VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COMPUTER NETWORKS

Submitted by

Likith R (1BM21CS151)

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

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B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "LAB COURSE **COMPUTER NETWORKS**" carriedout by **Likith R(1BM21CS151),** who is a bonafide student of **B. M. S. College ofEngineering.** 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 year2023. 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.

Nandini Vineeth
Assistant Professor
Department of CSE
BMSCE, Bengaluru

Dr. Jyothi S Nayak
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 message.

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Lab-1

Cisco Packet Tracer

1) LAN = Local area network is a collection of devices connected together in one physical location, such as a building, office or home. It can be small or large, ranging from home network

2) WAN = Wide area network, a network that connects separate machines over a wide area, for example in different countries, using telecommunication systems

3) Ethernet = It is a traditional technology for connecting devices in WLAN (or) WAN. It enables devices to communicate with each other via a protocol, which is a set of rules (or) common network language

4) IP-address = Internet protocol, uniq, ue address that identifies a device on internet or a local network. They contain location information and make devices accessible for communication.

5) HUB = It is a physical layer networking device which is used to connect multiple devices in a network

6) Switch = Switch is device in a computer network that connects other devices together.

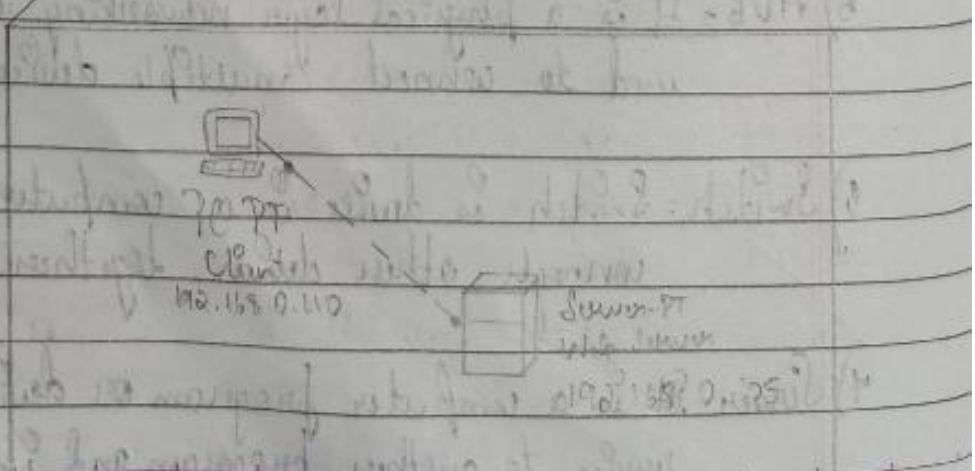
7) Server = It is a computer program or device that provides a service to another program and its user.

8) End Device = It is either a source or destination of data transmitted over the network

9) Nodes = It is the connection point among network devices such as routers or printers that can receive and send data from one endpoint to other.

Creating a Point Network

Step 1: Open the Cisco Packet Tracer student version.
Step 2: Click on Logical at the left-top corner and Simulation at right-down corner
Step 3: Go to End devices and add Generic PC and a generic Server.
Step 4: Under connections., select Copper - Cross-over cable.
Step 5: Now check if the lights are green, if not the connection
Step 6: Click the Server PC table, set the display name as client and the DNS server as 192.168.0.105 and IP address as 192.168.0.110.
Step 7: Click on Server table and change Web server and IP address as 192.168.0.105. Make sure Port Status is ON. Load a background image and Save the file.



DATE / /

Step 8: Under connections, select Copper-Straight-through cable and connect it. The red lights indicate connection is not working. Hence add connect Copper-cross-over cable.

Step 9: Go to realtime and select PC table and go to desktop and select Command prompt. In that type ping 192.168.0.110

Output:

Command Prompt:

PC > ping 192.168.0.110

Pinging 192.168.0.110 with 32 bytes of data

Reply from 192.168.0.110: bytes = 32 time = 0ms TTL = 128

Reply from 192.168.0.110: bytes = 32 time = 0ms TTL = 128

Reply from 192.168.0.110: bytes = 32 time = 0ms TTL = 128

Reply from 192.168.0.110: bytes = 32 time = 20ms TTL = 128

Ping Statistics for 192.168.0.110

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)

Approximate round trip times in milli-seconds

Minimum = 0ms, Maximum = 20ms, Avg = 5ms

PC > ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data

Request timed out

Request timed out

Request timed out

Request timed out

Packets: Sent: 4, Received = 0, Lost = 4 (100% loss)

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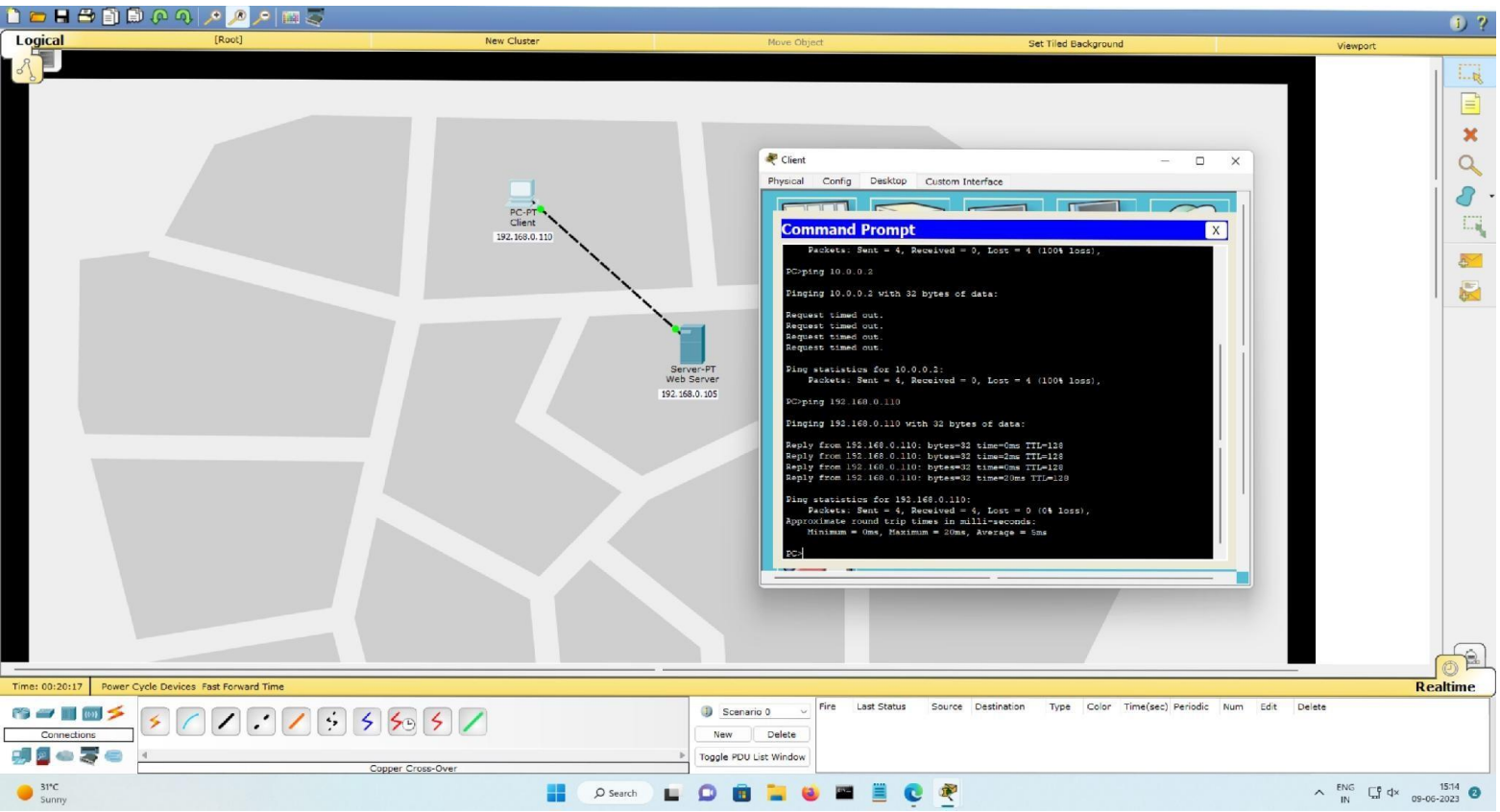
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT
Client
192.168.0.110
Server-PT
Web Server
192.168.0.105
Client
Physical
Config
Desktop
Custom Interface
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 10.0.0.2
Pinging 10.0.0.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.0.0.2:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 192.168.0.110
Pinging 192.168.0.110 with 32 bytes of data:
Reply from 192.168.0.110: bytes=32 time=0ms TTL=128
Reply from 192.168.0.110: bytes=32 time=2ms TTL=128
Reply from 192.168.0.110: bytes=32 time=0ms TTL=128
Reply from 192.168.0.110: bytes=32 time=20ms TTL=128
Ping statistics for 192.168.0.110:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 20ms, Average = 5ms
PC>
Time: 00:20:17
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Copper Cross-Over
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
31°C
Sunny
Search
ENG
IN
15:14
09-06-2023

Lab-2

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1) Create a topology and simulate sending a simple PDU from source to destination using simple hub and switch as connecting ~~device~~ domains

=)

Step 1: Drag and drop three PC's at one side and connect them to the a generic hub.

Step 2: Drag and drop another three PC's and connect them to a generic switch

Step 3: Use copper straight cable to connect each PC with the switch / hub.

Step 4: Create a unique IP address starting with 10:0:0:1 → 10:0:0:6 ~~on~~ for PC0 → PC05

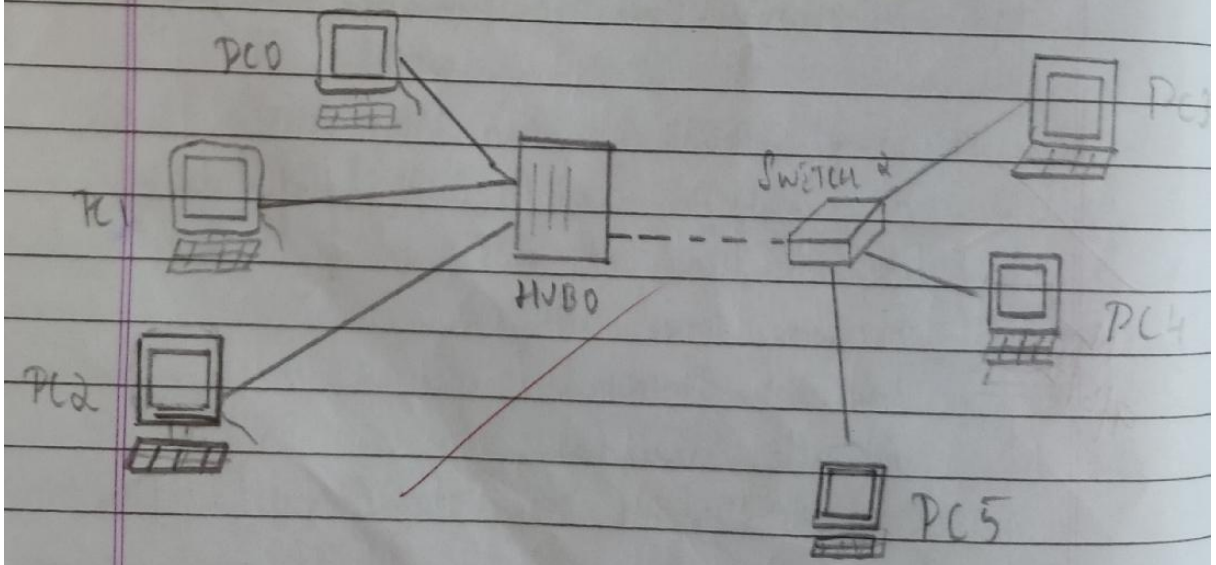
Step 5: Add a simple PDU from PC0 to PC1 which are within the hub. ~~Check for~~

Step 6: Create a new scenario and click on the auto/capture and check for the output as "Successful"

Step 7: Next scenario, send a simple PDU from PC4 to PC6 and check the output.

Step 8: Last scenario consist of a PDU from PC0 to PC4

Step 9: Click on and from PC0 and type ping 10.0.0.4 and the sum command takes place.



Command Prompt

i) Switch ON

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 = 7ms TTL = 128
Reply from 10.0.0.4: bytes = 32 time = 6ms TTL = 128
Reply from 10.0.0.4: bytes = 32 time = 6ms TTL = 128
Reply from 10.0.0.4: bytes = 32 time = 6ms TTL = 128

Ping statistics for 10.0.0.4
Packets: sent = 4, received = 4, lost = 0 (0% loss),
Approx round trip times in milli-secs:
Minimum = 6ms, Maximum = 7ms, Average = 6

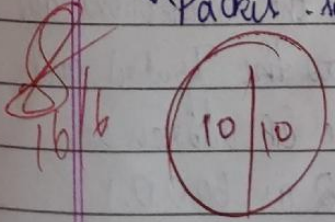
ii) Switch OFF

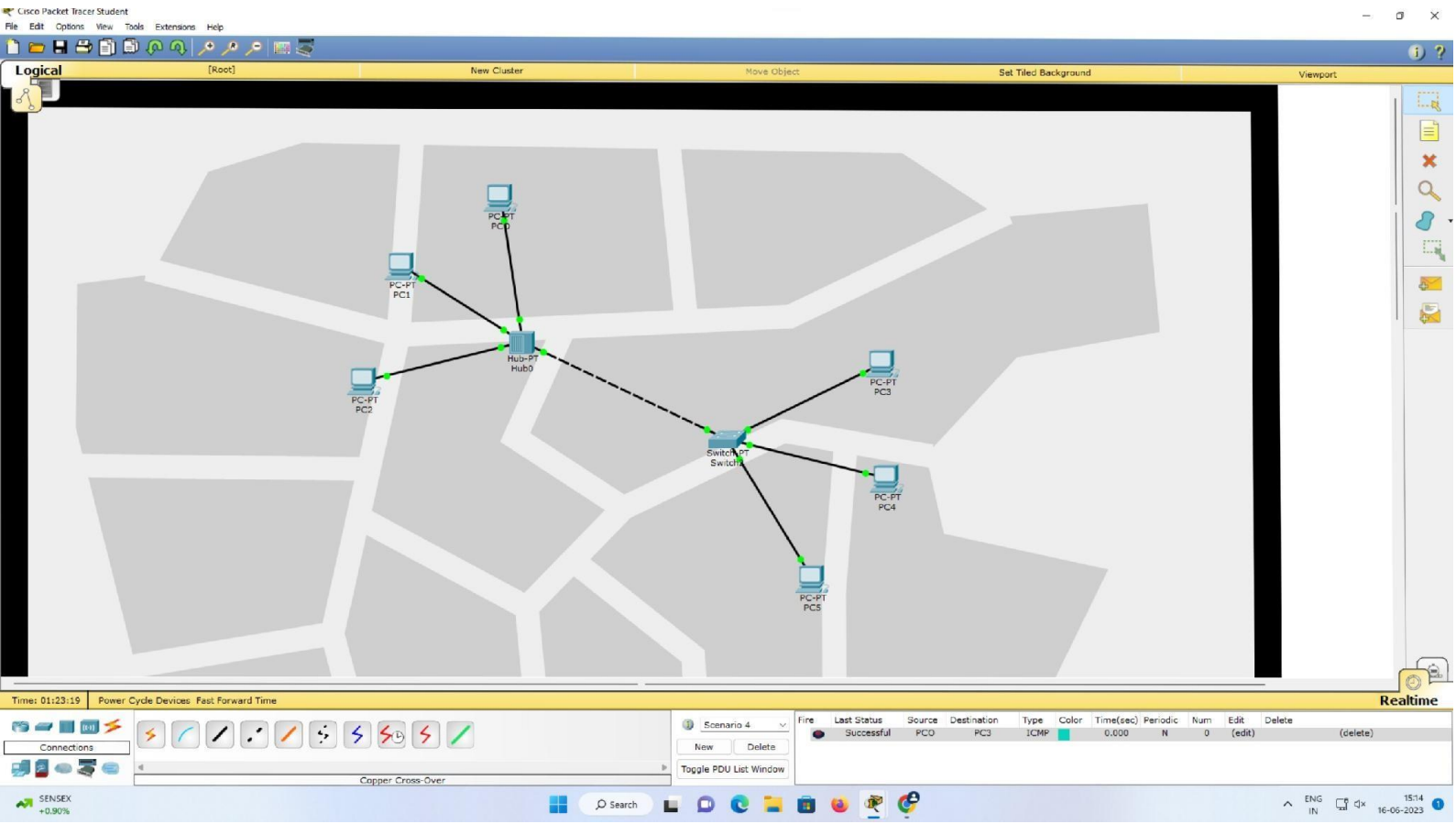
PC> ping 10.0.0.4

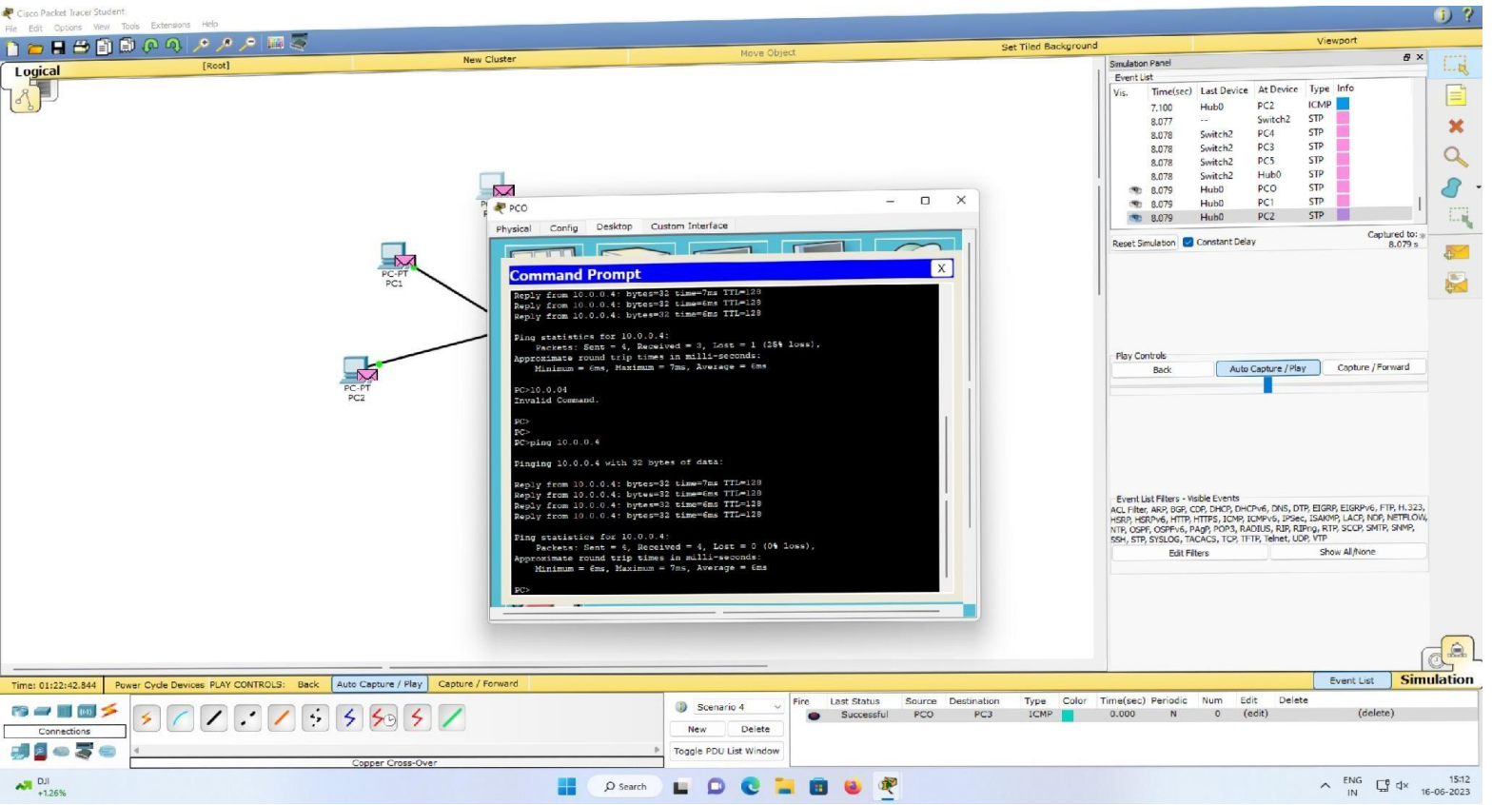
Pinging 10.0.0.4 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.0.4
Packet: sent = 4, received = 0, lost = 4, loss (100%).




Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT PC0
PC-PT PC1
PC-PT PC2
Hub-PT Hub0
PC-PT PC3
Switch-PT Switch1
PC-PT PC4
PC-PT PC5
Time: 01:23:19
Power Cycle Devices Fast Forward Time
Realtime
Connections
Copper Cross-Over
Scenario 4
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC3 ICMP 0.000 N 0 (edit) (delete)
SENSEX +0.90%
Search
ENG IN
15:14 16-06-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT PC1
PC-PT PC2
PC0
Physical Config Desktop Custom Interface
Command Prompt
Reply from 10.0.0.4: bytes=32 time=7ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 7ms, Average = 6ms
PC>10.0.04
Invalid Command.
PC>
PC>
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=7ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Reply from 10.0.0.4: bytes=32 time=6ms TTL=128
Ping statistics for 10.0.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 6ms, Maximum = 7ms, Average = 6ms
PC>
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type Info
7.100 Hub0 PC2 ICMP
8.077 -- Switch2 STP
8.078 Switch2 PC4 STP
8.078 Switch2 PC3 STP
8.078 Switch2 PC5 STP
8.078 Switch2 Hub0 STP
8.079 Hub0 PC0 STP
8.079 Hub0 PC1 STP
8.079 Hub0 PC2 STP
Reset Simulation
Constant Delay
Captured to: 8.079 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: 01:22:42.844
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Copper Cross-Over
Scenario 4
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC3 ICMP 0.000 N 0 (edit) (delete)
DJI +1.26%
Search
ENG IN
15:12 16-06-2023

WEEK 2

Configure IP address to routers in packet tracer.

Explorethe following messages: ping responses, destination unreachable, request timed out, reply

Lab-3

1) Configure IP address to routers in packet t. Explore ping responses, destination unreachable, request timed out.

=)

Step 1:) Connect two Generic PCs with a generic router. Add notes to each devices. Enter the IP address of PC1 → 10.0.0.1 and PC2 → 20.0.0.1. Also give the gateways 10.0.0.2 & 20.0.0.2 respectively.

Step 2:) Ensure all the devices are turned out. Go to the Router and CLI. Enter the following:

↳ no
↳ Router> enable
↳ # config t ↳ interface fa0/0 interface?
↳ ip address 10.0.0.2 255.0.0.0
↳ No shut
↳ exit

Step 3: Do the same for the second PC. Which can turn the connections 'ON'.

Step 4: Take a simple PDU to from PC1 → PC2. If it comes successful. A simple router-PC transmission is built.

Step 5: Next create the same structure using two different PC's and a generic router.

Step 6: Do the same steps for the second transmission to

Step 7: Connecting the two diff routers with a third router.

Step 8: Add a simple PDU for each of the routers with their IP address. Once the connection is made between the three routers. We can observe the connections are through serial port. Hence go to the Router1 and click on the server 2/0. Keep the IP address as 50.0.0.1 and for the Router 2 as 60.0.0.1

Step 9: Once it is done click on router 3 and set 50.0.0.2 for router 1 & 60.0.0.2 for router 2

Step 10: Repeat the same process as Step 2. Hence making all the connections turn Green.

Step 11: Click on the simple PDV and send a message from PC1 to PC4. It should come failed. Also click on PC1, go to cmd and type ping 40.0.0.1. Record the output produced.

Step 12: Go to Router 1 an check for the show ip route and check for the routes

Step 13: Hence we have to connect each PC address to each other PC's

Step 14: Now run the ping messages to check whether the messages were sent from one PC to another PC.

Outputs: Connecting two PCs to Routers.

Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router > enable

Router # config terminal

Router (config) # interface fastEthernet 0/0

Router (config-if) # ip address 10.0.0.2 255.0.0.0

Router (config-if) # no shutdown

Router (config-if) # exit.

Diagram.

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Output 2:

Router(config)# interface Serial 3/0
Router(config-if)#
%SYS-5-config-I: Configured from console by console.
%SYS-5-config-I: Configured from console by console exit.

Router(config)#ip route 30.0.0.0 255.0.0.0 50.0.0.2
Router(config)#ip route 40.0.0.0 255.0.0.0 50.0.0.2
Router(config)#ip route 60.0.0.0 255.0.0.0 50.0.0.2
Router(config)# exit
Router#
%SYS-5-CONFIG_I: Configured from Console by Console

Router# show ip route
Codes: C-connected, S-static, I-IGRP, R-RIP, M-mobile B-BG
D-EIGRP, EX-EIGRP external, O-OSPF, IA-OSPF inter area N1-OSPF NSSA external type 1, N2-OSPF NSSA extern 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 area 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, FastEthernet 0/0
C 20.0.0.0/8 is directly connected, FastEthernet 1/0
S 30.0.0.0/8 [1/0] via 50.0.0.2
S 40.0.0.0/8 [1/0] via 50.0.0.2
C 50.0.0.0/8 is directly connected, Serial2/0
C 60.0.0.0/8 is directly connected, Serial 3/0

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Output 3:

Packet Tracer PC Command Line 1.0
PC> ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:

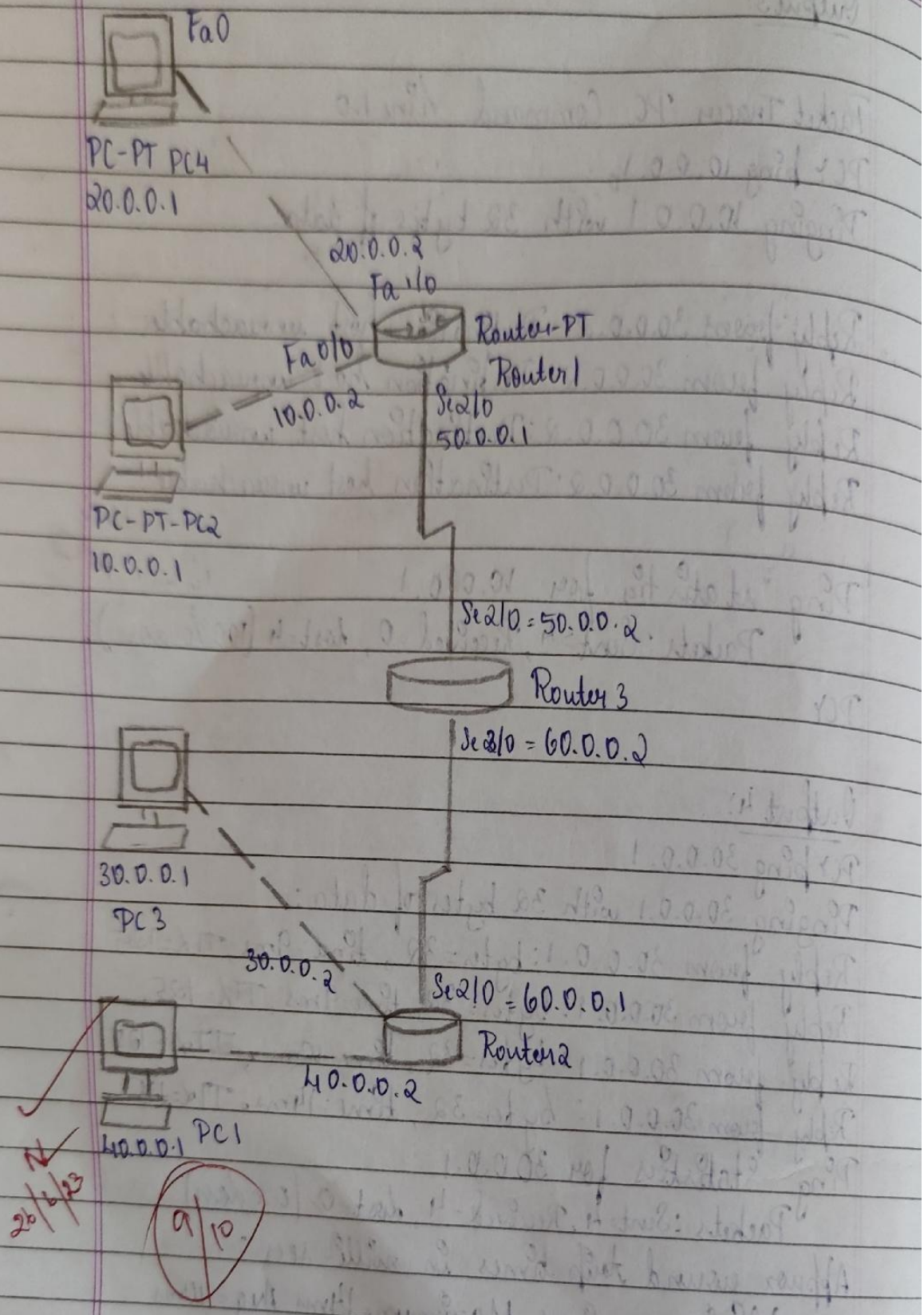
Reply from 30.0.0.2: Destination host unreachable.
Reply from 30.0.0.2: Destination host unreachable.
Reply from 30.0.0.2: Destination host unreachable.
Reply from 30.0.0.2: Destination host unreachable.

Ping statistics for 10.0.0.1
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>

Output 4:

PC> ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes = 32, time = 9ms, TTL = 125
Reply from 30.0.0.1: bytes = 32, time = 9ms, TTL = 125
Reply from 30.0.0.1: bytes = 32, time = 10ms, TTL = 125
Reply from 30.0.0.1: bytes = 32, time = 14ms, TTL = 125
Ping Statistics for 30.0.0.1
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-secs:
Minimum = 9ms, Maximum = 14ms, Avg = 10ms


Fa0
PC-PT PC4
20.0.0.1
20.0.0.2
Fa1/0
Router-PT
Router1
Fa0/0
10.0.0.2
Se2/0
50.0.0.1
PC-PT-PC2
10.0.0.1
Se2/0 = 50.0.0.2.
Router 3
Se2/0 = 60.0.0.2
30.0.0.1
PC3
30.0.0.2
Se2/0 = 60.0.0.1
Router2
40.0.0.2
40.0.0.1 PC1

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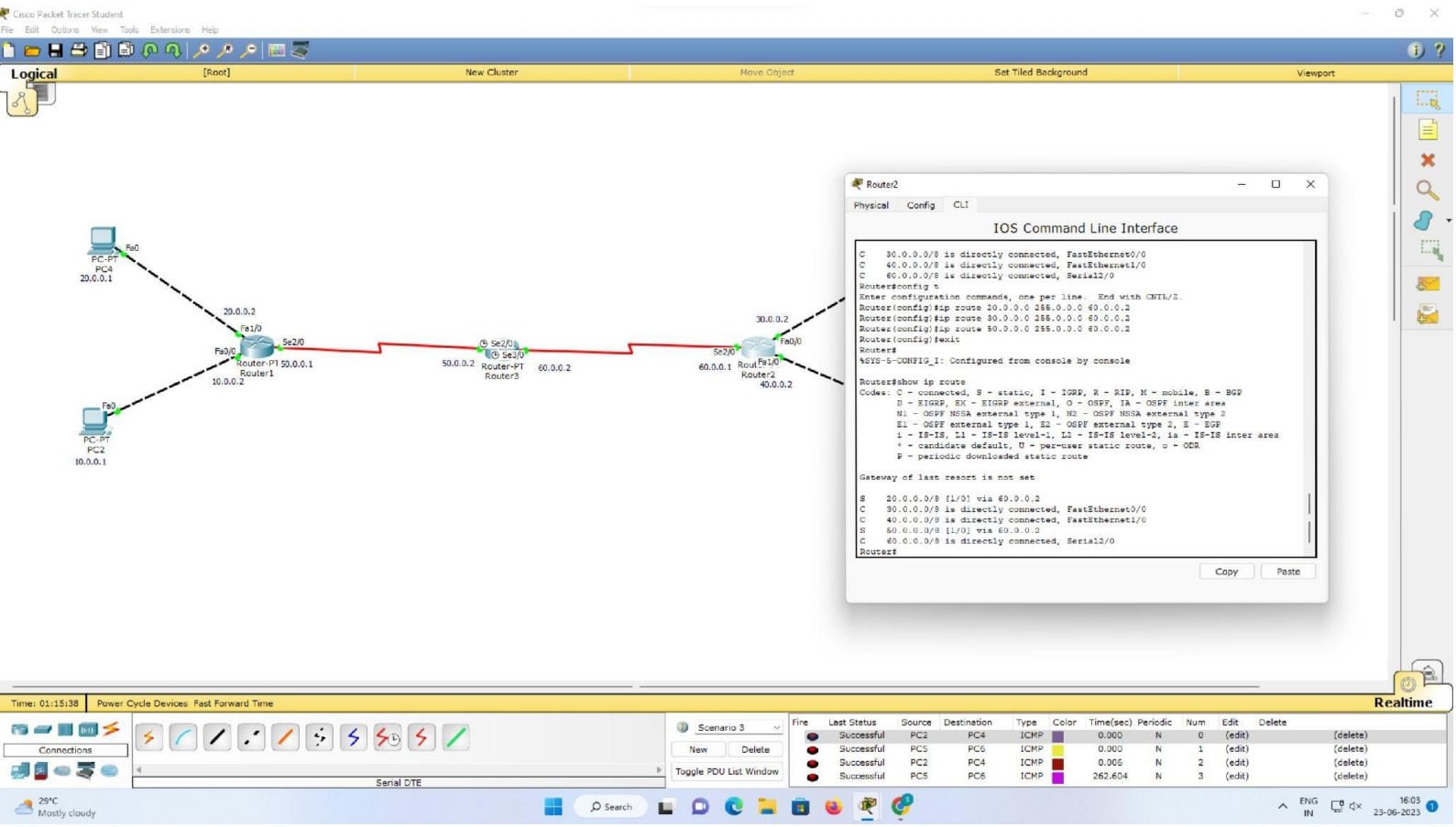
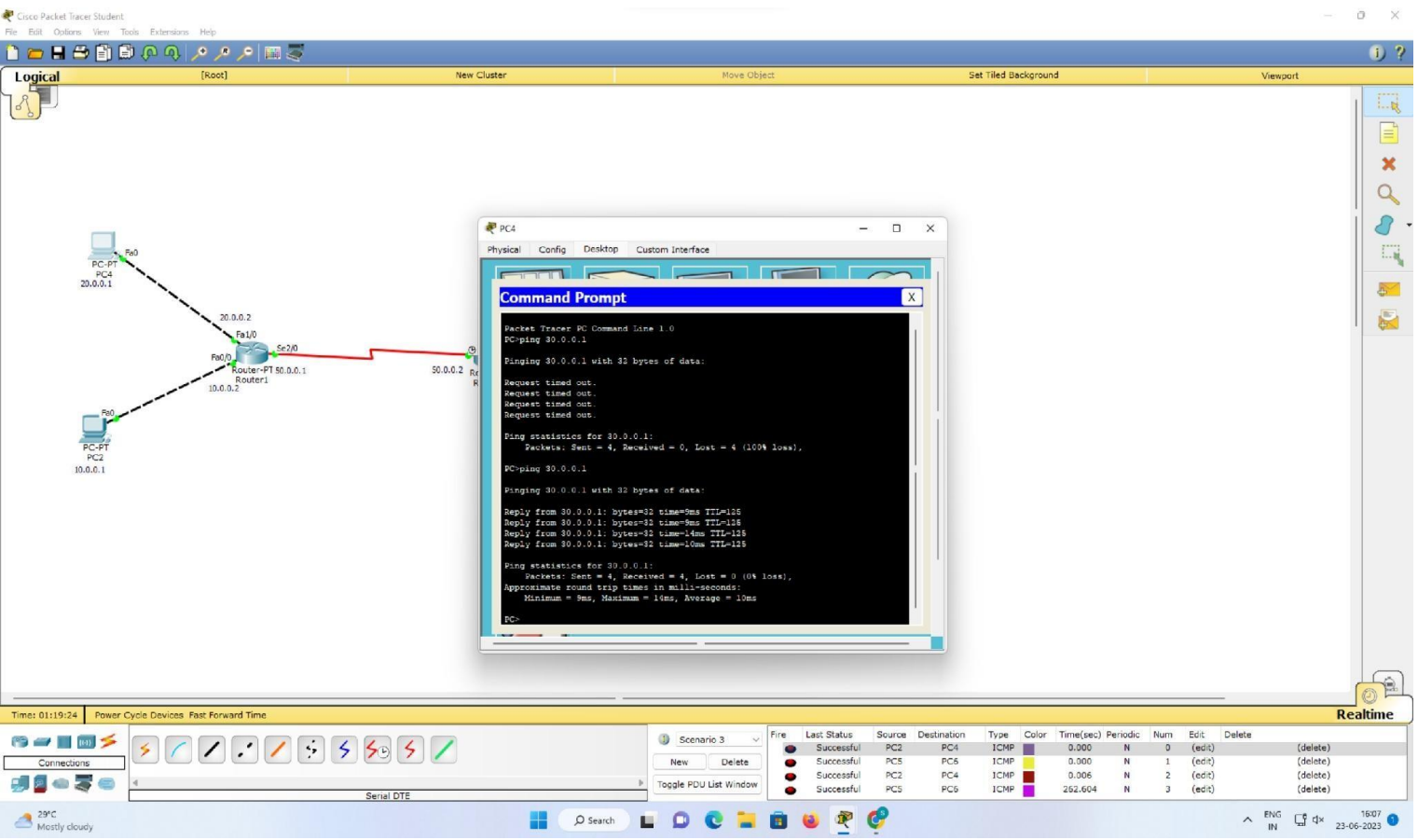

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT
PC4
20.0.0.1
Fa0
20.0.0.2
Fa1/0
Fa0/0
Router-PT
Router1
Se2/0
50.0.0.1
10.0.0.2
Fa0
PC-PT
PC2
10.0.0.1
Se2/0
50.0.0.2
Se3/0
Router-PT
Router3
60.0.0.2
30.0.0.2
Fa0/0
Se2/0
60.0.0.1
Fa1/0
Router2
40.0.0.2
Router2
Physical
Config
CLI
IOS Command Line Interface
C 30.0.0.0/8 is directly connected, FastEthernet0/0
C 40.0.0.0/8 is directly connected, FastEthernet1/0
C 60.0.0.0/8 is directly connected, Serial2/0
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 20.0.0.0 255.0.0.0 60.0.0.2
Router(config)#ip route 30.0.0.0 255.0.0.0 60.0.0.2
Router(config)#ip route 50.0.0.0 255.0.0.0 60.0.0.2
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#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
S 20.0.0.0/8 [1/0] via 60.0.0.2
C 30.0.0.0/8 is directly connected, FastEthernet0/0
C 40.0.0.0/8 is directly connected, FastEthernet1/0
S 50.0.0.0/8 [1/0] via 60.0.0.2
C 60.0.0.0/8 is directly connected, Serial2/0
Router#
Copy
Paste
Time: 01:15:38
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DTE
Scenario 3
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC2 PC4 ICMP 0.000 N 0 (edit) (delete)
Successful PC5 PC6 ICMP 0.000 N 1 (edit) (delete)
Successful PC2 PC4 ICMP 0.006 N 2 (edit) (delete)
Successful PC5 PC6 ICMP 262.604 N 3 (edit) (delete)
29°C
Mostly cloudy
Search
ENG
IN
16:03
23-06-2023


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT
PC4
20.0.0.1
Fa0
20.0.0.2
Fa1/0
Fa0/0
Router-PT
Router1
Se2/0
50.0.0.1
50.0.0.2
10.0.0.2
PC-PT
PC2
10.0.0.1
PC4
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 30.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes=32 time=9ms TTL=125
Reply from 30.0.0.1: bytes=32 time=8ms TTL=125
Reply from 30.0.0.1: bytes=32 time=14ms TTL=125
Reply from 30.0.0.1: bytes=32 time=10ms TTL=125
Ping statistics for 30.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 14ms, Average = 10ms
PC>
Time: 01:19:24
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DTE
Scenario 3
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC2 PC4 ICMP 0.000 N 0 (edit) (delete)
Successful PC5 PC6 ICMP 0.000 N 1 (edit) (delete)
Successful PC2 PC4 ICMP 0.006 N 2 (edit) (delete)
Successful PC5 PC6 ICMP 262.604 N 3 (edit) (delete)
29°C
Mostly cloudy
Search
ENG
IN
16:07
23-06-2023

WEEK 3

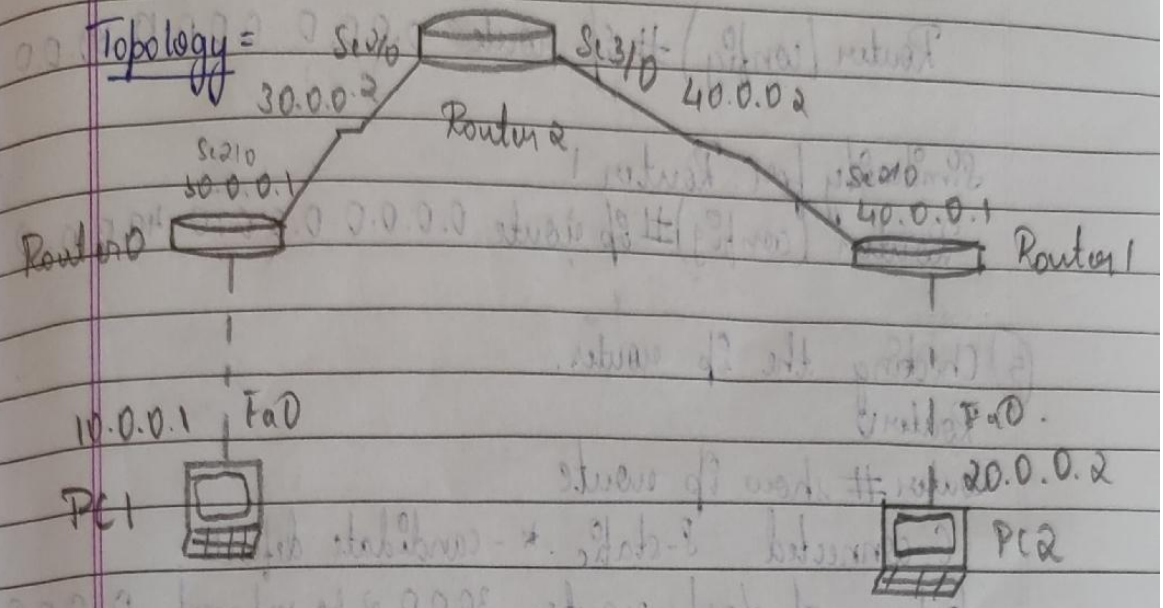
Configure default route, static route to the Router

Lab-4

Adora
PAGE NO.
DATE 30/6/23

Aim: To Configure default & static route to router

Topology:



Procedure:

1. Drag and drop 2 PC's & 3 routers from the devices. Connect each PC to one router and the extra router to the both routers.
2. Set IP addresses of PC1 → 10.0.0.1, PC2 → 20.0.0.1. Set the Gateway as 10.0.0.2 & 20.0.0.2.
3. Configure the ports in Router 0 & 1.

```
Router> enable
Router# config t
Router(config)# interface fastEthernet 0/0
Router(config-if)# ip address 10.0.0.2 255.0.0.0
Router(config-if)# no shut
Router(config-if)# exit
Router(config-if)# interface Serial 2/0
Router(config-if)# ip address 30.0.0.1 255.0.0.0
Router(config-if)# no shut
Router(config-if)# exit.
```

Similarly for Router1 & 2

(4) Next we have to perform default routing

Router(config)# ip route 0.0.0.0 0.0.0.0 30.0.0.

Similarly for Router 1

Router(config)# ip route 0.0.0.0 0.0.0.0 40.0.0.2

(5) Checking the ip router.

Router0

Router# show ip route

C-connected S-static *-candidate default.

Gateway of last route = 30.0.0.2 to network 0.0.0.0

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

C 30.0.0.0/8 is directly connected, Serial 2/0

S* 0.0.0.0/0 [1/0] via 30.0.0.1

Router2:

Router# show ip route

C-connected S-static *-candidate default.

S 10.0.0.0/8 [1/0] via 30.0.0.1

S 20.0.0.0/8 [1/0] via 40.0.0.1

C 30.0.0.0/8 directly connected, Serial 2/0

C 40.0.0.0/8 directly connected, Serial 3/0

Output:

Ping Output:

PC > ping 10.0.0.1

pinging 10.0.0.1 with 32 bytes of data

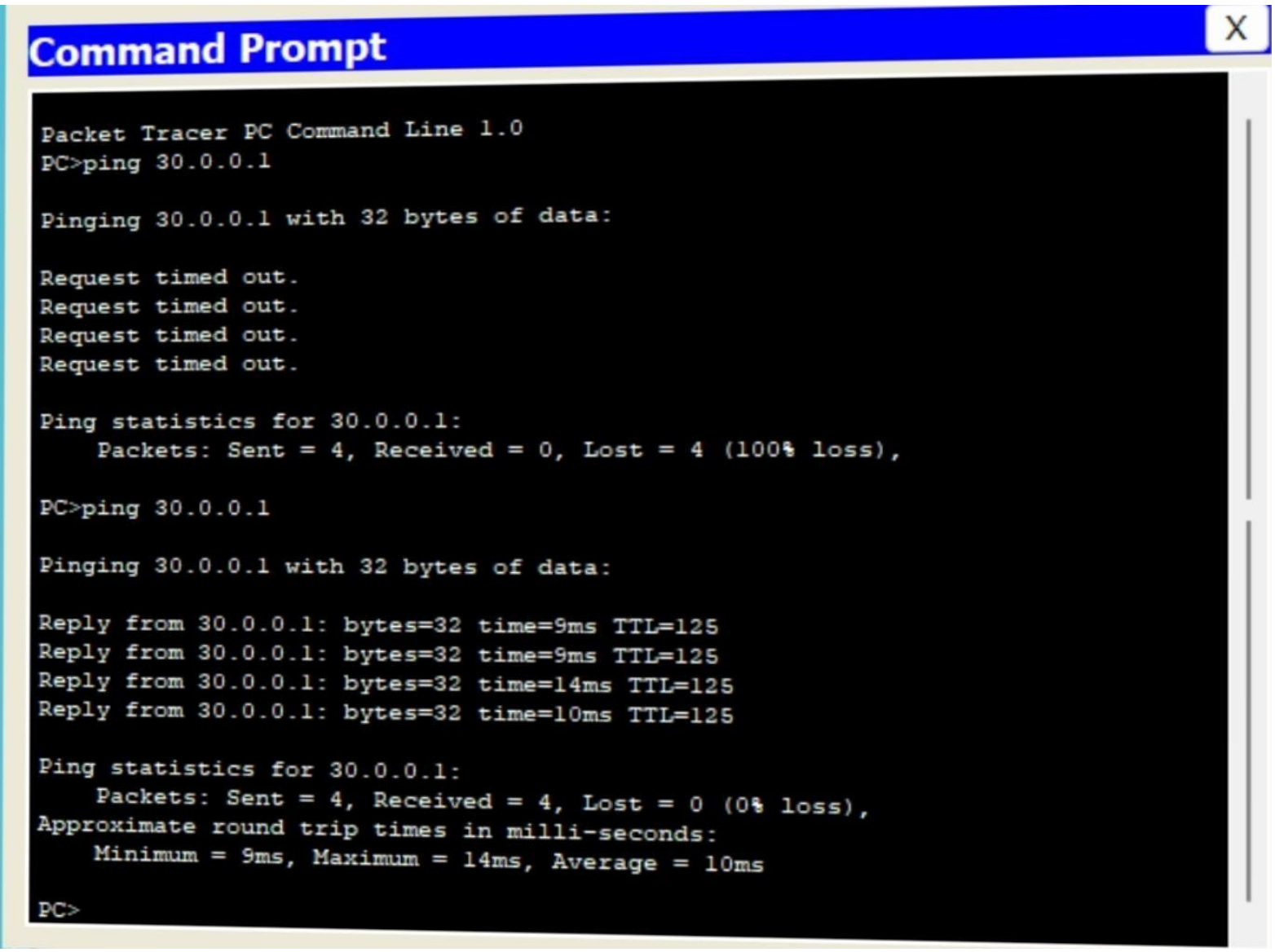
Reply from 10.0.0.1: bytes=32 time=4ms TTL=125
Reply from 10.0.0.1: bytes=32 time=16ms TTL=124
Reply from 10.0.0.1: bytes=32 time=17ms TTL=125
Reply from 10.0.0.1: bytes=32 time=25ms TTL=124

Ping Statistics for 10.0.0.1
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss)
Approx round trip times
Minimum = 4ms, Max = 25ms, Avg = 16ms

observation

10/2
17/7/23

Observation = We can observe that the default and static routing both can be done.


Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 30.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 30.0.0.1
Pinging 30.0.0.1 with 32 bytes of data:
Reply from 30.0.0.1: bytes=32 time=9ms TTL=125
Reply from 30.0.0.1: bytes=32 time=9ms TTL=125
Reply from 30.0.0.1: bytes=32 time=14ms TTL=125
Reply from 30.0.0.1: bytes=32 time=10ms TTL=125
Ping statistics for 30.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 9ms, Maximum = 14ms, Average = 10ms
PC>

WEEK 4

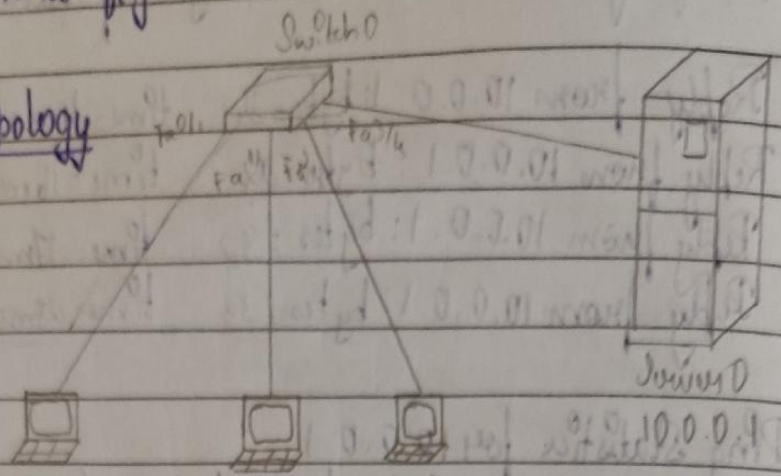
Configure DHCP within a LAN and outside LAN.

Adora
PAGE NO.
DATE 14 / 7 / 25

Lab 5

Aim: Configure DHCP between 2 LANs

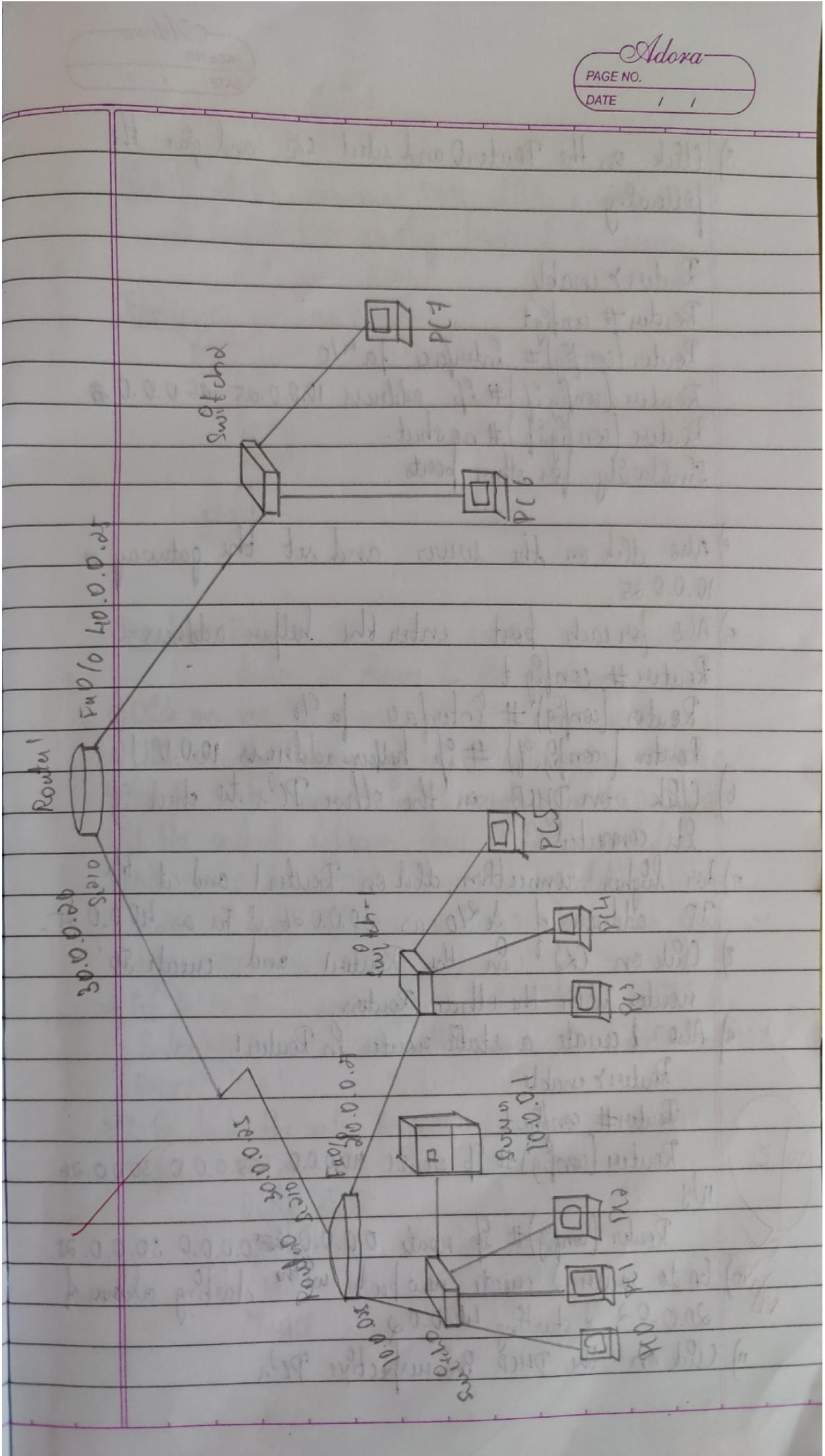
Topology



Procedure = 1) Select 3 PC's and one Server. with connecting all the devices with a switch.
2) Click on the server and give IP address as 10.0.0.1
3) Click on the server and click DHCP.
4) Create a new pool name: Server pool
Start IP address: 10.0.0.2
Subnet Mask: 255.0.0.0
5) Now go to the PC's and click on IP config and select DHCP. We can clearly see that the PC's are connected to the server.

II) For DHCP outside LAN:-

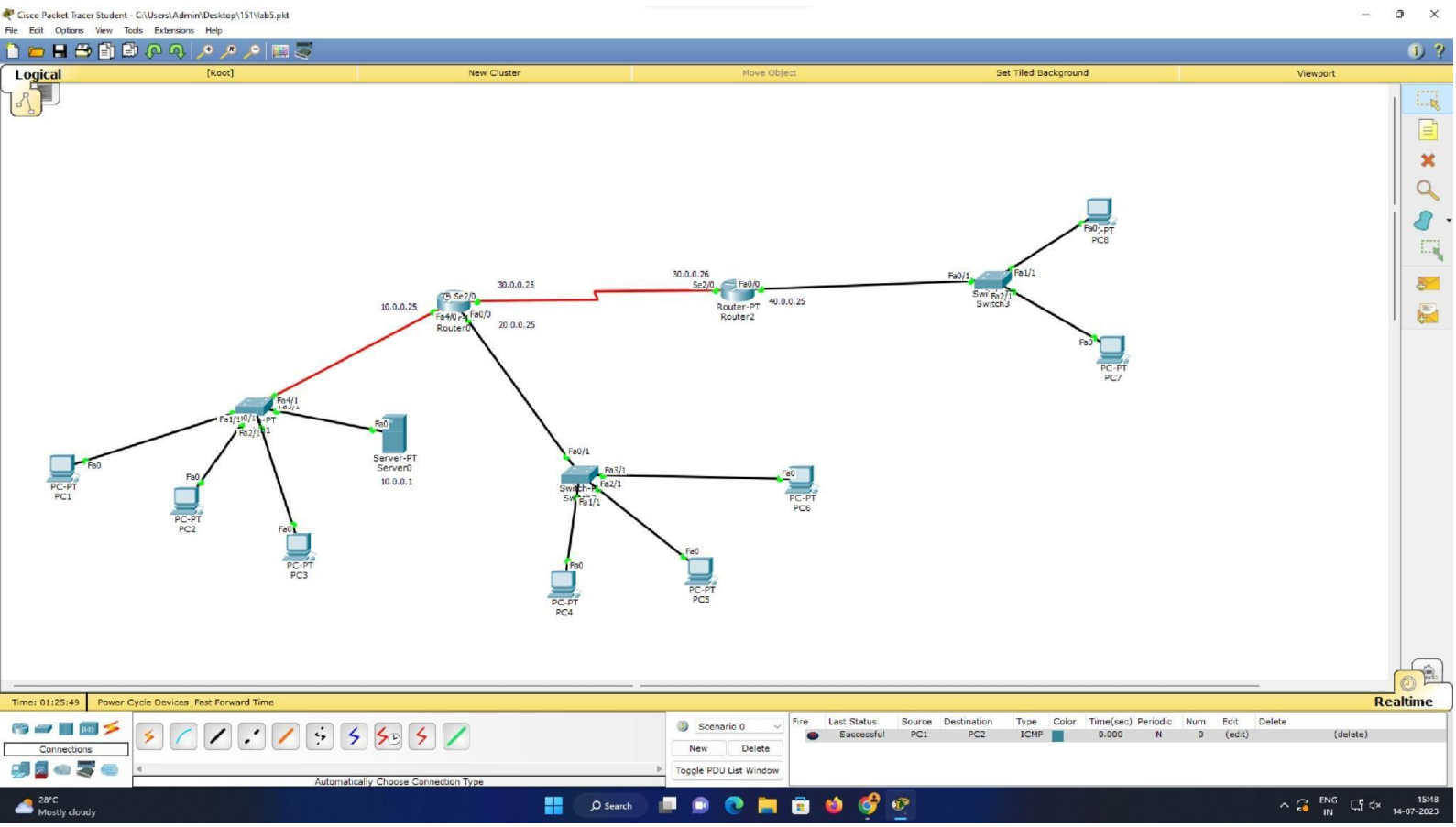
Procedure:
1) Now we connect two different LAN's with eachother.
2) Looking at the below topology, connect 3 PC's to a switch and other 3 PC's to a router. ~~Connect~~ Connect Router0 & Router1 with the Switch1 & Switch2.

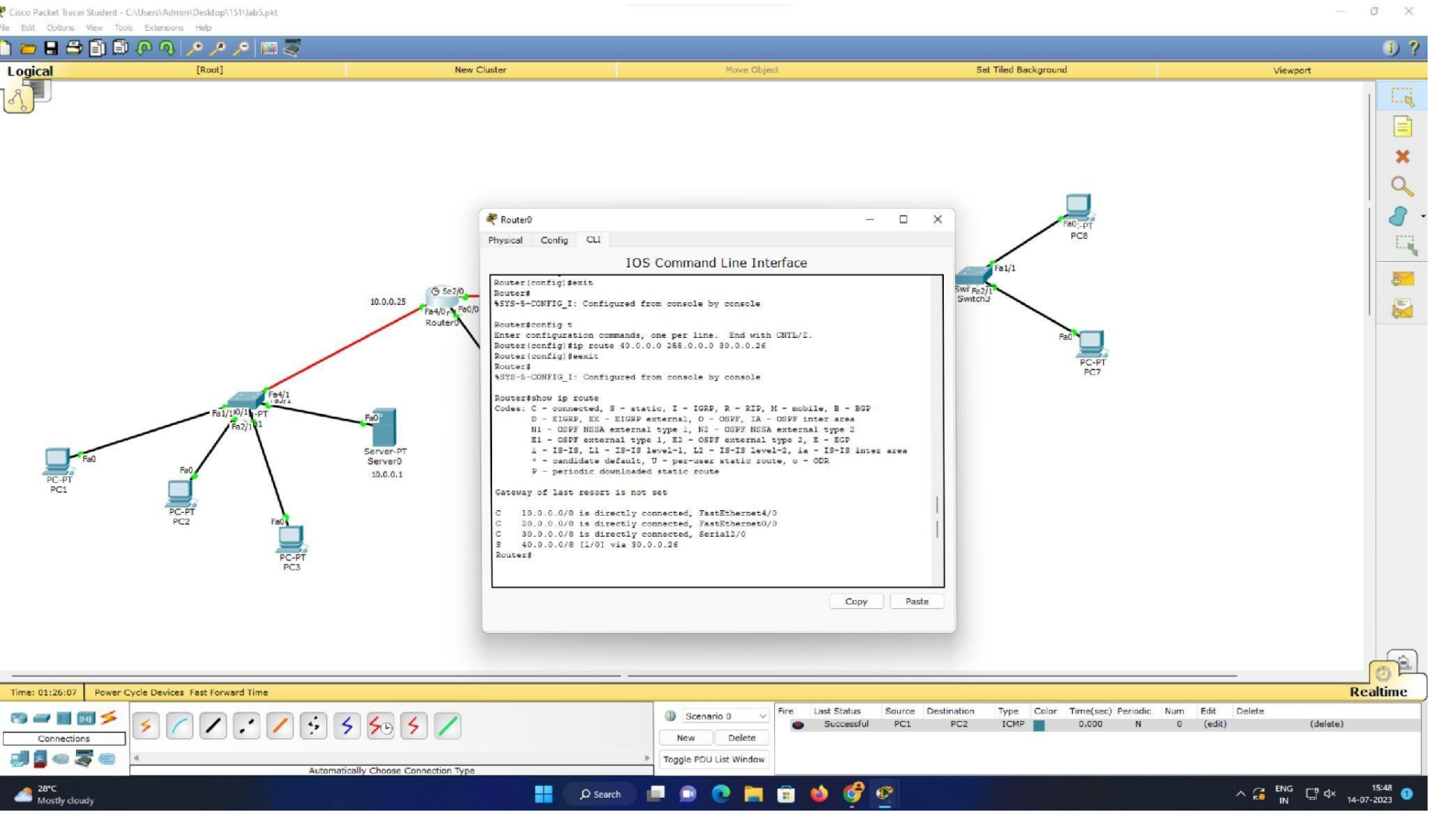

PC1
Switch
PC2
Router
Fa 0/0 40.0.0.1
40.0.0.0/8
Fa 0/1 30.0.0.1
30.0.0.0/8
PC3
PC4
Switch
PC5
Fa 0/0 20.0.0.1
20.0.0.0/8
Fa 0/1 10.0.0.1
10.0.0.0/8
Server
PC6
PC7
PC8

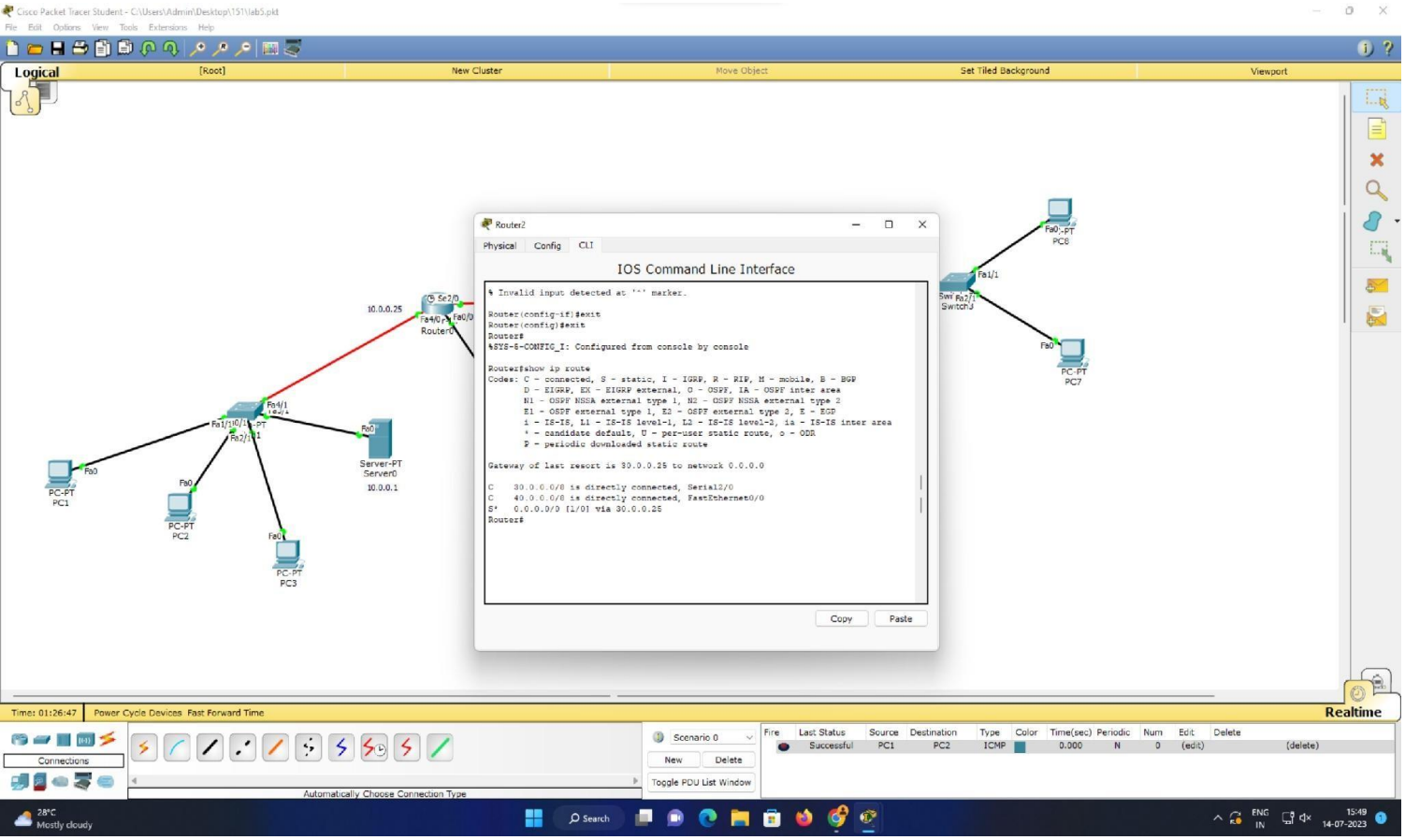
3) Click on the Router0 and select CLI and give the following:

Router> enable
Router# config t
Router(config)# interface fa 4/0
Router(config-if)# ip address 10.0.0.25 25.0.0.0
Router(config-if)# no shut.
Similarly for other ports.

4) Also click on the server and set the gateway as 10.0.0.25
5) Also for each port enter the helper address:-
Router# config t
Router(config)# Interface fa 0/0
Router(config-if)# ip helper-address 10.0.0.1
6) Click on DHCP on the other PC's to check if its connected
7) For higher connection, click on Router1 and set the IP address of Se 2/0 as 30.0.0.26 & Fa as 40.0.0.25.
8) Click on CLI in the Router1 and create IP routes with the other Routers.
9) Also create a static route in Router1.
Router> enable
Router# config t
Router(config)# ip route 40.0.0.0 255.0.0.0 30.0.0.26
II/y
Router(config)# ip route 0.0.0.0 0.0.0.0 30.0.0.25.
10) Go to server & create new pool with the starting address of 20.0.0.2 & starting 40.0.0.2
11) Click on the DHCP in respective PC's.


Cisco Packet Tracer Student - C:\Users\Admin\Desktop\151\lab5.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
30.0.0.25
30.0.0.26
Se2/0
Fa0/0
Router-PT
Router2
40.0.0.25
Fa0/1
Fa1/1
Swi Fa2/1
Switch3
Fa0
PC-PT
PC8
PC7
10.0.0.25
Se2/0
Fa4/0
Fa0/0
Router0
20.0.0.25
Fa4/1
Fa1/1
Fa2/1
Server-PT
Server0
10.0.0.1
PC1
PC2
PC3
Fa0/1
Fa3/1
Fa2/1
Fa1/1
PC4
PC5
PC6
Time: 01:25:49
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Successful
PC1
PC2
ICMP
0.000
N
0
(edit)
(delete)


Cisco Packet Tracer Student - C:\Users\Admin\Desktop\151\lab5.pkt
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router0
Physical
Config
CLI
IOS Command Line Interface
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 40.0.0.0 255.0.0.0 30.0.0.26
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#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, FastEthernet4/0
C 20.0.0.0/8 is directly connected, FastEthernet0/0
C 30.0.0.0/8 is directly connected, Serial2/0
S 40.0.0.0/8 [1/0] via 30.0.0.26
Router#
Copy
Paste
10.0.0.25
Router0
PC-PT PC1
PC-PT PC2
PC-PT PC3
Server-PT Server0
10.0.0.1
PC-PT PC8
PC-PT PC7
Time: 01:26:07
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Successful
PC1
PC2
ICMP
0.000
N
0
(edit)
(delete)
28°C
Mostly cloudy
Search
ENG
IN
15:48
14-07-2023


Cisco Packet Tracer Student - C:\Users\Admin\Desktop\151\lab5.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router2
Physical
Config
CLI
IOS Command Line Interface
% Invalid input detected at '^' marker.
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-6-CONFIG_I: Configured from console by console
Router#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 30.0.0.25 to network 0.0.0.0
C 30.0.0.0/8 is directly connected, Serial2/0
C 40.0.0.0/8 is directly connected, FastEthernet0/0
S* 0.0.0.0/0 [1/0] via 30.0.0.25
Router#
Copy
Paste
10.0.0.25
Router0
Server-PT Server0
10.0.0.1
PC-PT PC1
PC-PT PC2
PC-PT PC3
PC-PT PC8
PC-PT PC7
Time: 01:26:47
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Successful
PC1
PC2
ICMP
0.000
N
0
(edit)
(delete)
28°C
Mostly cloudy
Search
ENG
IN
15:49
14-07-2023

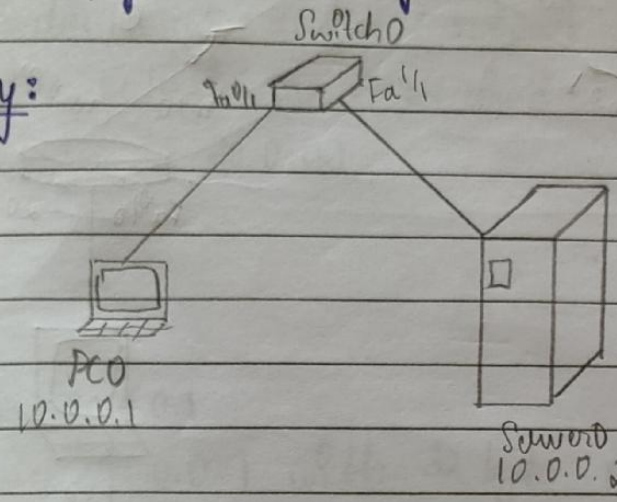
WEEK 5

Configure Web Server, DNS within a LAN and RIP routing.

Lab 6

Aim: 1) Config webbrowser, DNS within a LAN
2) Config RIP routing protocol in router

Topology:



Procedure: Select a PC, server, switch and connect each device as shown in the topology.

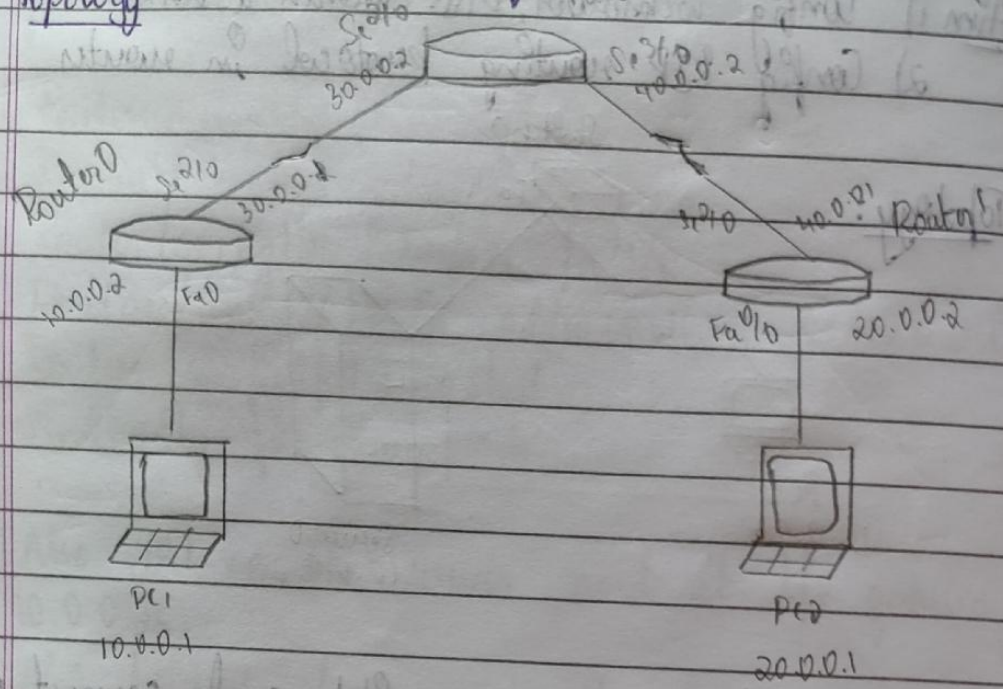
2) Click on the PC and set IP address as 10.0.0.1
3) Click on the Server and set IP address as 10.0.0.20
4) Go to web browser in PC and type 10.0.0.20
5) If the output appears then it is connected.
6) Now, Go to DNS server and add a new name 'LR151' and address as '10.0.0.20'. Now when we type LR151 the output appears.
7) Go to HTTP in server. and click on 'edit' in Index.html and change the names to 'Likith.R' '151' 'BMSCE' 'CSE'
8) Go check the web browser

Output: Welcome to Cisco Packet Tracer.

Quick Links:
Likith.R
151
BMSCE
CSE

2) Configure RIP routing protocol in Routers.

Topology:



Procedure: Use 2 PCs & 3 routers from devices and connecting each PC to one router and connecting routers to the third router.

2) Configure IP address of PC1 → 10.0.0.1 & PC2 → 20.0.0.1

3) Set IP address to routers and even update gateways

Router# config t

Router(config) interface fa 0/0

Router(config-if) ip address 10.0.0.2 255.0.0.0

Router(config-if) no shut

Repeat the same for all routers.

4) Configure the serial ports using the following commands for the routers

Router(config-if) encapsulation ppp

Router(config-if) clock rate 64000

Router(config-if) no shut

5) Also we have to use the command RIP

Router (config)# router rip

Router (config-router)# network 10.0.0.0

Router (config-router)# network 30.0.0.0

6) Now, the output can be received by pinging from 10.0.0.1 to 20.0.0.1

Output:

PC> ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data

Reply from 20.0.0.1 : byte = 32 time = 2ms TTL = 125

Reply from 20.0.0.1 : bytes = 32 time = 9ms TTL = 125

Reply from 20.0.0.1 : bytes = 32 time = 7ms TTL = 125

Reply from 20.0.0.1 : bytes = 32 time = 2ms TTL = 125

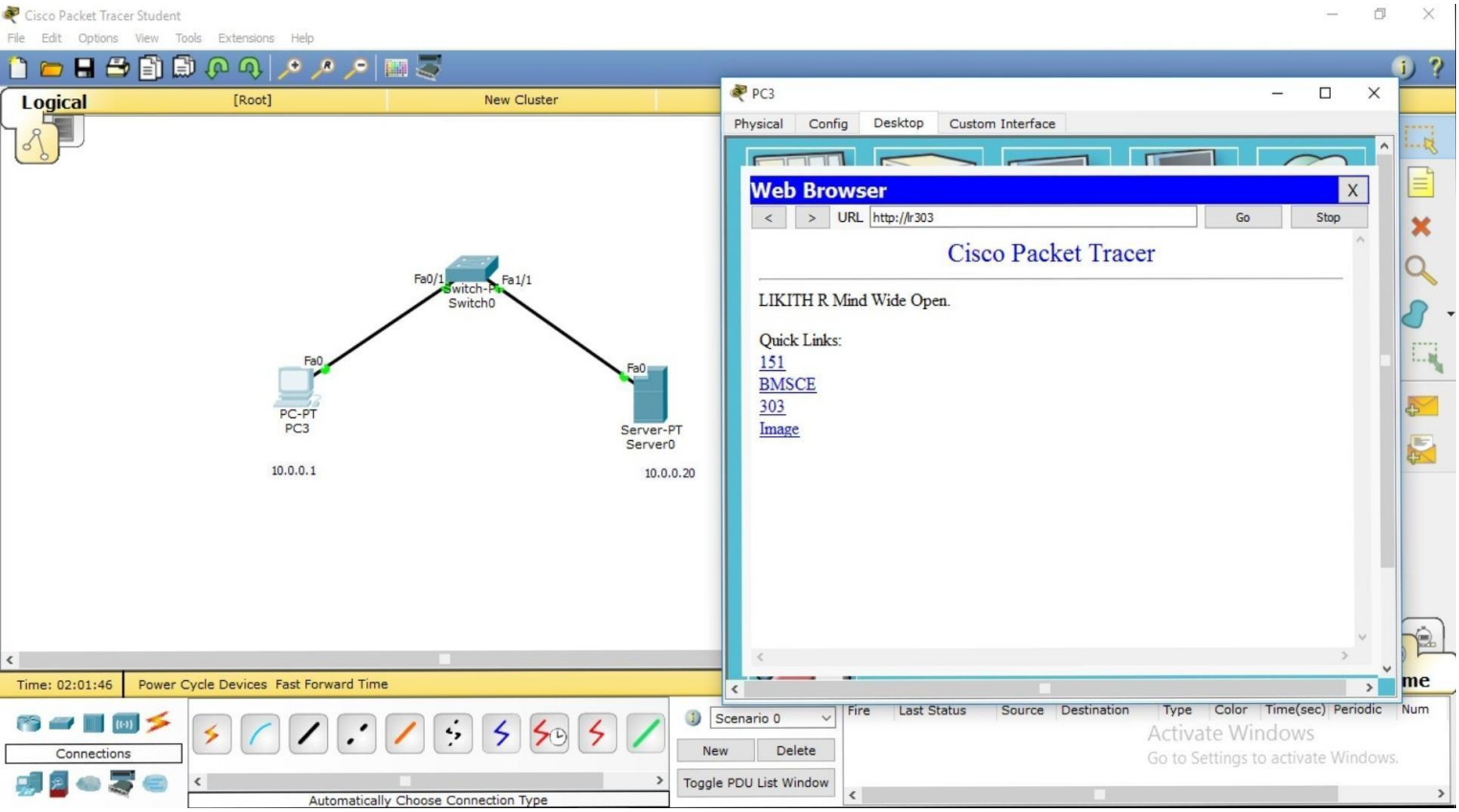
Ping statistic for 20.0.0.1

Packets sent = 4, received = 4, lost = 0 (0% loss)

Approx round trip time in ms

Minimum = 2ms, Max = 9ms, Avg = 4ms

10/10

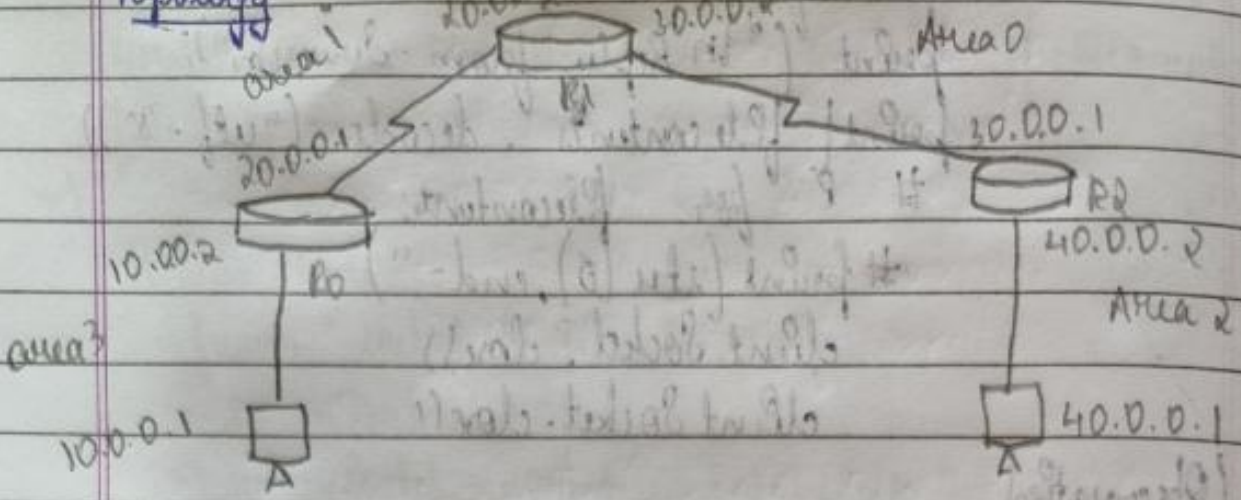

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Fa0/1
Fa1/1
Switch-PT
Switch0
Fa0
PC-PT
PC3
10.0.0.1
Fa0
Server-PT
Server0
10.0.0.20
PC3
Physical
Config
Desktop
Custom Interface
Web Browser
URL
http://lr303
Go
Stop
Cisco Packet Tracer
LIKITH R Mind Wide Open.
Quick Links:
151
BMSCE
303
Image
Time: 02:01:46
Power Cycle Devices Fast Forward Time
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.

WEEK 6

Configure OSPF ROUTING PROTOCOL

1) Configure OSPF routing protocol

Topology:



Procedure: 1) Create the topology as given above with 2 PC's and 3 routers

2) Configure the IP addresses for PC's 10.0.0.1 and 40.0.0.1 respectively

3) Configure the routers with IP addresses for all the interfaces

4) All the serial port of router's configure "encapsulation ppp" & clock rate 64000 command at ports.

Router:0,

router (config)# interface serial 2/0
router (config)# ip address encapsulation ppp
↳ no shut
↑ exit

se
↳ te 3/0
↳ encapsulation ppp
↳ clock rate 64000
↳ no shut.

5) Now, enable ip routing by configuring ospf routing protocol in all routers.
In router R0,
↳ router ospf 1
↳ router-id 1.1.1.1
↳ network 10.0.0.0 0.255.255.255 area 3
↳ network 20.0.0.0 0.255.255.255 area 1
↳ exit
Repeat same for R1 & R2

6) Checking the routing table.
↳ show ip route
Codes C-connected, S-static, R-RIP, M-Mobile, B-BGP
O-OSPF, IA-OSPF inter area N1-OSPF NSSA
Gateway of last resort is not set
C 10.0.0.0/8 is directly connected, fa 2/0
C 20.0.0.0/8 is directly connected, se 2/0
O IA 40.0.0.0/8 via 20.0.0.2, 00:04:23, se 2/0
O IA 30.0.0.0/8 via 20.0.0.2, 00:07:29, se 2/0
R2 knows the network area 0, and R2 is connected to R1 via 20.0.0.0

7) Now forming the loopback function as follow:
↳ interface loopback 0
↳ ip address 172.16.1.252 255.255.0.0
↳ no shut
Similarly for R2 & R3
There must be one interface up to keep ospf process up.

PAGE NO.
DATE / /

8) Routing table:

Codes C = connected S-state O-OSPF OIA=OSPF
Gateway at last resort is not set
O&A 20.0.0.0/8 via 30.0.0.1, 00:18:58, se1/0
C 40.0.0.0/8 directly connected, a 0/0
C 30.0.0.0/8 directly connected se2/0

9) Now to create virtual link b/w R1 & R3
→ router ospf 1
→ area 1 virtual link 2.2.2.2

- Similarly in router2;
→ area 1 virtual link 1.1.1.1

10) Now check the route of R3 and you can see the update on the area 3.

11) Try pinging from 10.0.0.1 → 40.0.0.1

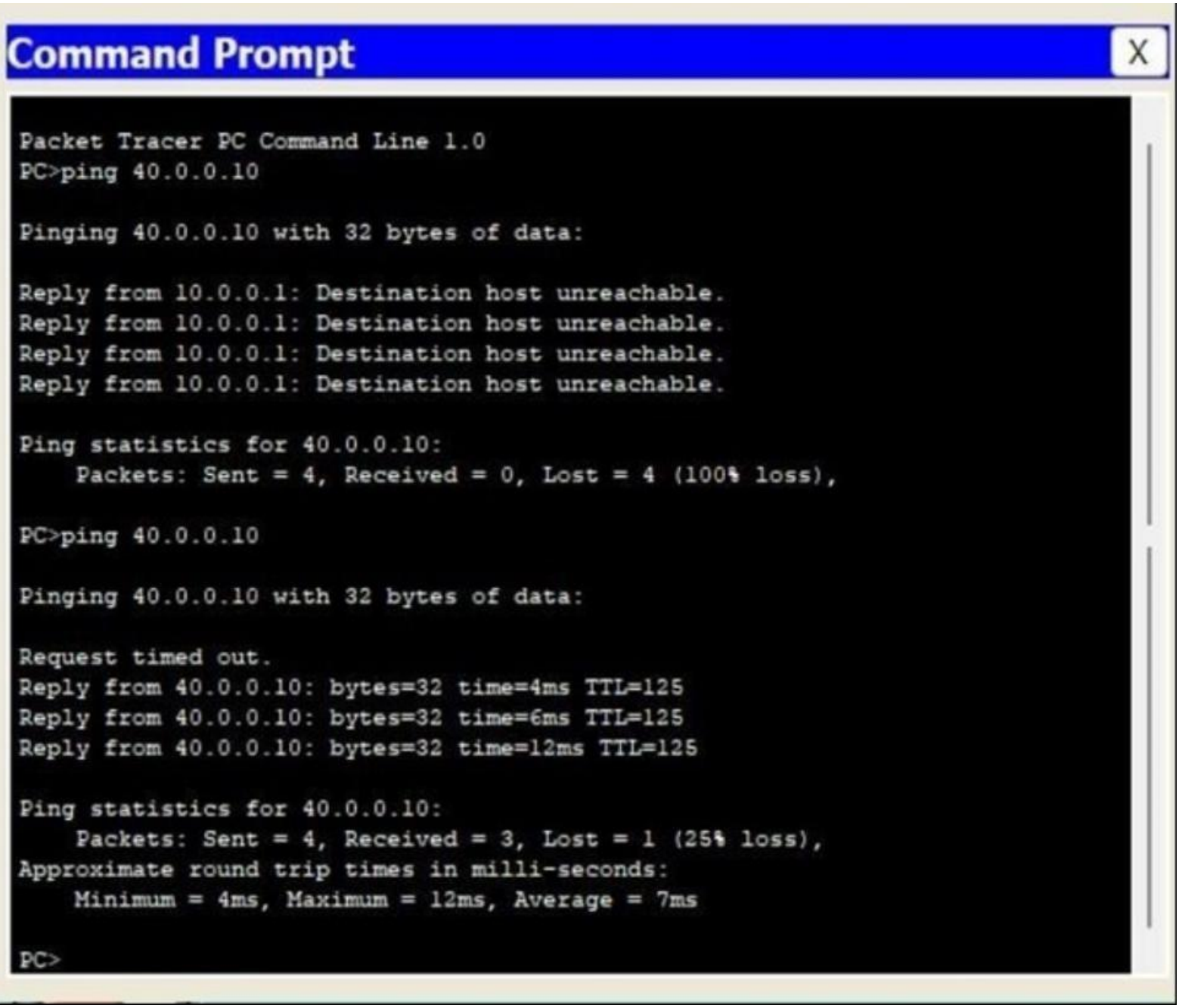
Output: PC> ping 40.0.0.1

Pinging 10.0.0.1 with 32 bytes of data
Reply from 10.0.0.1 bytes=32 time=12ms TTL=128
Reply from 10.0.0.1 bytes=32 time=12 TTL=128
Reply from 10.0.0.1 bytes=32 time=12 TTL=128
Reply from 10.0.0.1 bytes=32 time=12 TTL=128

Packets sent=4 Received=4, Lost=0
Approx round trip time in ms.
Min = 0ms Max = 12ms Avg = 12ms.

Observation :- We could ping from one PC to other through OSPF protocol.

8/15 15
2/9/23


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>

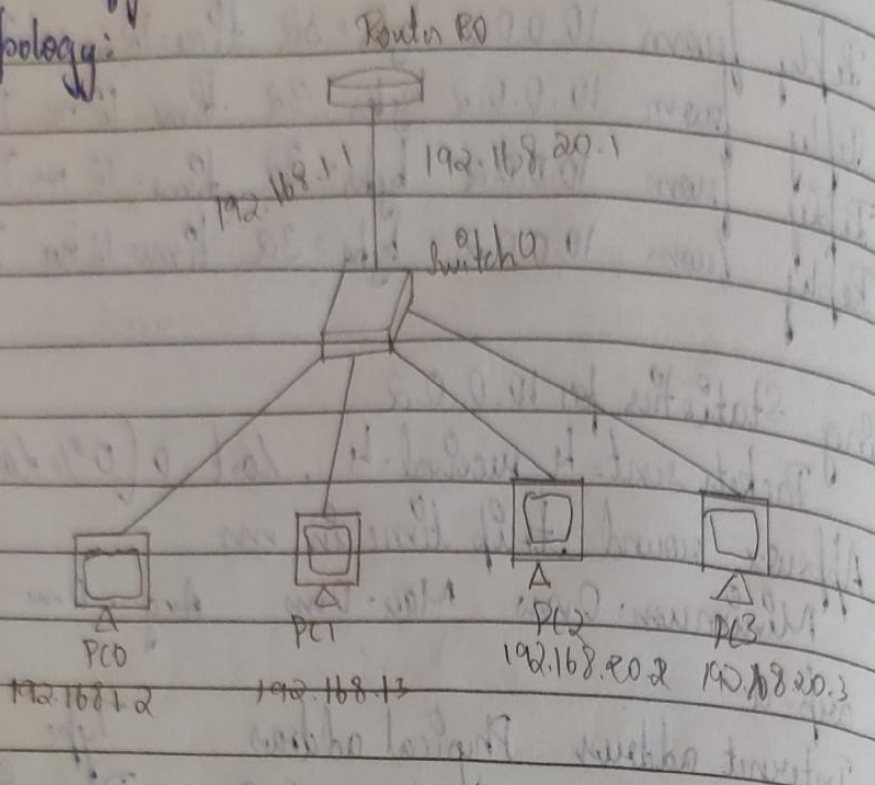
WEEK 8

To construct a VLAN and make a pc communicate amongVLAN.

Lab-8

1) To configure VLAN database

Topology:



Procedure: 1) Connect 4 PC's with a switch and also connect a router (1841) (2960)

2) Ensure PC0 & PC1 are set as 192.168.1.2 and 192.168.1.3 and are placed towards the left side end of the switch and the router IP is set as 192.168.1.1

3) The PC2 & PC3 IP's are set as 192.168.20.2 and 192.168.20.3 and are placed at the right-most end of switch.

4) Sled switch and go to Config tab and select a VLAN database

5) Enter the new VLAN number as 303 and name as LRVLAN and add it to the database

6) Sled the interface nearer to the fastEthernet i.e 4/0 and select trunk.

7) Now add the new VLAN database to the trunk option

8) Go to router and select the VLAN database and enter the same VLAN No and the VLAN name.

9) Now go to CLI of router.
and enter the following
-> Router (VLAN) # exit
-> Router # config t
-> Router (config) # interface fa 0/0.1
-> Router (config-subif) #
-> Router (config-subif) # encapsulation dot1q 30
-> Router (config-subif) # ip address 192.168.20.1 255.255.255.0
-> Router (config-subif) # no shut
-> Router (config-subif) # exit

10) Ensure all the databases are selected. Then Ping from PC0 to PC3.

Output:

PC>ping 192.168.20.2

Pinging 192.168.20.2 with 32 bytes of data:

Request timed out

Reply from 192.168.20.2 bytes=32 time=0 TTL=127

Reply from 192.168.20.2 bytes=32 time=3 TTL=127

Reply from 192.168.20.2 bytes=32 time=0 TTL=127

Ping statistics for 192.168.20.2

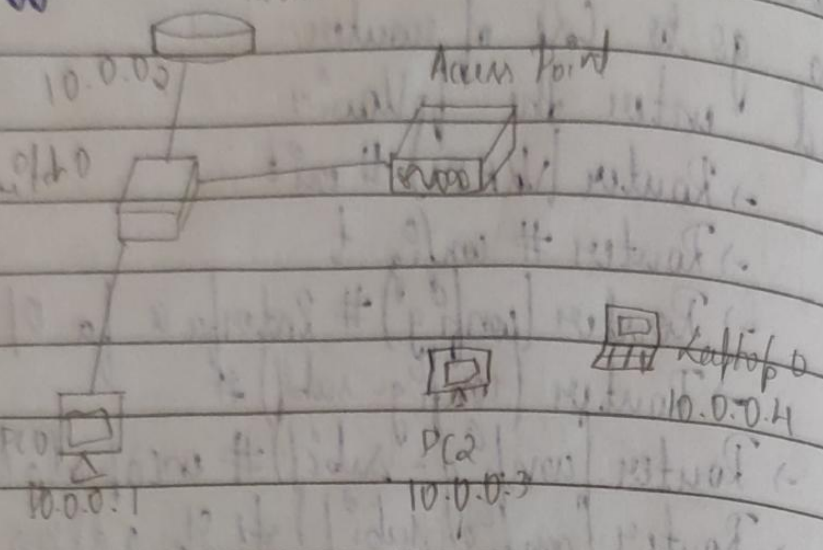
Packets sent: 4, received = 3 Lost=1 (25% loss)

Approx. round trip in ms

Minimum = 0ms Max = 3ms Avg = 1ms

2) To construct a WLAN through wireless communication

1) Topology:



Procedure: 1) Select a PC0 an set the IP address as 10.0.0.2 and connect it to a switch.

2) Select the router and connect to the switch by setting an IP address of 10.0.0.1

3) Select a Access Point and connect to the switch

4) Go to Port1 in access point and change the SSID name to NEWLAN and the 10 digit hex key to 9074130303

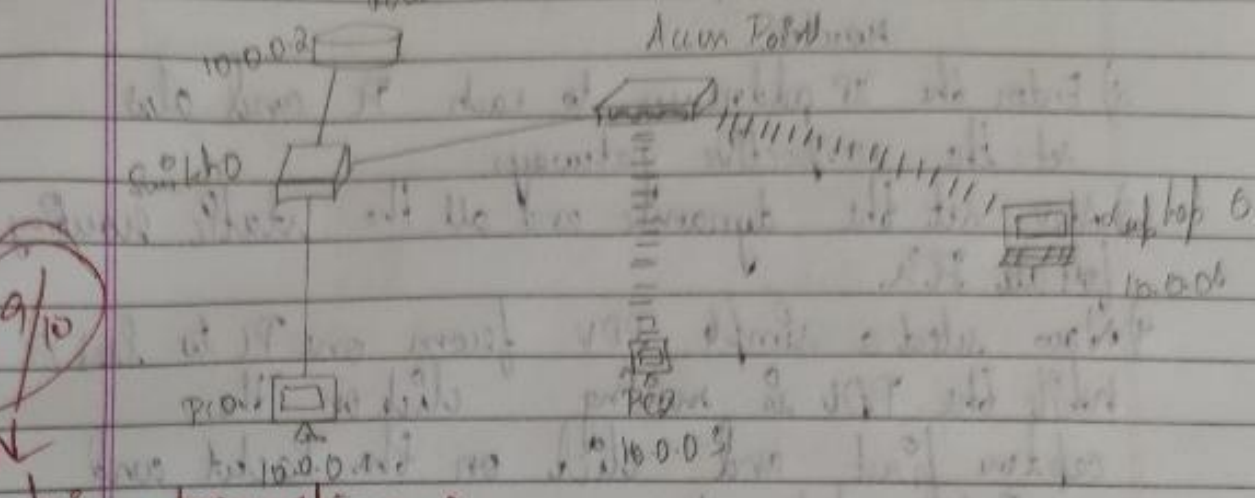
5) Now select a PC1 and a Laptop for wireless communication

6) Click on Laptop and switch off the device. Drag the existing existing Port host to the component list and add the wireless interface.

7) Now in config, we can find a wireless interface select SSID name and select WEP & enter the same hex key.

8) Repeat the same for PC also and we can check that it is communicating.

Final topology.



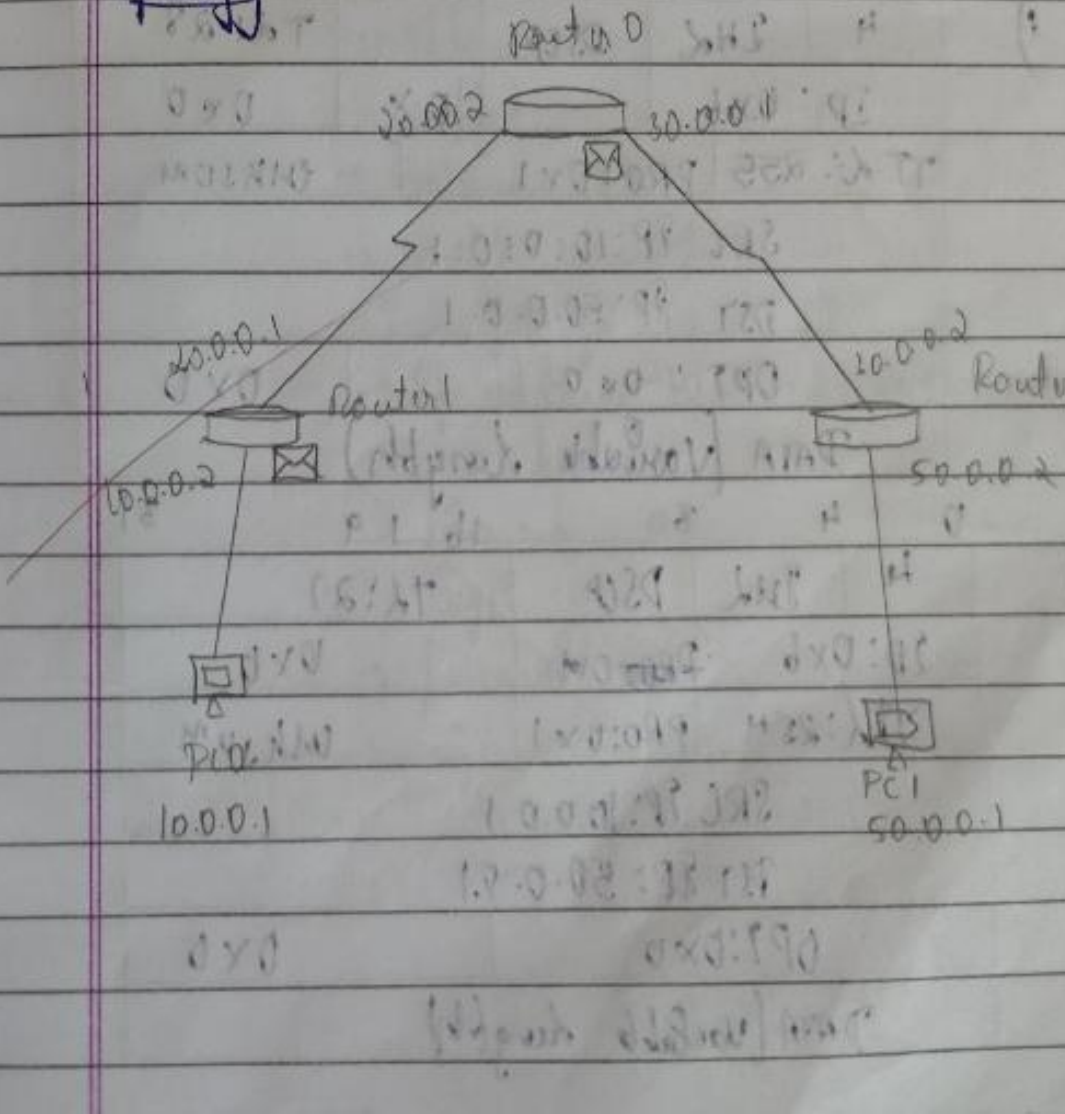
9/10

N

1/9/23 observation :

3) Demonstration of TTL

Topology :



Procedure: Select 2 PC's and connect them to different routers. Connect the two routers to another router.

2) Enter the IP addresses to each PC and also set the respective gateways.

3) Also set the dynamic and all the static routing for all PC's.

4) Now select a simple PDU from one PC to last PC while the PDU is moving click on the capture first and click on the Packet and a window pops up.

5) Between every router there will be a time difference of 1 in TTL

Output: IP:

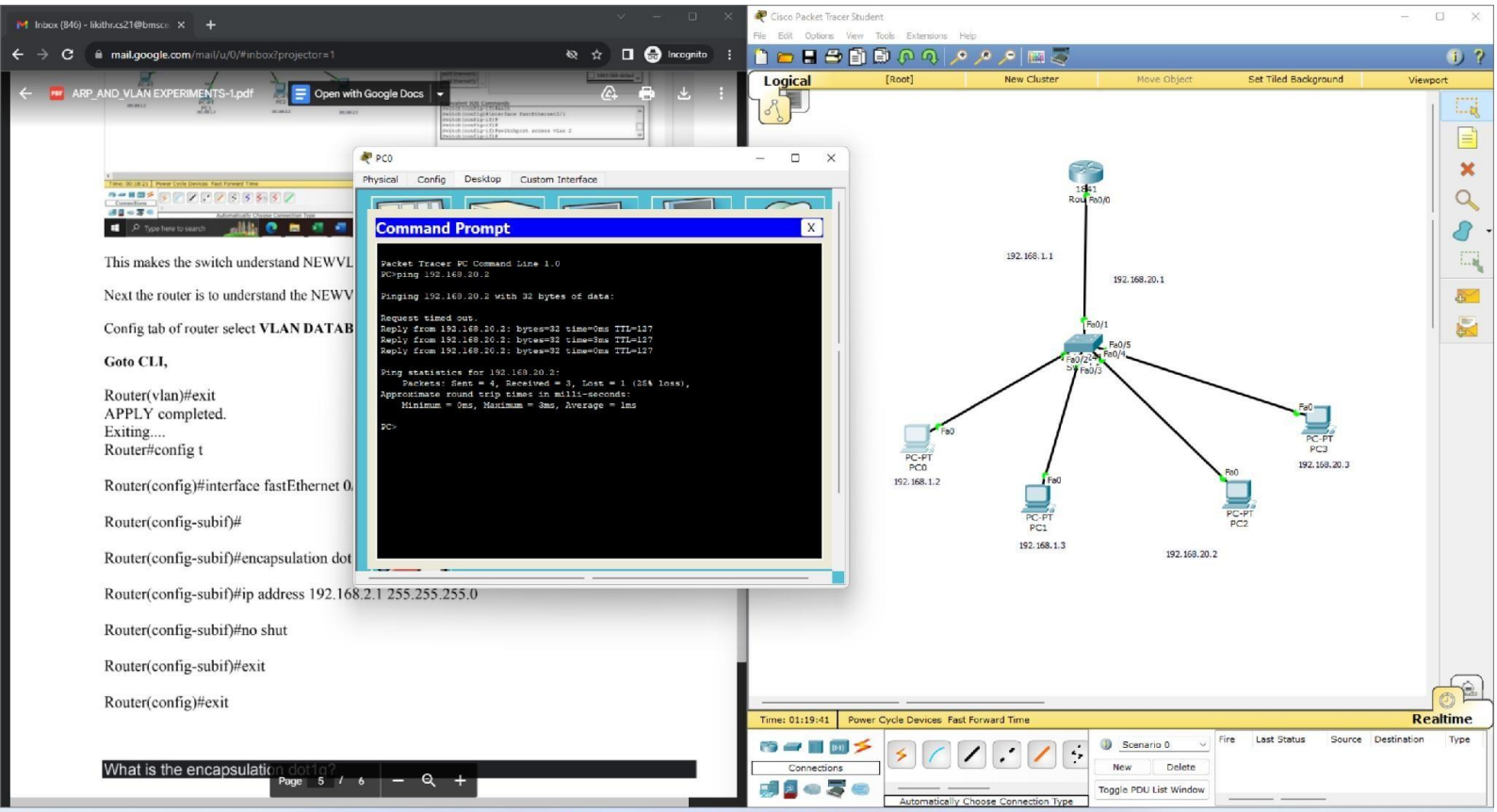
1)

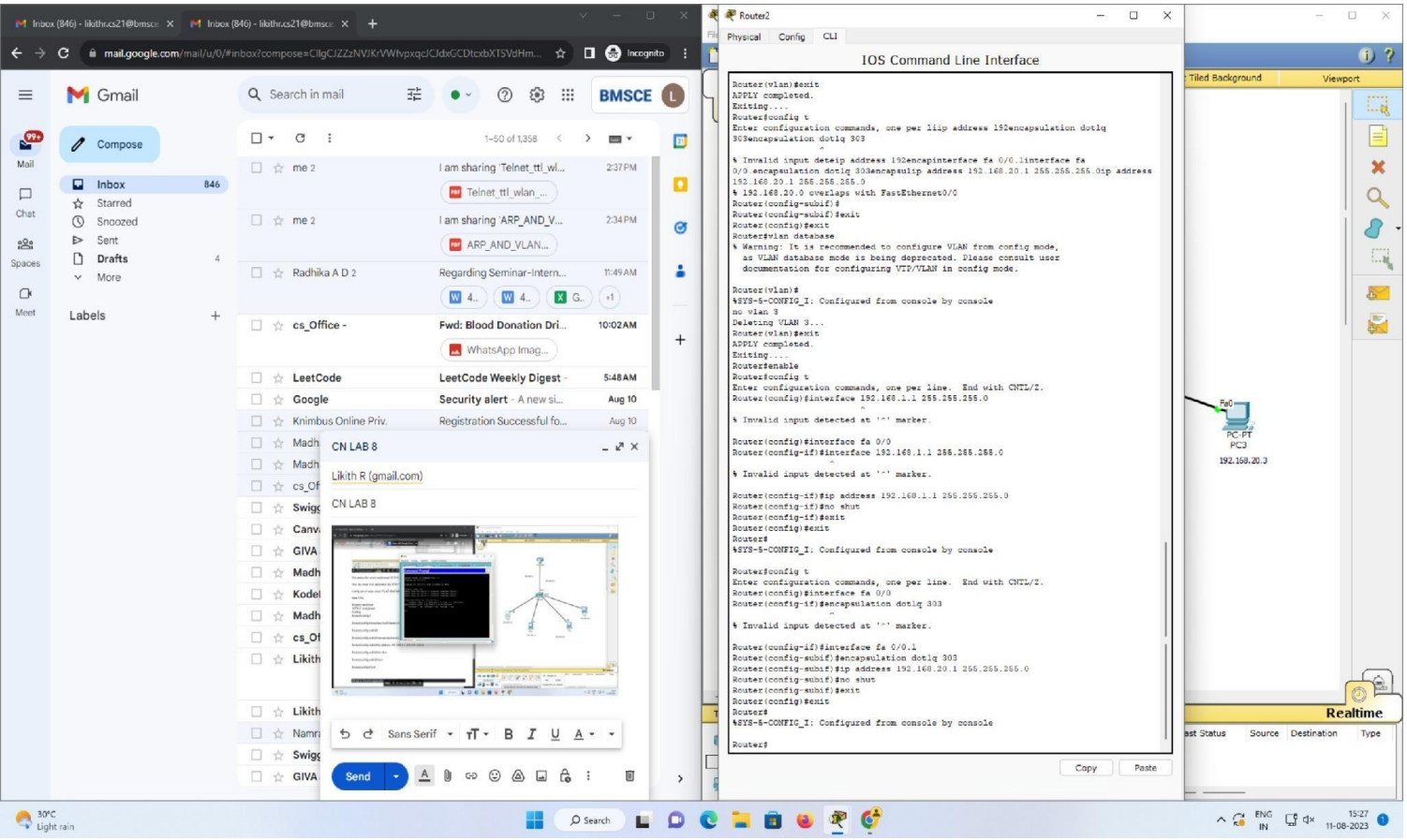
0	4	8	16	19	31
4	IHL	DSCP		TL: 28	
IP: 0x6			0x	0x0	
TTL: 255	PRO: 0x1		CHKSUM		
SRC IP: 10.0.0.1					
DST IP: 50.0.0.1					
OPT: 0x0				0x0	
DATA (Variable length)					

10/10
19/23

2)

0	4	8	16	19	31
4	IHL	DSCP	TL: 28		
IP: 0x6	PRO: 0x1		0x0		
TTL: 254	PRO: 0x1		CHKSUM		
SRC IP: 10.0.0.1					
DST IP: 50.0.0.1					
OPT: 0x0				0x0	
DATA (variable length)					


Inbox (846) - likithr.cs21@bmsce
mail.google.com/mail/u/0/#inbox?projector=1
Incognito
ARP_AND_VLAN EXPERIMENTS-1.pdf
Open with Google Docs
This makes the switch understand NEWVL
Next the router is to understand the NEWV
Config tab of router select VLAN DATAB
Goto CLI,
Router(vlan)#exit
APPLY completed.
Exiting....
Router#config t
Router(config)#interface fastEthernet 0.
Router(config-subif)#
Router(config-subif)#encapsulation dot
Router(config-subif)#ip address 192.168.2.1 255.255.255.0
Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#exit
What is the encapsulation dot1q?
Page 5 / 6
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.20.2
Pinging 192.168.20.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.2: bytes=32 time=0ms TTL=127
Reply from 192.168.20.2: bytes=32 time=3ms TTL=127
Reply from 192.168.20.2: bytes=32 time=0ms TTL=127
Ping statistics for 192.168.20.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 3ms, Average = 1ms
PC>
Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.1
192.168.20.1
Fa0/1
Fa0/5
Fa0/4
Fa0/2
Fa0/3
Fa0
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
Time: 01:19:41
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
30°C
Light rain
Search
ENG
IN
15:22
11-08-2023


Gmail
Search in mail
BMSCE
Compose
Inbox 846
Starred
Snoozed
Sent
Drafts 4
More
Labels
CN LAB 8
Likith R (gmail.com)
CN LAB 8
Send
Router2
Physical
Config
CLI
IOS Command Line Interface
Router(vlan)#exit
APPLY completed.
Exiting....
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface 192.168.1.1 255.255.255.0
% Invalid input detected at '^' marker.
Router(config)#interface fa 0/0
Router(config-if)#interface 192.168.1.1 255.255.255.0
% Invalid input detected at '^' marker.
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface fa 0/0
Router(config-if)#encapsulation dotlq 303
% Invalid input detected at '^' marker.
Router(config-if)#interface fa 0/0.1
Router(config-subif)#encapsulation dotlq 303
Router(config-subif)#ip address 192.168.20.1 255.255.255.0
Router(config-subif)#no shut
Router(config-subif)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#
Copy
Paste
Realtime
PC-PT
PC3
192.168.20.3

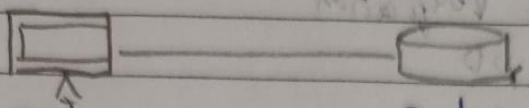
WEEK 9

To Demonstrate TELNET by accessing router in server room from a PC

Lab-9

1) Demonstrate TELNET by accessing router in server room from a PC

=) Topology:



Procedure: Select a PC and router and set IP as
PC → 10.0.0.1 Router → 10.0.0.2

2) Set the IP address for router in CLI

3) Enter the following commands

→ enable
→ config t
→ hostname R1
→ enable secret p1
→ interface fa 0/0
→ ip address 10.0.0.2 255.0.0.0
→ no shut
→ line vty 0 5
→ login
→ password p0
→ exit

Output:

PC> telnet 10.0.0.1
Trying 10.0.0.1 ... Open
User Access Verification
Password: b0
r1> enable
Password: b1
r1# Show IP route
Gateway of last

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

10/10

2) Write a program for error decoding code using CRC-CCITT (16 bits)

```
#include<stdio.h>
#include<string.h>
#define CRC_POLY 0x8021
unsigned short calculate_CRC(const char *data, int length)
{
    unsigned short crc = 0xFFFF;
    for(i=0; i<length; i++)
    {
        crc^ = (unsigned short) data[i]<<8;
        for(int j=0; j<8; j++)
        {
            if(crc & 0x8000)
                crc = (crc<<1) ^ CRC_POLY;
```

```
        else
            crc <<= 1;
        }
    }
    return crc;
}

int main()
{
    char data[100];
    printf("Enter data");
    scanf("%s", &data);
    int datalength = strlen(data);
    unsigned short checksum = calculateCRC(data, datal
    printf("Calculated CRC: 0x%04X\n", checksum);
    unsigned short receivedChecksum;
    printf("Enter received CRC:");
    scanf("%hx", &receivedChecksum);
    if (receivedChecksum == checksum){
        printf("Data is error-free\n"); el
        printf("Data Contain error\n");
    }
}
```

Output: Enter frame bits: 1011

Message after appending 16 zeros: 1011 0000 0000 0000 0000

Generator: 1000100000010000 1

Quotient: 1011

Transmitted frame: 1011 1011 0000 0110 1011

Enter frame bits: 1011 1011 0001 0110 1011

Last remainder: 0000 0000 0000 0000

Data is error-free

2) Write a program for congestion control using Leaky bucket

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

Adora
PAGE NO.
DATE / /

Output: Enter bucket size, outgoing rate & no of i/p
20 10 2
Enter Incoming packet size: 30
Incoming packet size: 30
Dropped 10 no of packets
bucket buffer size 0 out of 20
After outgoing 10 packets left 20 in buffer.

Enter Incoming packet size: 10
Incoming packet size 10
bucket buffer size 10 out of 20
After outgoing 10 packets left 20 in buffer.

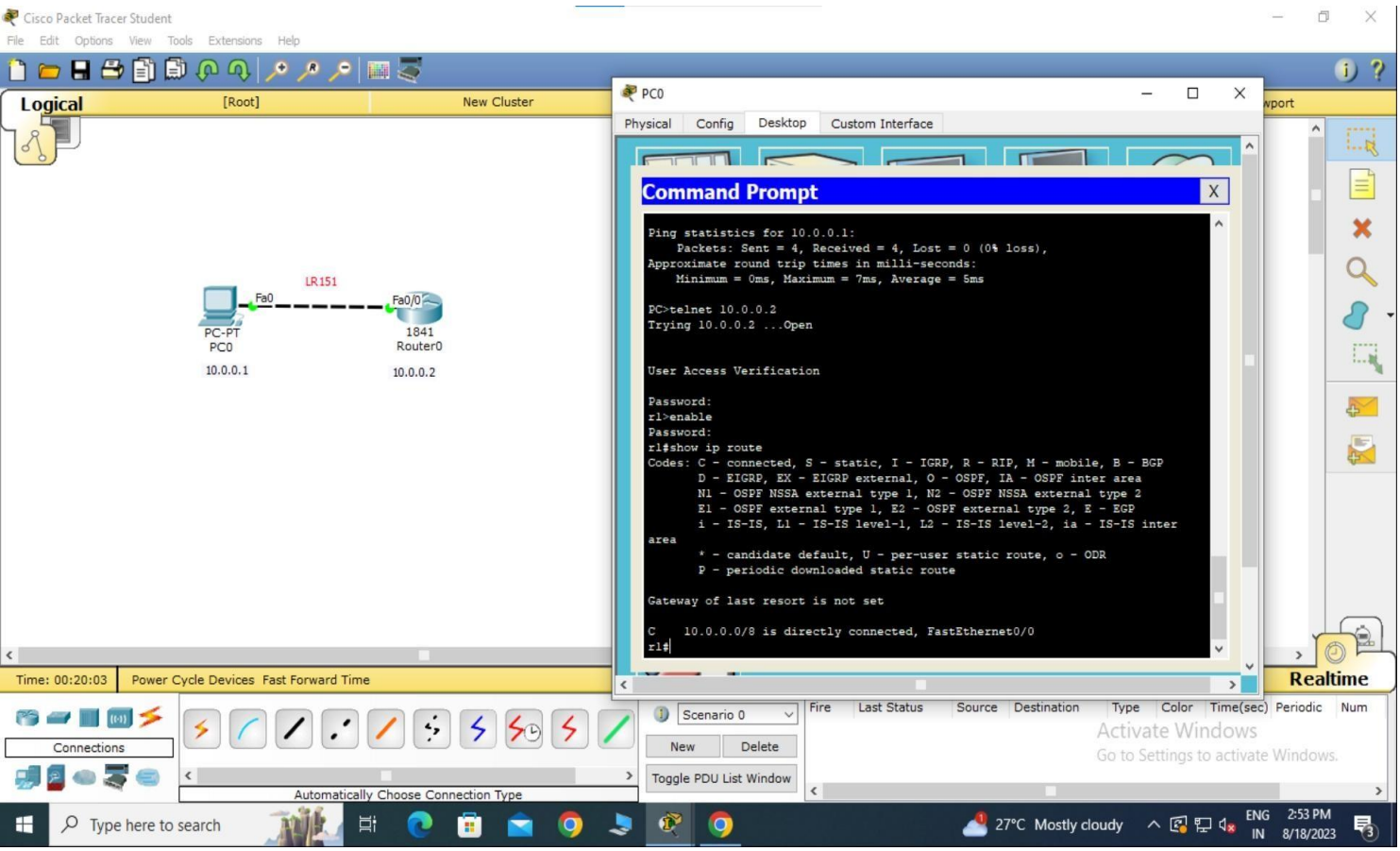
Space shortage

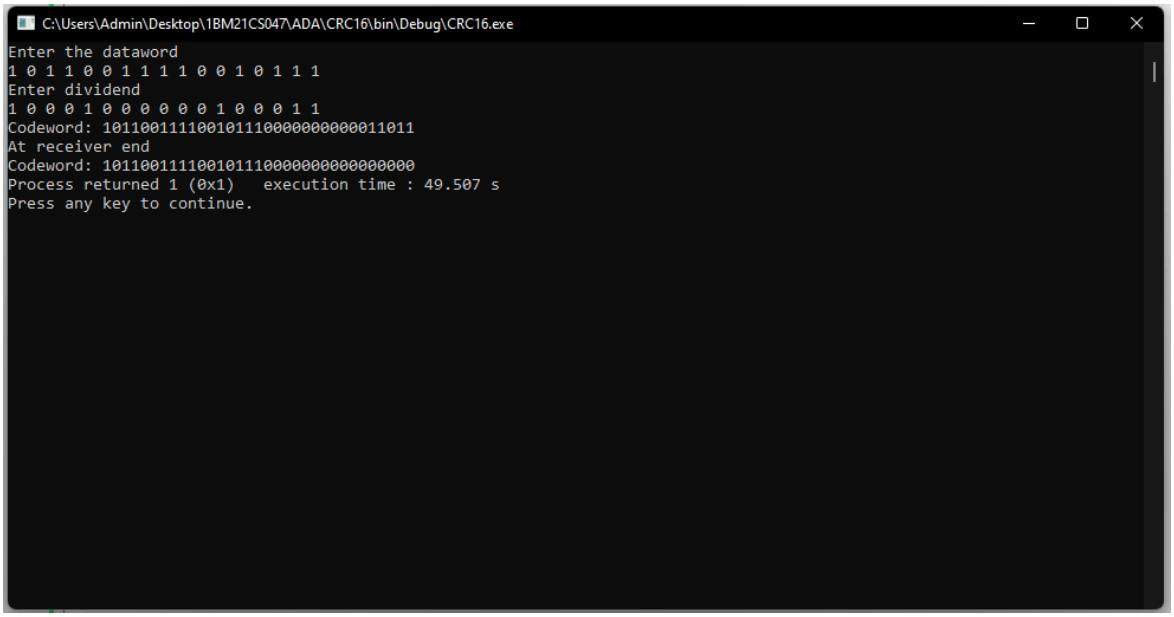
10/10

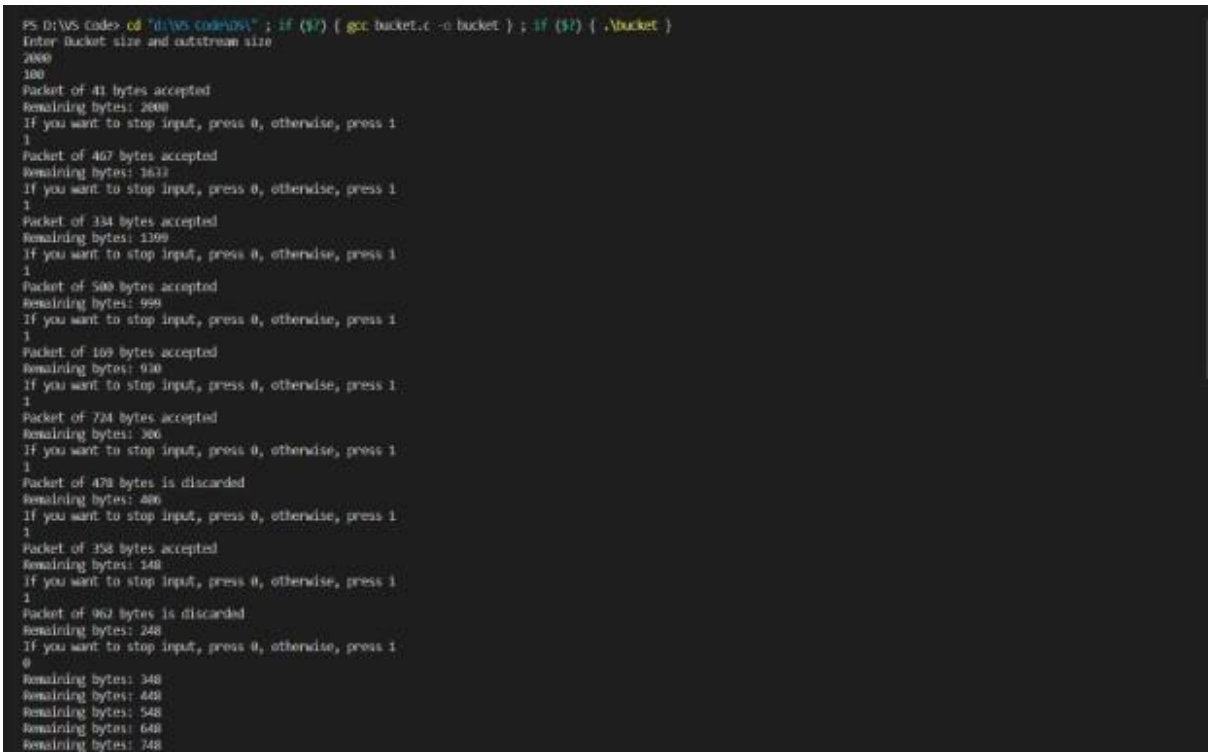
PKt - 200 byte
Pkt - 100 by

31/8/23

Output:2 : Enter bucket size, outgoing & no of i/p.


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
LR151
Fa0
Fa0/0
PC-PT
PC0
10.0.0.1
1841
Router0
10.0.0.2
PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
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 = 7ms, Average = 5ms
PC>telnet 10.0.0.2
Trying 10.0.0.2 ...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#
Time: 00:20:03
Power Cycle Devices Fast Forward Time
Realtime
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Activate Windows
Go to Settings to activate Windows.
Type here to search
27°C Mostly cloudy
ENG
IN
2:53 PM
8/18/2023


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.


PS D:\VS Code> cd "d:\VS Code\DS\" ; 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

WEEK 10

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.

Lab-10

1) Using TCP/IP sockets, write a client-server program to make client sending the file name and the server to send back contents.

=)

Procedure = To execute this program, IDLE python should be used. Select IDLE file in search. Go to new file and the code executed can be seen below.

2) Server has a bind() method which binds specific IP and port so that it can listen to incoming requests using that IP and port.
3) Server has a listen() method which puts the server into listening mode
4) It has an accept and close method where accept initiates a connection with a client and close method closes the connection with the client

Code:

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("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()

5) Next we apply client code

Code:

```
client: from socket import *
        server port = 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()
```

Observation = When we run the server code, the output displayed was "Server is ready to receive"

Then we run the client code,

→ Enter file name : new.py

→ From Server: The whole contents was displayed

10/10

Output

Server: The server is ready to receive.

Sent contents of new.py.

2/9/23

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

→1

Server code:

```
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverport))
print("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", end=' ')
    print(sentence)
    # for i in sentence
    #     print(str(i), end="")
    file.close()
```

Client code:

```
from socket import *
serverName = '127.0.0.1'
serverPort = 12000
clientSocket(AF_INET, SOCK_DGRAM)
sentence = input("Enter file Name")
clientSocket.sendto(bytes(sentence, "utf-8"),
    (serverName, serverport))
```

```
file contents, server address = clientSocket
    recvfrom(2048)
print("\n Reply from Server\n");
print(file contents.decode("utf-8"))
# print for filecontents;
#print(str(i).end="")
    clientSocket.close()
    clientSocket.close()
```

Observation

Output: Client:

→ Enter filename: server.py

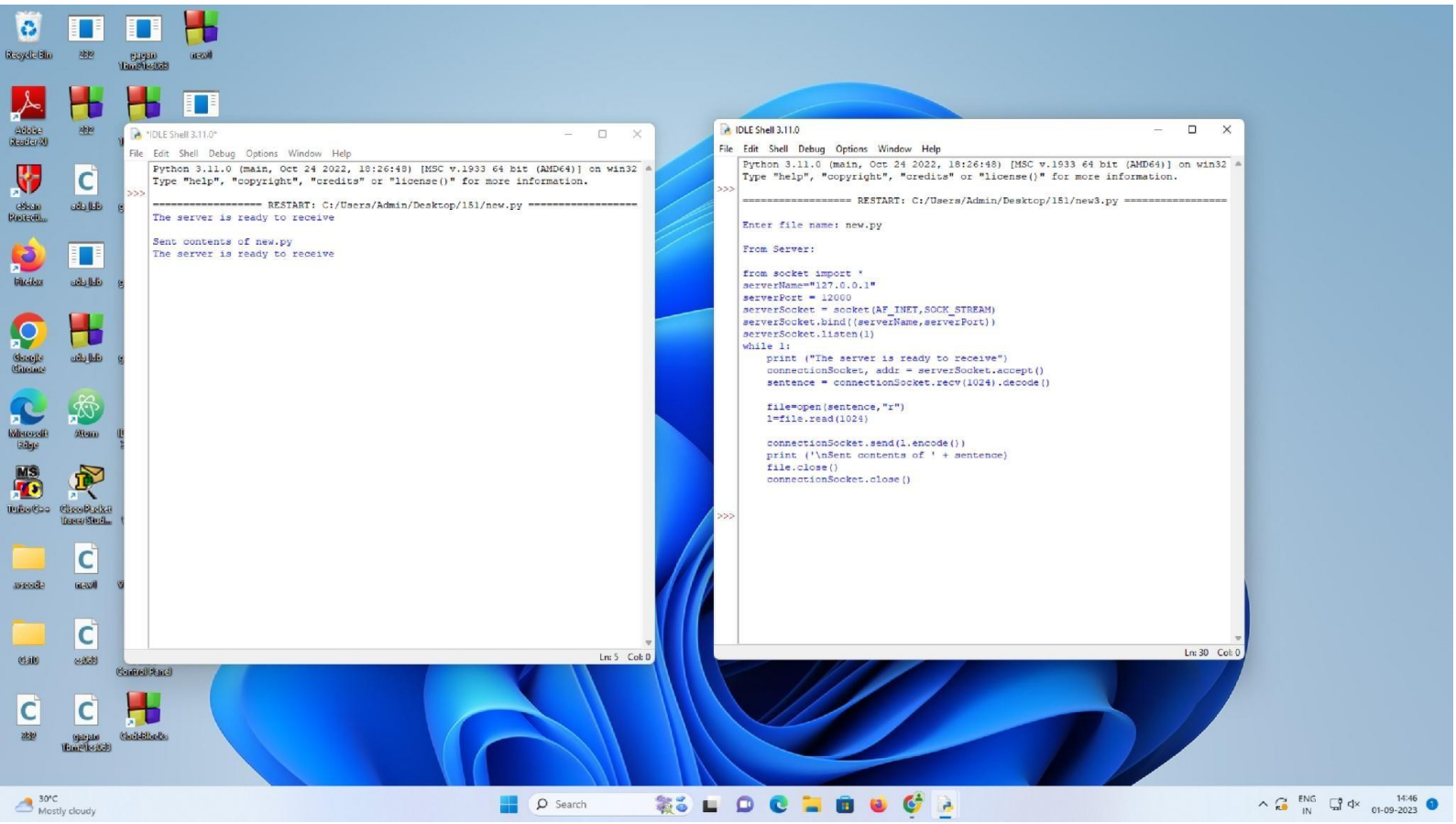
→ Reply from server: All the contents were displayed

Server: The server ready to receive

Sent contents of server.py

19/9

2/9/23


IDLE Shell 3.11.0
File Edit Shell Debug Options Window Help
Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/Admin/Desktop/151/new.py ==========
The server is ready to receive
Sent contents of new.py
The server is ready to receive
Ln: 5 Col: 0
IDLE Shell 3.11.0
File Edit Shell Debug Options Window Help
Python 3.11.0 (main, Oct 24 2022, 18:26:48) [MSC v.1933 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/Admin/Desktop/151/new3.py ==========
Enter file name: new.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()
>>>
Ln: 30 Col: 0