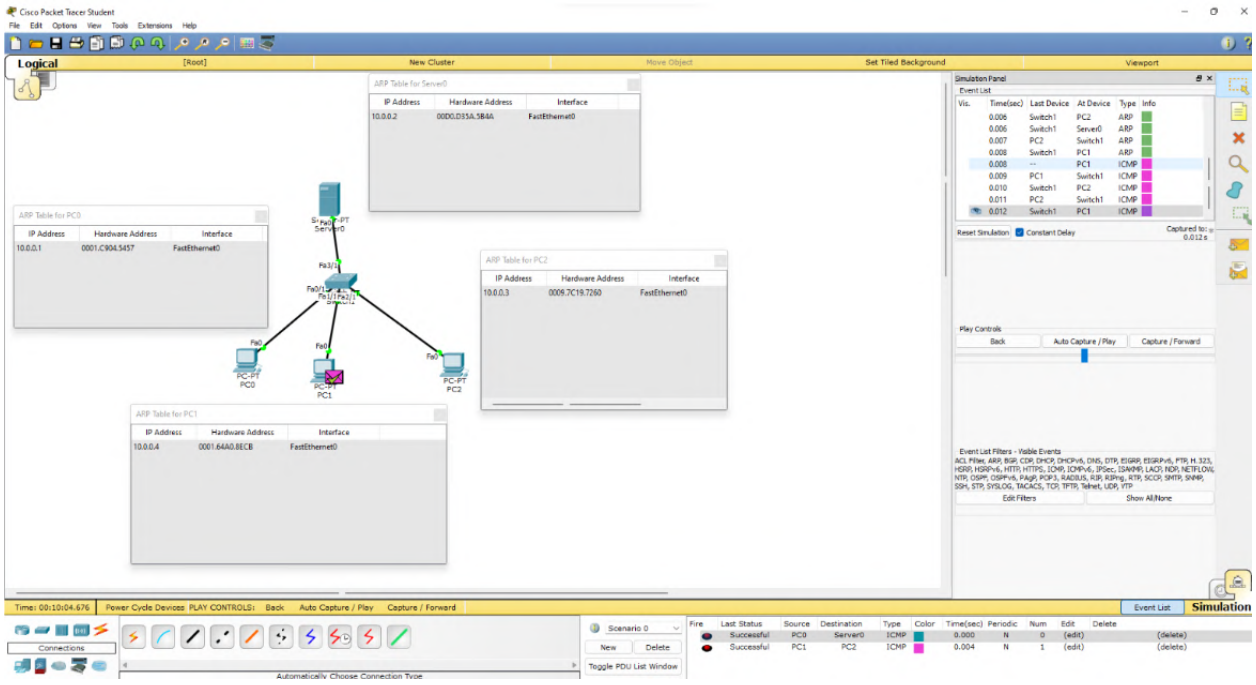
- When we ping 1 PC and Server the address of Server is known to PC & vice-versa
- When we ping between other two PC's simultaneously the addresses of each other are known.
- Every time a host requests a MAC address in order to send a packet to another host in the LAN, it checks its ARP cache to see if the IP to mac address translation address already exists. If the translation doesn't exits it performs ARP.

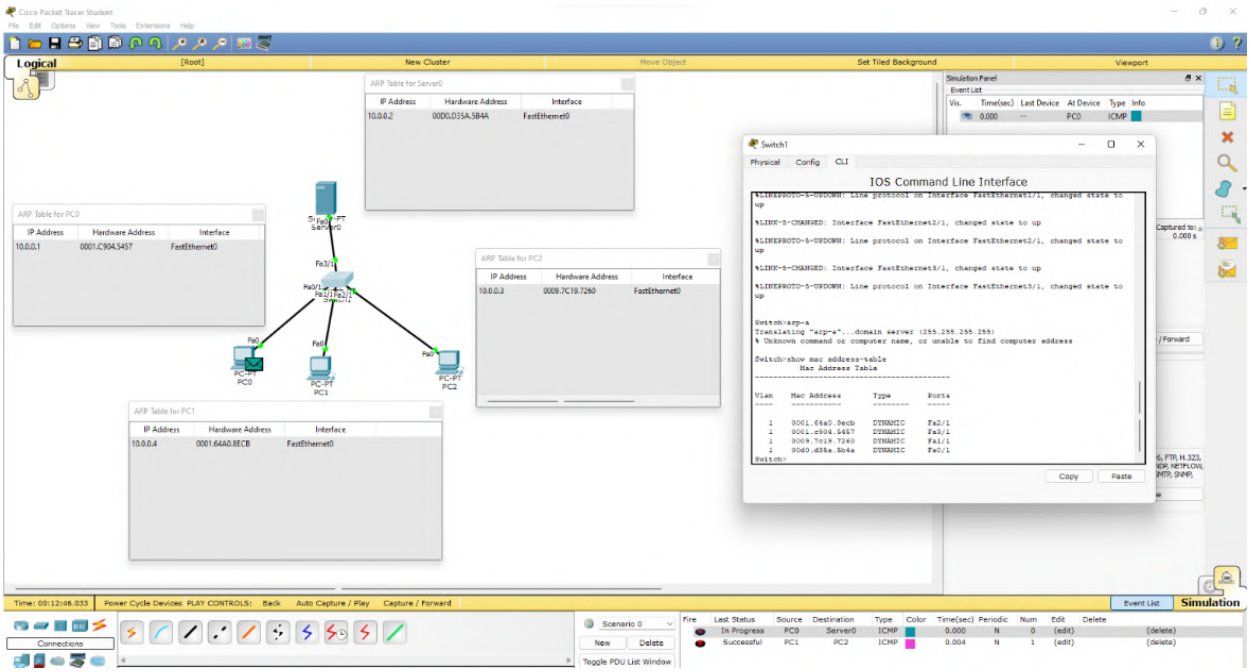
Rec 3/8/23

TOPOLOGY:



OUTPUT:

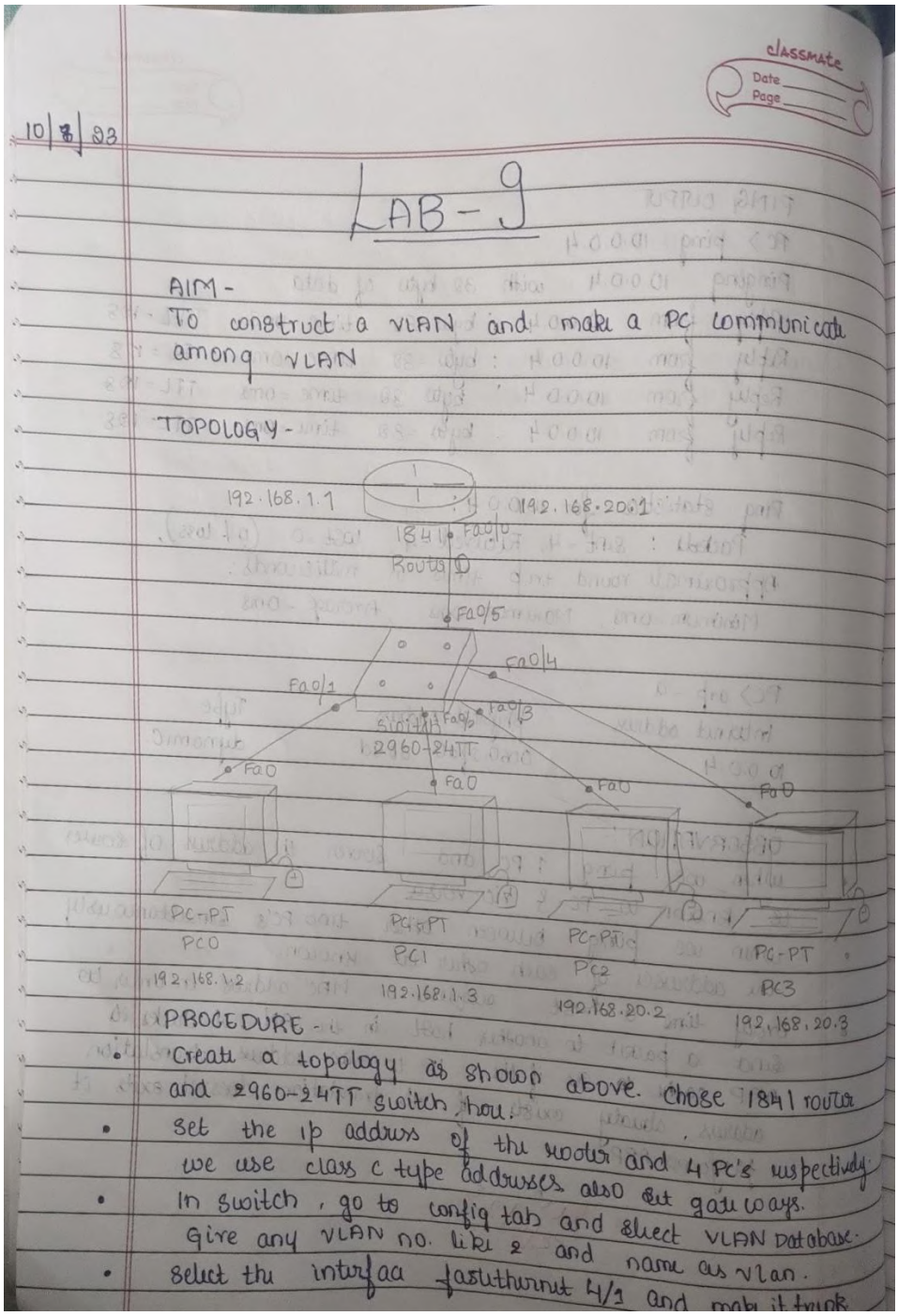



Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
ARP Table for Server0
IP Address
Hardware Address
Interface
10.0.0.2
00D0.D35A.5B4A
FastEthernet0
ARP Table for PC0
10.0.0.1
0001.C904.5457
ARP Table for PC2
10.0.0.3
0009.7C19.7260
ARP Table for PC1
10.0.0.4
0001.64A0.8ECB
Switch1
Physical
Config
CLI
IOS Command Line Interface
Switch>arp-a
Translating "arp-a"...domain server (255.255.255.255)
% Unknown command or computer name, or unable to find computer address
Switch>show mac address-table
Mac Address Table
Vlan Mac Address Type Ports
1 0001.64a0.8ecb DYNAMIC Fa2/1
1 0001.c904.5457 DYNAMIC Fa3/1
1 0009.7c19.7260 DYNAMIC Fa1/1
1 00d0.d35a.5b4a DYNAMIC Fa0/1
Switch>
Copy
Paste
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
Info
0.000
PC0
ICMP
Time: 00:12:46.033
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Event List
Simulation
Connections
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
In Progress
PC0
Server0
ICMP
0.000
N
0
(edit)
(delete)
Successful
PC1
PC2
ICMP
0.004
N
1
(edit)
(delete)

WEEK 9

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

OBSERVATION:



10/8/23

LAB-9

AIM-
To construct a VLAN and make a PC communicate among VLAN

TOPOLOGY-

PROCEDURE -

- Create a topology as shown above. Chose 1841 router and 2960-24TT switch from.
- Set the ip address of the router and 4 PC's respectively we use class C type addresses also set gateways.
- In switch, go to config tab and select VLAN Database. Give any VLAN no. like 2 and name as vlan.
- Select the interface fastethernet 4/1 and make it trunk

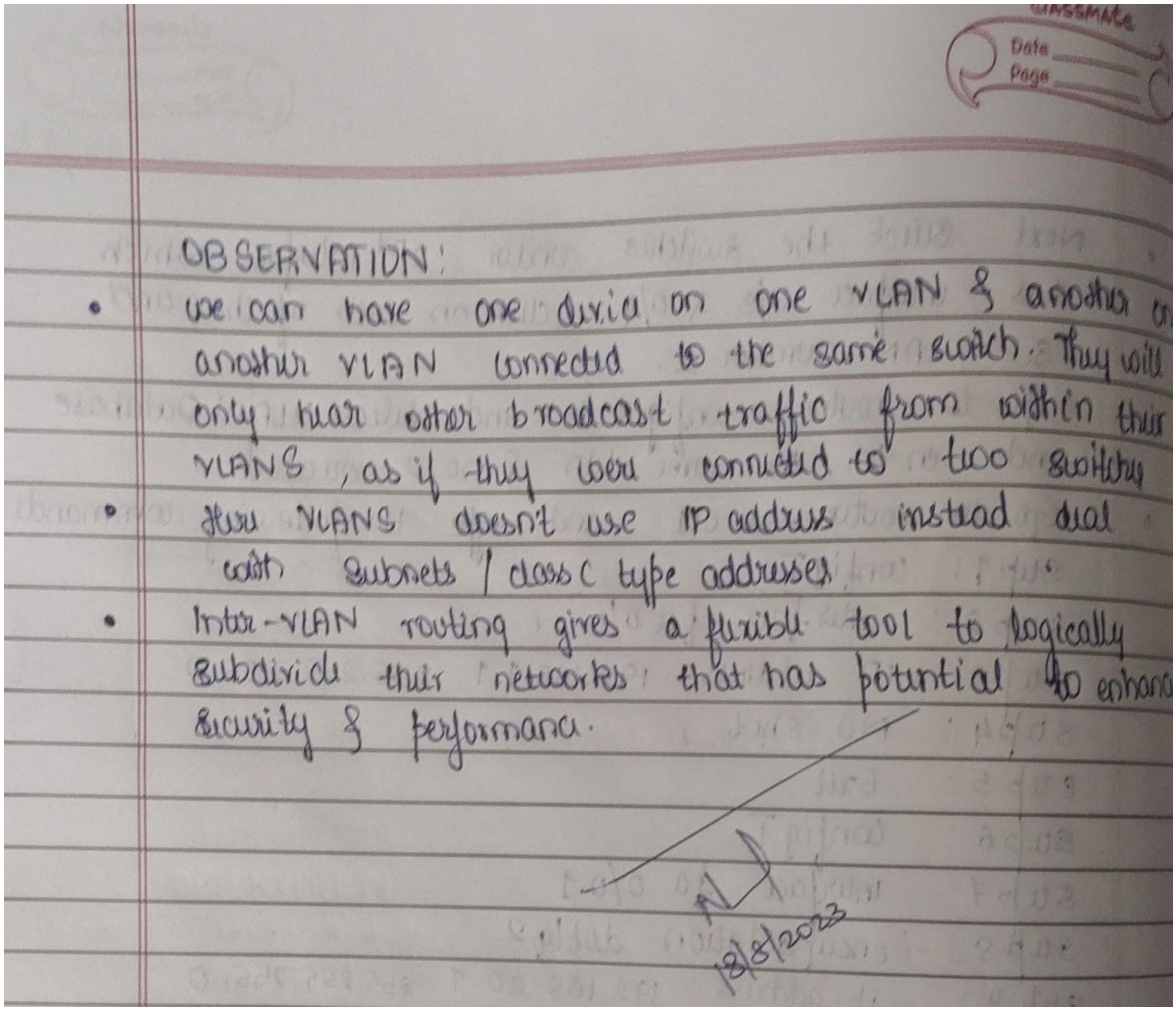
- Next Select the switches under 2nd interface which has interface 0/3 & 0/4. click on each of them and Set VLAN number 2.
- Go to router → config tab and select VLAN Database and enter the name vlan & no. 2 created.
- Go to router → CLI and type the following commands.

  Stp 1: configT
  Stp 2: interface fa 0/0
  Stp 3: IP address: 192.168.1.1 255.255.255.0
  Stp 4: NO shut
  Stp 5: Exit.
  Stp 6: configT
  Stp 7: interface fa 0/0.1
  Stp 8: encapsulation dot1q 2
  Stp 9: ip address 192.168.20.1 255.255.255.0
  Stp 10: No shut.
  Stp 11: Exit

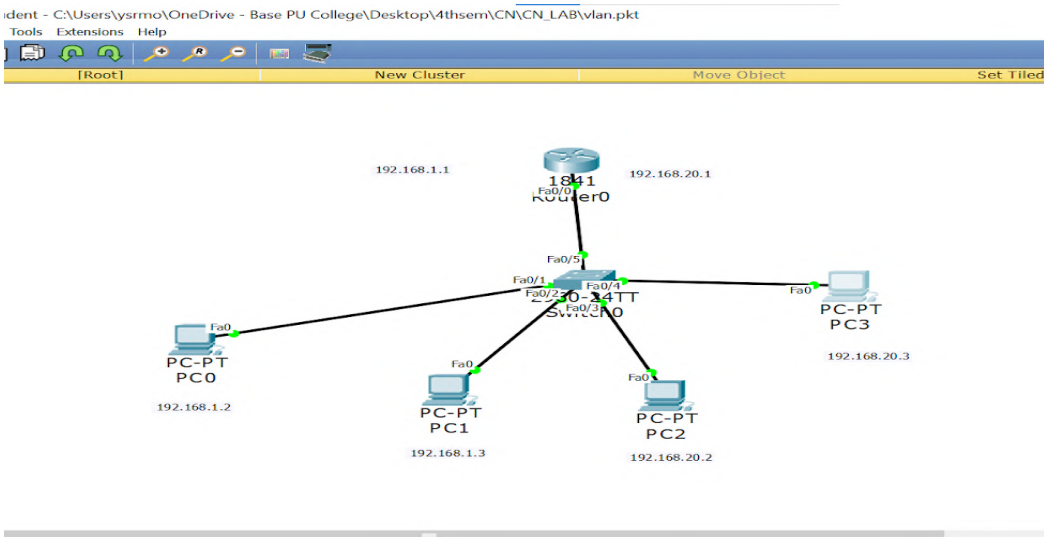
- Ping message from PC to another VLAN PC.

PING OUTPUT:

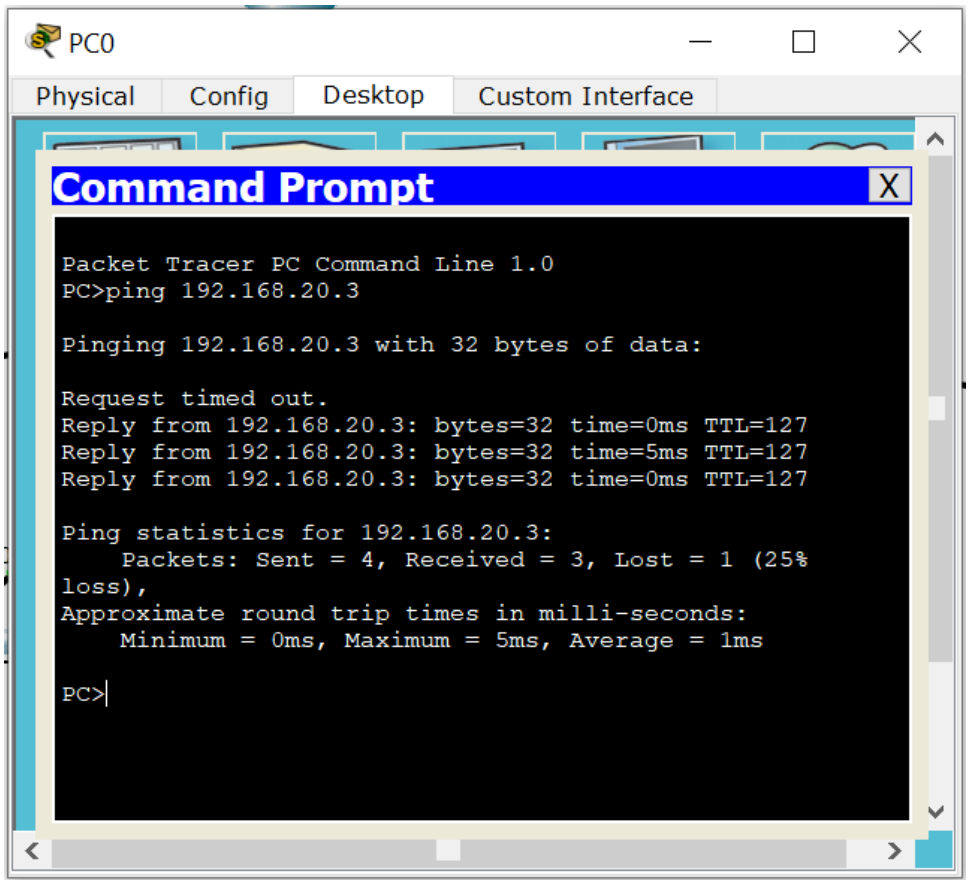
Packet Tracer PC command line 1.0
PC> Ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=0ms, TTL=127
Reply from 192.168.20.3: bytes=32 time=5ms TTL=127
Reply from 192.168.20.3: bytes=32 time=6ms TTL=127
Ping statistics for 192.168.20.3:
Packets: Sent=4, Received=3, Lost=1 (25% loss),
Approximate round trip times in milliseconds:
Minimum=0ms, Maximum=5ms, Average=1ms

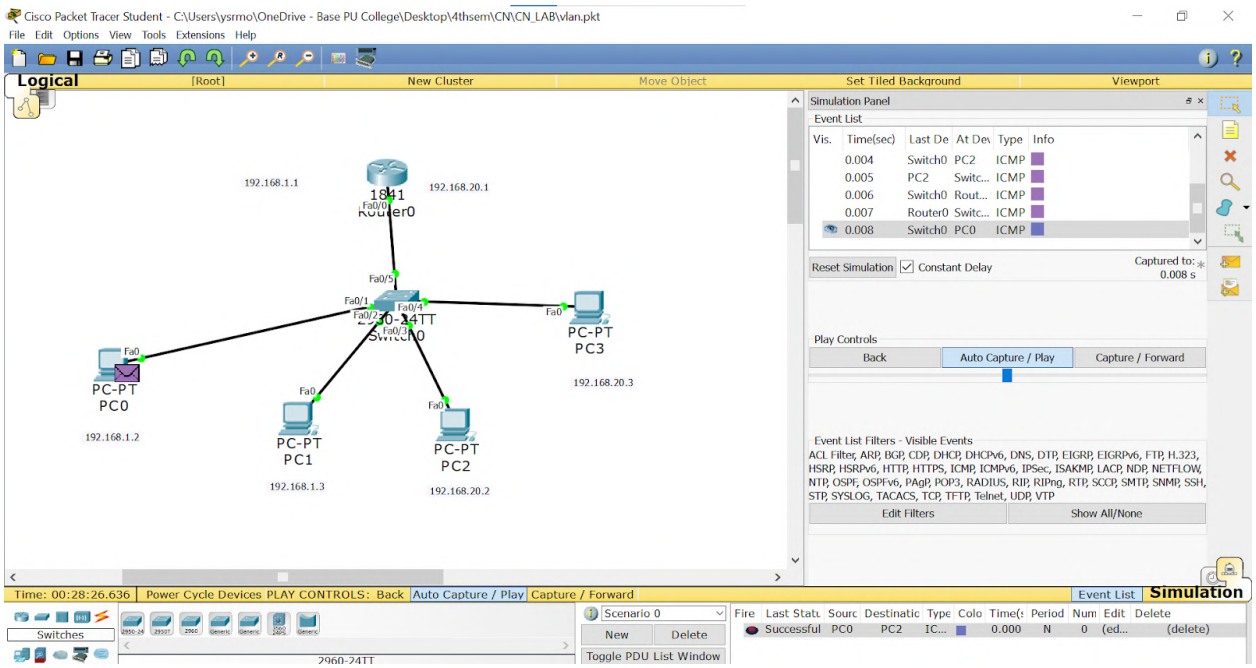

OBSERVATION:
• We can have one device on one VLAN & another on another VLAN connected to the same switch. They will only hear other broadcast traffic from within their VLANS, as if they were connected to two switches
• Our VLANS doesn't use IP address instead deal with Subnets / class C type addresses
• Inter-VLAN routing gives a flexible tool to logically subdivide their networks that has potential to enhance security & performance.
18/8/2023

TOPOLOGY:


ident - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\vlan.pkt
Tools Extensions Help
[Root] New Cluster Move Object Set Tiled
192.168.1.1
1841
Router0
192.168.20.1
Fa0/5
Fa0/1
Fa0/4
Fa0/3
Switch0
Fa0
PC-PT
PC0
192.168.1.2
Fa0
PC-PT
PC1
192.168.1.3
Fa0
PC-PT
PC2
192.168.20.2
Fa0
PC-PT
PC3
192.168.20.3

OUTPUT:

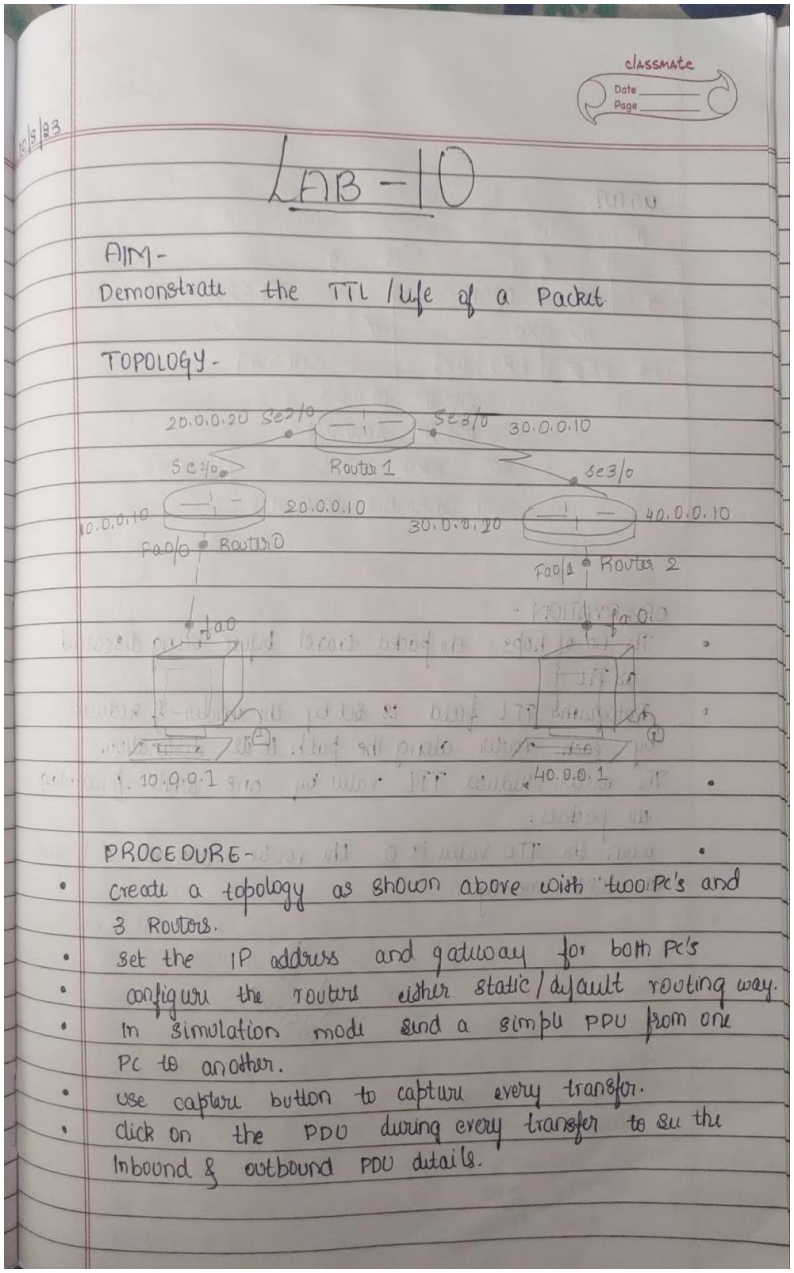

PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 192.168.20.3
Pinging 192.168.20.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.3: bytes=32 time=0ms TTL=127
Reply from 192.168.20.3: bytes=32 time=5ms TTL=127
Reply from 192.168.20.3: 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>


Logical
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
192.168.1.1
192.168.20.1
192.168.1.2
192.168.1.3
192.168.20.2
192.168.20.3
Simulation Panel
Event List
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Simulation

WEEK 10

Demonstrate the TTL/ Life of a Packet.

OBSERVATION:



LAB - 10

AIM -
Demonstrate the TTL / life of a Packet

TOPOLOGY -

PROCEDURE -

- Create a topology as shown above with two PC's and 3 Routers.
- Set the IP address and gateway for both PC's
- configure the routers either static / default routing way.
- In simulation mode send a simple PDU from one PC to another.
- use capture button to capture every transfer.
- click on the PDU during every transfer to see the Inbound & outbound PDU details.

OUTPUT:

IP

0 4	8	16 19	31
4	IHL: DSCP	TL: 28	
ID: 0X6		0X	0X0
TTL: 255	PRO: 0X1	CHKSUM	
SRC IP: 10.0.0.1			
DST IP: 40.0.0.1			
OPT: 0X0			0X0
DATA (VARIABLE LENGTH)			

OBSERVATION -

- The no. of hops the packet travel before being discarded as TTL
- Datagrams TTL field is set by the sender & reduced by each router along the path to its destination.
- The router reduces TTL value by one while forwarding the packets.
- When the TTL value is 0, the router discards it & sends an ICMP message.

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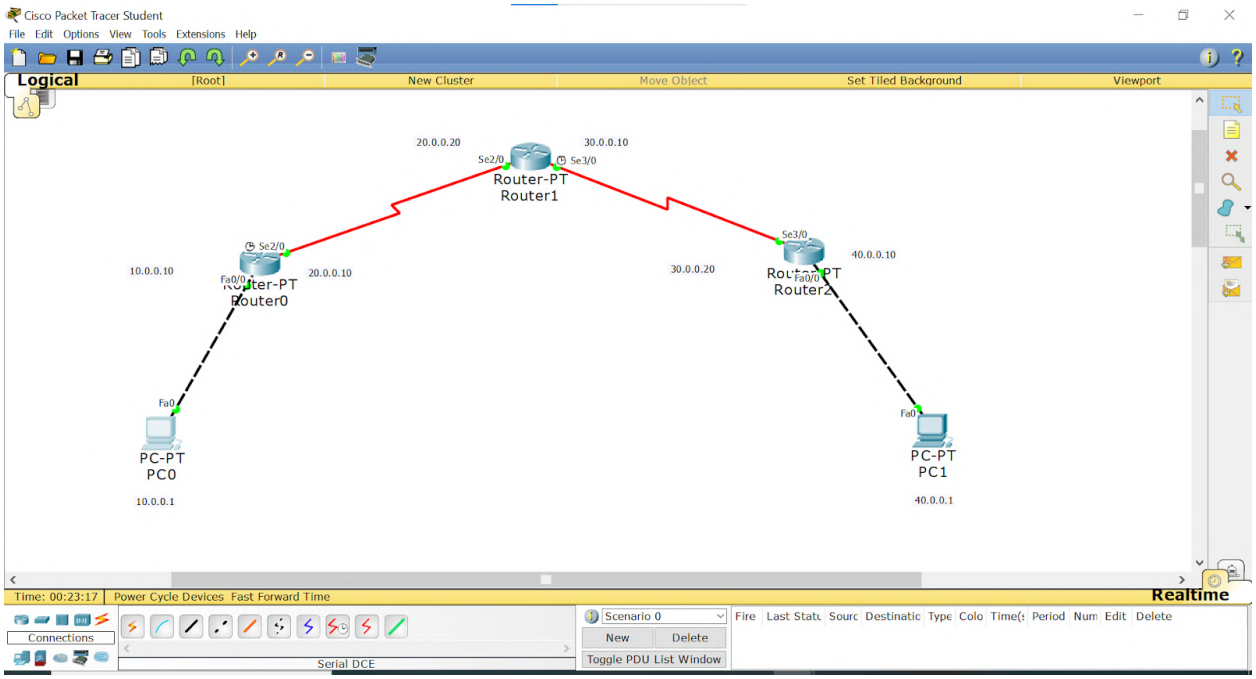
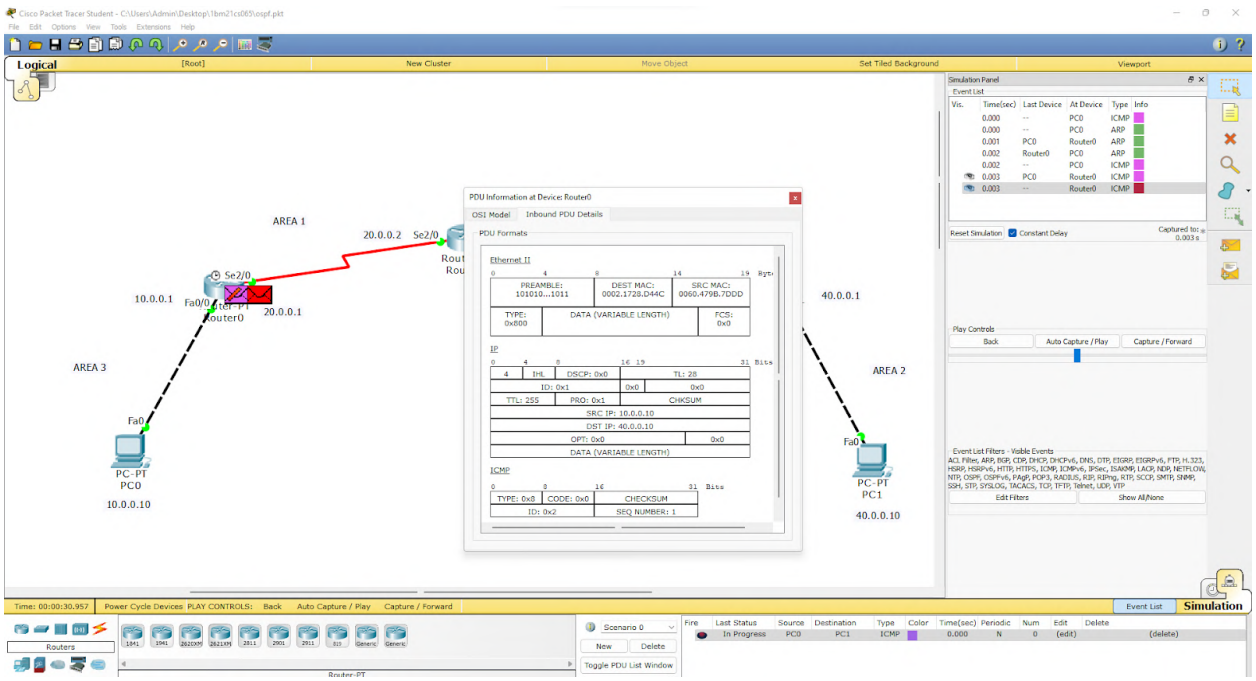
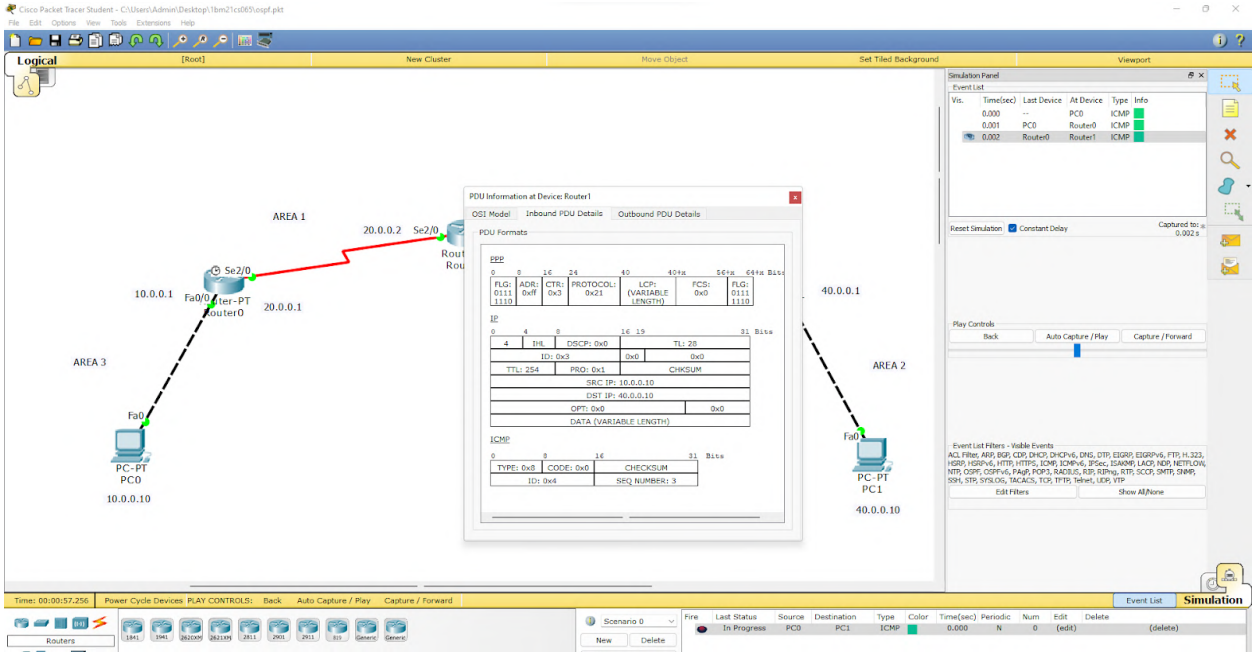
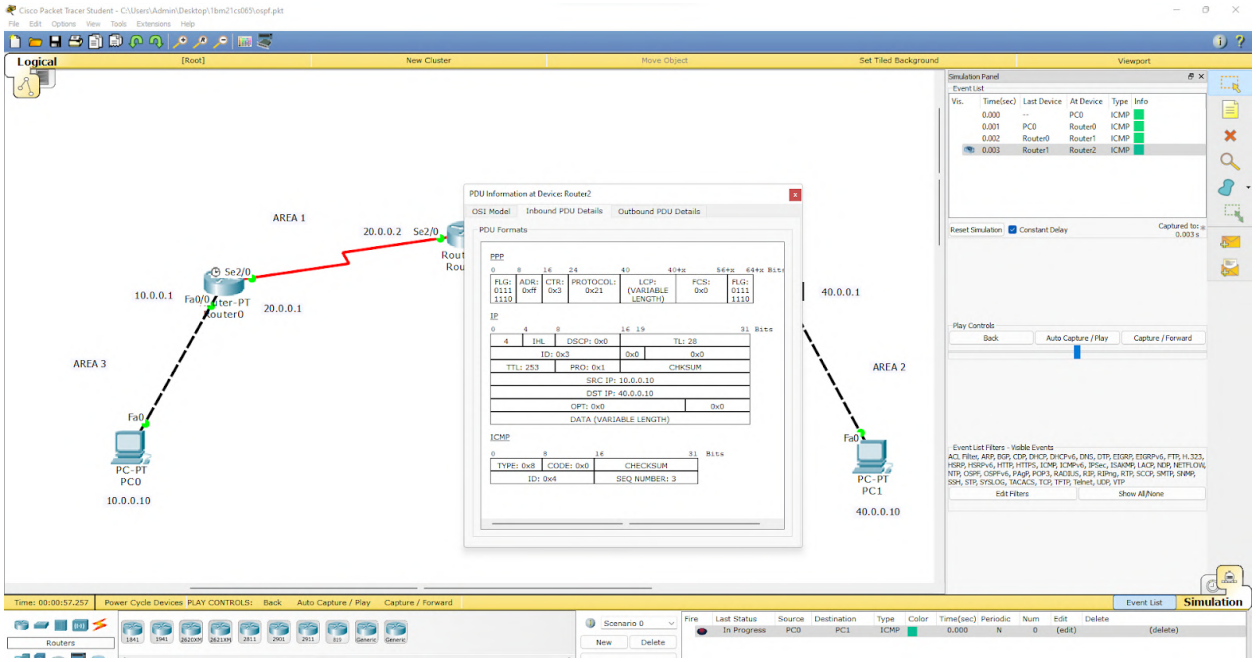
TOPOLOGY:

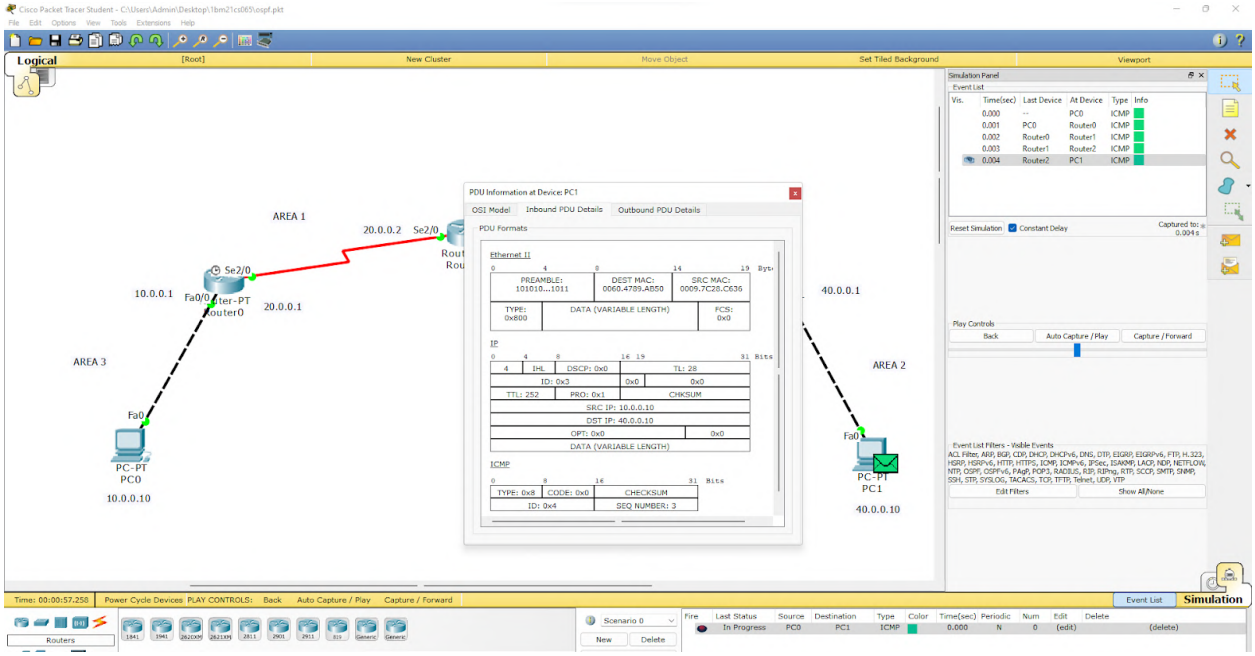


OUTPUT:




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
PC1
40.0.0.10
PDU Information at Device: Router1
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TTL: 254
TTL: 28
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
DATA (VARIABLE LENGTH)
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Simulation

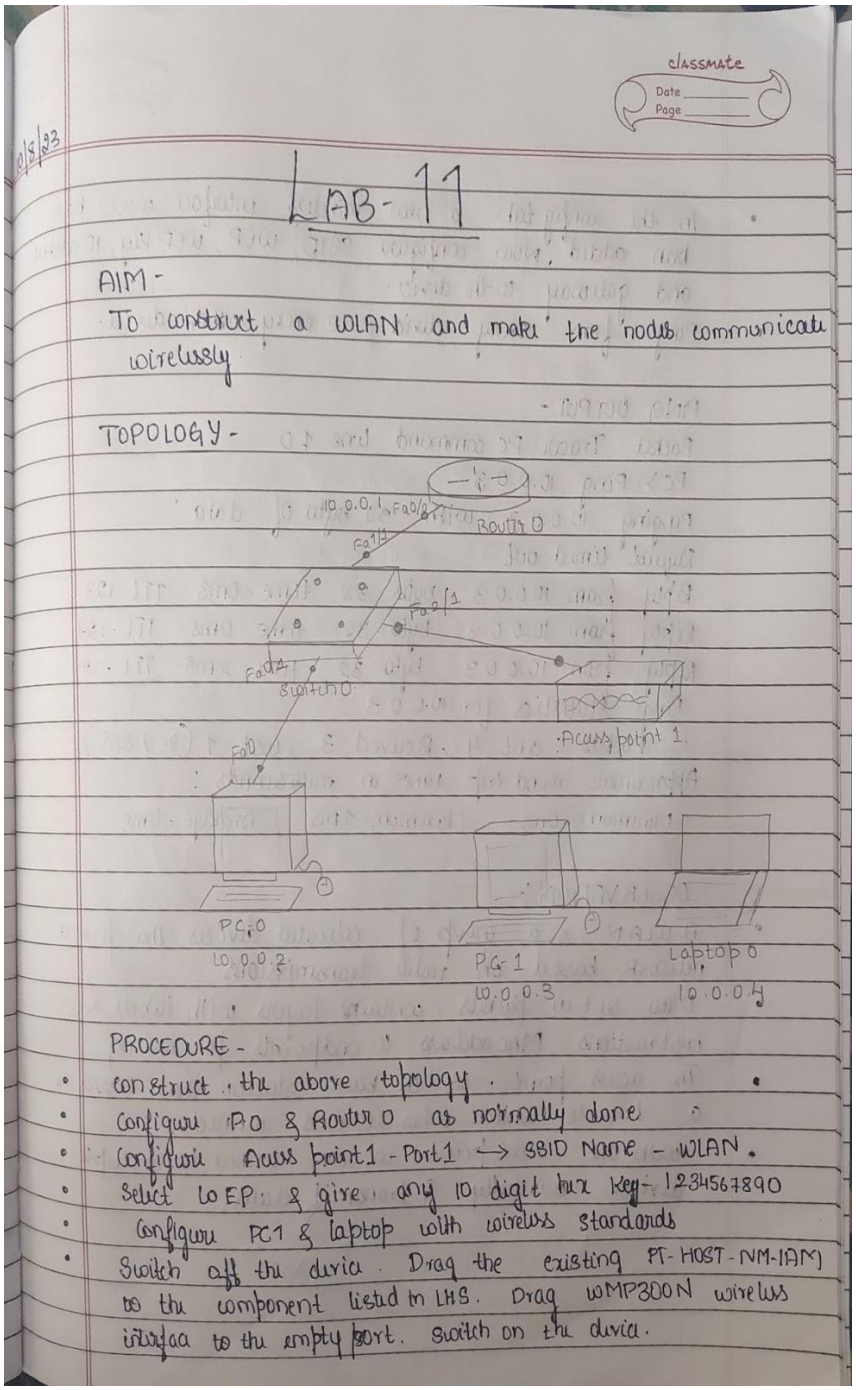

Logical
AREA 1
AREA 2
AREA 3
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
40.0.0.1
Fa0
PC-PT
PC0
10.0.0.10
PC1
40.0.0.10
PDU Information at Device: Router2
OSI Model
Inbound PDU Details
Outbound PDU Details
PDU Formats
PPP
IP
ICMP
TTL: 253
TTL: 28
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
DATA (VARIABLE LENGTH)
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
Play Controls
Simulation


Logical
AREA 1
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
Router-PT
Router0
20.0.0.1
AREA 3
Fa0
PC-PT
PC0
10.0.0.10
40.0.0.1
AREA 2
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: 10101010...1011
DEST MAC: 0060.4789.AB50
SRC MAC: 0009.7C28.C636
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
DSCP: 0x0
TL: 28
ID: 0x3
TTL: 252
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
OPT: 0x0
DATA (VARIABLE LENGTH)
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x4
SEQ NUMBER: 3
Simulation Panel
Event List
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
In Progress
PC0
PC1
ICMP
(edit)
(delete)

WEEK 11

To construct a WLAN and make the nodes communicate wirelessly

OBSERVATION:



LAB-11

AIM -

To construct a WLAN and make the nodes communicate wirelessly

TOPOLOGY -

PROCEDURE -

- construct the above topology.
- Configure PC0 & Router 0 as normally done
- Configure Access point 1 - Port 1 → SSID Name - WLAN.
- Select WEP & give any 10 digit hex key - 1234567890
- Configure PC1 & laptop with wireless standards
- Switch off the device. Drag the existing PT-HOST-NM-1AM to the component listed in 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 to the device.
- Ping from every device to every other device.

PING OUTPUT:-

Packet Tracer PC command line 1.0

PC> Ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Request timed out

Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL = 127

Reply from 10.0.0.3 : bytes = 32 time = 0ms TTL = 127

Reply from 10.0.0.3 : bytes = 32 time = 2ms TTL = 127

Ping statistics for 10.0.0.3

Packets : Sent = 4, Received = 3, Lost = 1 (25% Loss),

Approximate round trip times in milliseconds:

Minimum = 0ms, Maximum = 1ms, Average = 0ms

OBSERVATION:-

- A WLAN is a group of colocated devices that form a network based on radio transmissions.
- Data sent in packets contain layers with labels & instructions. MAC address to endpoints for routing.
- The access point is the base station that serves as a hub to which other stations connect.
- With one access point we can connect to multiple devices wirelessly & transmit data.

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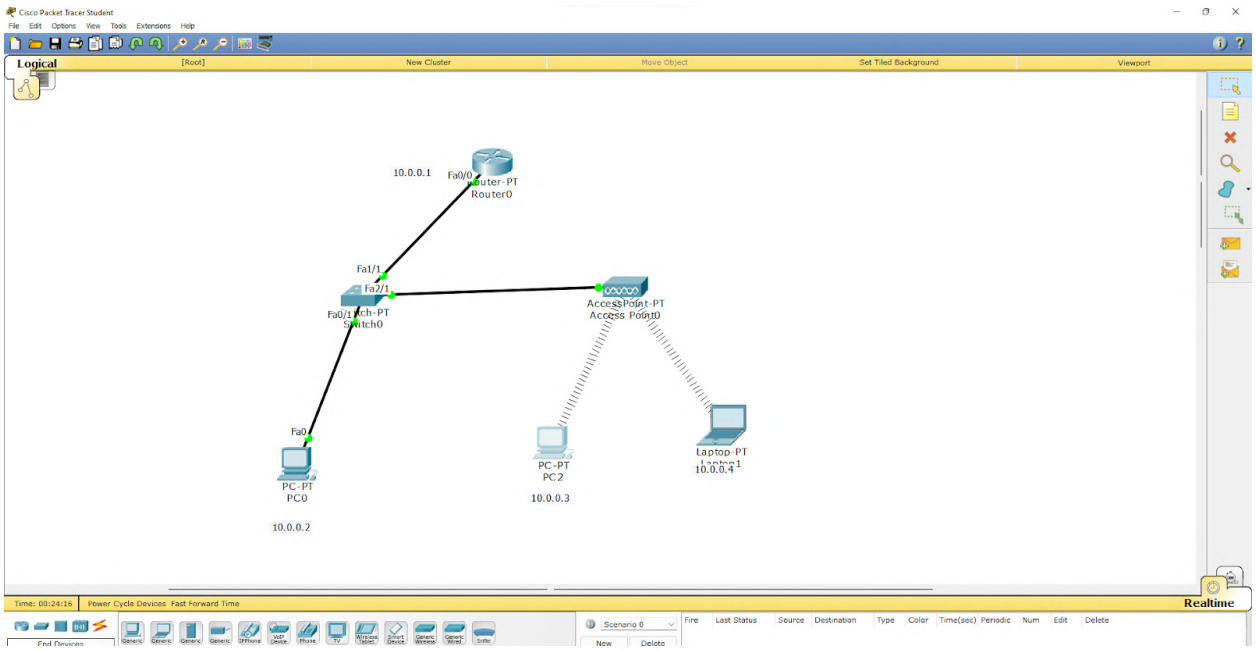
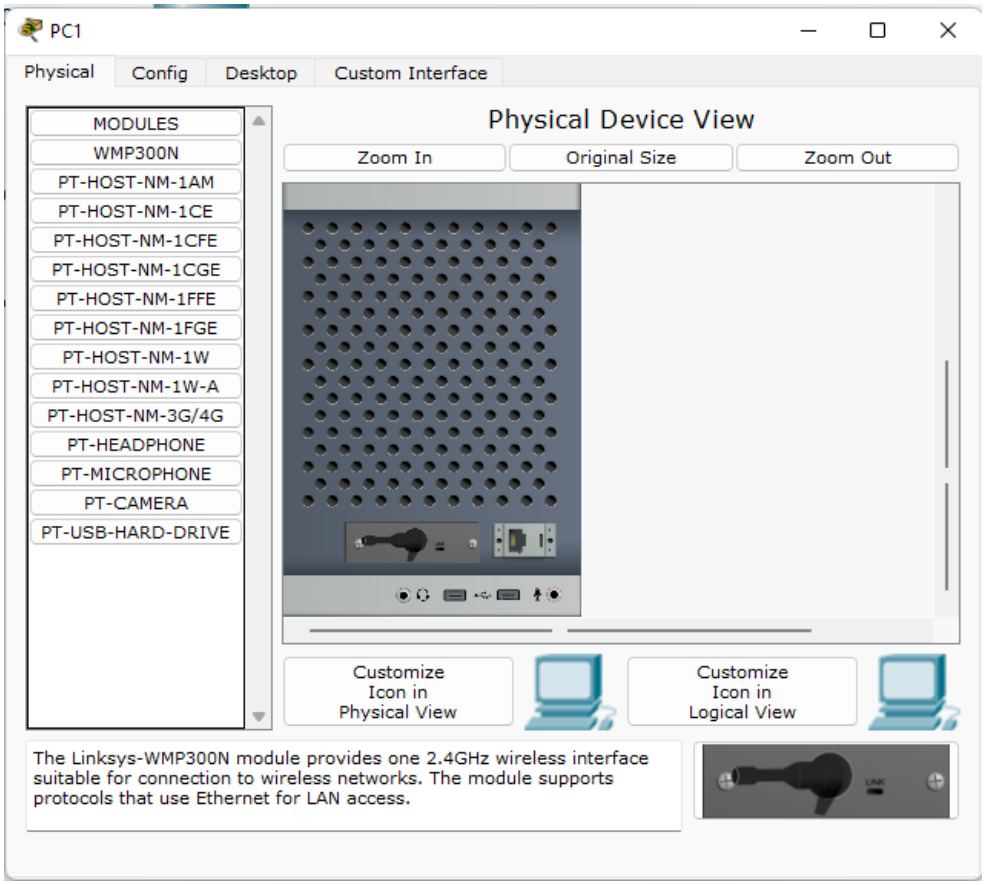
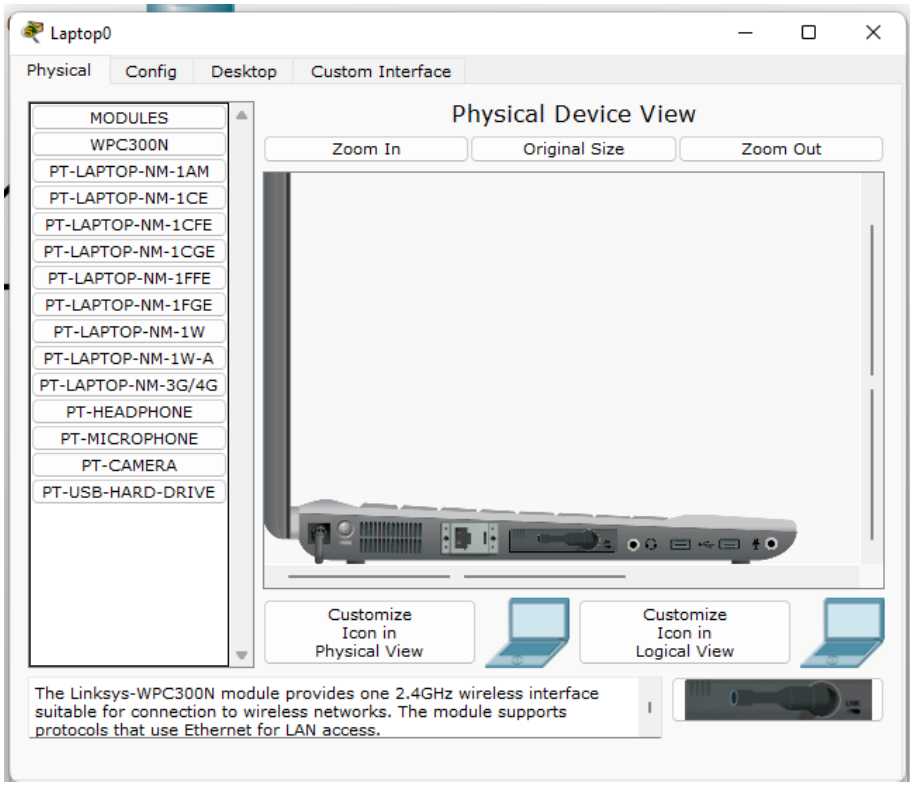
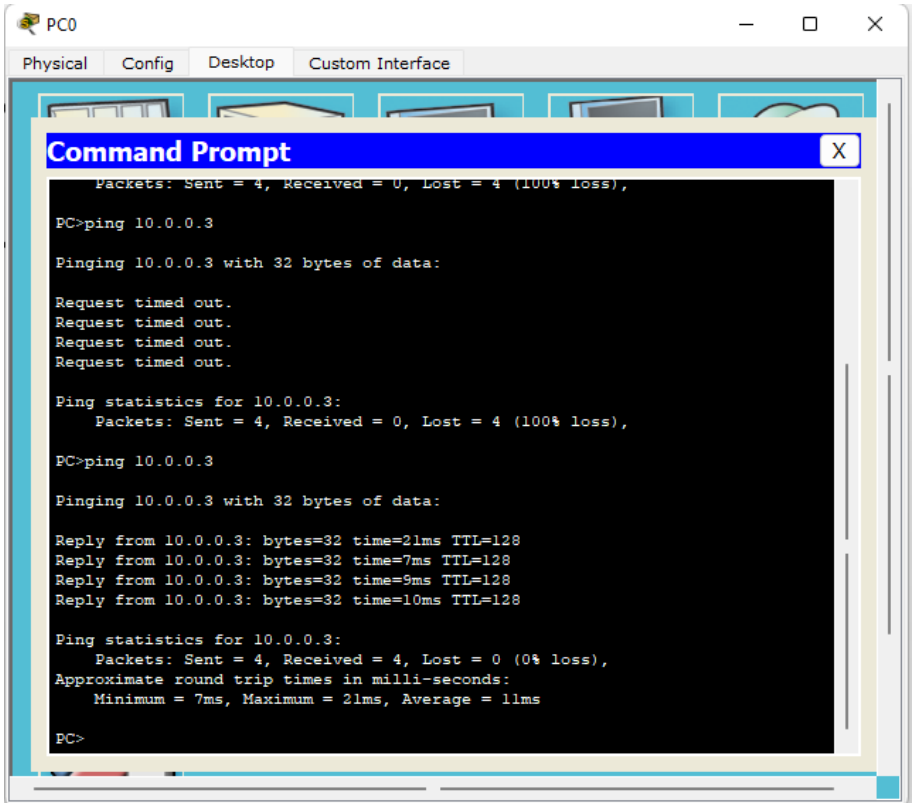
TOPOLOGY:


Logical
10.0.0.1
Fa0/0
Router-PT
Router0
Fa1/1
Fa2/1
Fa0/1
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.

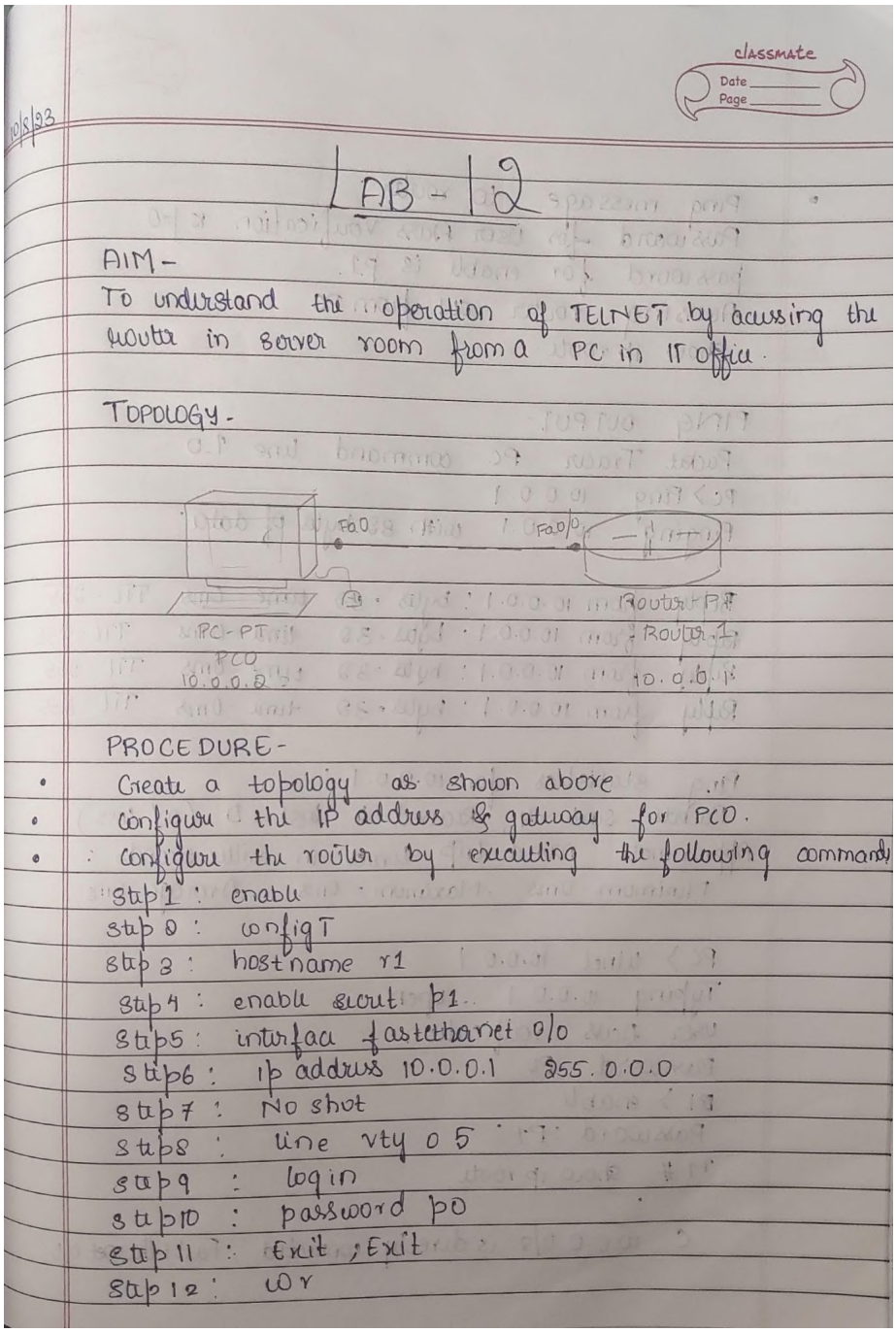
OUTPUT:


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:



LAB - 12

AIM -

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

TOPOLOGY -

PROCEDURE -

- Create a topology as shown above
- Configure the IP address & gateway for PC0.
- Configure the router by executing the following commands

Stp 1 : enable
Stp 2 : configT
Stp 3 : hostname r1
Stp 4 : enable secret p1
Stp 5 : interface fastethernet 0/0
Stp 6 : ip address 10.0.0.1 255.0.0.0
Stp 7 : No shut
Stp 8 : line vty 0 5
Stp 9 : login
Stp 10 : password p0
Stp 11 : Exit ; Exit
Stp 12 : wr

Ping message to router
Password for User Acss 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, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in millic seconds :
Minimum = 0ms, Maximum = 0ms, Average = 0ms,

PC > telnet 10.0.0.1
Typing 10.0.0.1 ... Open
User Acss verification
Password : P0
R1 > enable
Password : P1 :
R1 # show ip route

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

OBSERVATION -

- TELNET stands for Teletype Network. It is a type of protocol that enables one computer to connect to the local computer.
- It is used as a standard TCP/IP protocol for virtual terminal servic provided by ISO.
- During TELNET operation, whatever is being performed on the remote computer will be displayed by the local computer. Telnet operates on a client/ server principle.

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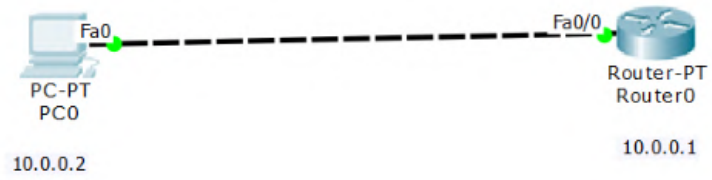
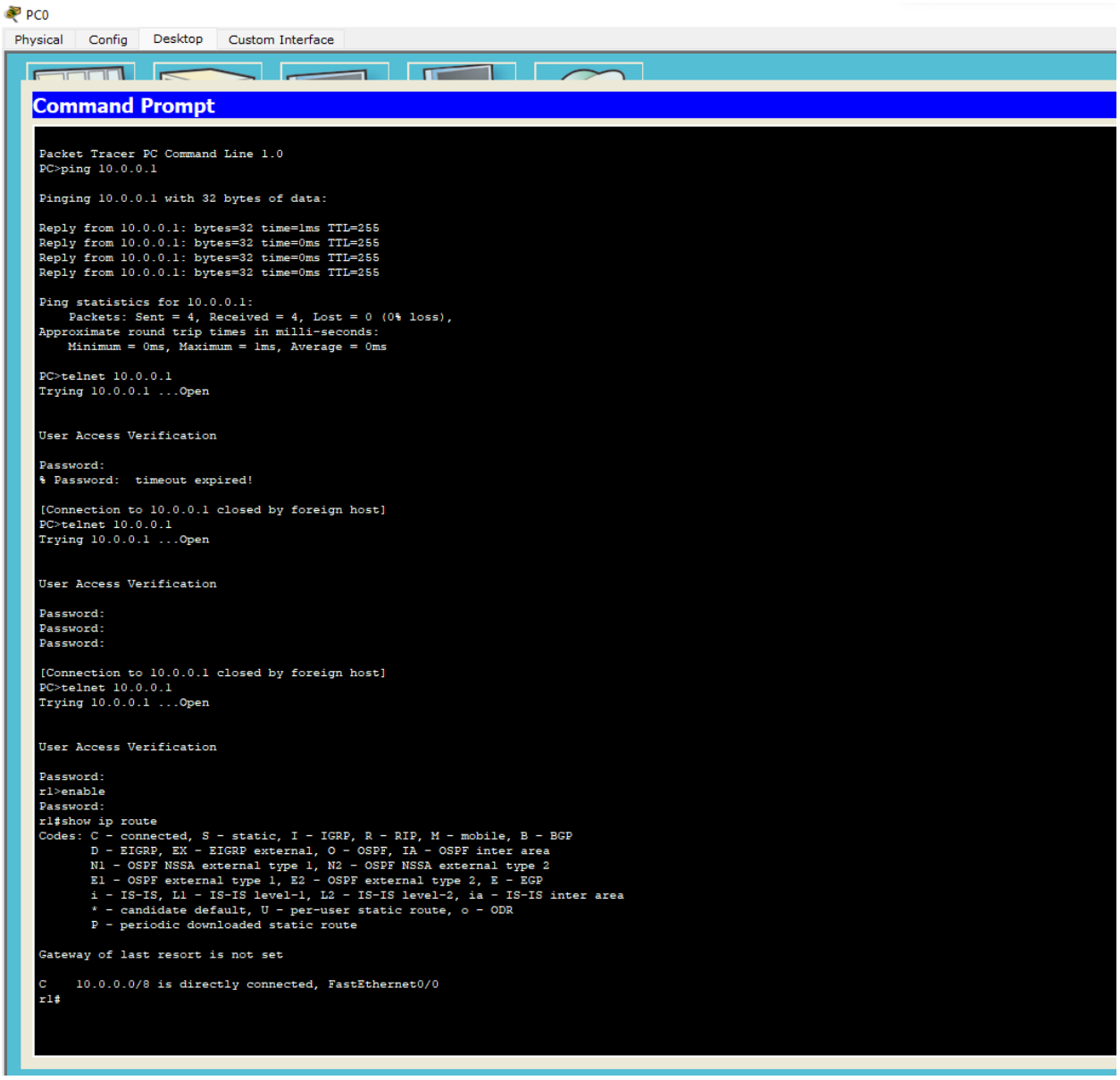
TOPOLOGY:



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:
rl>enable
Password:
rl#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
rl#

WEEK 13

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

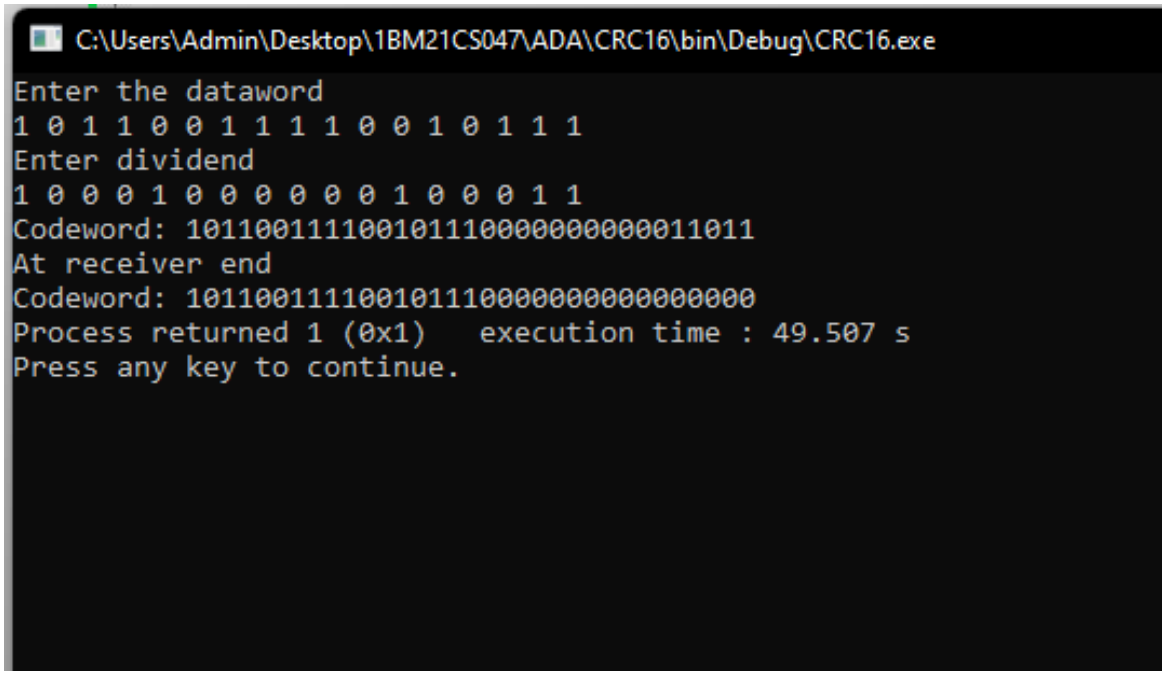
CODE:

```
#include<stdio.h>
int arr[17];

void xor(int x[], int y[])
{
   int k=0;
   for(int i=1;i<16;i++)
   {
      if(x[i]==y[i])
         arr[k++]=0;
      else
         arr[i]=1;
   }
}

void main()
{
   int dd[17],div[33],ze[17],i,k;

   printf("Enter the dataword \n");
   for(i=0;i<17;i++)
      scanf("%d",&div[i]);

   for(i=i;i<33;i++)
      div[i]=0;

   for(i=0;i<17;i++)
      ze[i]=0;
   printf("Enter dividend \n");
```

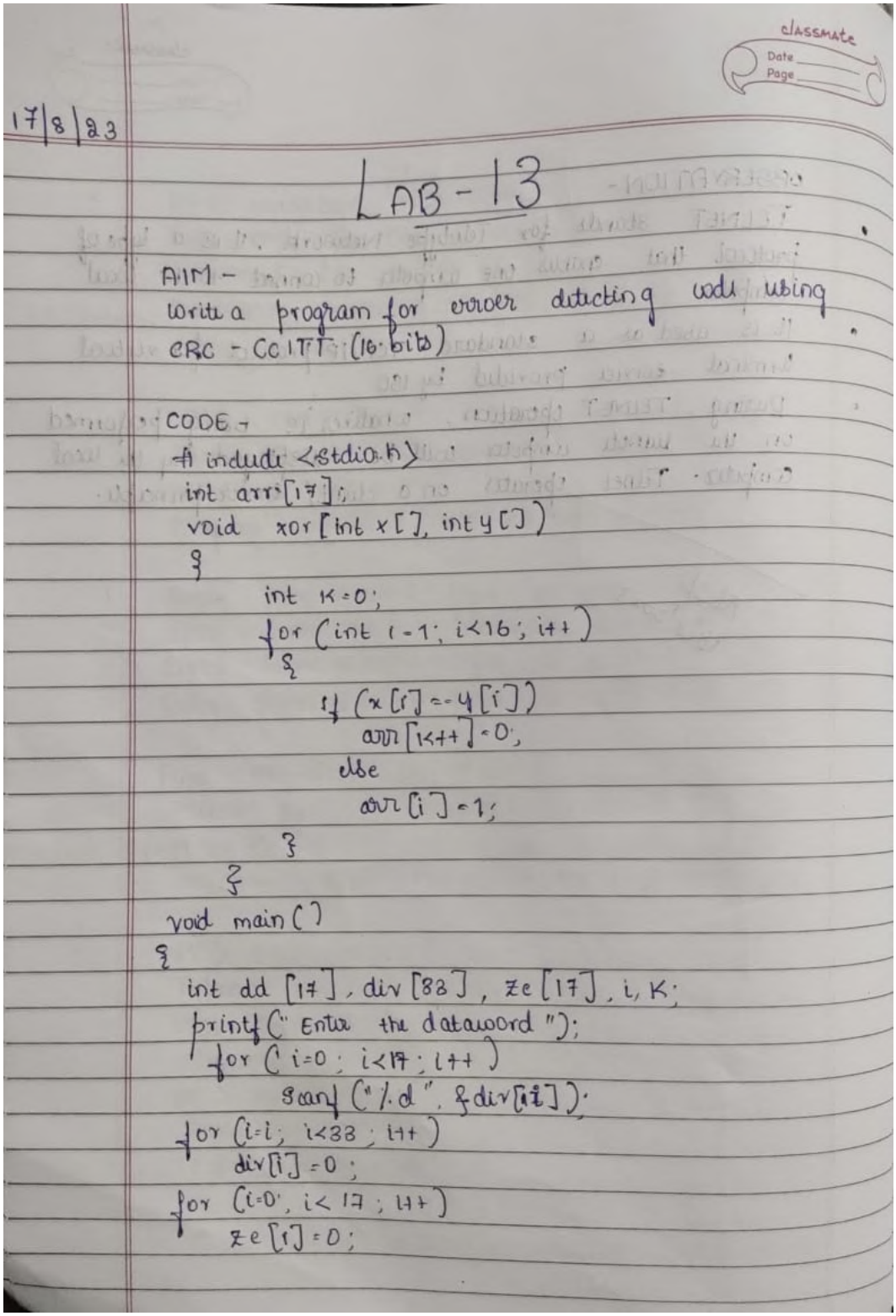
```
for(i=0;i<17;i++)
   scanf("%d",&dd[i]);

i=0;
k=0;
   for(i=i;i<17;i++)
      arr[k++]=div[i];
while(i<33)
{
   if(arr[0]==0)
      xor(arr,ze);
   else
      xor(arr,dd);

   arr[16]=div[i++];

}
k=0;
for(i=17;i<33;i++)
   div[i]=arr[k++];
printf("Codeword: ");
   for(i=0;i<33;i++)
      printf("%d",div[i]);

for(i=0;i<17;i++)
   arr[i]=0;

printf("\nAt receiver end \n");

 k=0;
   for(i=i;i<17;i++)
      arr[k++]=div[i];
while(i<33)
{
```

```
        if(arr[0]==0)
            xor(arr,ze);
        else
            xor(arr,dd);

        arr[16]=div[i++];

    }
    k=0;
    for(i=17;i<33;i++)
        div[i]=arr[k++];

    printf("Codeword: ");
        for(i=0;i<33;i++)
            printf("%d",div[i]);
}
```

OUTPUT:



OBSERVATION:



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LAB - 13

AIM -
Write a program for errorer detecting code using CRC - CCITT (16-bits)

CODE -

```
#include <stdio.h>
int arr[17];
void xor[int x[], int y[])
{
    int k=0;
    for (int i=1; i<16; i++)
    {
        if (x[i]==y[i])
            arr[k++]=0;
        else
            arr[i]=1;
    }
}
void main()
{
  int dd[17], div[33], ze[17], i, K;
  printf(" Enter the dataword ");
    for (i=0; i<17; i++)
        scanf("%d", &div[i]);
  for (i=i; i<33; i++)
    div[i]=0;
  for (i=0, i<17; i++)
    ze[i]=0;
```

```
printf(" Enter dividend ");
for (i=0; i<17; i++)
    scanf ("%d", &dd[i]);
i=0;
k=0;
    for (i=i; i<17; i++)
      arr[k++] = div[i];
while (i<33)
{
    if (arr[0] == 0)
        xor (arr, ze);
    else
        xor (arr, dd);
    arr[16] = div[i+4];
}
k=0;
for (i=17; i<33; i++)
    div[i] = arr[k++];
    printf(" codword ");
    for (i=0; i<33; i++)
        printf("%d", div[i]);
for (i=0; i<17; i++)
    arr[i]=0;
printf (" At receiver end ");
ik=0;
    for (i=i, i<17; i++)
      arr[k++] = div[i];
while (i<33)
{
    if (arr[0] == 0)
      xor (arr, ze);
```

```
else
    xor(arr, dd);
  arr[16] = div[i++];
  }
K=0;
for (i=17; i<33; i++)
    div[i] = arr[i++];
printf("codeword");
    for (i=0; i<33; i++)
      printf("%d", div[i]);
}
```

OUTPUT:

Enter the dataword

1011 00 1111 0010 1111

Enter the divisor

10001 000000 100011

codeword : 10110011110010111 00000000000 11011

At receiver end

codeword : 10110011110010111 00000000000 00000

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WEEK 14

Write a program for congestion control using Leaky bucket algorithm.

CODE:

```
#include <stdio.h>
#include <stdlib.h> // Include this for the rand() function
int main()
{
   int buckets, outlets, k = 1, num, remaining;
   printf("Enter Bucket size and outstream size\n");
   scanf("%d %d", &buckets, &outlets);
   remaining = buckets;
   while (k)
   {
      num = rand() % 1000; // Generate a random number between 0 and 999
      if (num < remaining)
      {
         remaining = remaining - num;
         printf("Packet of %d bytes accepted\n", num); // Added missing variable
      }
      else
      {
         printf("Packet of %d bytes is discarded\n", num);
      }
      if (buckets - remaining > outlets)
      {
         remaining += outlets; // Fixed the calculation
      }
      else
         remaining = buckets;
      printf("Remaining bytes: %d \n", remaining);
      printf("If you want to stop input, press 0, otherwise, press 1\n");
      scanf("%d", &k);
```

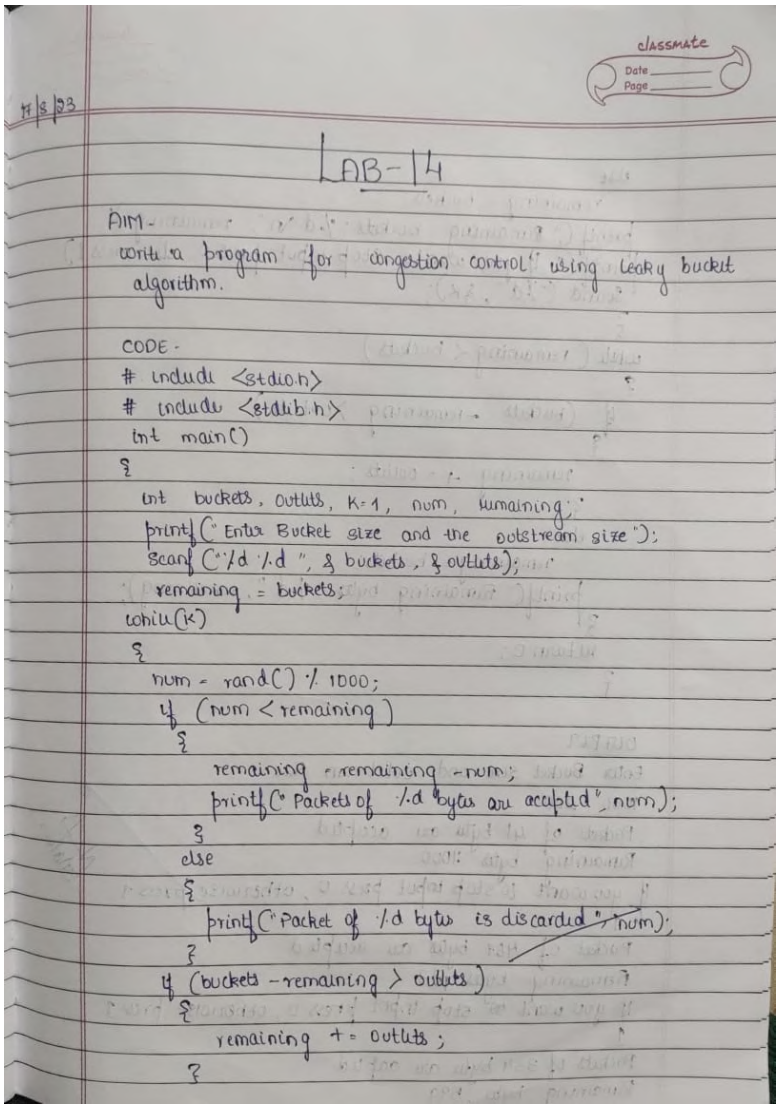
```
    }
    while (remaining < buckets) // Fixed the condition
    {
        if (buckets - remaining > outlets)
        {
            remaining += outlets; // Fixed the calculation
        }
        else
            remaining = buckets;
        printf("Remaining bytes: %d \n", remaining);
    }
    return 0; // Added a return statement to indicate successful completion
}
```

OUTPUT:

```
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>
```

OBSERVATION:



LAB-14

AIM -
write a program for congestion control using leaky bucket algorithm.

CODE -

```
# includu <stdio.h>
# includu <stdlib.h>
int main()
{
  int buckets, outlts, K=1, num, lumaining;
  printf(" Entur Bucket size and the outstream size ");
  scanf("%d %d ", & buckets, & outlts);
  remaining = buckets;
while(K)
{
  num = rand() % 1000;
  if (num < remaining)
    {
      remaining = remaining -num;
      printf(" Packets of %d bytes are acceptid", num);
    }
  else
    {
      printf(" Packet of %d byte is discardud ", num);
    }
  if (buckets -remaining > outlts)
    {
      remaining += outlts;
    }
```

```
else
    remaining = buckets;
printf(" Remaining buckets : %d \n", remaining);
printf(" If you want to stop input press 0, else press 1");
scanf("%d", &x);
}
while (remaining < buckets)
{
  if (buckets - remaining > outlets)
  {
    remaining += outlets;
  }
  else
    remaining = buckets;
  printf(" Remaining bytes : %d ", remaining);
}
return 0;
}
```

OUTPUT:

```
Enter Bucket size and outstream size
1000 200
Packet of 41 bytes are accepted
Remaining bytes :1000
If you want to stop input press 0, otherwise press 1
1
Packet of 467 bytes are accepted
Remaining bytes -783
If you want to stop input press 0, otherwise press 1
1
Packets of 334 bytes are aapted
Remaining bytes : 599
```

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.

CODE:

ClientTCP.py

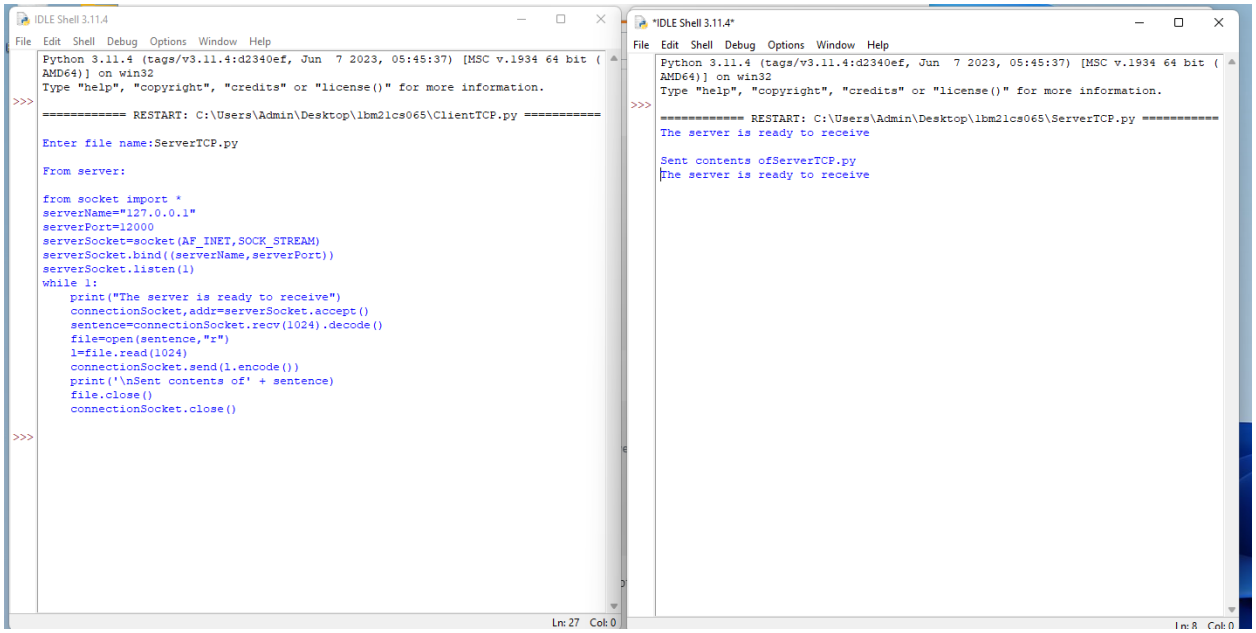
```
from socket import *
serverName = "127.0.0.1"
serverPort = 12000
clientSocket = socket(AF_INET, SOCK_STREAM)
clientSocket.connect((serverName,serverPort))
sentence = input("\nEnter file name: ")
clientSocket.send(sentence.encode())
filecontents = clientSocket.recv(1024).decode()
print ("\nFrom Server:\n")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

ServerTCP.py

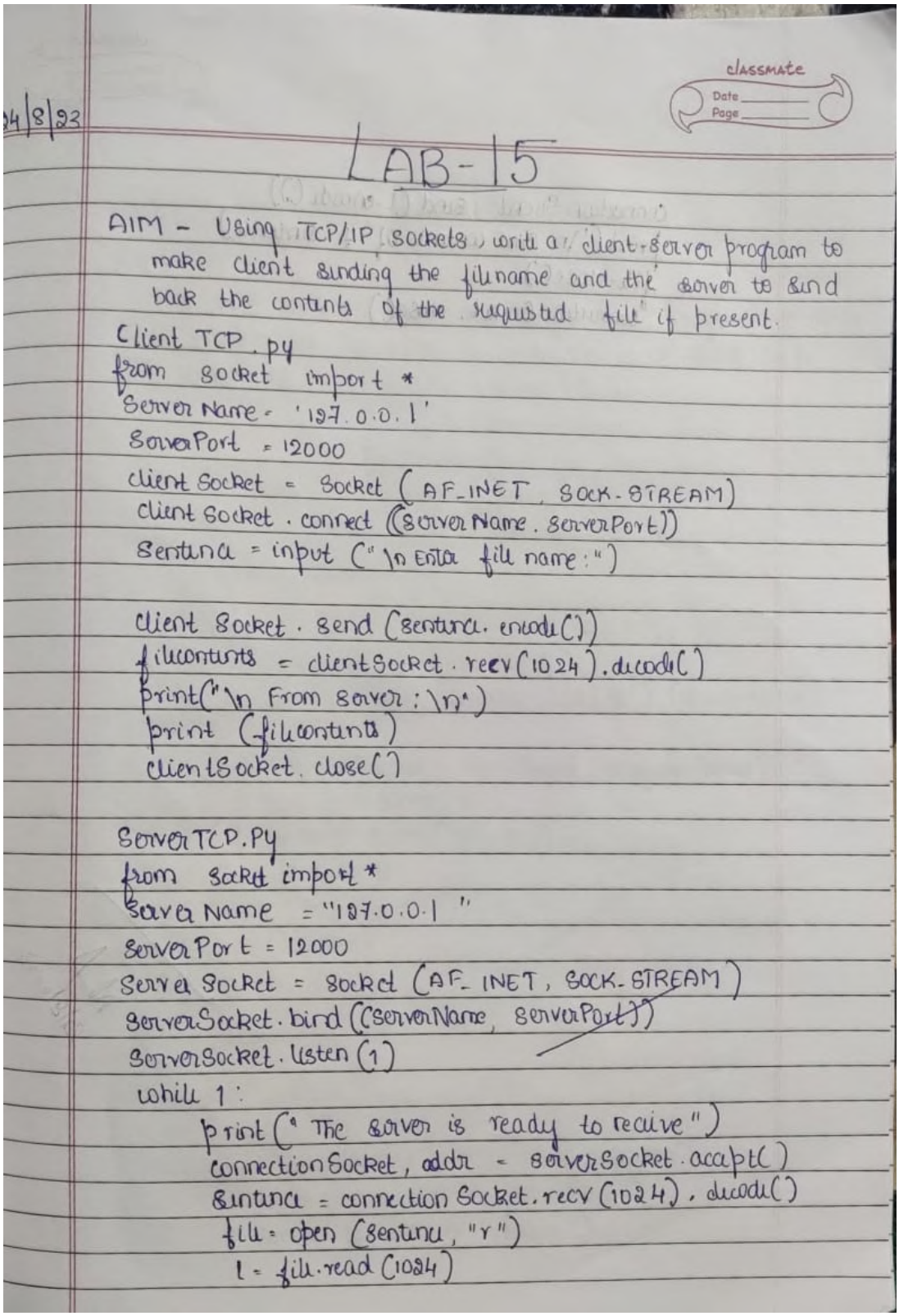
```
from socket import *
serverName="127.0.0.1"
serverPort = 12000
serverSocket = socket(AF_INET,SOCK_STREAM)
serverSocket.bind((serverName,serverPort))
serverSocket.listen(1)
while 1:
print ("The server is ready to receive")
connectionSocket, addr = serverSocket.accept()
sentence = connectionSocket.recv(1024).decode()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

print (“\nSent contents of “ + sentence)
file.close()
connectionSocket.close()

OUTPUT:



OBSERVATION:



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LAB-15

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

Client TCP.py

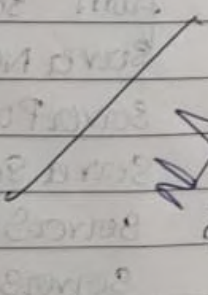
```
from socket import *
ServerName = '127.0.0.1'
ServerPort = 12000
clientSocket = socket (AF_INET, SOCK_STREAM)
clientSocket.connect ((ServerName, ServerPort))
Sentence = input ("\n Enter file name:")

clientSocket.send (sentence.encode())
fileContents = clientSocket.recv(1024).decode()
print("\n From Server: \n")
print (fileContents)
clientSocket.close()
```

ServerTCP.py

```
from sockt 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('\n Sent contents of ' + sentence)
file.close()
connectionSocket.close()
```



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.

CODE:

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(2048)
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(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()
```

OUTPUT:

OBSERVATION:

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LAB-16

AIM-

Using UDP 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.

CODE-

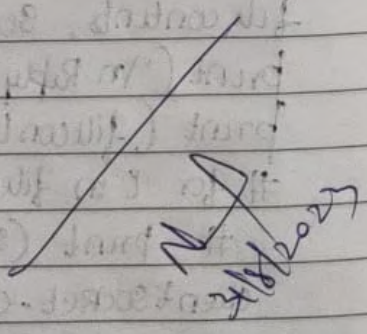
Client UDP.py

```
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))
file contents, 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()
client Socket.close()
```

ServerUDP.py

```
from socket import *
ServerPort = 12000
SorverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print("The Server is ready to receive")
while 1:
```

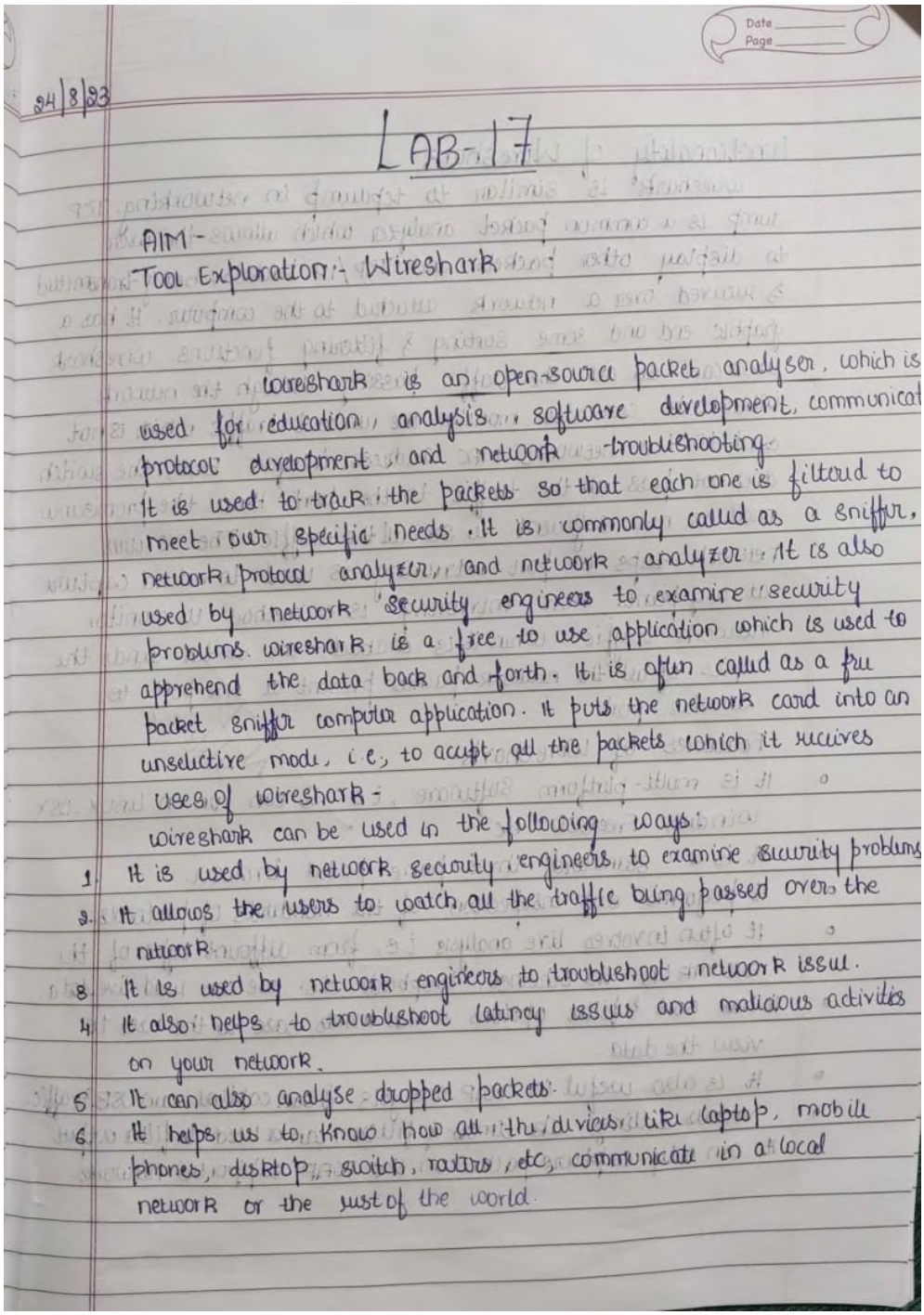
```
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file = open(sentence, "r")
con = file.read(2048)
serverSocket.sendto(bytes(con, "utf-8"), clientAddress)
print('\n Sent contents of', end = ' ')
print(sentence)
# for i in sentence:
    # print(str(i), end="")
    file.close()
```



WEEK 17

Tool Exploration -Wireshark

OBSERVATION:



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LAB-17

AIM-

Tool Exploration:- Wireshark

Wireshark is an open-source packet analyser, which is used for education, analysis, software development, communicat protocol development, and network troubleshooting.

It is used to track the packets so that each one is filtered to meet our specific needs. It is commonly called as a sniffer, network protocol analyzer, and network analyzer. It is also used by network security engineers to examine security problems. Wireshark is a free to use application which is used to apprehend the data back and forth. It is often called as a fre packet sniffer computer application. It puts the network card into an unselective mode, i.e, to accept all the packets which it receives

Uses of Wireshark -

Wireshark can be used in the following ways:

1. It is used by network security engineers to examine security problems
2. It allows the users to watch all the traffic being passed over the network.
3. It is used by network engineers to troubleshoot network issues.
4. It also helps to troubleshoot latency issues and malicious activities on your network.
5. It can also analyse dropped packets.
6. It helps us to know how all the devices like laptop, mobile phones, desktop, switch, routers, etc, communicate in a local network or the rest of the world.

Functionality of Wireshark

Wireshark is similar to tcpdump in networking. TCP dump is a common packet analyzer which allows the user to display other packets and TCP/IP packets, being transmitted & received over a network attached to the computer. It has a graphic end and some sorting & filtering functions. Wireshark users can see all the traffic passing through the network. Wireshark can also monitor the unicast traffic which is not sent to the network's MAC address interface. But, the switch does not pass all the traffic to the port. Hence, the promiscuous mode is not sufficient to see all the traffic. The various network taps or port mirroring is used to extend capture at any point. Port mirroring is a method to monitor network traffic. When it is enabled, the switch sends the copies of all the network packets present at one port to another port.

Features of Wireshark

- It is multi-platform software, i.e. it can run on Linux, OSX, Windows, FreeBSD, etc.
- It is a standard three-pane packet browser.
- It performs deep inspection of the hundreds of protocols
- It often involves live analysis i.e, from different types of the network like the Ethernet, loopback, etc. we can read live data.
- It has sort & filter options which makes ease to the user to view the data.
- It is also useful in VOIP analysis & can capture raw USB traffic.
- various settings, like timers & filters, can be used to filter output
- It can only capture packet on the PCAP supported networks.