VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

COMPUTER NETWORKS LAB

Submitted by

ADVITHI D (1BM21CS009)

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 LAB" carried out by **ADVITHI D (1BM21CS009),** who is 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 Lab- (22CS4PCCON)** work prescribed for the said degree.

Name of the Lab-Incharge -Dr .Nandini Vineeth	**Dr. Jyothi S Nayak**
Assistant professor	Professor and Head
Department of CSE	Department of CSE
BMSCE, Bengaluru	BMSCE, Bengaluru

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CYCLE-1

EXPERIMENT NO-1

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

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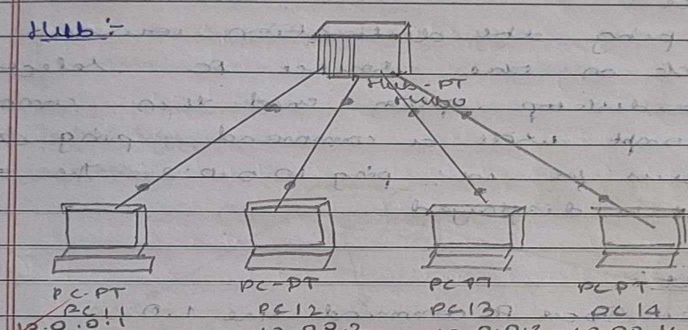
Experiment-1

Aim:- To create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping message.

Topology:-

Hub:-



Procedure:-

* select PC from end devices in the bottom toolbar and place them in the workspace.
* add the ip address for each one of them by selecting the PC and fastethernet option in config add IP address.
* connect the PC with the hub using copper straight through to different ports. to add an extra port select hub and add a port in physical device by turning on the hub again

connection is active.

*) select the source and destination and add the simple PDU from source to destination.

*) Hub sends the message to all devices in network but only the destination PC sends back acknowledgment the acknowledge message is also set to all device but only accepted by the source.

*) To ping the destination source: click on the source PC, select the ~~com~~ desktop option and then command prompt write a command ping destination IP-address for ex: ping 10.0.0.2. The output will be displayed.

Result:-

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=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128

Ping statistics for 10.0.0.3:
Packets: sent =4, Received=4, Lost=0(0% loss),
Approximate round trip time in milli-seconds:
minimum = 4 ms, Maximum = 4ms, Average = 4ms

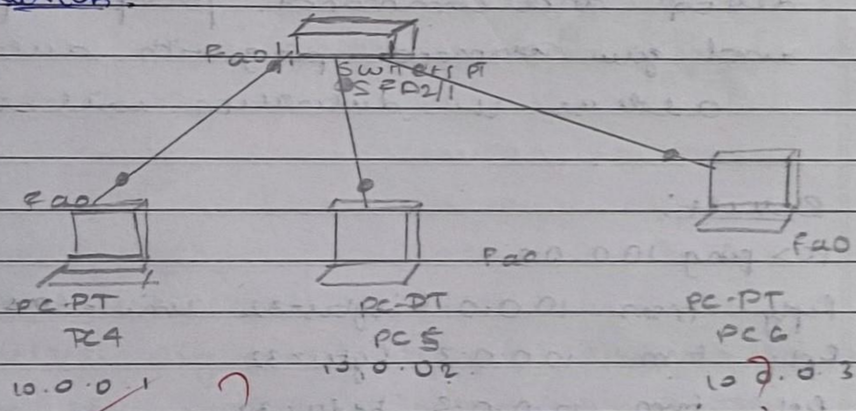
Observation:

*) the message is sent from source to all devices in network but every other device rejects the message except destination and acknowledge message from destination is sent to other devices in network through the hub.

*) message goes from source to hub and then other devices. the acknowledge message is accepted by only the source device.

Topology

switch:



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Procedure:

*) select pc's from realtime mode and place on workspace.

*) place a generic switch on the workspace connect each one of the pc's using copper straight through connection with the switch add IP address to the pc's and select the source and destination

* add simple pdu to the source and destination in simulation mode select autocapture/play after the connection turns green.

observation:

* the message is sent from source to the switch. switch sends the message to destination device.
* In return the acknowledge message from destination is sent to the source.
* to observe output in realtime mode the source is selected and select desktop and command prompt option and give command ping with destination address. the destination will be pinged.

Result:

PC> ping 10.0.0.3

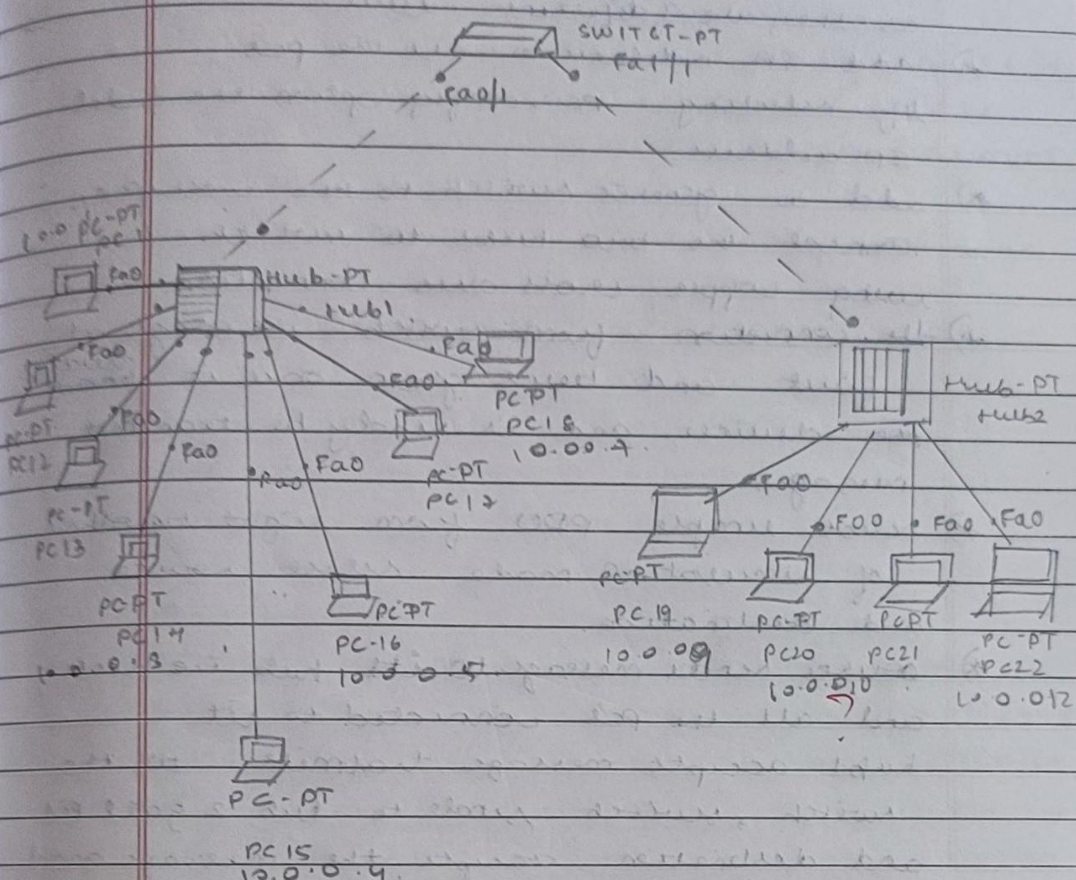
Reply from 10.0.0.3 : bytes=32 time=6ms TTL=128

Reply from 10.0.0.3 : bytes=32

Reply from 10.0.0.3 : bytes=32

Reply from 10.0.0.3 : bytes=32

Topology:



Procedure:

1) select any number of pc's and add them to the workspace. maximum number of pc's that can be connected are 10 by adding ports.

2) add ports to the hub by selecting hub and adding ports. by switching off the hub and then add ports then the hub on connections are green indicating the active network.

3) add some more pc's to the workspace and connect them to another hub.

*) use copper straight through connection as they are of different level.
*) add IP address to all the pc's, by selecting PC, config option the add IP address.
*) add a generic switch to the workspace, connect the two hubs to switch using copper cross over connection.
*) the connection from switch is orange at first and turns green once it studies the device and is ready to transmit messages.
*) select simple PDU from right toolbar of simulation mode. select source and destination.
*) source sends message to its hub i.e hub1 and all the pc's connected to it. hub1 accepts message transmits to the switch, switch sends to hub 2 & all pc's and destination accepts the message and acknowledgment is also sent back.

Observation:
*) Once you select the source PC in hub1 and destination pc in hub2, source sends message to the hub it is connected to and all other pc's connected to the same hub i.e, hub1, and is accepted by hub1.
*) Hub1 transmits the message to the switch which forwards it to hub 2,
*) message from hub2 is sent to all pc's connected to it, the message is accepted by

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destination pc of hub 2.

*) acknowledgement from destination is sent to hub 2 (the hub it is connected to) and all the PC's connected to the same hub. hub 2 accepts acknowledgement forwards it to switch.

*) switch sends the acknowledge message to the hub1 containing source and then hub1 sends the message to its PC's.

*) acknowledgement is received by the source in hub 1.

Result:-

PC> ping 10.0.0.9.
Pinging 10.0.0.9 with 32 bytes of data:
Reply from 10.0.0.9: bytes=32 time=17ms TTL=128
Reply from 10.0.0.9: bytes=32 time=8ms TTL=128
Reply from 10.0.0.9: bytes=32 time=8ms TTL=128
Reply from 10.0.0.9: bytes=32 time=8ms TTL=128
Ping statistics for 10.0.0.9:
Packets: sent=4, Received=4, Lost=0 (0% loss).
Approximate round trip times in milli-seconds:
Minimum=8ms, Maximum=17ms, Average=10ms

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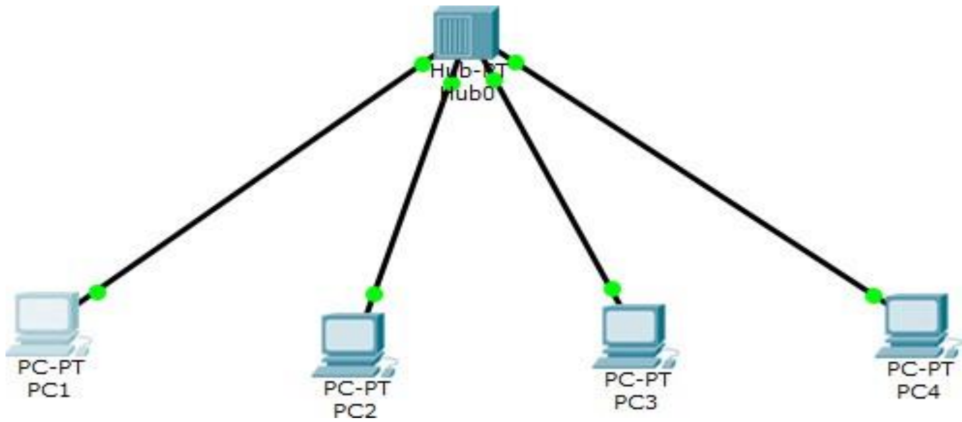
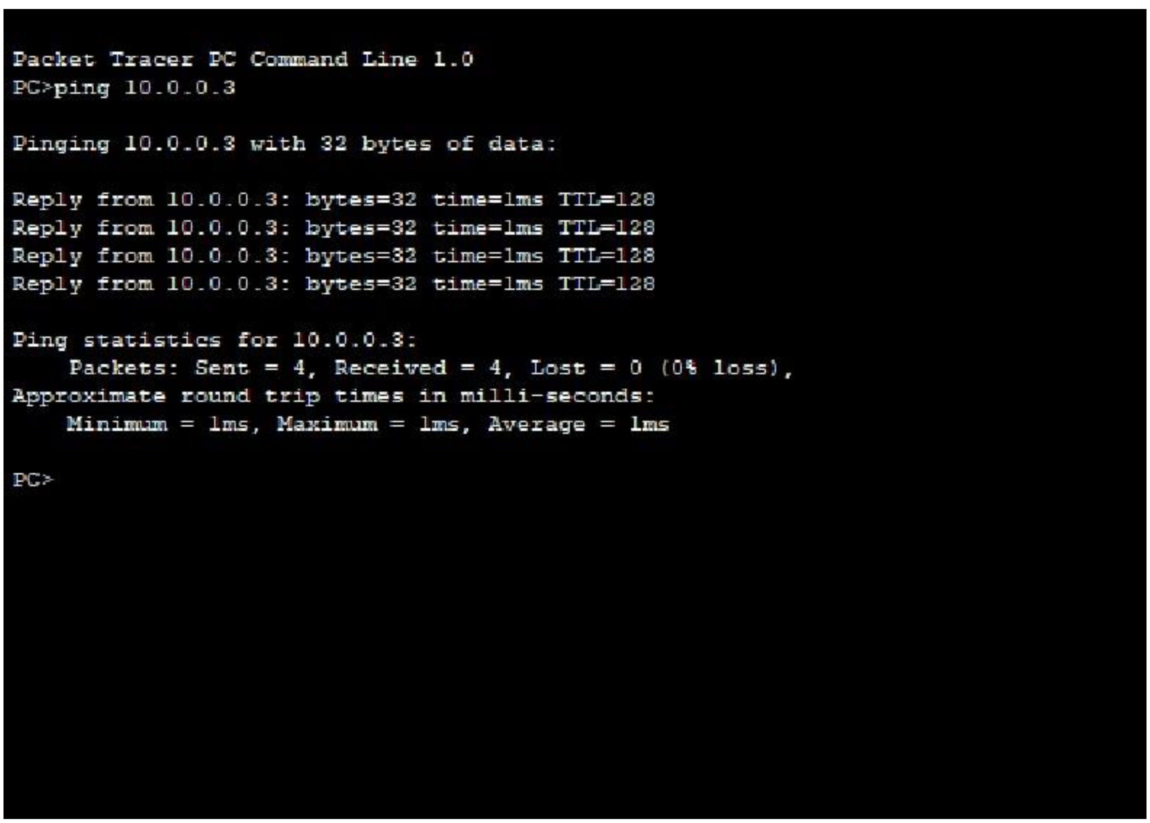
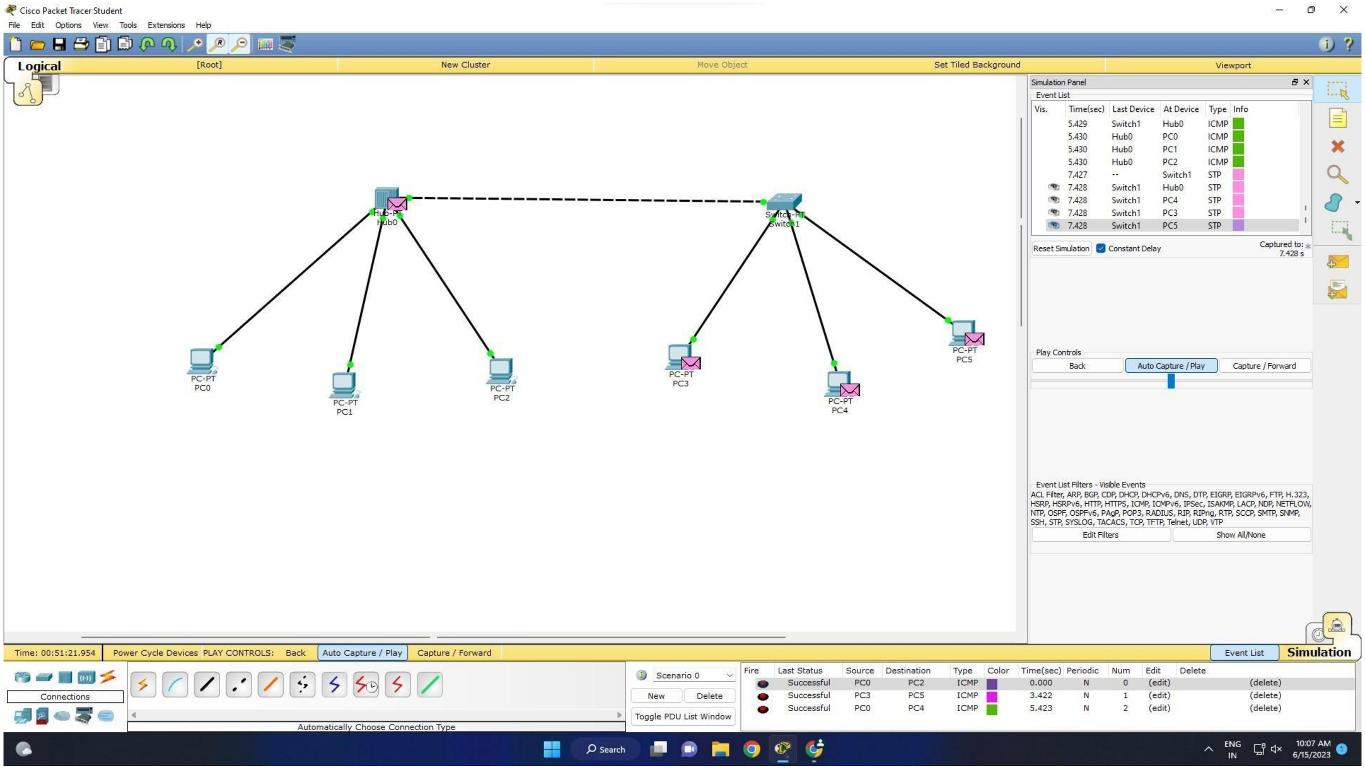
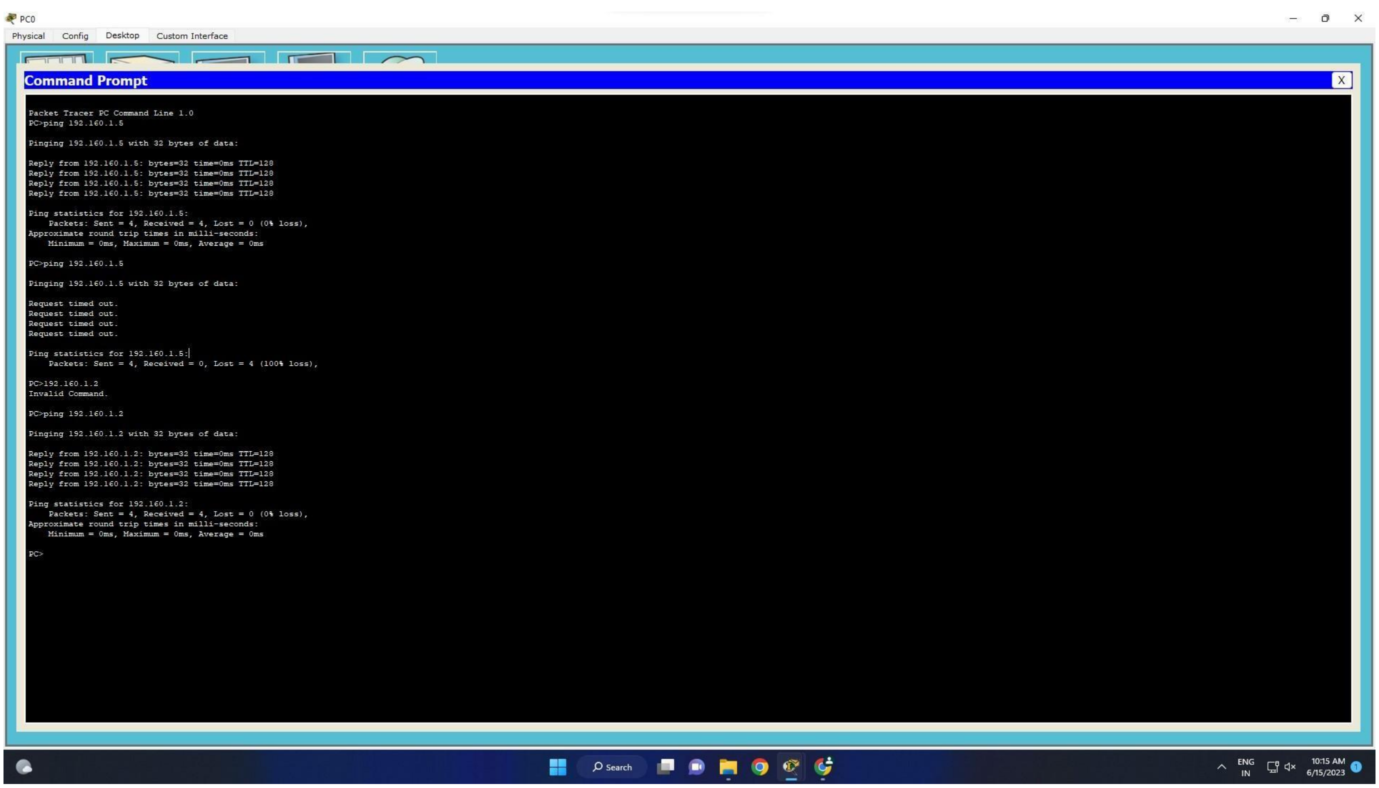
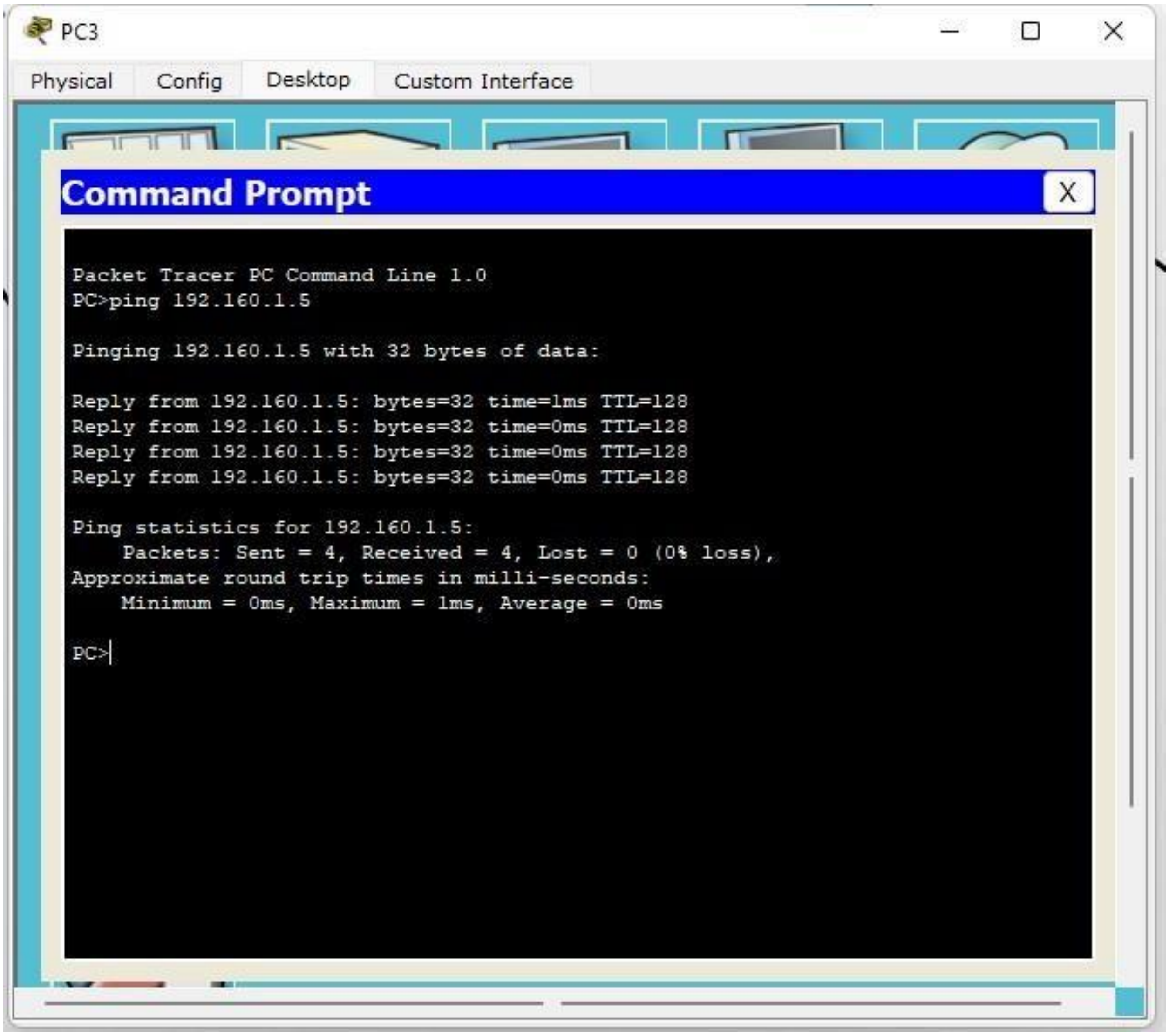

Hub-PT
Hub0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
PC-PT
PC4


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=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms TTL=128
Reply from 10.0.0.3: bytes=32 time=1ms 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 = 1ms, Maximum = 1ms, Average = 1ms
PC>


Cisco Packet Tracer Student
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
PC-PT
PC4
PC-PT
PC5
Play Controls
Back
Auto Capture / Play
Capture / Forward
Time: 00:51:21.954
Event List
Simulation


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
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=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 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>ping 192.160.1.5
Pinging 192.160.1.5 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.160.1.5:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>192.160.1.2
Invalid Command.
PC>ping 192.160.1.2
Pinging 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 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
PC>


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>

EXPERIMENT NO-2

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

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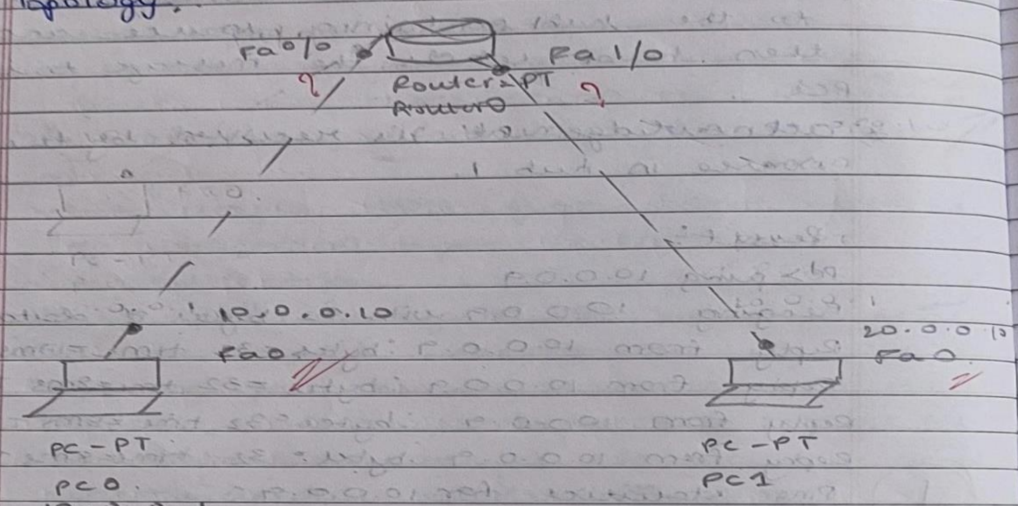
Thursday

Experiment 2

Aim:- configure IP address to router. Explore following messages: ping responses, destination unreachable, request timed out, reply.

Topology:-



Procedure:-

*) add a router and 2 pc's in the workspace
*) add labels of IP addresses to each of the devices.
*) add IP address of PC1 as 10.0.0.1 in config and set gateway to 10.0.0.10 in the global setting option.
*) similarly set IP of PC2 to 20.0.0.1 and

gateway as 20.0.0.10.
*) here select a copper cross over connection to connect the PC's to the router.
*) the ip address of end devices PCs are set by clicking config → fastethernet → IP address global settings → gateway.
*) set up the interface of router from following commands: enter no and press enter for the router. once Router> appears start:
Router> enable
Router# config t
Router(config)# interface fastethernet 0/0
Router(config-if) # IP address 10.0.0.10 255.0.0.0
Router(config-if) #no shut
Router (config-if) # exit
similarly to set interface of router with PC1 press '↑' key and ~~change~~. set
#interface fastethernet 1/0
#IP address 20.0.0.10 255.0.0.0.
[to remove IP address no IP can be used]
#no shut
#exit
show IP rout can be used to see the IP rout configuration.

Observation:-
*) after following the procedures specified select one end device PC0.
*) click on PC0 select desktop → command prompt
*) give a command to ping PC1 i.e.,
PC> ping 20.0.0.1

the first output will be received
as Request timed out.

*) Therefore the command should be given again.

PC> ping 20.0.0.1

PC0 pings PC1 through the router.

*) Interface set of router with 2 different end devices helps it to receive message from PC0 and then send it to PC1 with IP address gateway address 20.0.0.10 and IP address 20.0.0.1.

*) when PC0 sends message the message is first received by router then sent to PC1.

Result:

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=0 ms TTL=127

Reply from 20.0.0.1: bytes=32 time=0ms TTL=127

Reply from 20.0.0.1: bytes=32 time=0ms 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 = 0ms, Average = 0ms.

PC> ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time=2ms TTL=127

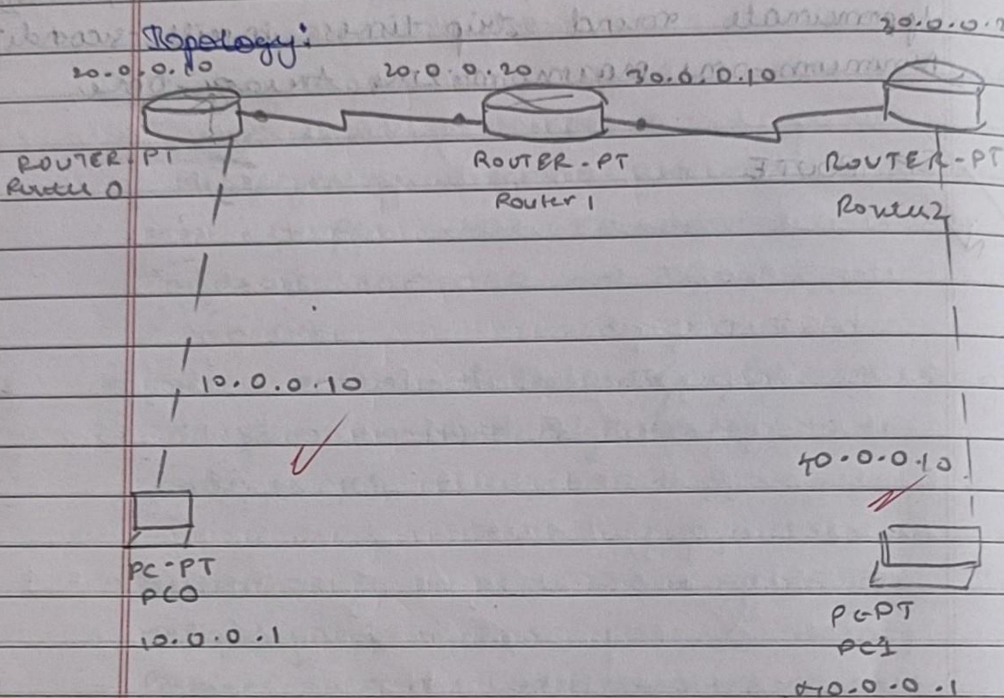
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127

Reply from 20.0.0.1: bytes=32 time=0ms TTL=127
Reply from 20.0.0.1: bytes=32 time=0ms TTL=127

Ping statistics for 20.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% Loss),
Approximate round trip times in milli-seconds
Minimum = 0ms, Maximum = 2ms, Average = 0ms

Aim: configure IP address to routers, Explore following messages: ping responses, destination unreachable, request timed out, reply.

Topology:



Procedure:

* Add three generic routers to the workspace, add 2 end devices to the workspace.
* Label the IP address and gateway address of end devices and routers.
* Select one end device PC0
  Config → fast ethernet → IP address set IP address as 10.0.0.1
  Config → global settings → gateway set gateway to 10.0.0.10.
* Select another end device PC1 set IP address

as 40.0.0.1 and ~~gateon~~ gateway as 40.0.0.10 using similar steps.

*) connect PC0 to router0 using copper cross over from fastethernet of PC0 to fastethernet 0/0.

*) connect router0 to router1 ~~are~~ using serial cable from serial 2/0 of router0 to serial 2/0 of router1.

*) connect router1 to router2 using serial cable using serial 3/0 of router1 and serial 2/0 of router 2.

*) another end device PC1 is connected to router2 using copper (cross) over connection from fastethernet of PC1 to fastethernet 0/0 of router 2.

*) Interface of routers are set by following commands:- select a Router → CLI.

<u>for</u> <u>Router 0</u> ; press no and enter.

Router>enable
Router#config t
Router(config)#interface fastethernet 0/0
Router(config)#IP address 10.0.0.10 255.0.0.0
Router(config-if)# no shut
Router(config-if)# exit
Router (config)# interface serial 2/0
Router(config-if) # IP address 20.0.0.10 255.0.0.0
Router(config-if) # no shut
Router(config)# exit
Show IP rout

<u>similarly for Router1</u>: enter no and press enter

Router>enable
Router# config t
Router(config)# interface serial 2/0

Router(config-if)#IP address 20.0.0.20 255.0.0.0
Router(config-if)# no shut
Router(config-if)#exit
Router(config-if)#interface serial2/0
Router(config-if)#IP address 30.0.0.10 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit
similarly for router 2.
type no press enter, press enter.
Router>enable.
Router# config t
Router(config)# interface serial 2/0
Router(config-if)#IP address 30.0.0.20 255.0.0.0
Router(config-if)# no shut
Router(config-if)#exit
Router(config-if)# interface fastethernet 0/0
Router(config-if)#IP address 40.0.0.10 255.0.0.0
Router(config-if)#no shut
Router(config-if) #exit.
show IP rout
* now select PC0 and device.
desktop → command prompt
PC> ping 40.0.0.1
will be unable to ping therefore to configure
routers :→
select Router0 → CLI
Router# config t
Router(config-if) # IP rout 30.0.0.0 255.0.0.0 20.0.0.20
Router(config-if)#IP rout 40.0.0.0 255.0.0.0 20.0.0.20
Router(config-if)#exit.
Show IP rout

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similarly for Router1
Router#config t
Router(config-if)#IP rout 10.0.0.0 255.0.0.0 20.0.0.10
Router(config-if)#IP rout 40.0.0.0 255.0.0.0 30.0.0.20
Router(config-if)#exit
show IP rout
similarly for Router2
Router# config t
Router(config - if)# IP rout 10.0.0.0 255.0.0.0 30.0.0.10
Router(config - if)# IP rout 20.0.0.0 255.0.0.0 30.0.0.10
Router (config - if)#Exit
show IP root.

*) select enddevice PC1 → desktop→ commandprompt PC> ping 10.0.0.1 the device will be pinged.

Observation:

*) a selected end device will not be able to ping the destination before the router is configured.

*) destination is pinged after the procedure is completed.

IP ROUTE TAB

for Router0
show IP rout
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 type1, 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/...

which PC from

PING OUTPUT

case1 (when it is unreachable)

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

Reply from 10.0.0.10: Destination host unreachable.

Ping statistics for 40.0.0.1:

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

RESULT

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 =3ms TTL=125

Reply from 10.0.0.1: bytes=32 time=1ms 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:

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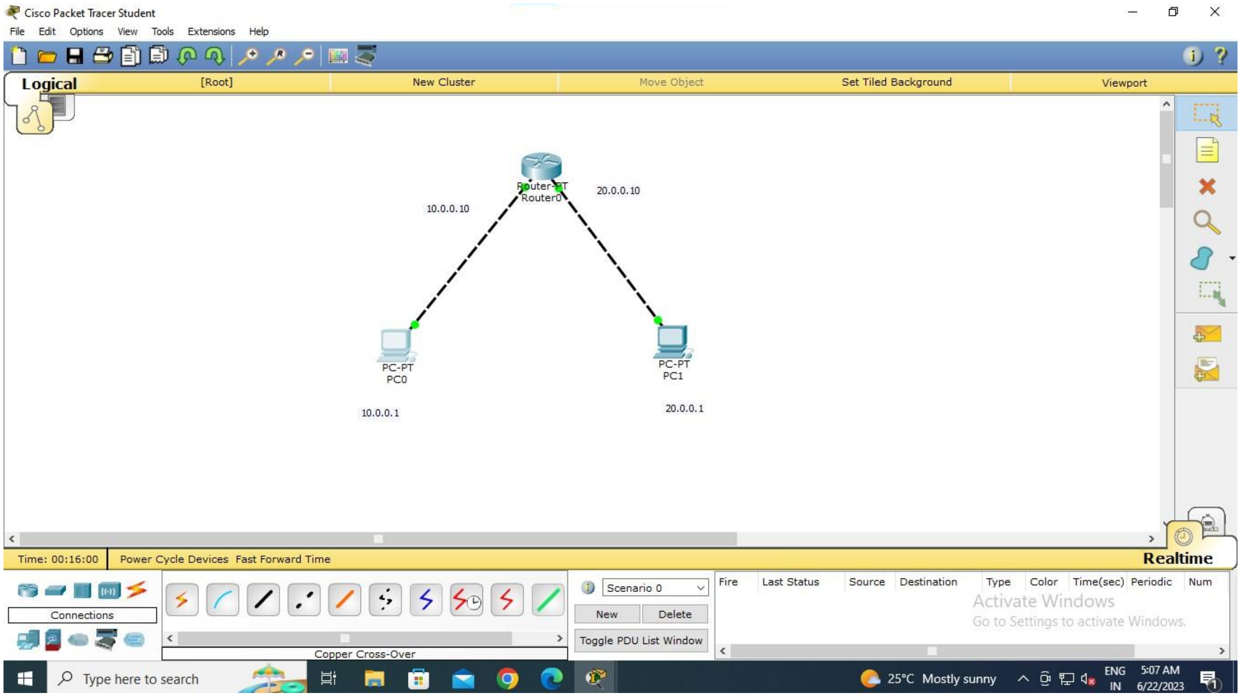
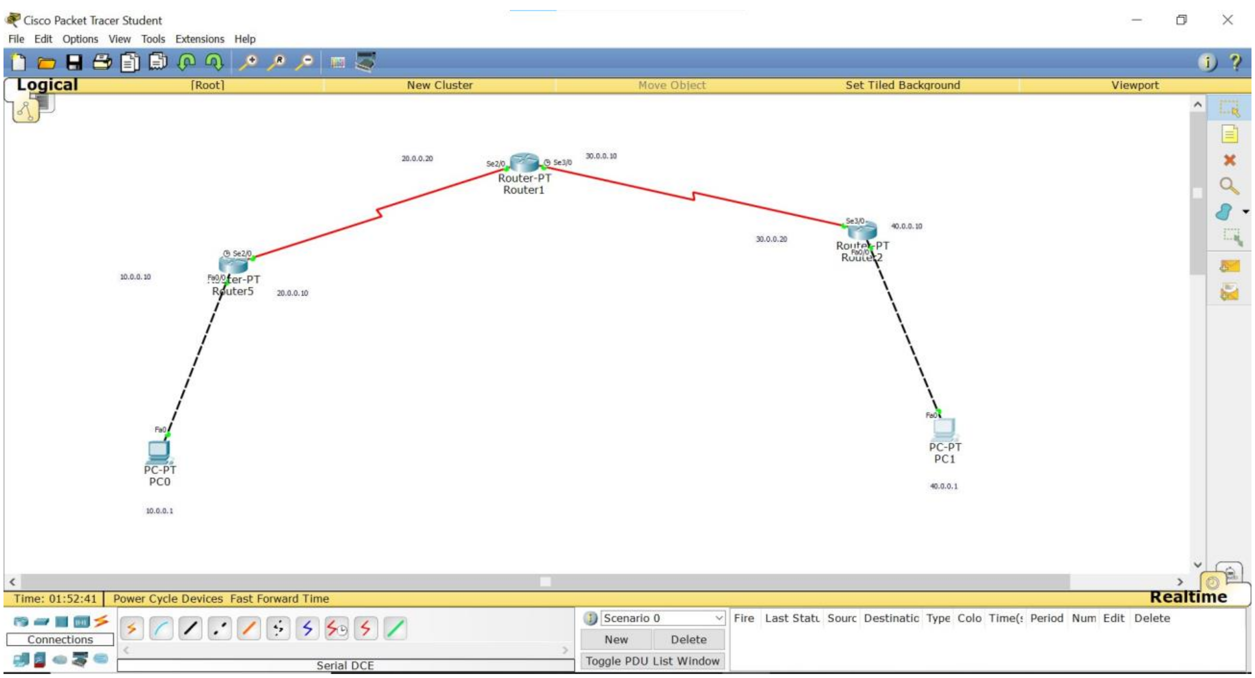
Minimum = 2ms, Maximum = 11ms, Average = 4ms

TOPOLOGY:

PROGRAM 2.1

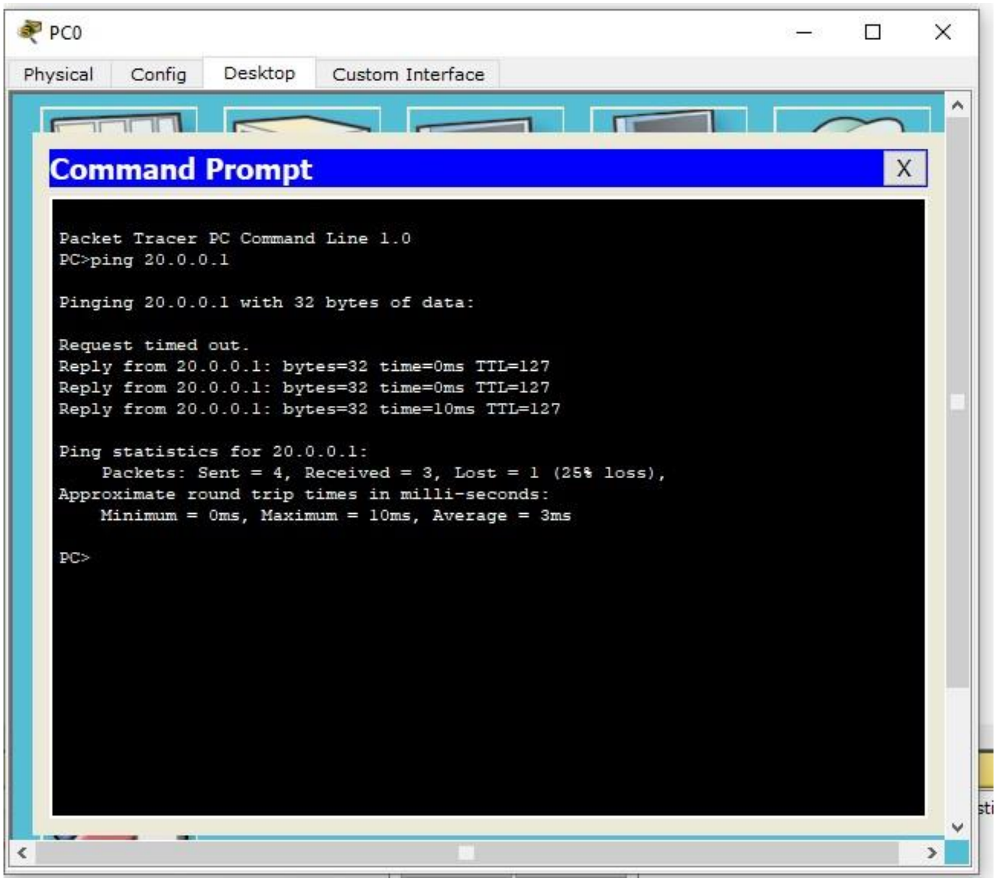


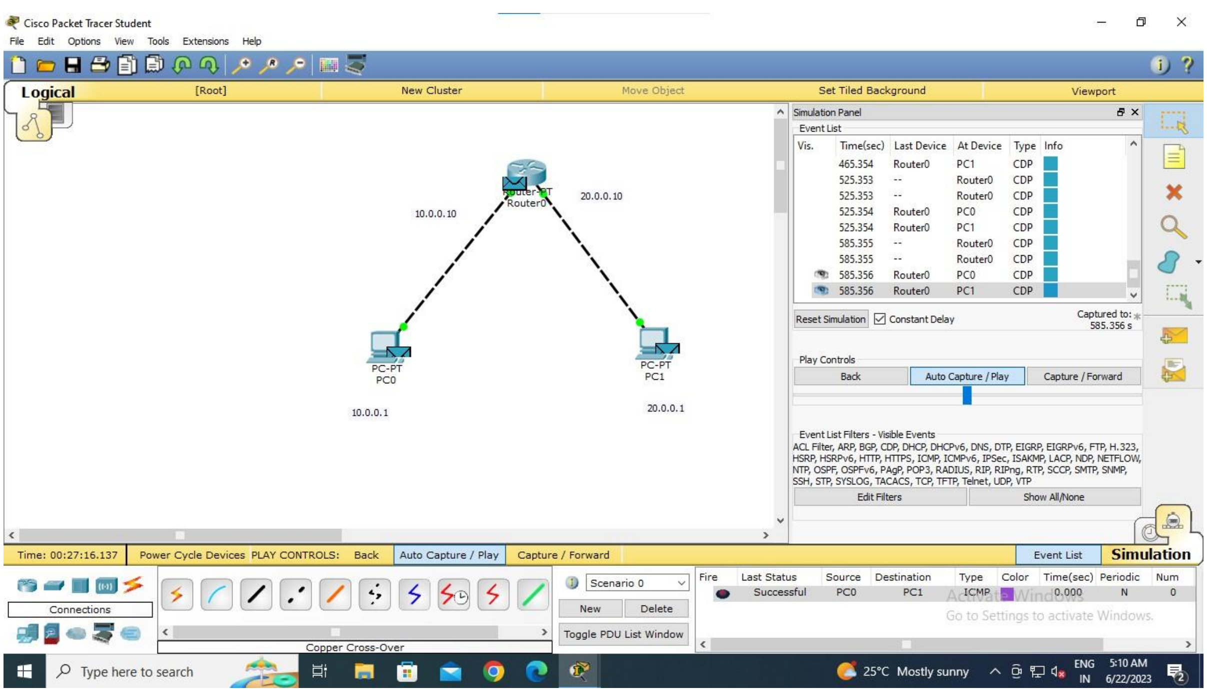
PROGRAM 2.2



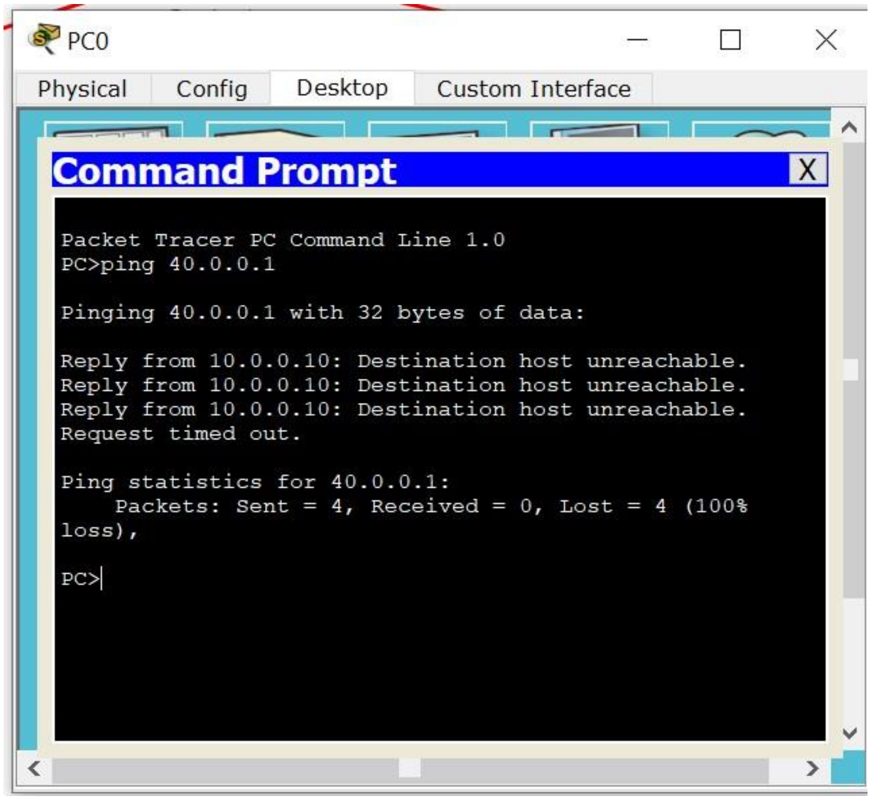
OUTPUT:

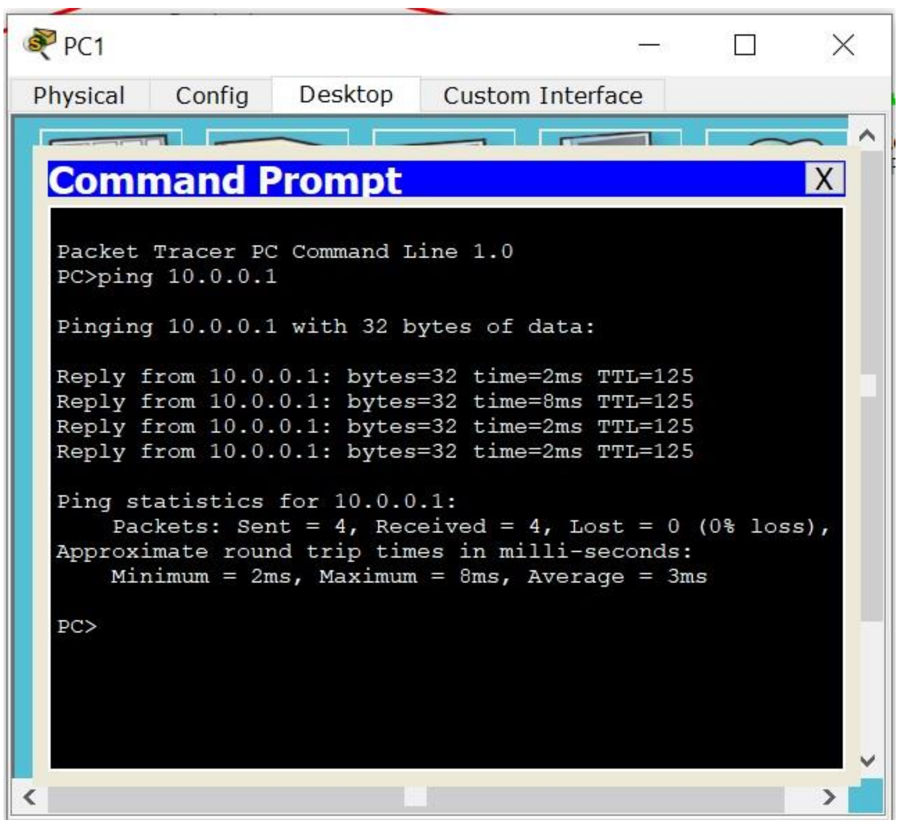
PROGRAM 2.1

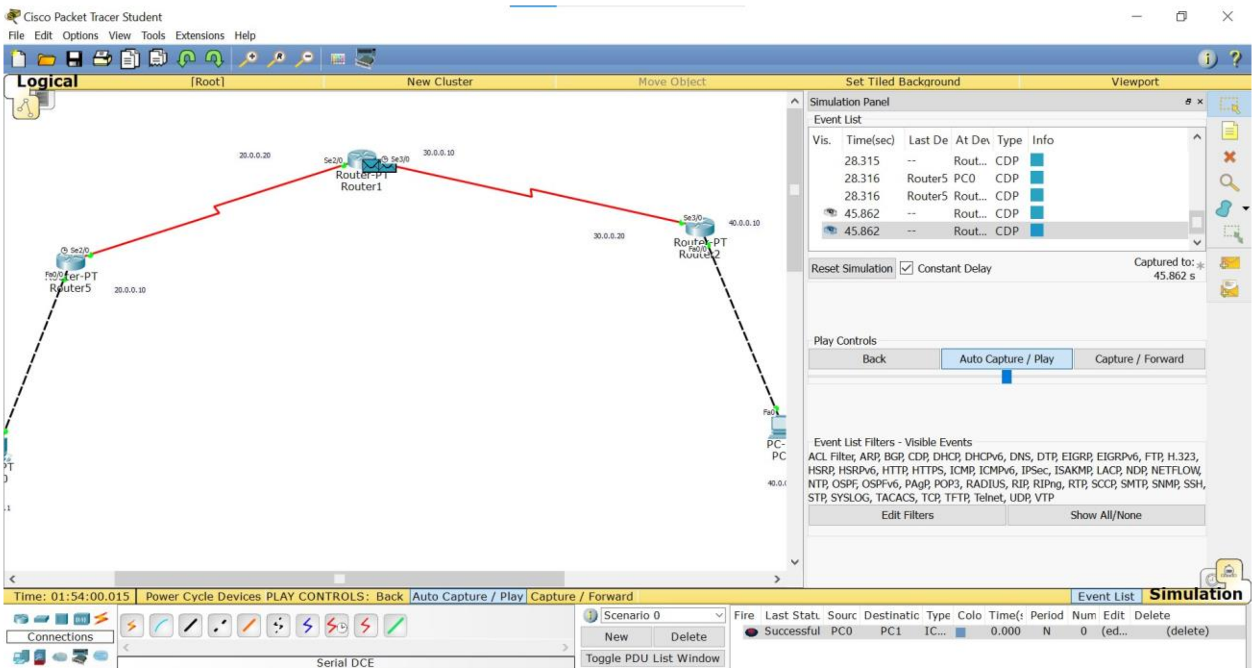




PROGRAM 2.2


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
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
X
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.1
Pinging 10.0.0.1 with 32 bytes of data:
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=8ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125
Ping statistics for 10.0.0.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 8ms, Average = 3ms
PC>


Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router1
Router5
Router2
Simulation Panel
Event List
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
Event List
Simulation
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Successful PC0 PC1

EXPERIMENT NO-3

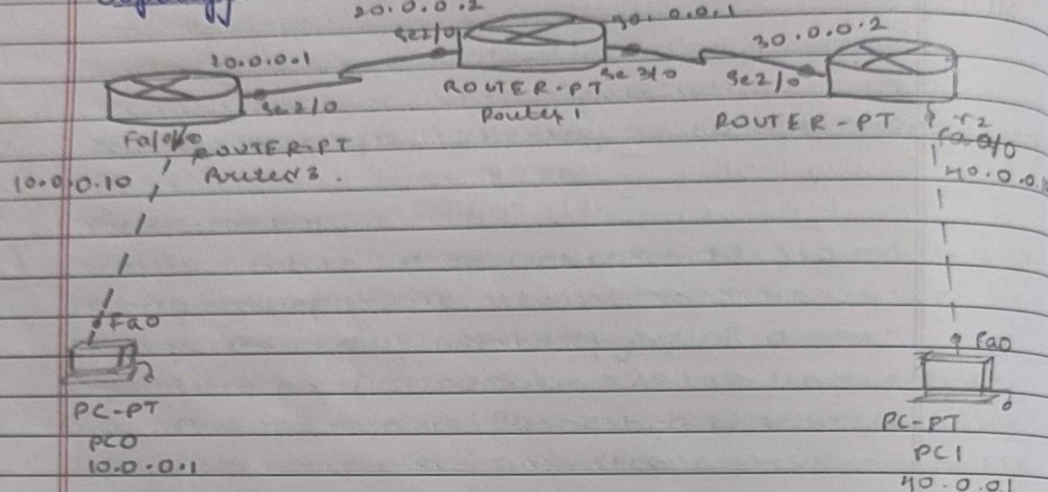
Configure default route, static route to the Router.

14/7/23

Experiment -3

Aim:- Configuration of default router.

Topology:-



Procedure.

*) select three router and drop them to the workspace, select two end devices (PC's) and drop them to the workspace.

*) connect the PC's to the router using copper cross over. PC0 is connected to router 3 using copper cross over PC0 fastethernet 0 to fastethernet 0/0 of router 3.

*) router 3 is connected to router 1 using serial DTE from serial 2/0 to serial 2/0.

*) Router 1 is connected to router 2 using serial DTE from serial 3/0 to serial 2/0 of router 2

*) PC1 is connected to router 2 using copper cross over

from fastethernet 0 to fastethernet 0/0 of Router 2.

* IP and gateway address of PC0 is 10.0.0.1 and 10.0.0.10 is set by selecting PC0 config → fastethernet → IP address set as 10.0.0.1
config → global settings → gateway set gateway as 10.0.0.10.
* select PC1 config → fastethernet → IP address set as 40.0.0.1
config → global settings → gateway set gateway to 40.0.0.10.
* Interface of Routers are set by following commands :→ select router → CLI.

for Router 3 :- type no and enter

Router>enable
Router#configt
Router(config)# interface fastethernet 0/0
Router(config-if)# IP address 10.0.0.10 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit.
Router(config)#interface serial 2/0
Router(config)# IP address 20.0.0.1 255.0.0.0
Router(config)#no shut
Router(config)#exit.

similarly for Router 1:

Router>enable
Router#configt
Router(config)# 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

Router(config)# interface serial 3/0
Router(config-if)# IP address 30.0.0.1 255.0.0.0
Router(config-if) # no shut
Router(config-if) # exit
For router-2
Router >enable
Router # config t
Router(config) # interface fastethernet 0/0
Router(config-if) # IP address 40.0.0.10 255.0.0.0
Router(config-if) # no shut
Router (config-if) # exit
Router (config) # interface serial 2/0
Router (config-if) # IP address 30.0.0.2 255.0.0.0
Router (config-if) # no shut
Router (config-if) # exit

2) To set IP routes for all the routers for all routes via routers.
For router 3 and router 2, default routing is done and for router 1, static routing is done.

Router-3
Router# config t
Router(config) # IP route 0.0.0.0 0.00.0 20.0.0.2
Router (config) # no shut
Router (config) # exit.
show IP rout
C 10.0.0.0/8 is directly connected, FastEthernet 0/0
C 20.0.0.0/8 is directly connected, serial 2/0
S 0.0.0.0/0 [1/0] via 20.0.0.2.
Similarly for router 2
Router# config t
Router(config) # IP rout 0.0.0.0 0.00.0 30.0.0.1

Router(config)#exit

For router 1

static routing will be done

Router#config t

Router(config)#IP route 10.0.0.0 255.0.0.0 20.0.0.0

Router(config)#IP route 40.0.0.0 255.0.0.0 30.0.0.0

Router (config)#exit

show IP route

S 10.0.0.0/8 [1/0] via 20.0.0.0

C 20.0.0.0/8 is directly connected serial 2/0

C 30.0.0.0/8 is directly connected, serial 3/0

S 40.0.0.0/8 [1/0] via 30.0.0.0

Ping output (unreachable case)

ping from the command prompt of 40.0.0.1 to the 10.0.0.1

PC> ping 10.0.0.1

pinging 10.0.0.1 with 32 bytes of data

Request timed out.

Reply from 10.0.0.1: bytes=32 time=26ms TTL=125

Reply from 10.0.0.1: bytes=32 time=4ms 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=3, Lost=1 (25% loss),

Approximate round trip times in milli-seconds:

Minimum = 2ms, Maximum=26ms, Average=10ms

RESULT (from 40.0.0.1) to 10.0.0.1

PC> ping 10.0.0.1

pinging 10.0.0.1 with 32 bytes of data:

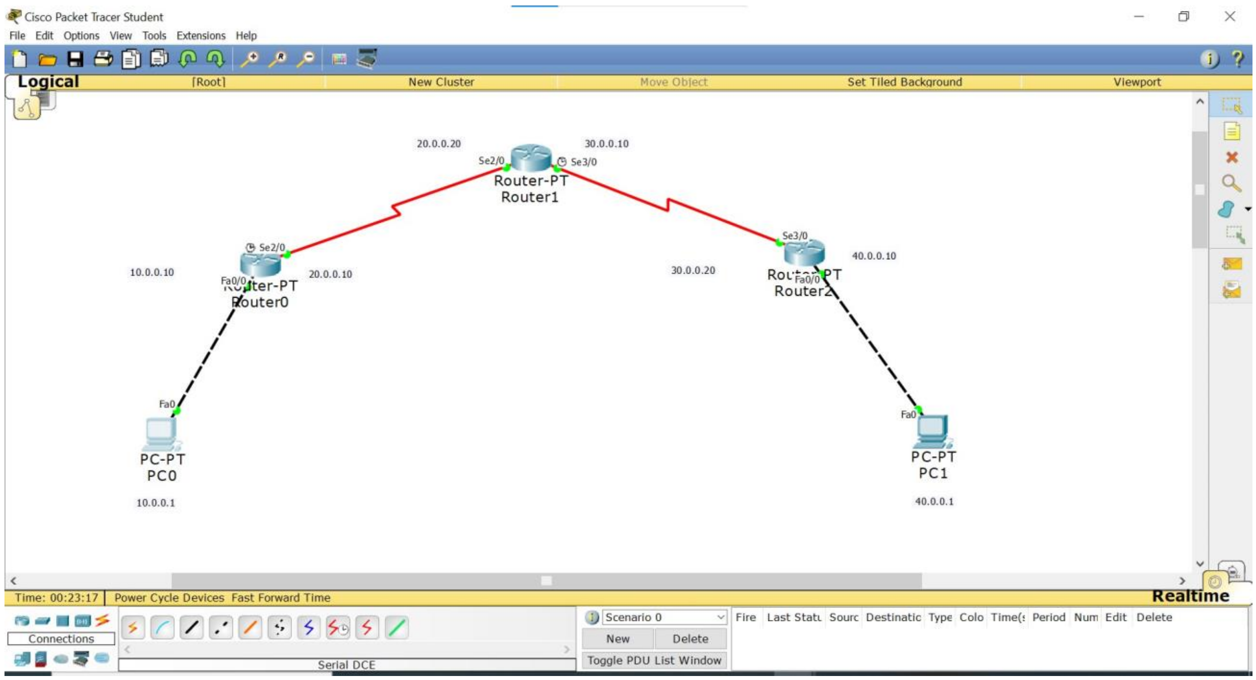
Reply from 10.0.0.1: bytes=32 time=2ms TTL=125

Reply from 10.0.0.1: bytes=32 time=8ms TTL=125

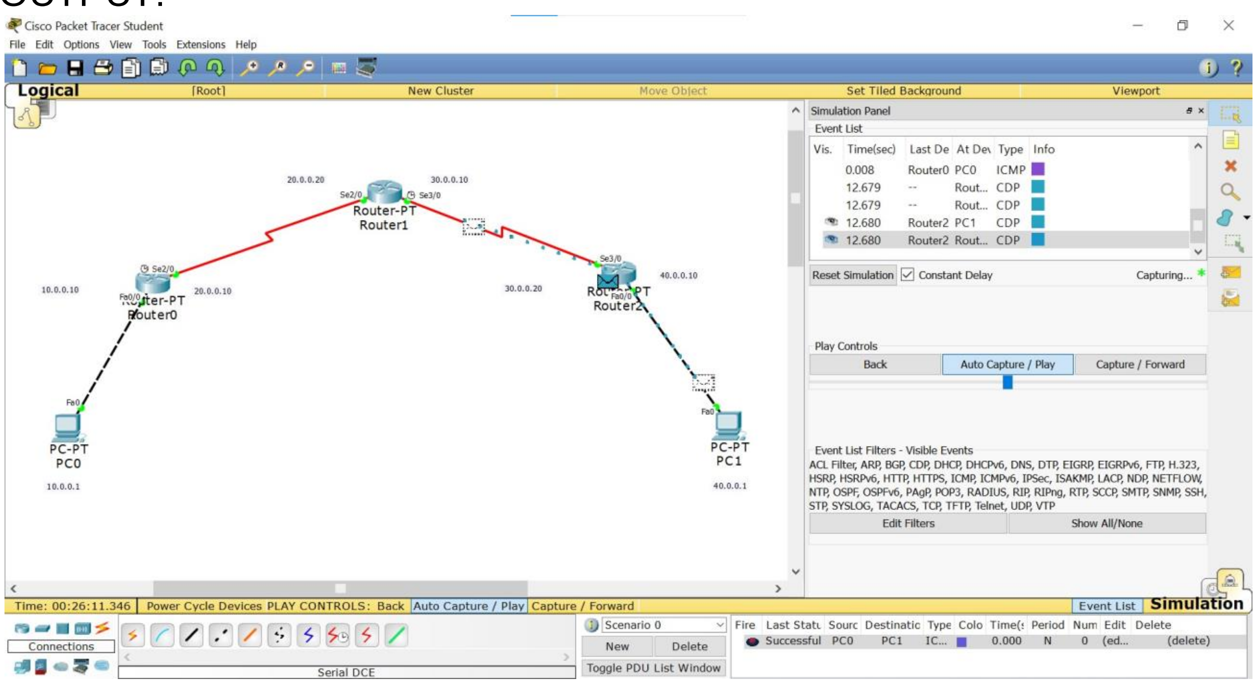
Reply from 10.0.0.1: bytes = 32 time = 2ms TTL = 125
Reply from 10.0.0.1: bytes = 32 time = 12ms TTL = 125
ping statistics for 10.0.0.1:
Packets: sent = 4, Received = 4, Lost = 0 (0% Loss)
Approximate round trip times in milli-seconds
minimum = 2ms, maximum = 12ms, Average = 6ms

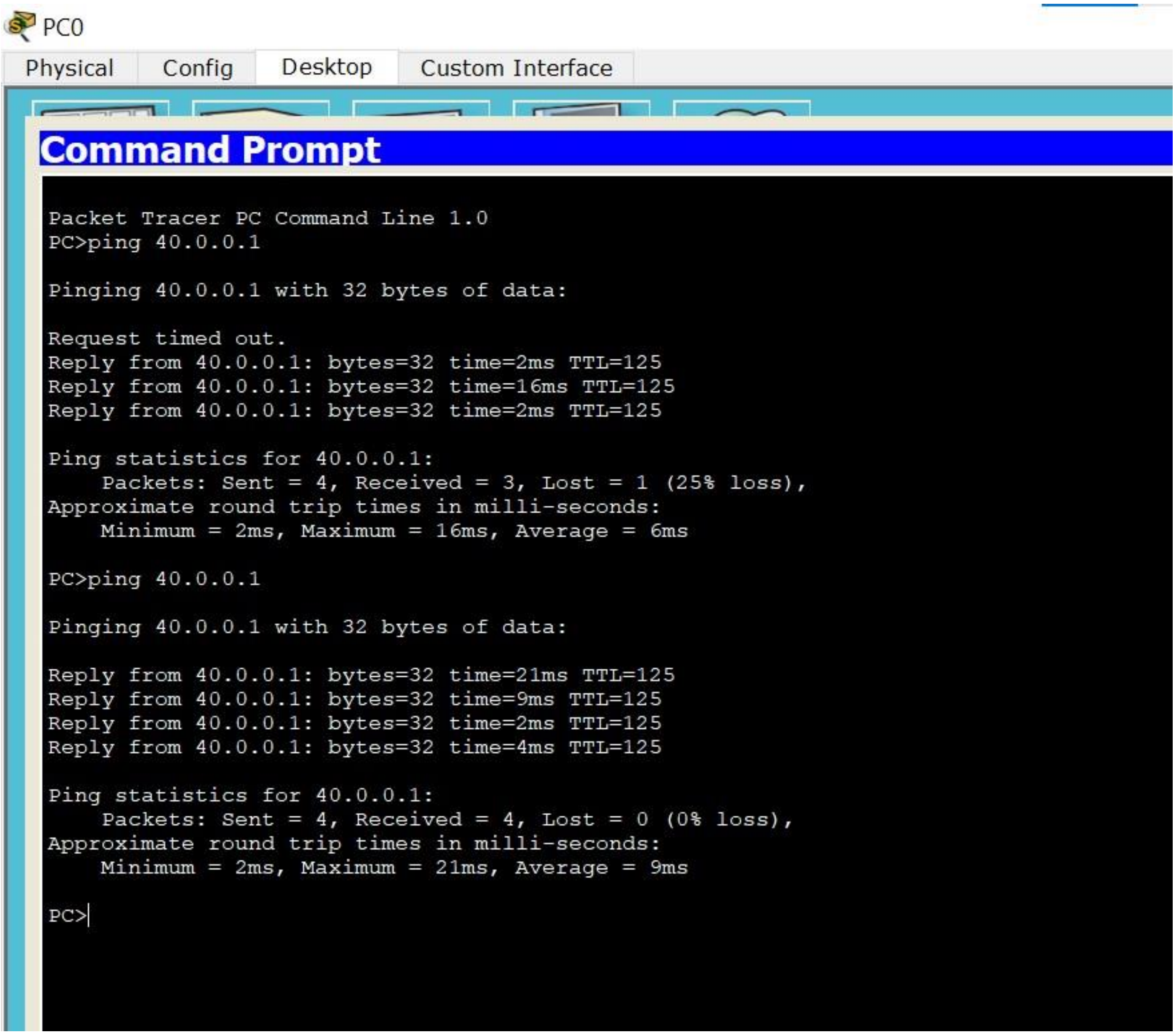
10/10

28/7/23


Cisco Packet Tracer Student
Router-PT
Router1
Router-PT
Router0
Router2
PC-PT
PC0
PC-PT
PC1
20.0.0.20
30.0.0.10
10.0.0.10
20.0.0.10
30.0.0.20
40.0.0.10
10.0.0.1
40.0.0.1
Time: 00:23:17
Realtime

OUTPUT:


Cisco Packet Tracer Student
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Time: 00:26:11.346
Simulation
Successful PC0 PC1


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>

EXPERIMENT NO-4

Configure DHCP within a LAN and outside LAN.

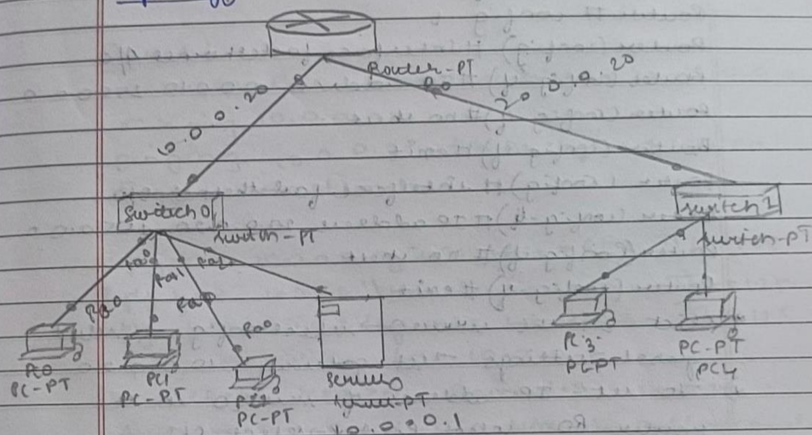
Bafna Gold
Date: Page:

14/7/23.

Experiment - 4

Aim: secure LAN connection within and outside the network using routers and switches.

Topology.



Procedure:-

*) select one router two switches generic PC's and a server drop them to the workspace.

*) connect two switches to the router using copper straight through connection. one switch is connected to PC's and a server using copper straight through connection while another switch is connected to two PC's

*) set the IP address of the server as 10.0.0.1 click on the server -> select services -> select DHCP save the current IP address and

check IP address of all other devices in network by selecting the device → select desktop → select IP configuration.

* select the router, click router → select CLI and enable the router, enter no password.

Router> enable
Router # config t
Router(config) #interface fastethernet 4/0
Router (config-if) # IP address 10.0.0.10 255.0.0.0
Router(config-if)# no shut
Router (config-if) # exit
Router (config)# interface fastethernet 0/0
Router (config-if)# IP address 20.0.0.20 255.0.0.0
Router(config-if) # no shut
Router (config-if) # exit.

* click on the server0 → select config → select global → settings → set gateway 10.0.0.20

* To set IP address of server0 in the router R0, select Router → select CLI.

Router # config t
Router(config) # interface fastethernet 0/0
Router(config-if) # IP helper-address 10.0.0.1
Router(config-if) # no shut
Router(config-if) # exit

* click on the server0 → select services → select DHCP → add a new IP address set IP address as 20.0.0.2.

* select PC3 (PC out of the network) PC in the other switch PC3 or PC4 : click PC3 → select desktop → select IP configuration. in IP configuration with two options DHCP and static. select DHCP IP gateway

can be seen.

observation.

* The IP address of the other LAN is dynamically set. The IP helper-address command helps us to find the server.

Result:

PC2 to PC0 whose address is 10.0.0.2

PC> ping 10.0.0.2

pinging 10.0.0.2 with 32 bytes of data:

Request timed out

Reply from 10.0.0.2: bytes=32 time=6ms TTL=125

Reply from 10.0.0.2: bytes=32 time=2ms TTL=125

Reply from 10.0.0.2: bytes=32 time=12ms TTL=125

ping statistics for 10.0.0.2

Packets: sent=4, Received=3, Lost=1

Approximate round-trip time in milliseconds:

minimum=2ms, maximum=12ms, Average=6ms.

to add new ~~pop~~ pool.

Procedure:

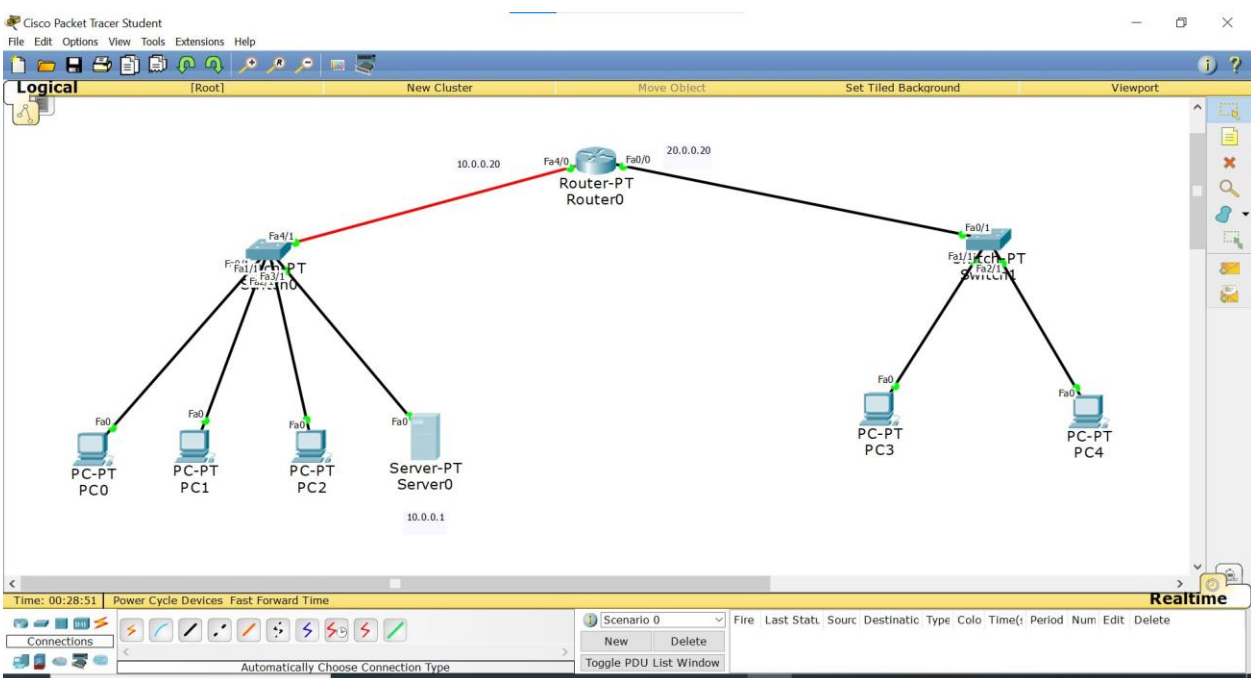
pool name	Default Gateway	DNS server	start IP address
~~server pool~~	~~10.0.0.20~~	~~0.0.0.0~~	~~20.0.0.2~~
serverpool 1	20.0.0.20	0.0.0.0	10.0.0.2

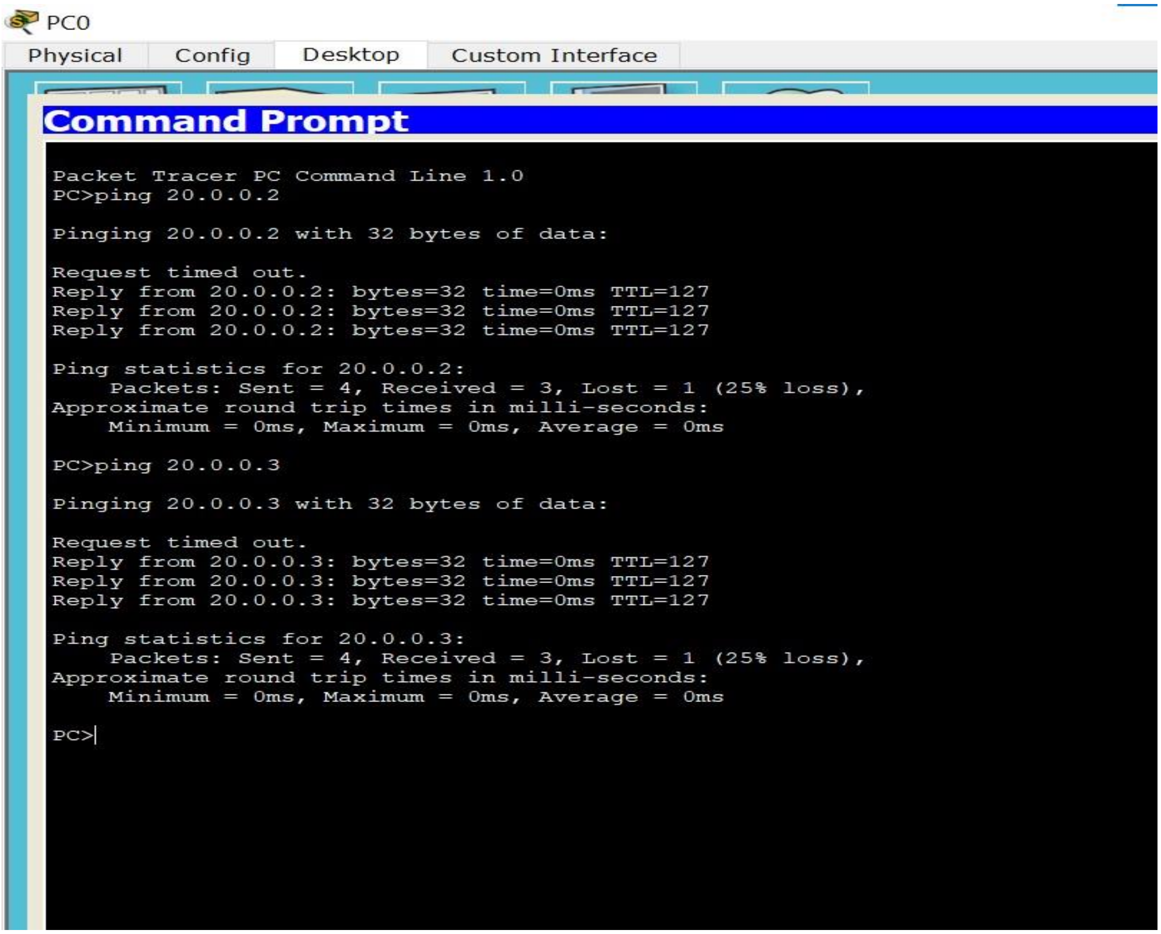
subnet mask	max user	TFTP.
255.0.0.0	512	0.0.0.0
255.0.0.0.	512	0.0.0.0.

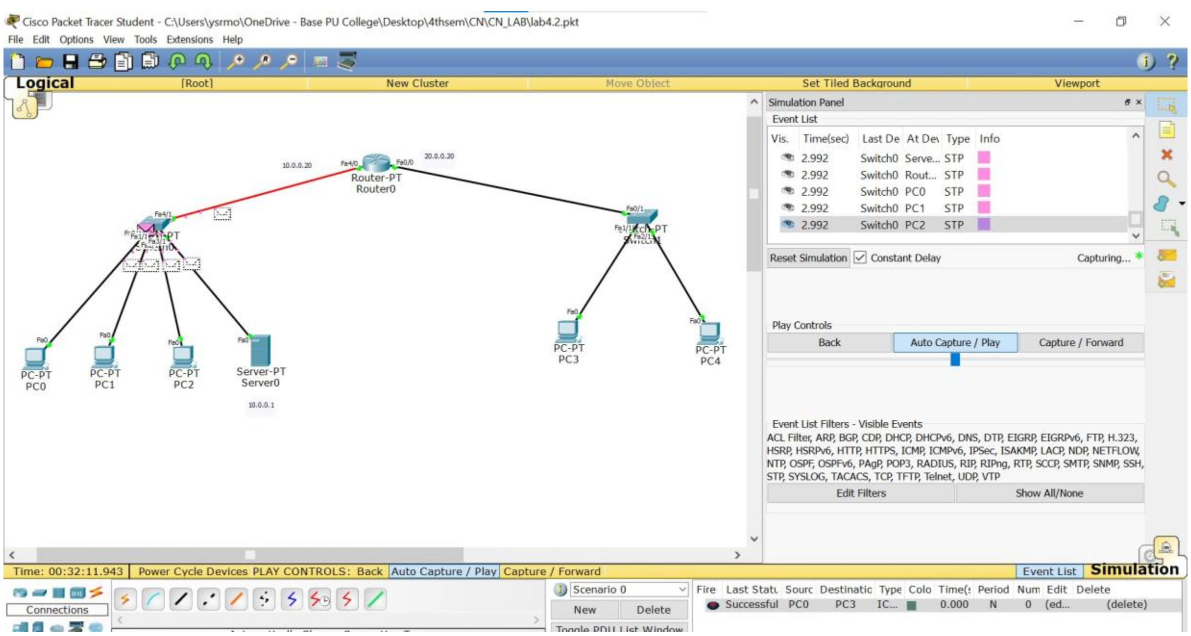
now go to pc's new lan →
desktop → Ip config → DHCP →
now the IP address will be
generated. generate IP add for all systems.

in the other LAN.

* ping lan.




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


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab4.2.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router-PT
Router0
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
Server-PT
Server0
PC-PT
PC3
PC-PT
PC4
Simulation Panel
Event List
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
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
Scenario 0
New
Delete
Toggle PDU List Window
Successful
(delete)

EXPERIMENT NO-5

Configure Web Server, DNS within a LAN.

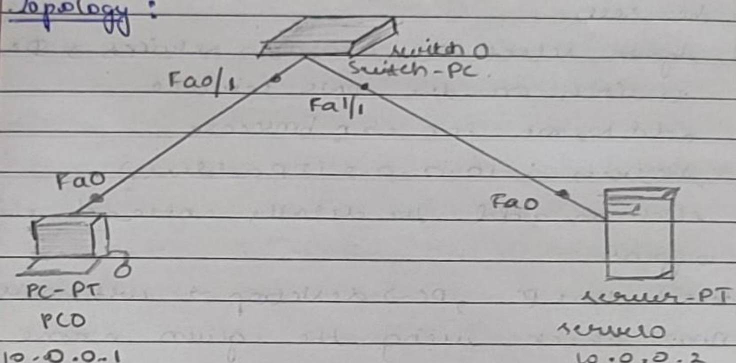
Bafna Gold
Date: Page:

20/7/23

Experiment 5

Aim:- To configure web server, domain name server with local area network.

Topology :



Procedure:-

*) select a switch, one PC and one server drop them to the workspace PC and the server are connected to the switch using automatic cable.

*) set the IP address of PC as 10.0.0.1 by select PC → config → fastethernet → IP add. Similarly set the IP address of server as 10.0.0.2

*) Select the PC → select desktop → webbrowser type the IP address of server i.e, 10.0.0.2 click on go.

*) select the server → services → http (on the left) → select the last row from the table which appears i.e, "index.html click on edit in the row and edit the necessary details where we can add images or change the text given. click on save and confirm by clicking

yes.

*) go back to the PC's web browser
PC → desktop → webbrowser → 10.0.0.2 (server's IP add)
changes made in http of server can be seen.

*) Again select the server → services → DNS
switch on the DNS service
add Name for ex: bmsccse
Address : 10.0.0.2 (IP address).
click on add the details entered will appear.

*) select the PC, PC → desktop → webbrowser
now check using the given name
i.e, bmsccse. The details will appear.
changes saved by http will appear.

Observation :-

* To configure the DNS and web server using LAN changes are made in contents of http of server and the contents can be accessed by entering the IP address of server in the webbrowser of PC.

*) DNS service of server is turned on and a name is set, now contents ~~can be~~ of server (http) can be seen by entering the name of server in PC's web browser instead of the IP address.

Experiment - 5.

Result:-

Web Browser.

<| |> URL http://bmscecse | go | stop

BMS college of Engineering

Advithi's CV. Opening doors to new oppurtunities

Quick Areas:

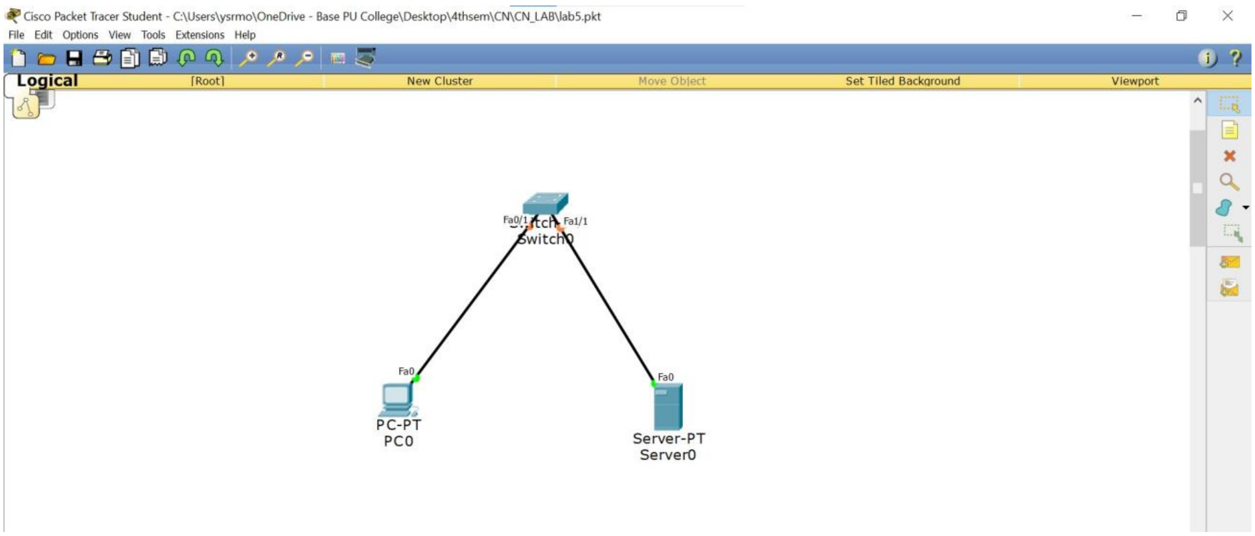
Languages I know

Image page

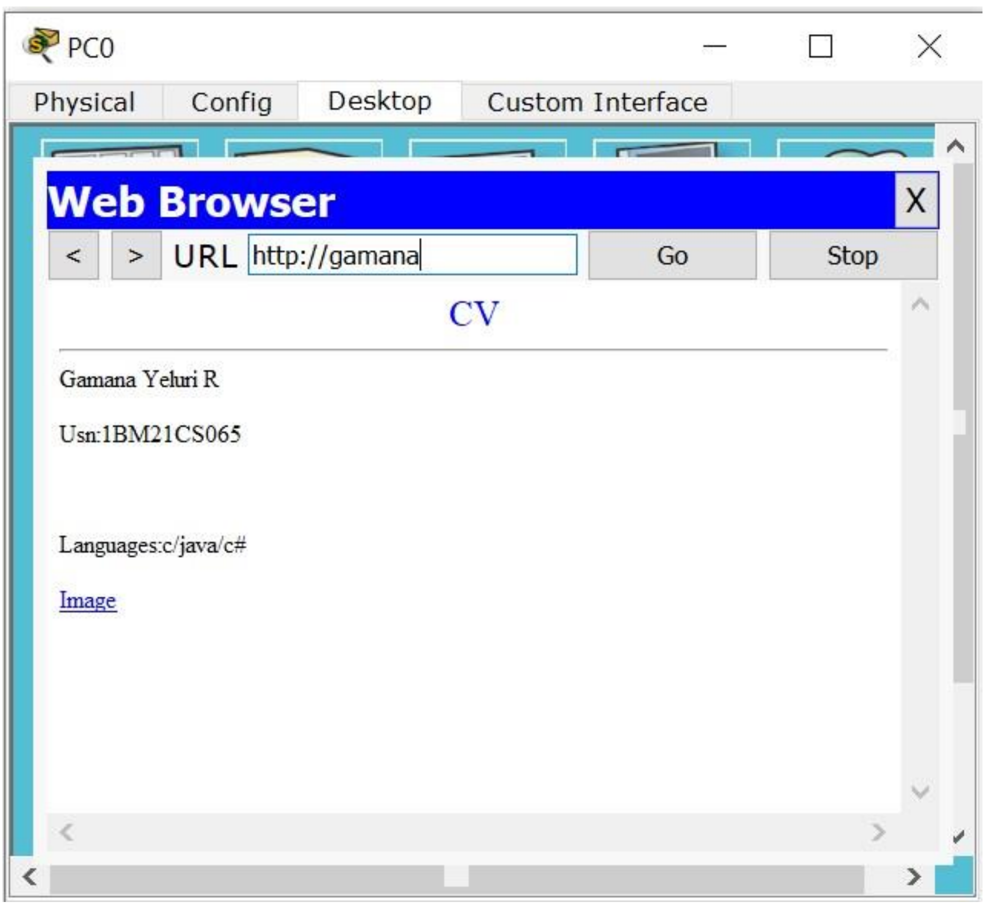
Image.

10/10

25/7/23


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab5.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Fa0/1
Fa1/1
Switch0
Fa0
PC-PT
PC0
Fa0
Server-PT
Server0

OUTPUT:


PC0
Physical
Config
Desktop
Custom Interface
Web Browser
X
<
>
URL
http://gamana
Go
Stop
CV
Gamana Yeluri R
Usn:1BM21CS065
Languages:c/java/c#
Image

EXPERIMENT NO-6

Configure RIP routing Protocol in Routers

Bafna Gold

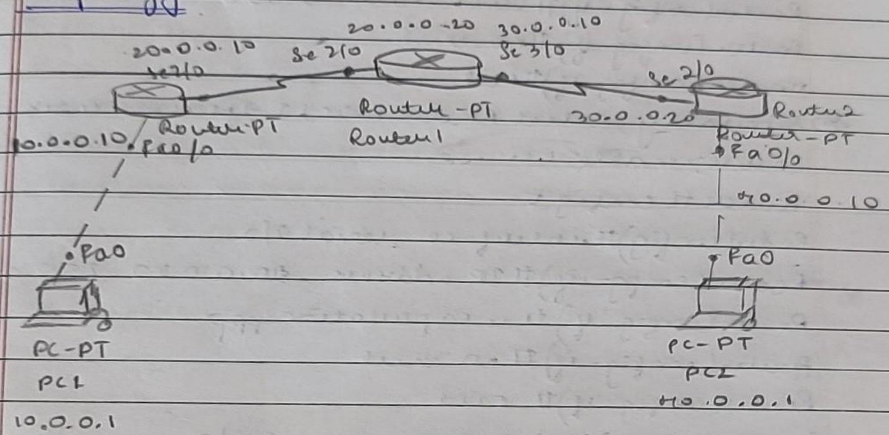
Date: Page:

0/7/23.

Experiment -6

Aim :- To configure RIP routing Protocol in Routers.

Topology:



Procedure

*) Select 2 PC's, 3 routers and drop them to the workspace. Set the IP address for PC1

*) select PC → config → fastethernet → IP address set as 10.0.0.1 and, global → settings → gateway as 10.0.0.10. similarly set IP address for PC2 as 40.0.0.1 and gateway for 40.0.0.10.

*) Connect the two pc's to the router using copper cross over connection and routers with the serial DCE cable with clock.

*) select Router 0 → CLI, enter no, press enter

Router>enable

Router# config t

Router(config)# interface fastethernet 0/0

Router(config-if)# IP address 10.0.0.10 255.0.0.0

Router(config-if)# no shut

Router(config-if)# exit

Router(config)# interface serial 2/0
Router(config-if)# IP address 20.0.0.10 255.0.0.0
Router(config-if)# encapsulation ppp
Router(config-if)# clock rate 64000
Router(config-if)# no shut
Router(config-if)# exit
*) similarly, select Router1 → CLI → press no enter.
Router>enable
Router# config t
Router(config)# interface serial 2/0
Router(config-if)# IP address 20.0.0.20 255.0.0.0
Router(config-if)# encapsulation ppp
Router(config-if)# no shut
Router(config-if)# exit
Router(config)# interface serial 3/0
Router(config-if)# IP address 30.0.0.10 255.0.0.0
Router(config-if)# encapsulation ppp
Router(config-if)# clock rate 64000.
Router(config-if)# no shut
Router(config-if)# exit.
*) select Router2 → CLI - type no press enter.
Router>enable
Router# config t
Router(config)# interface serial2/0
Router(config-if)# IP address 30.0.0.20 255.0.0.0
Router(config-if)# encapsulation ppp
Router(config-if)# no shut
Router(config-if)# exit
Router(config)# interface fastethernet 0/0
Router(config-if)# IP address 40.0.0.10 255.0.0.0
Router(config-if)# no shut
Router(config-if)# exit.

Bafna Gold
Date: Page:

*) select Router0, CLI → when router is in config mode
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#exit
Router(config)#exit

*) select Router 1, CLI, To see IP rout (initially)
Router#show ip rout.
Gateway of last resort is not set.
20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 20.0.0.0/8 is directly connected, serial 2/0
C 20.0.0.10/32 is directly connected, serial 2/0
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, serial 3/0
C 30.0.0.20/32 is directly connected, serial 3/0.

Router#config t
Router(config)#router rip
Router(config-router)# network 20.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)# ~~no shut~~ exit
Router(config)# exit

*) select Router 2, CLI.
Router(config)#router rip
Router(config-router) # network 30.0.0.0
Router(config-router) # network 40.0.0.0
Router(config-router) # exit
Router(config) #exit

*) select Router 0
Router# show ip rout
C 10.0.0.0/8 is directly connected, fastethernet 0/0
C 20.0.0.0/8 is directly connected, serial2/0

C 20.0.0.20/32 is directly connected, serial 2/0
R 30.0.0.0/8 [120/1] via 20.0.0.20, 00:00:16 serial 2/0
R 40.0.0.0/8 [120/2] via 20.0.0.20, 00:00:16, serial 2/0

*) similarly for Router 1
Router#show ip rout.
R 10.0.0.0/8 [120/1] via 20.0.0.10, 00:00:21, serial 2/0
C 20.0.0.0/8 is directly connected, serial 2/0
C 20.0.0.10/32 is directly connected, serial 2/0
C 30.0.0.0/8 is directly connected, serial 3/0
C 30.0.0.20/32 is directly connected, serial 3/0
R 40.0.0.0/8 [120/1] via 30.0.0.20, 00:00:09 serial

*) select Router 2.
Router# show ip rout
R 10.0.0.0/8 [120/2] via 30.0.0.10, 00:00:26, serial 2/0
R 20.0.0.0/8 [120/1] via 30.0.0.10, 00:00:26, serial 2/0
C 30.0.0.0/8 is directly connected, serial 2/0
C 30.0.0.10/32 is directly connected, serial 2/0
C 40.0.0.0/8 is directly connected, FastEthernet 0/0

Ping output (Unreachable case)
Result :-
* select PC 1 with IP address 10.0.0.1
PC> ping 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 = 11ms TTL = 125
Reply from 40.0.0.1 : bytes = 32 time = 9ms 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=11ms, Average =7ms.

~~PC > ping 40.0.0.1~~

~~pinging~~

Result:

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=2ms TTL=125

Reply from 40.0.0.1: bytes=32 time=2ms TTL=125

Reply from 40.0.0.1: bytes=32 time=2ms TTL=125

Reply from 40.0.0.1: bytes=32 time=2ms 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 =27ms, Average =13ms

Similarly, ping from 40.0.0.1 to 10.0.0.1

select PC2 → desktop-command prompt

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=12

Reply from 10.0.0.1: bytes=32 time=7ms TTL=12

Reply from 10.0.0.1: bytes=32 time=17ms TTL=12

Reply from 10.0.0.1: bytes=32 time=16ms TTL=1

ping statistics for 10.0.0.1:

packets: sent=4, Received=4, Lost=0 (0% Loss),

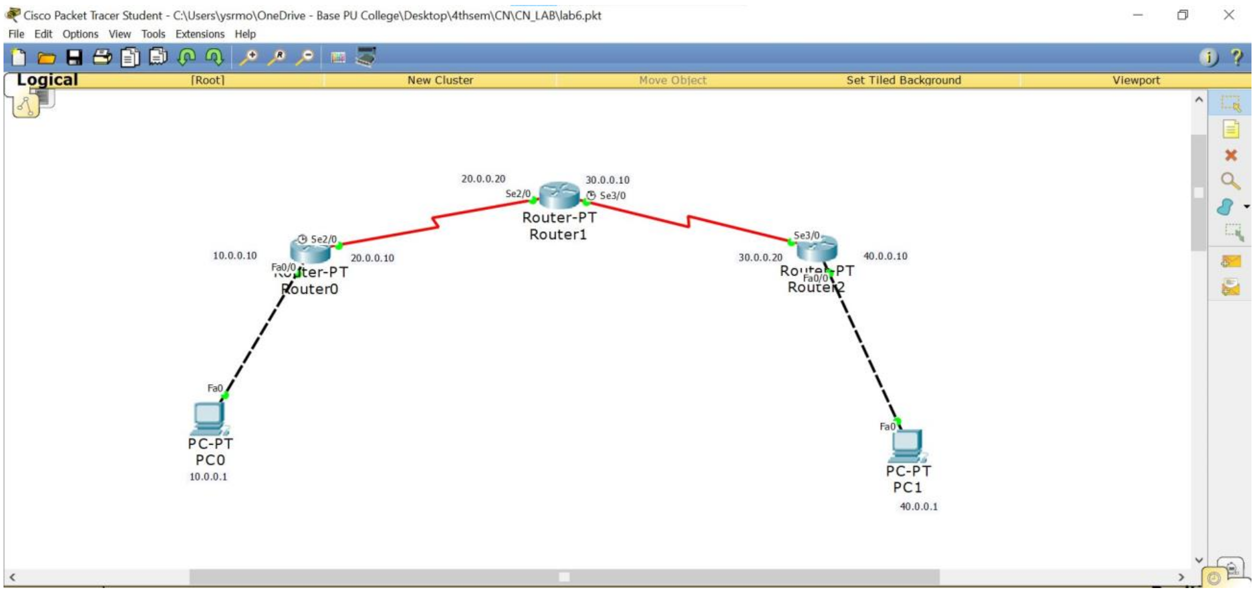
Approximate round trip times in milli-seconds:

Minimum =2ms, Maximum =17ms, Average =10ms

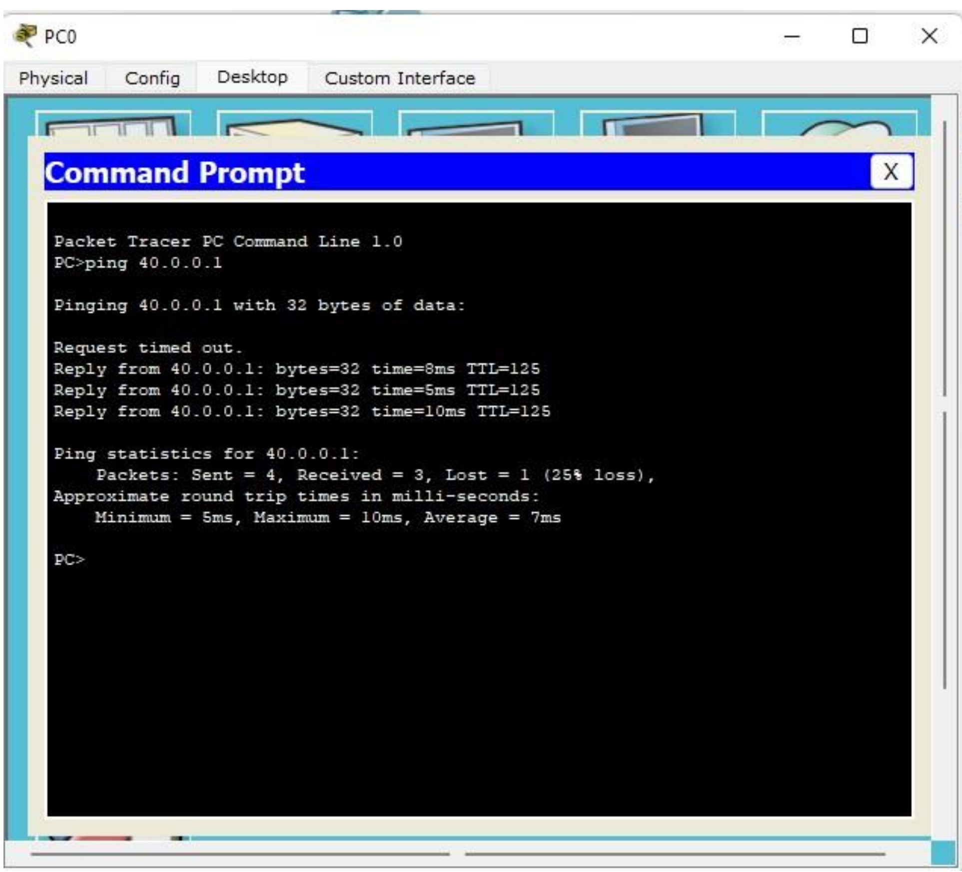
10/10

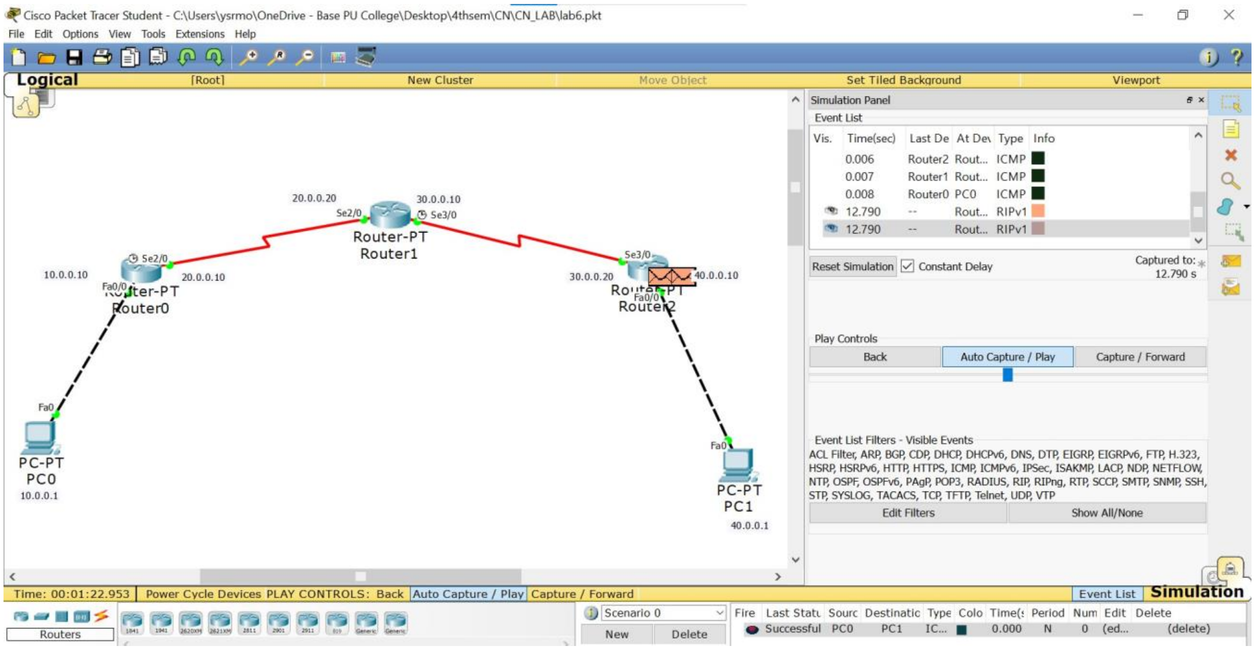
25/7/23

TOPOLOGY:



OUTPUT:




Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\lab6.pkt
Router-PT
Router0
Router-PT
Router1
Router2
PC-PT
PC0
10.0.0.1
PC-PT
PC1
40.0.0.1
10.0.0.10
20.0.0.10
20.0.0.20
30.0.0.10
30.0.0.20
40.0.0.10
Simulation Panel
Event List
Reset Simulation
Constant Delay
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
Simulation

EXPERIMENT NO-7

Configure OSPF routing protocol.

Bafna Gold
Date: Page:

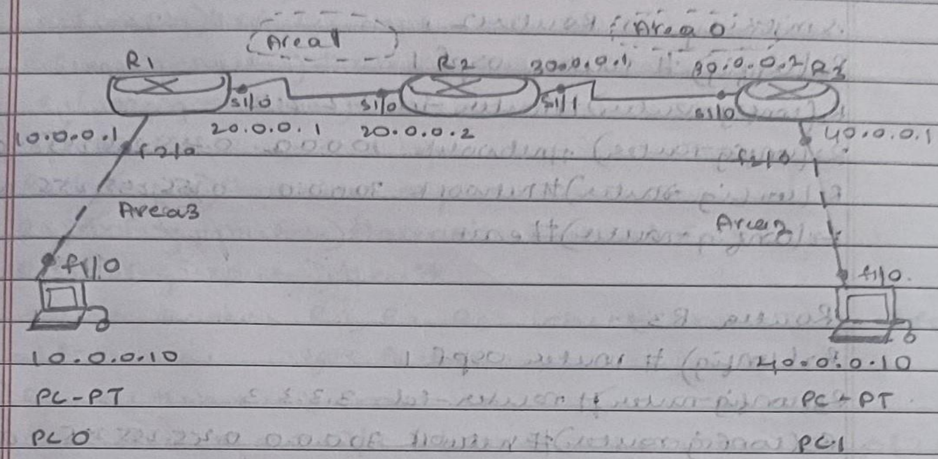
7/7/23

Experiment - 7

Q-7

Aim: To configure OSPF routing protocol.

Topology:-



Procedure:

*) Take three routers and two PCs drop them in the workspace.
*) configure the PC's with IP address and gateway according to the above topology.
*) configure each of the routers according to IP address given.
*) Encapsulation ppp and clock rate need to be set as done in RIP protocol experiment.
*) same wires connection cables are used as in RIP protocol experiment.

2) select Router 1 → CLI. (when it is in config mode)
R1(config)# router ospf 1
R1(config-router)# router-id 1.1.1.1
R1(config-router)# network 10.0.0.0 0.255.255.255 area 0
R1(config-router)# network 20.0.0.0 0.255.255.255 area 0
R1(config-router)# exit.

similarly in Router 2,
R2(config)# router ospf 1
R2(config-router)# router-id 2.2.2.2.
R2(config-router)# network 20.0.0.0 0.255.255.255 area 0
R2(config-router)# network 30.0.0.0 0.255.255.255 area 0
R2(config-router)# exit

Router R3,
R3(config)# router ospf 1
R3(config-router)# router-id 3.3.3.3
R3(config-router)# network 30.0.0.0 0.255.255.255 area 0
R3(config-router)# network 40.0.0.0 0.255.255.255 area 0
R3(config-router)# exit.
virtual interface never goes down once we configure routers. (to be in config-if)

3) Router 1 (config)# interface serial 2/0, then.
R1(config-if)# interface loopback 0
R1(config-if)# ip address 172.16.1.252 255.255.0.0
R1(config-if)# no shutdown.

R2(config-if)# interface loopback 0
R2(config-if)# ip address 172.16.1.253 255.255.0.0
R2(config-if)# no shut.

R3(config-if)#interface loopback 0
R3(config-if)# IP address 192.16.1.254 255.255.0.0
R3(config-if)#noshut.

*) create virtual link between R1, R2 by this we create virtual link to connect to area 0.
In Router R1,
R1(config)# router ospf 1
R1(config-router)# area 1 virtual-link 2.2.2.2.
R1(config-router)#
In Router R2,
R2(config)# router ospf 1
R2(config-router)# area 1 virtual-link 1.1.1.1
R2(config-router)#exit.
select Routers R1, R2, R3. check show IP route for all routers. for Router 2.

*) Router#show ip route.

O IA 10.0.0.0/8 via 20.0.0.1 00:00:01 serial 2/0
20.0.0.0/8 is variably subnetted, 2 subnets 2 masks
C 20.0.0.0/8 is directly connected serial 2/0
C 20.0.0.0/8 is directly connected serial 2/0.
30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 30.0.0.0/8 is directly connected, serial 3/0
L 30.0.0.2/32 is directly connected, serial 3/0
O IA 40.0.0.0/8 via 30.0.0.2, 00:06:40, serial 3/0
C 172.16.0.0/16 is directly connected, loopback 0

*) Observation:- OSPF -> open shortest path first is a routing protocol for Internet protocol networks. it uses link state routing algorithm and falls into group of interior gateway protocol.

3/8

Result:

PC > ping 40.0.0.10

Pinging 40.0.0.10 with 32 bytes of data:

Reply from 40.0.0.10: bytes = 32 time = 9ms TTL = 125

Reply from 40.0.0.10: bytes = 32 time = 9ms TTL = 125

Reply from 40.0.0.10: bytes = 32 time = 9ms TTL = 125

Reply from 40.0.0.10 bytes = 32 time = 9ms TTL = 125

ping statistics for 40.0.0.10:

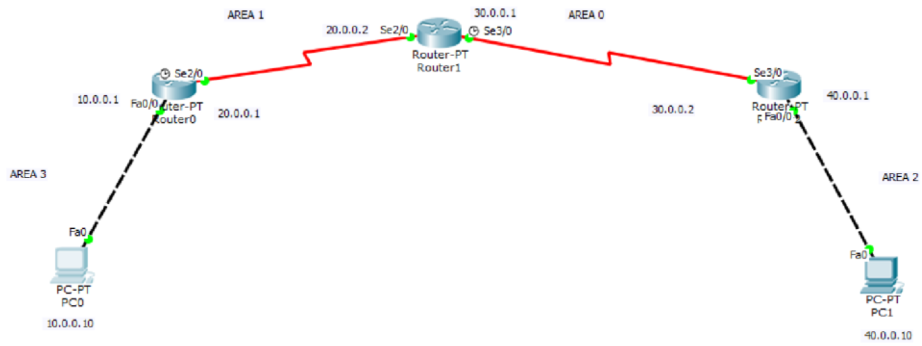
Packets: sent = 4, Received = 4, Lost = 0

Approximate round trip times in milliseconds:

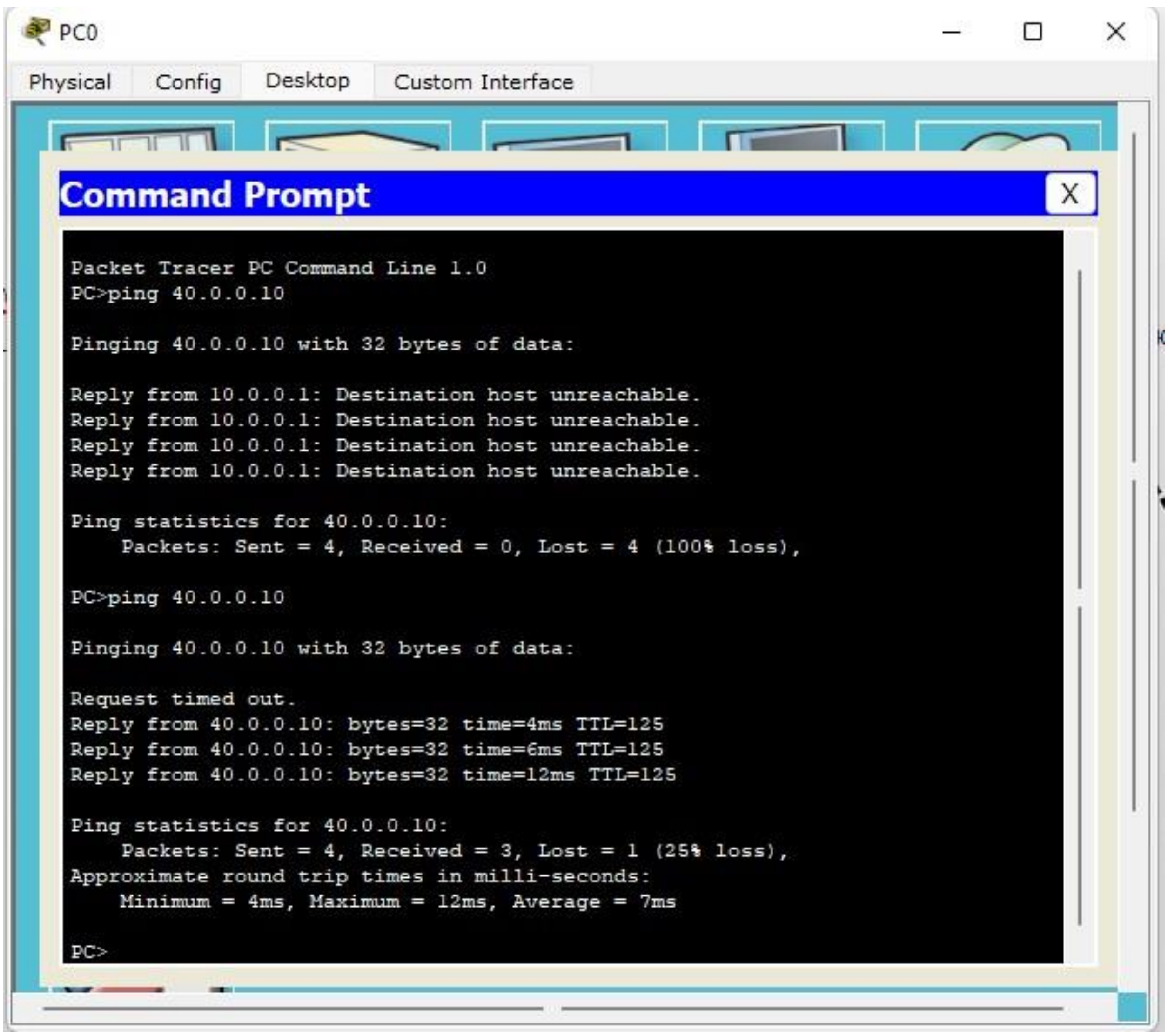
Minimum = 2ms, Maximum = 12ms, Average = 8ms

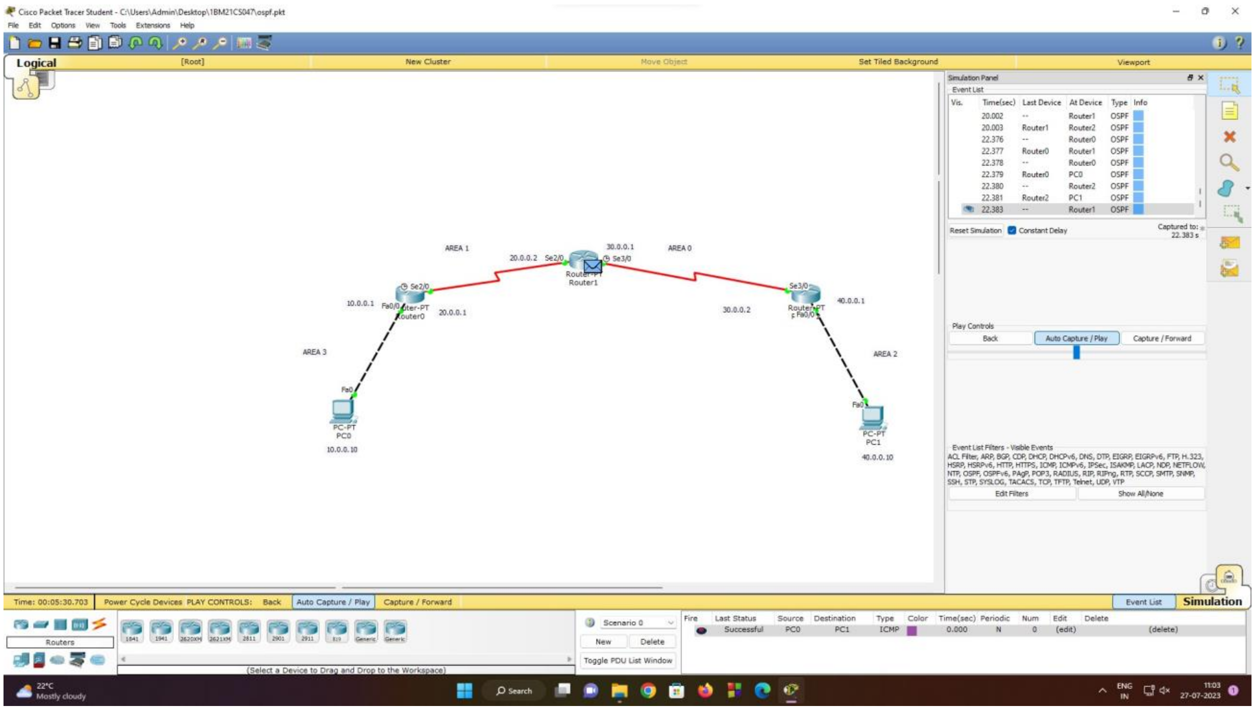
10/10

2/8/23


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

OUTPUT:


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



EXPERIMENT NO-8

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

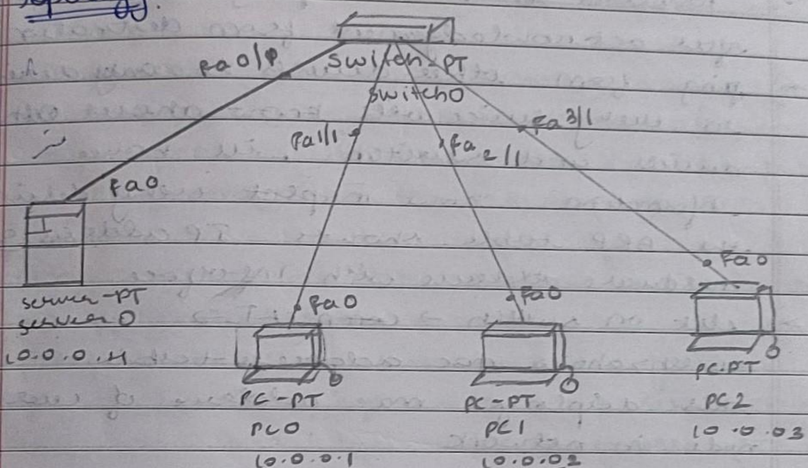
3/8/23

Experiment -8

To construct simple LAN and understand the concept and operation of address resolution protocol (ARP).

Aim: construct LAN and to understand concept of ARP

Topology:



procedure:

*) select a switch, server and three pcs and drop them in the workspace. a generic server, pc and switch.

*) set IP address of server as 10.0.0.4. PC0 as 10.0.0.1, PC1 as 10.0.0.2, PC2 as 10.0.0.3 and connect them to the switch0 with automatic connection.

*) pc1 → command prompt → PC> arp-a → No arp found select inspect and click on everydevice PC-0 ARP

the arp table will be empty.

* select simulation mode. select a source and destination device, for example PC0 → desktop → command prompt PC> ping 10.0.0.4 i.e ping. source, the click on capture forward each time and message reaches destination keep on pressing capture/forward to see the ping output after acknowledgement from destination
* ping from other devices to any device so, every device will know about other devices and switch will have information. now inspect every device the ARP table shows IP address & Hardware address with interface.
* click on switch → CLI → switch>show mac address-table this displays mac address of every node in network.

Observation :-

* At beginning arp table will be empty and arp -a command does not fetch any output.
* after pinging the switch knows about all devices and show mac address-table shows the mac address of all devices the inspect option shows the IP, and hardware address of all devices with its interface.

Result:

*) ping output from PC0 (10.0.0.1) to server (10.0.0.4)

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=8ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms TTL=128
Reply from 10.0.0.4: bytes=32 time=4ms 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=4ms, Maximum=8ms, Average=5ms

*) ping from PC1 to PC2 i.e (10.0.0.2) to (10.0.0.3)
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=8ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms TTL=128
Reply from 10.0.0.3: bytes=32 time=4ms 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=4ms, Maximum=8ms, Average=5ms

*) after pinging to check mac address of all devices.
switch0 → CLI
switch → show mac address-table

Mac Address Table

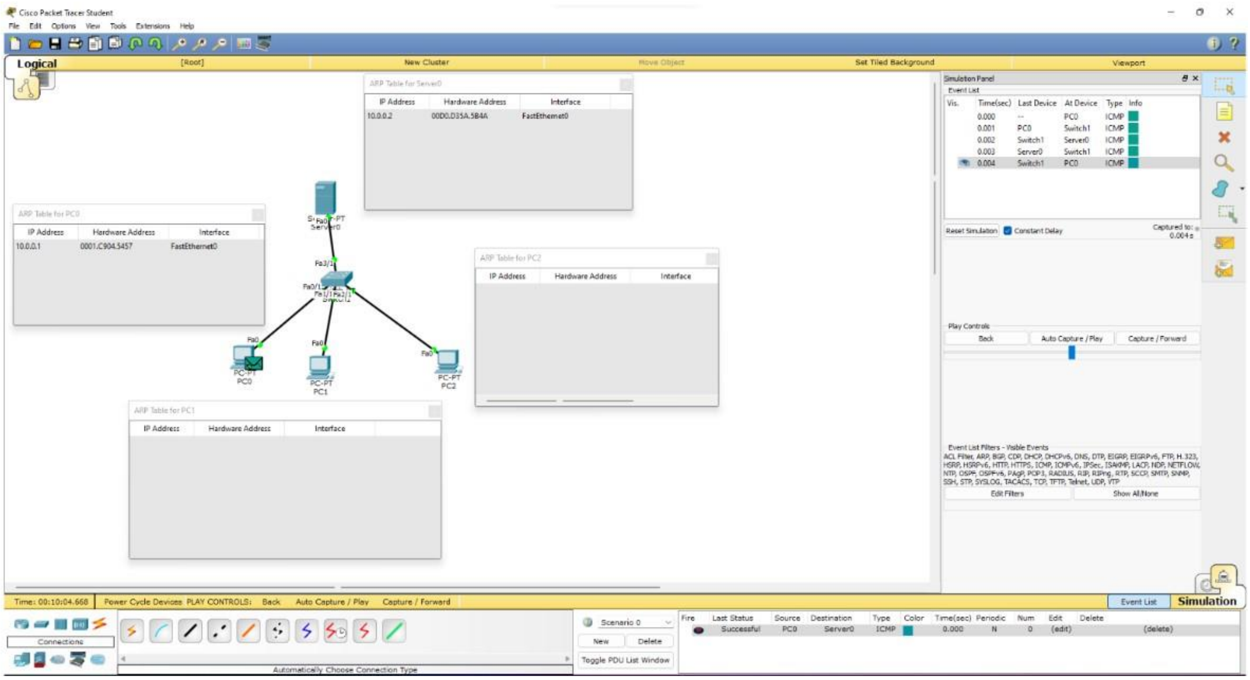
Vlan	Mac Address	Type	Ports
1	0000.0C0C.4a2b	DYNAMIC	Fa 3/1
1	00D4.9a55.0b51	DYNAMIC	Fa1/1
1	0060.2f09.a2C2	DYNAMIC	Fa2/1
1	00e0.b05b.d54b	DYNAMIC	Fa 0/1

PC >arp -a

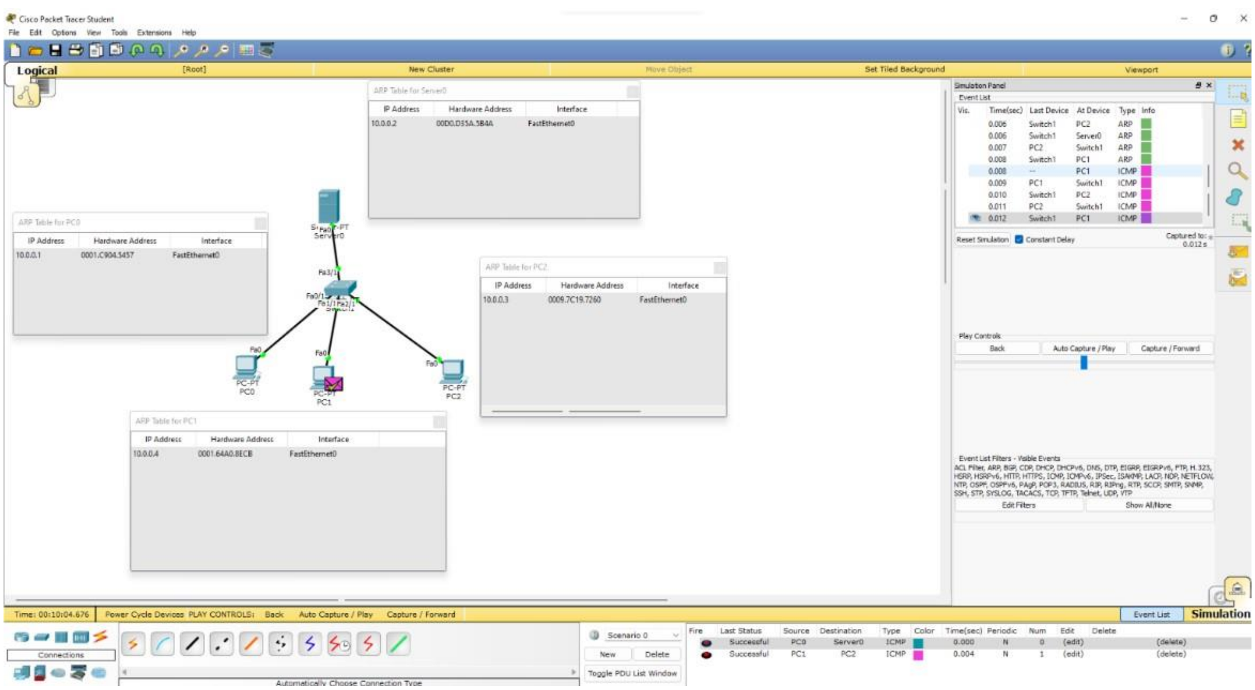
Internet address	Physical address	Type
10.0.0.1	0001.9683.7660	dynamic
10.0.0.4	0090.2373.E0A4	dynamic
10.0.0.2	0001.9796.E267	dynamic

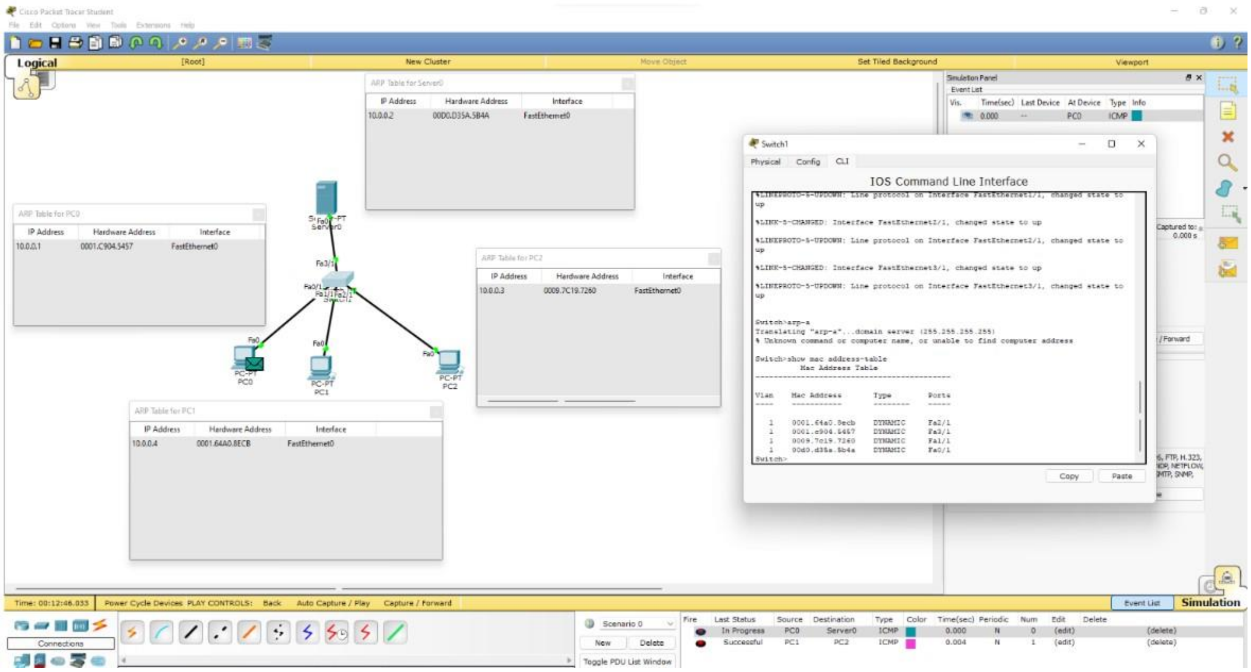
10/10

3/8/23



OUTPUT:





Cisco Packet Tracer Student
Logical
[Root]
New Cluster
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 | FastEthernet0
ARP Table for PC2
10.0.0.3 | 0009.7C19.7260 | FastEthernet0
ARP Table for PC1
10.0.0.4 | 0001.64A0.8ECB | FastEthernet0
Switch1
Physical
Config
CLI
IOS Command Line Interface
%LINK-5-CHANGED: Interface FastEthernet2/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/1, changed state to up
%LINK-5-CHANGED: Interface FastEthernet3/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet3/1, changed state to up
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
Simulation

EXPERIMENT NO-9

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

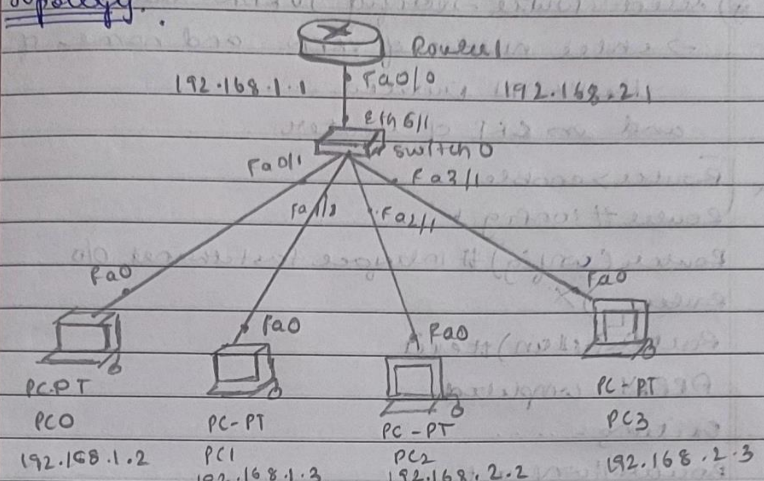
8/8/23.

Experiment -9.

Aim:

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

Topology:



Procedure:

*) Take a router, a switch, four PCs and drop them in the workspace. choose 1841 router.

*) Use copper straight through connection to connect all four PC's to the switch and then connect the switch to the Router

*) set the IP addresses and gateway for all PC's.

*) In the switch → config → select VLAN database, give the VLAN Number as 20 and VLAN Name as NEWVLAN. select add.

*) select interface fastethernet 0/1 (near

the switch from router and make it the trunk).

*) select the switch → config → set VLAN no in fastethernet 2/1 as 20 and fastethernet 3/1 as 20.

*) select router → config → VLAN database → enter number of VLAN and name of the VLAN created...

and in CLI of router.

Router>enable
Router# config t
Router(config)# interface fastethernet 0/0
Router)
Router(vlan)#exit
APPLY completed.
Exiting.....
Router#config t
Router(config)#interface fastethernet 0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shut.
Router(config-if)# interface fastethernet 0/0.1
Router(config-subif)#encapsulation dot 1q 20
Router(config-subif)# ip address 192.168.20.1 255.255.255.0
Router(config-subif)# no shut
Router(config-subif)# exit.

Observation:

virtual local area network → broadcast domain that is partitioned and isolated in computer network at data link layer. The pc's in the experiment communicate through a virtual LAN.

Bafna Gold Date: Page:

Result :- (in PC0)

PC > ping 192.168.20.3

pinging 192.168.20.3 with 32 bytes of data

Reply from 192.168.20.3 : bytes = 32 time= 1ms TTL=128

Reply from 192.168.20.3 : bytes = 32 time=0ms TTL=128

Reply from 192.168.20.3 : bytes = 32 time=0ms TTL=128

Reply from 192.168.20.3 : bytes = 32 time=0ms TTL=128

ping statistics for 192.168.1.3:

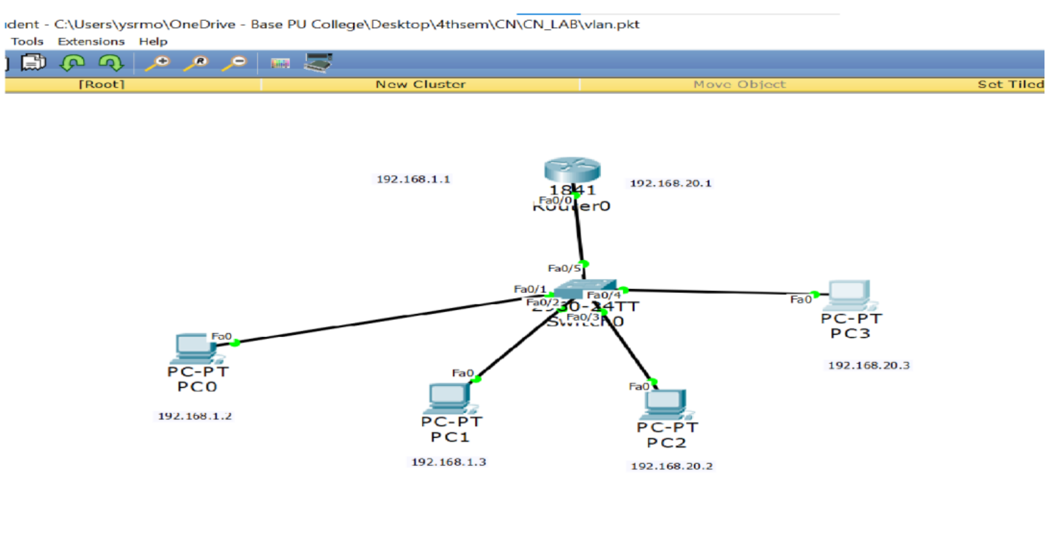
Packets : sent = 4, Received = 4, Lost = 0 (0% Loss)

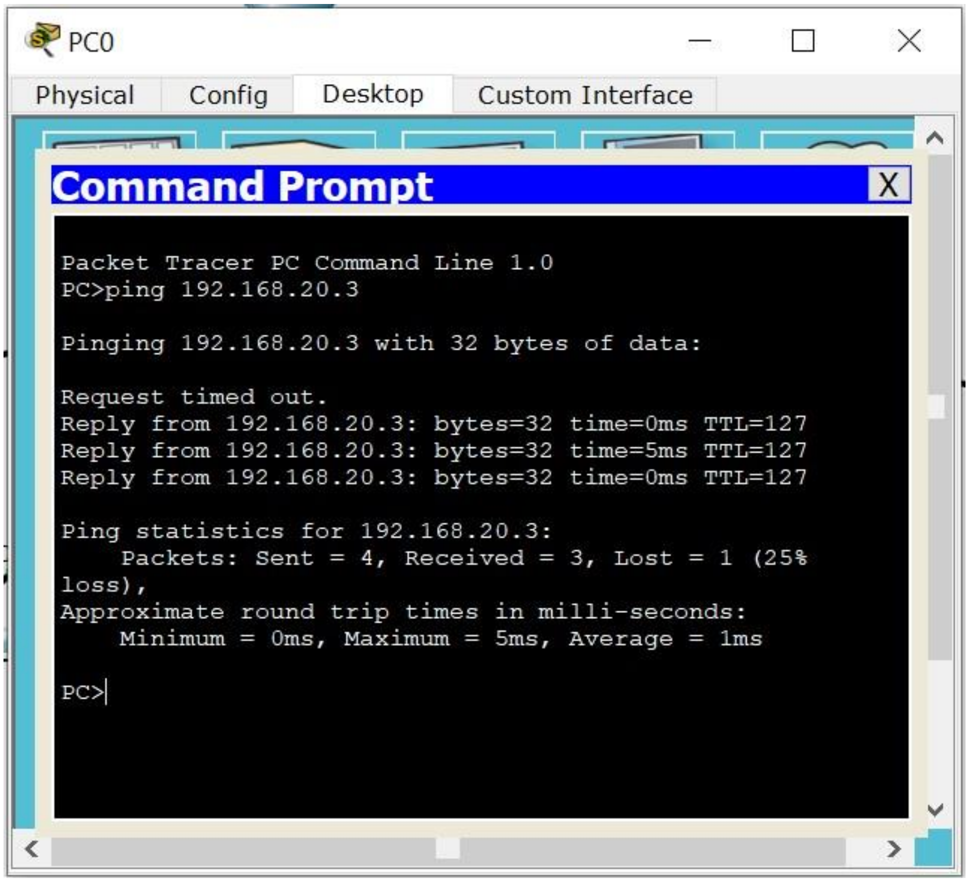
Approximate round trip times in milli-seconds,

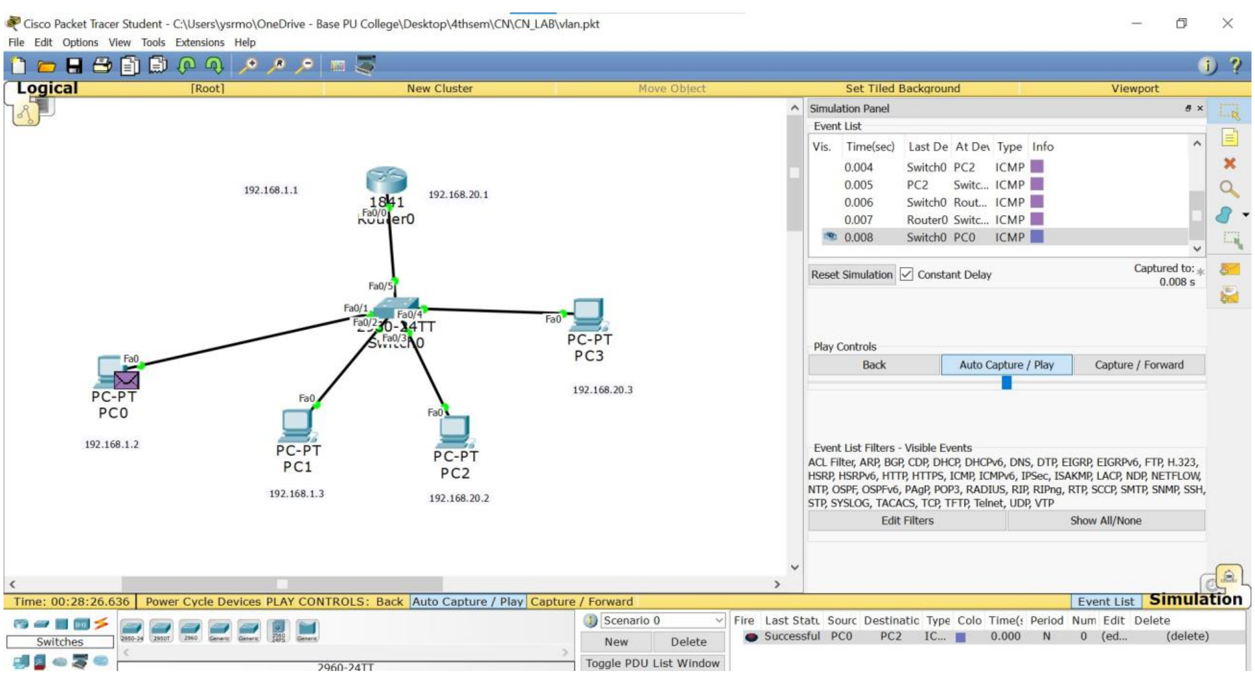
Minimum = 0ms, Maximum = 1ms, Average = 0ms.

10/10

12/8/23




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


Cisco Packet Tracer Student - C:\Users\ysrmo\OneDrive - Base PU College\Desktop\4thsem\CN\CN_LAB\vlan.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.1
192.168.20.1
1841
Router0
PC-PT
PC0
192.168.1.2
PC-PT
PC1
192.168.1.3
PC-PT
PC2
192.168.20.2
PC-PT
PC3
192.168.20.3
Simulation Panel
Event List
Vis. Time(sec) Last De At Dev Type Info
0.004 Switch0 PC2 ICMP
0.005 PC2 Switc... ICMP
0.006 Switch0 Rout... ICMP
0.007 Router0 Switc... ICMP
0.008 Switch0 PC0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.008 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: 00:28:26.636
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Switches
Scenario 0
New
Delete
Toggle PDU List Window
2960-24TT
Successful PC0 PC2 0.000 N 0 (delete)

EXPERIMENT NO-10

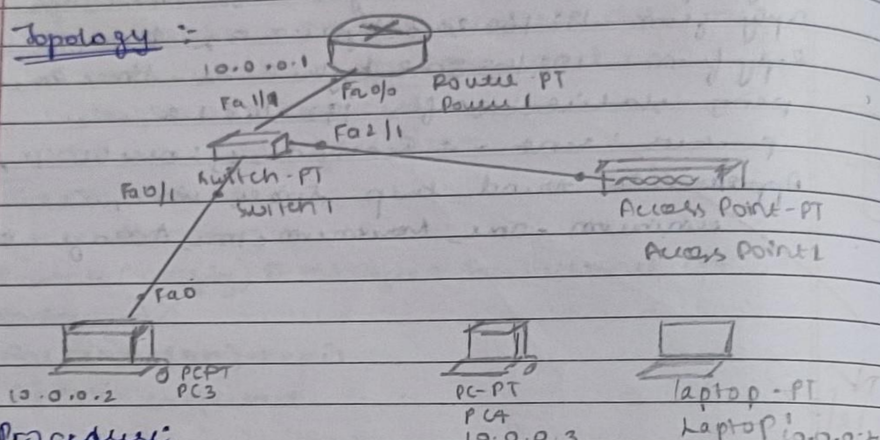
To construct a WLAN and make the nodes communicate Wirelessly

10/8/23

Experiment 10.

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

Topology :-



Procedure:

*) select a switch, router, Accesspoint-PT, two PC's a laptop and drop them on the workspace construct the above topology PC, accesspoint and router are connected to the switch using copper straight through connection.

*) configure the connected PC and router as normally done.

*) configure access point-port 1 → SSID ~~name~~ as WLAN

*) select WEP and enter any 10 digit hex key → i.e 1234567890.

*) To configure PC4 and laptop with wireless standards

switch off the device. Drag existing PT-Host-NM-1AM to the component listed in the LHS. Drag WMP300N wireless interface to the empty port, switch on the device.

*) PC4 → config → new wireless ~~device~~ interface would have been added. configure SSID, WEP, WEP key, IP address and gateway to the device.

SSID → WLAN, authentication → select → WEP enter the same key → 1234567890.

IP address – 10.0.0.3. and subnet mask will be → 255.0.0.0.

to configure router:

Router>enable

Router#config t.

Router(config)# interface fastethernet 0/0

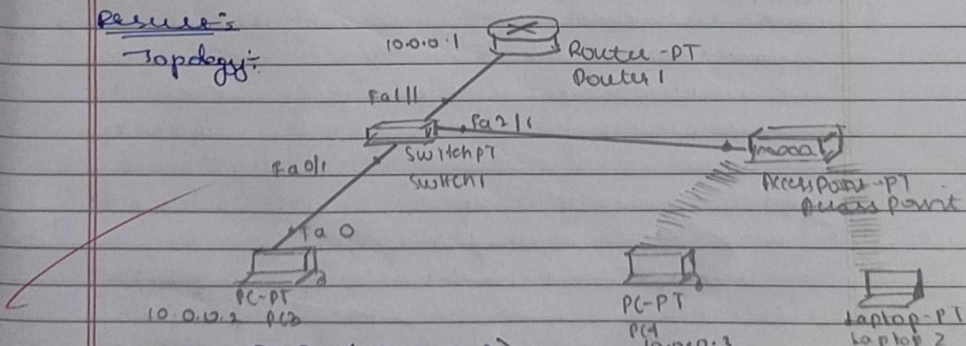
Router(config-if)# IP address 10.0.0.1 255.0.0.0.

Router(config-if) #no shut.

Router(config-if) #exit.

Result's

Topology:



from PC0 (10.0.0.2)

PC > ping 10.0.0.3.

pinging 10.0.0.3 with 32 bytes of data:

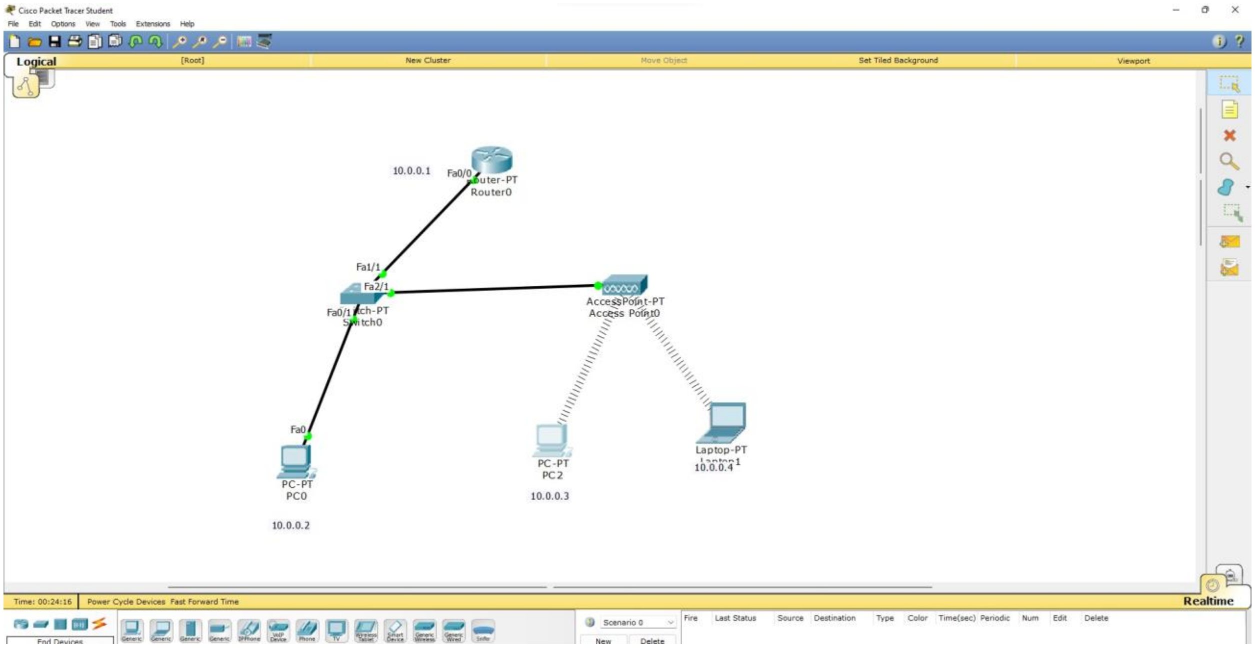
Reply from 10.0.0.3, bytes=32 time=21ms, TTL=128

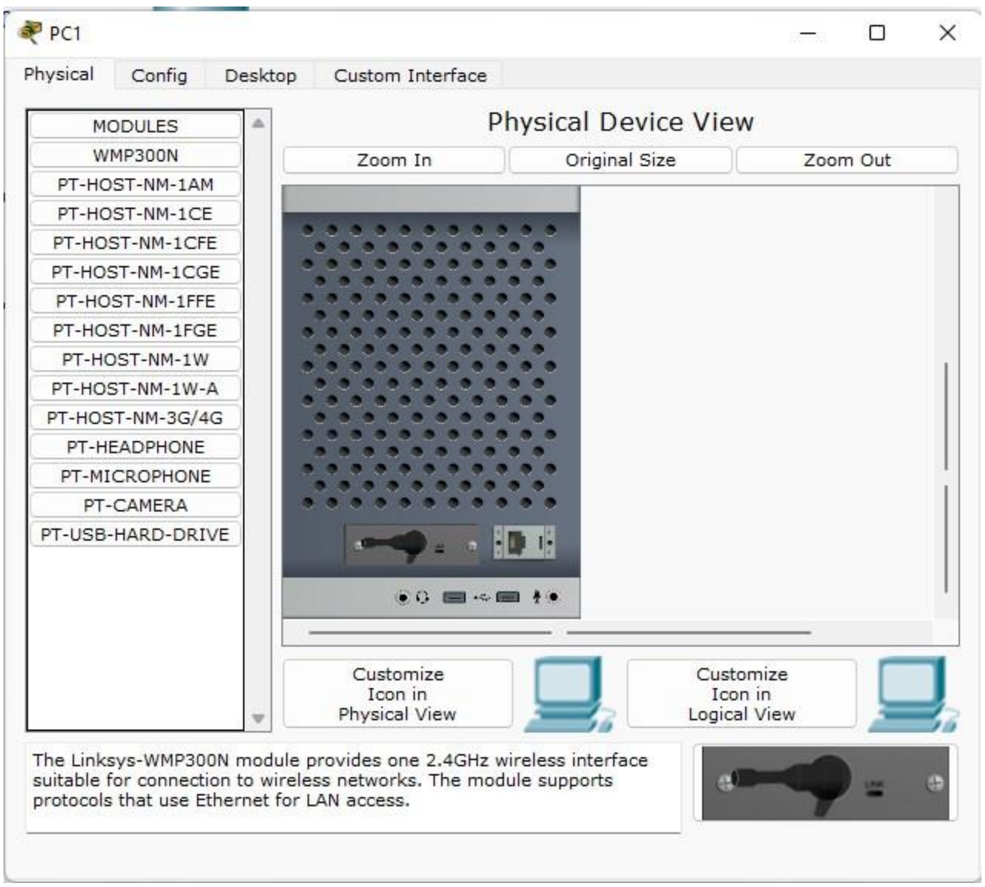
Reply from 10.0.0.3 bytes = 32 time=13ms TTL=
Reply from 10.0.0.3 bytes = 32 time=6ms TTL=
Reply from 10.0.0.3 bytes = 32 time=0ms TTL.
Reply from 10.0.0.3

ping statistics for 10.0.0.3.
packets : sent =4, Received =4, Lost =0 (0% loss)
Approximate round trip times in milli seconds Minimum=0ms, Maximum=20ms.
Average =12ms.

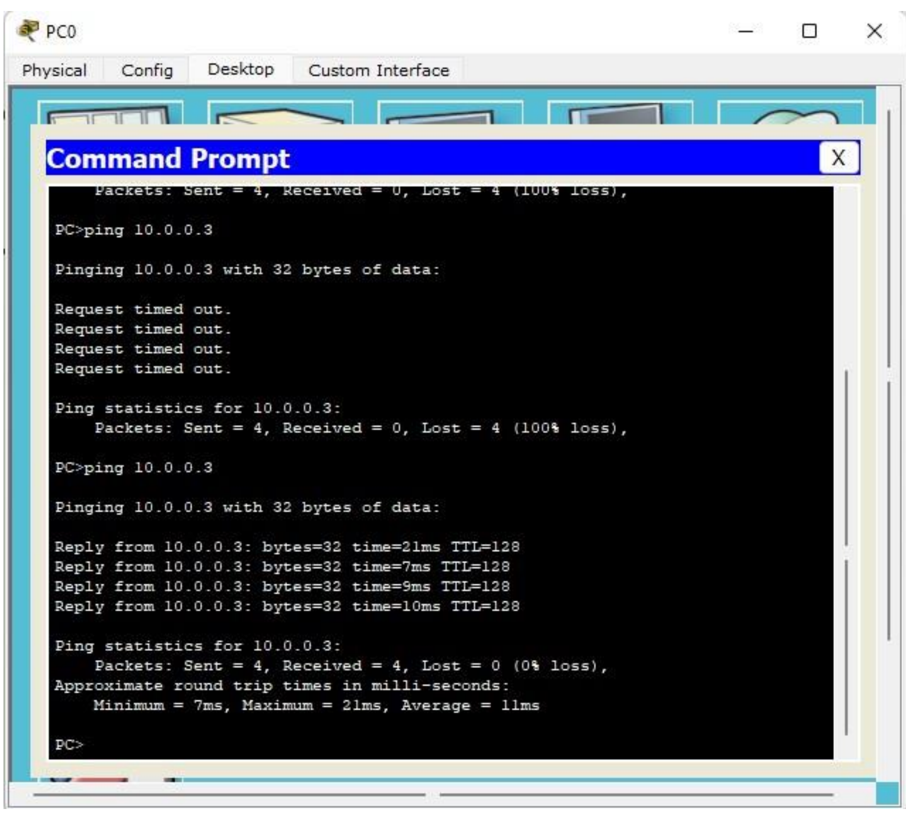
Observation:
WLAN is a wireless computer network that links two or more devices using wireless communication to form a local area network.

10/8/23


Cisco Packet Tracer Student
Logical
10.0.0.1
Fa0/0
Router-PT
Router0
Fa1/1
Fa2/1
Fa0/1
Switch-PT
Switch0
AccessPoint-PT
Access Point0
Fa0
PC-PT
PC0
10.0.0.2
PC-PT
PC2
10.0.0.3
Laptop-PT
Laptop1
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.


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
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>

EXPERIMENT NO-11

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

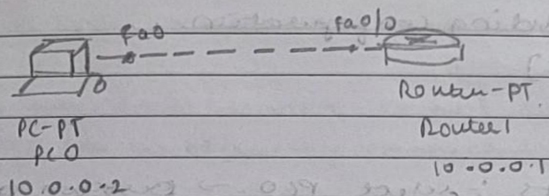
Bafna Gold
Date: Page:

10/8/23

Experiment 11

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

Topology:



Procedure:

*) Select a PC and a router drop them in the workspace connect them using a copper cross over connection set the IP address of PC as 10.0.0.2. Select router → CLI.

Router>enable
Router#config t
Router(config)#hostname r1
r1(config)#enable secret p1
r1(config)#interface fastethernet 0/0
r1(config-if)# ip address 10.0.0.1 255.0.0.0
r1(config-if)#no shut
r1(config-if)# line vty 0 5
r1(config-line)# login
% Login disabled on line 132, until 'password' is set
% Login disabled on line 133, until 'password' is set

%login disabled on line 134, until 'password' is set
%login disabled on line 135, until 'password' is set
%login disabled on line 136, until 'password' is set
%login disabled on line 137, until 'password' is set
r1 (config-line) # password p0
r1 (config-line) # exit
r1 (config-line) # exit
r1 # wr
Building configuration...
[ok]
r1 #.

Results :- select PC0 → Desktop → command prompt
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 milli-seconds:
minimum = 0ms, maximum = 0ms, Average = 0 ms
pc > telnet 10.0.0.1
Trying 10.0.0.1 ... open
User Access Verification
password:
r1 > enable
password:
r1 # show ip route
codes: C - connected, S - static, I - IGRP, R - RIP,
M - mobile, B - BGP, D - EIGRP, EX - EIGRP

external ,O-OSPF, IA-OSPF inter area.
N1-OSPF NSSA external type 1, N2-OSPF.
NSSA external type 2 E1-OSPF external type 1,
E2-OSPF external type 2, E-EGP
i-IS-IS, L1-IS-IS level-1, L2-IS-IS level-2, ia-IS-IS inter area.
*-candidate default, U-per user static route, O-ODR
P-periodic downloaded static route.

Gateway of last resort is not set
C 10.0.0.0/8 is directly connected, FastEthernet0/0 N#.

Observation:
Telnet stands for teletype Network, but it can also be used to establish a connection using telnet protocol. It is used for accessing remote computers over TCP/IP networks like the Internet.

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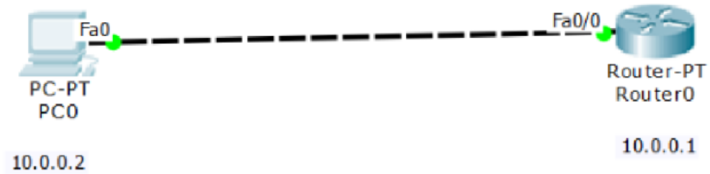
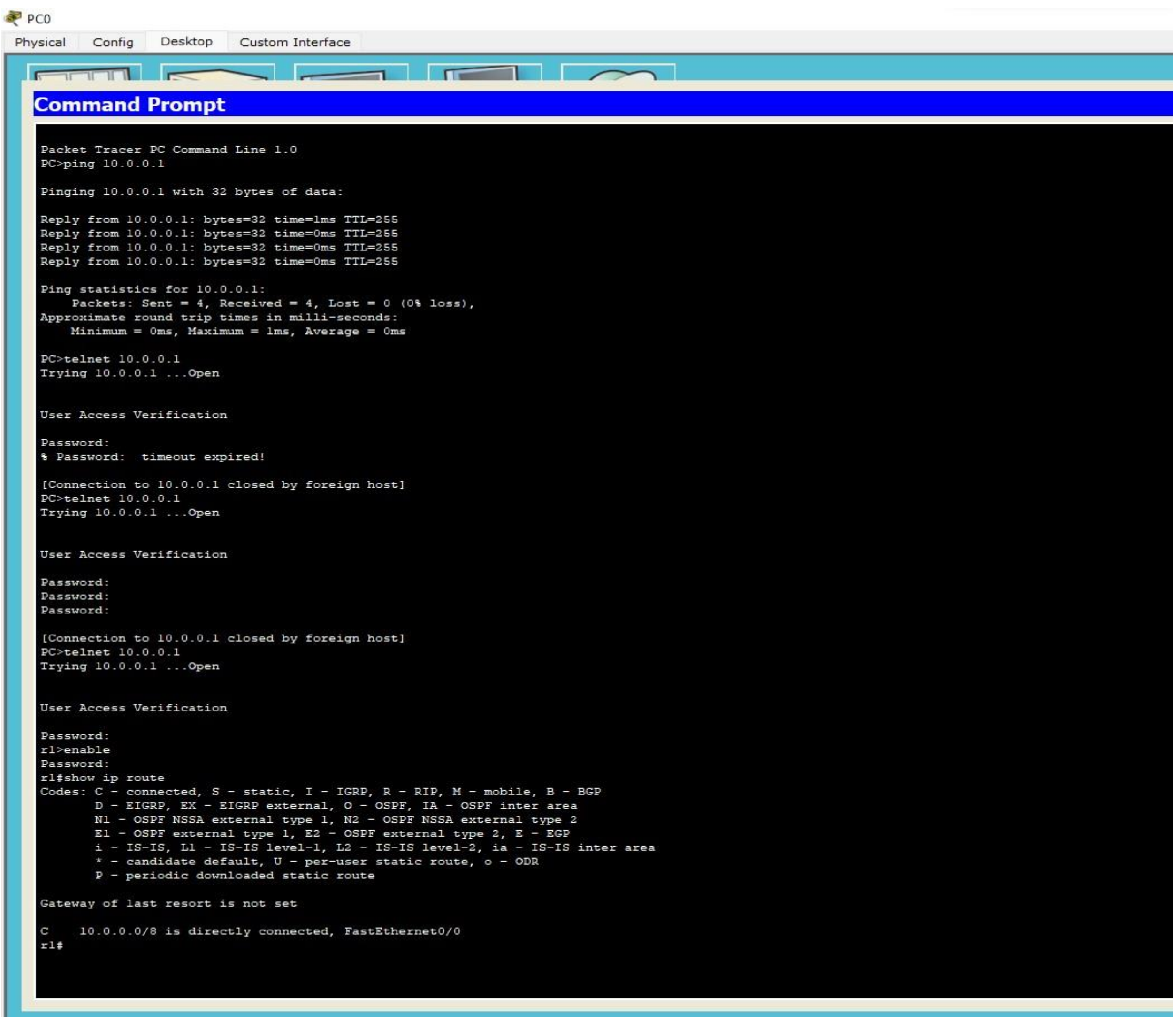
TOPOLOGY:


Fa0
Fa0/0
PC-PT
PC0
Router-PT
Router0
10.0.0.2
10.0.0.1


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

EXPERIMENT NO-12

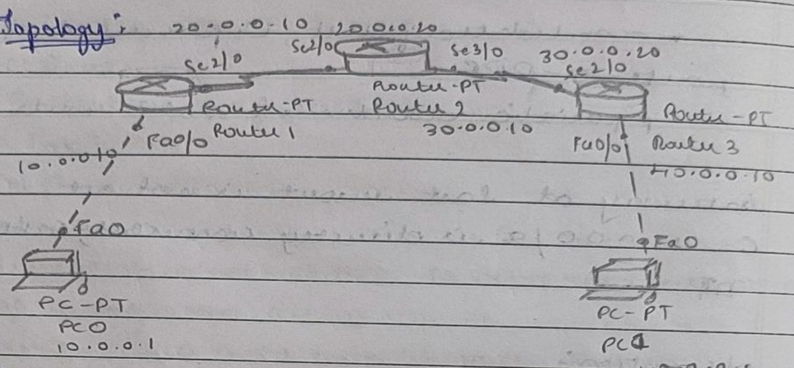
Demonstrate the TTL/ Life of a Packet.

10/8/23

Experiment 12

Aim: To Demonstrate the TTL (time to live) / Life of a Packet.

Topology:



Procedure:

*) select two PC's and three routers drop them in the workspace connect PC0 to a router and PC1 to another router using copper cross over connection connect all these routers using automatic cable

*) set IP address and gateway for both PC's

*) configure routers.

for Router 1

Router>enable

Router#config t.

Router(config)#interface fastethernet 0/0

Router(config-if)#ip address 10.0.0.10 255.0.0.0

Router(config-if)#no shut

Router(config-if)#exit

Router(config)#interface serial 2/0

Router(config-if)#ip address 20.0.0.10 255.0.0.0.

Router(config-if)#no shut
Router (config-if)#exit
Router(config)#exit

Router 2:

Router>enable
Router#config t
Router(config)#interface serial 2/0
Router(config-if)# ip address 20.0.0.20 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#interface serial 3/0
Router(config-if)# ip address 30.0.0.10 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config-if)#exit

Router 3:

Router>enable
Router#config t
Router(config)#interface serial 2/0
Router(config-if)#ip address 30.0.0.20 255.0.0.0
Router(config-if)#no shut
Router (config-if)#exit
Router(config)#interface fastethernet 0/0
Router(config-if)# ip address 40.0.0.10 255.0.0.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#exit

Router 1:

Router#config t
Router(config)#ip route 30.0.0.0 255.0.0.0 20.0.0.20
Router(config)#ip route 40.0.0.0 255.0.0.0 20.0.0.20
Router (config)# exit

similarly for Router 2:

Router# config t
Router(config)# ip route 10.0.0.0 255.0.0.0 20.0.0.
Router(config)# ip route 40.0.0.0 255.0.0.0 30.0.0.
Router(config)# exit

Router 3:

Router# config t
Router(config)# ip route 10.0.0.0 255.0.0.0 30.0.
Router(config)# ip route 20.0.0.0 255.0.0.0 30.0.0.
Router(config)#

*) select simulation mode, select simple PDU 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 and outbound PDU details. Observe that there is a difference of 1 in TTL when it crosses every router.

Observation:

*) Time to live is the amount of time or hops that a packet is set to exist inside a network before being discarded by a router.

Result:

~~Select and~~ click on the PDU during every transfer to see inbound and outbound PDU details.

PDU information at Device: Router2.

Inbound PDU details:

PDU Formats

HDLC

0	8	16	32	32+x	48+x	56+x
FLG: 0111 1110	ADR: 0xef	CONTROL: 0x0	DATA (VARIABLE LENGHT)	FCS: 0x0	FLG: 0111 1110	

IP

0 4 8 16 19 31 Bits

4	IHL	DSCP: 0x0	TL: 28	
ID: 0xa			0x0	0x0
TTL: 254		PRO: 0x1	CHKSUM	
SRC IP: 10.0.0.1				
DST IP: 40.0.0.1				
OPT: 0x0				0x0
DATA (VARIABLE LENGTH)				

ICMP

0 8 16 31 Bits

TYPE: 0x8	CODE: 0x0	CHECKSUM
ID: 0x4		SEQ NUMBER: 6

Outbound PDU details.

HDLC

0	8	16	32	32+x	48+x	56+x
FLG: 0111 1110	ADR: 0xef	CONTROL: 0x0	DATA: (VARIABLE LENGTH)	FCS: 0x0	FLG: 0111 1110	

IP

0 4 8 16 19 31 Bits

4	IHL	DSCP: 0x0	TL: 28	
ID: 0xa			0x0	0x0
TTL: 253		PRO: 0x1	CHKSUM	
SRC IP: 10.0.0.1				
DST IP: 40.0.0.1				
OPT: 0x0				0x0
DATA (VARIABLE LENGTH)				

ICMP

0	8	16	31 Bits
TYPE: 0x8	CODE: 0x0	CHECKSUM	
ID: 0x4		SEQ NUMBER: 1	

PDU information at Device PC1

Inbound PDU Details

PDU Formats

Ethernet II

0	8	14	19 Bytes
PREAMBLE: 101010...1011	DEST MAC: 0010.111B.PPBE	SRC MAC: 000D.EF93.1A78	
TYPE: 0x800	DATA (VARIABLE LENGTH)		FCS: 0x0

IP

0	4	8	16	19	31 Bits
4	IHL	DSCP: 0x0	TL: 28		
ID: 0xa			0x0	0x0	
TTL: 252		PRO: 0x1	CHKSUM		
SRC IP: 10.0.0.1					
DST IP: 20.0.0.1					
OPT: 0x0				0x0	
DATA (VARIABLE LENGTH)					

ICMP

0	8	16	31 Bits
TYPE: 0x8	CODE: 0x0	CHECKSUM	
ID: 0x4		SEQ NUMBER: 6	

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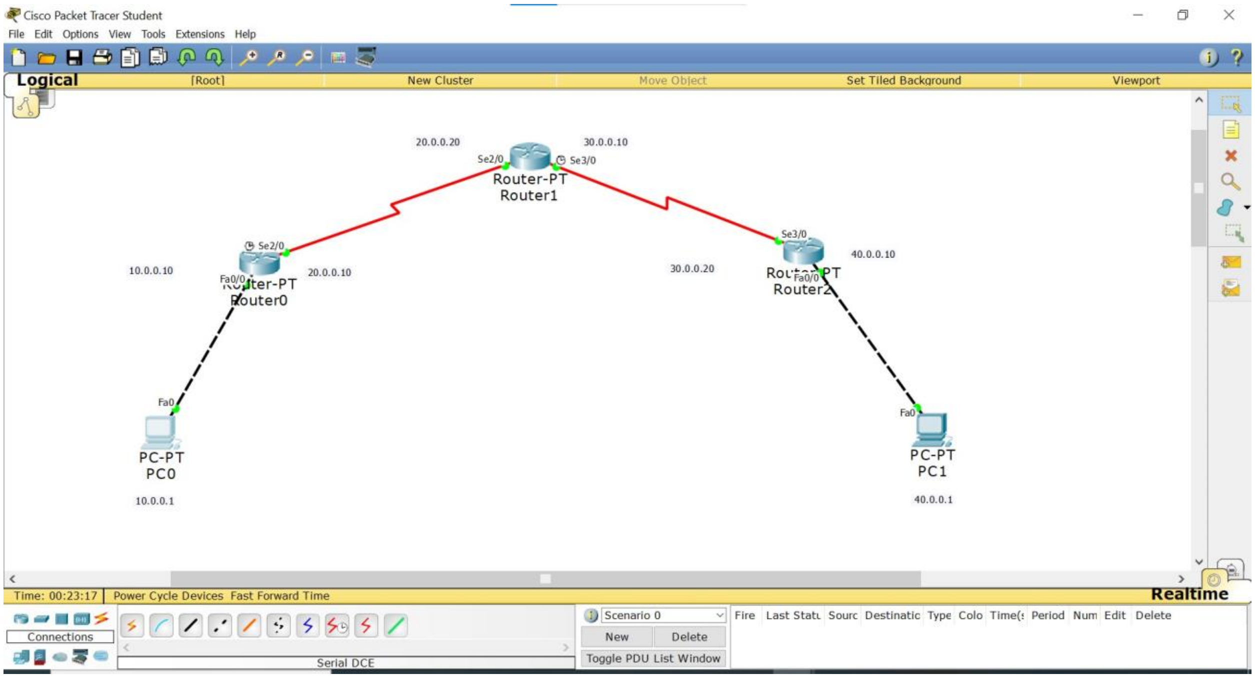
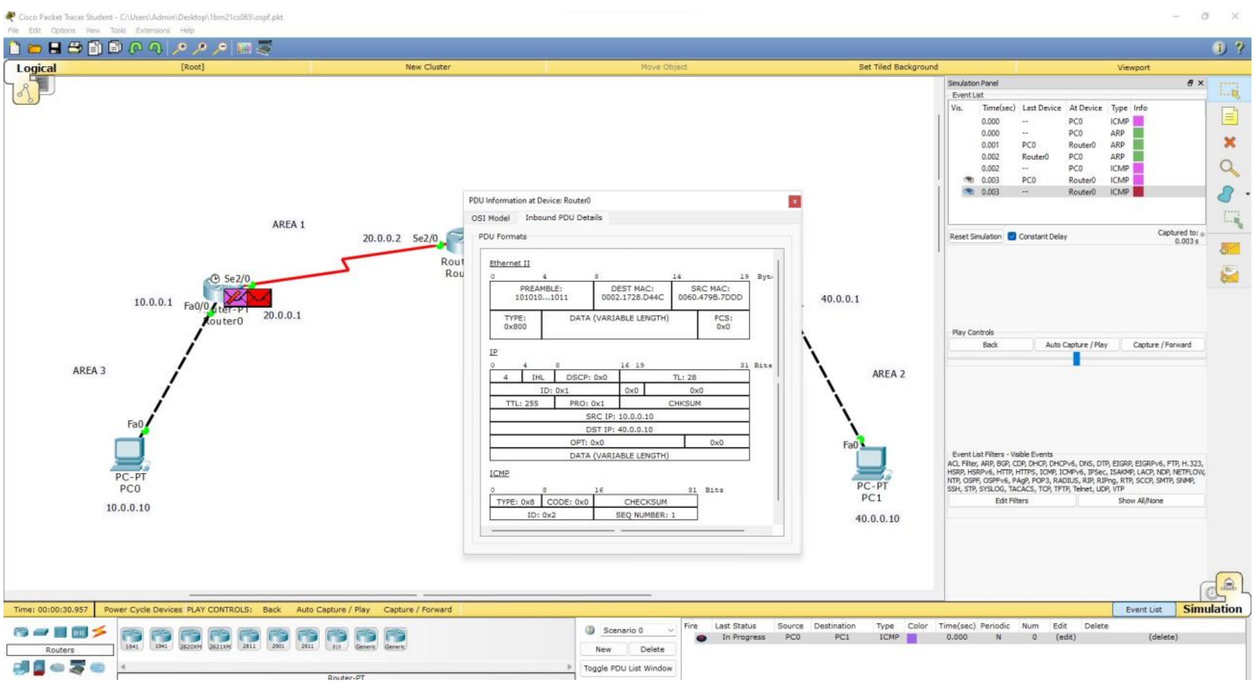
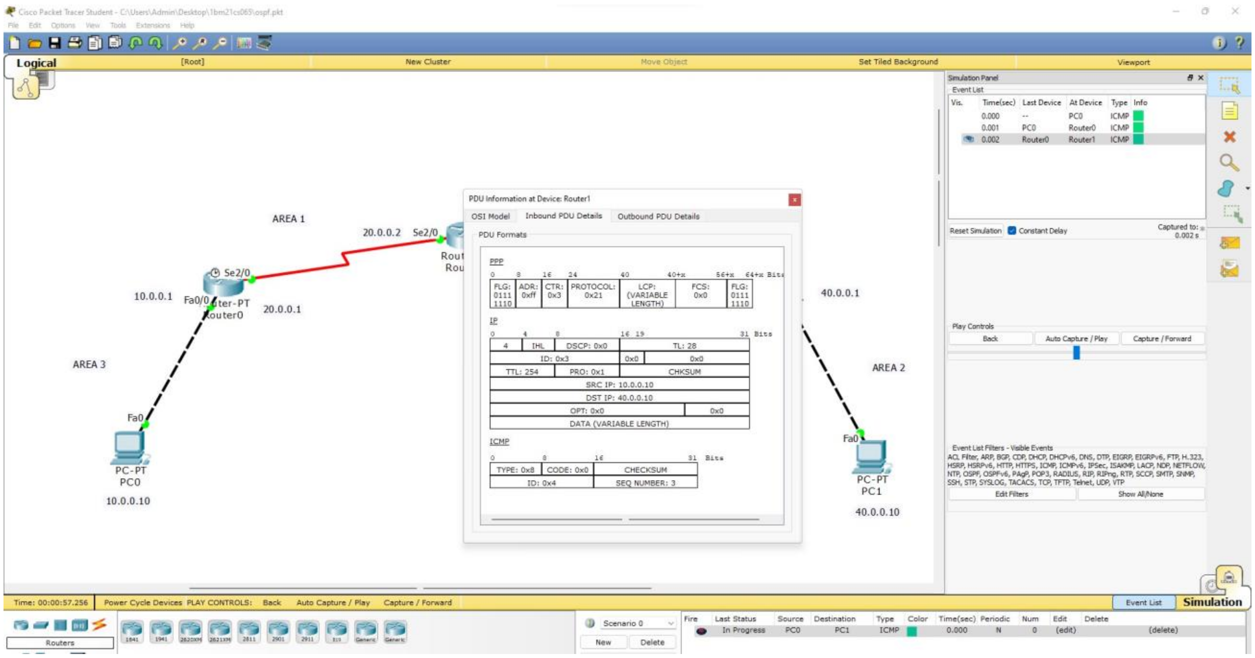
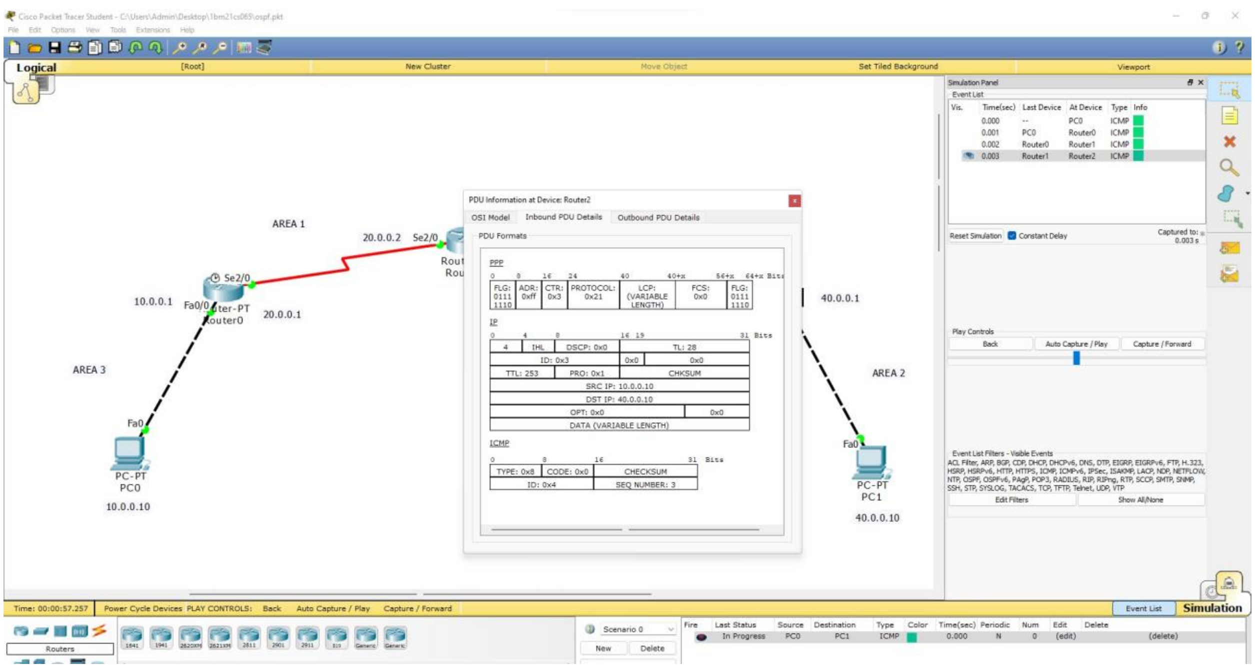

Cisco Packet Tracer Student
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
20.0.0.20
30.0.0.10
Se2/0
Se3/0
Router-PT
Router1
Se2/0
Se3/0
10.0.0.10
20.0.0.10
30.0.0.20
40.0.0.10
Fa0/0
Router0
Router2
Fa0
PC-PT
PC0
10.0.0.1
PC-PT
PC1
40.0.0.1
Time: 00:23:17
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(: Period Num Edit Delete

OUTPUT:


AREA 1
AREA 2
AREA 3
20.0.0.2
Se2/0
10.0.0.1
Fa0/0
20.0.0.1
40.0.0.1
PC-PT
PC0
10.0.0.10
PC-PT
PC1
40.0.0.10
PDU Information at Device: Router0
OSI Model
Inbound PDU Details
PDU Formats
Ethernet II
PREAMBLE: 101010...1011
DEST MAC: 0002.1728.D44C
SRC MAC: 0060.479B.7DDD
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
TTL: 255
PRO: 0x1
CHKSUM
SRC IP: 10.0.0.10
DST IP: 40.0.0.10
ICMP
TYPE: 0x8
CODE: 0x0
CHECKSUM
ID: 0x2
SEQ NUMBER: 1
Simulation Panel
Event List
Reset Simulation
Constant Delay
Play Controls
Back
Auto Capture / Play
Capture / Forward
Edit Filters
Show All/None
Simulation
Scenario 0
New
Delete
Toggle PDU List Window





CYCLE -2

EXPERIMENT NO-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]);
}
```

Date: 17/8/23

CYCLE-2

Experiment - 1

Aim:- To write program for error detecting code using CRC-CCITT (16-bits)

```
#include <stdio.h>
#include <string.h>
#define N strlen(poly)
char data[20];
char check value[30];
char poly[10];
int data length,i,j;
void XOR
{ for(j=1; j<N; j++)
 checkvalue[j] = ((check_value[j] == poly [j] ? '0':'1')
 ); }
void receiver()
{ printf("enter the received data :");
 scanf("%s", data);
 printf("Data received :%s", data);
  crc();
for (i=0; (i<N-1) && (check_value [i]!='1'); i++)
 if (N-1)
 printf ("\n error detected\n");
  else
 printf("\n No error detected \n"); }
void crc()
{ for (i=0; i<N ; i++)
 checkvalue[i] = data [i];
  do {
     if (checkvalue[0] == '1')
     XOR();
```

```
for(j=0;j<N-1;j++)
check_value[j]=check_value[j+1];
  check_value[j]=data[j+1];
  }while (i<=data_length+N+1); }
int main()
{printf("\n Enter data to be transmitted :");
 scanf("%s",data);
 printf("\n Enter the division polynomial :");
  scanf("%s",poly);
  data_length=strlen(data);
 for(i=data_length; i<data_length+16-1;i++)
  data[i]='0';
 printf("\n Data padded with n-1 zeroes :%s",
 data);
 crc();
printf("\n CRC value is %s",check_value);
for (i=data_length; i<data_length+16-1+1;i++)
  data[i]=check_value[i-data_length];
 printf("\n Final dataword to be sent:%s"
     data);
  receiver();
  return 0; }
```

Output:

Enter the data to be transmitted :101100
Enter the divisor polynomial :1001
Data padded with n-1 zeroes :101100000
CRC value is :001
Final codeword to be sent :101100001
Enter the received data :101100001
No error detected.
Enter the data to be transmitted :1010110
Enter the divisor polynomial :1011

Data padded with n-1 zeroes : 101010000
CRC value is : 001
Final codeword to be sent : 101010001

Enter the received data : 10001000
error detected.

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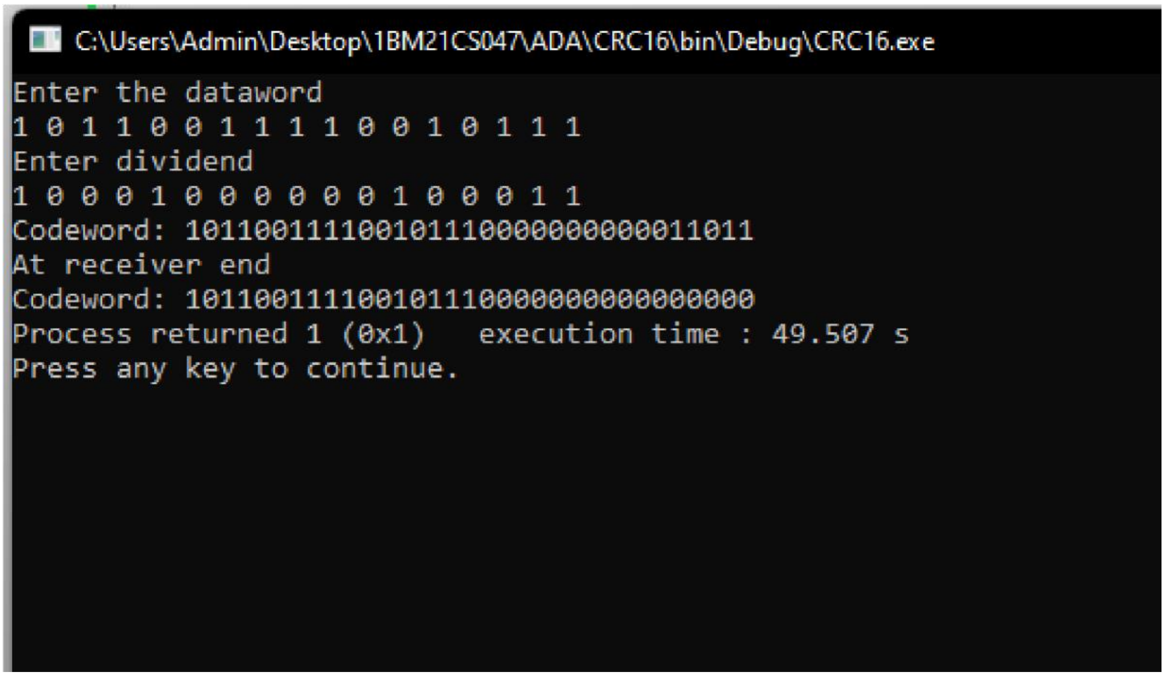
C:\Users\Admin\Desktop\1BM21CS047\ADA\CRC16\bin\Debug\CRC16.exe
Enter the dataword
1 0 1 1 0 0 1 1 1 1 0 0 1 0 1 1 1
Enter dividend
1 0 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1
Codeword: 101100111100101110000000000011011
At receiver end
Codeword: 101100111100101110000000000000000
Process returned 1 (0x1)   execution time : 49.507 s
Press any key to continue.

EXPERIMENT NO-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
}
```

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Experiment : 2

Write a program for congestion control using leaky Bucket algorithm.

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

output:

Enter bucket size: 5000
Enter outgoing rate: 2000
Enter number of inputs: 2
Enter the incoming packet size: 3000
Bucket buffer size 3000 out of 5000
After outgoing 1000 packets left out of 5000 in buffer
Enter the incoming packet size: 1000
Bucket buffer size 2000 out of 5000
After outgoing 0 packets left out of 5000 in buffer.

case 2:

Enter the bucket size: 1000
Enter the outgoing size: 500
Enter the number of inputs: 1
2000 Enter the incoming bucket size: 2000
not possible
3000 ~~Bucket buffer size 0 out of 2000~~
~~dropped 1000 no of packets~~.
Incoming packet size 2000
Dropped 1000 no of packets.
Bucket buffer size 0 out of 1000
After outgoing 500 packets left out of 1000 in buffer.

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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>
```

EXPERIMENT NO-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()
```

24/8/23 Experiment 3

Aim: 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

Solution:

① 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()
```

② 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('\n Sent contents of '+ sentence)
file.close()
connectionSocket.close()
```

Output:

* when you run serverTCP.py

The server is ready to receive

when you run clientTCP.py

Enter file name: serverTCP.py
from server:
(The file from ServerTCP.py will be copied and displayed here)

* In serverTCP.py

The server is ready to receive

Sent contents of ServerTCP.py
The server is ready to receive.

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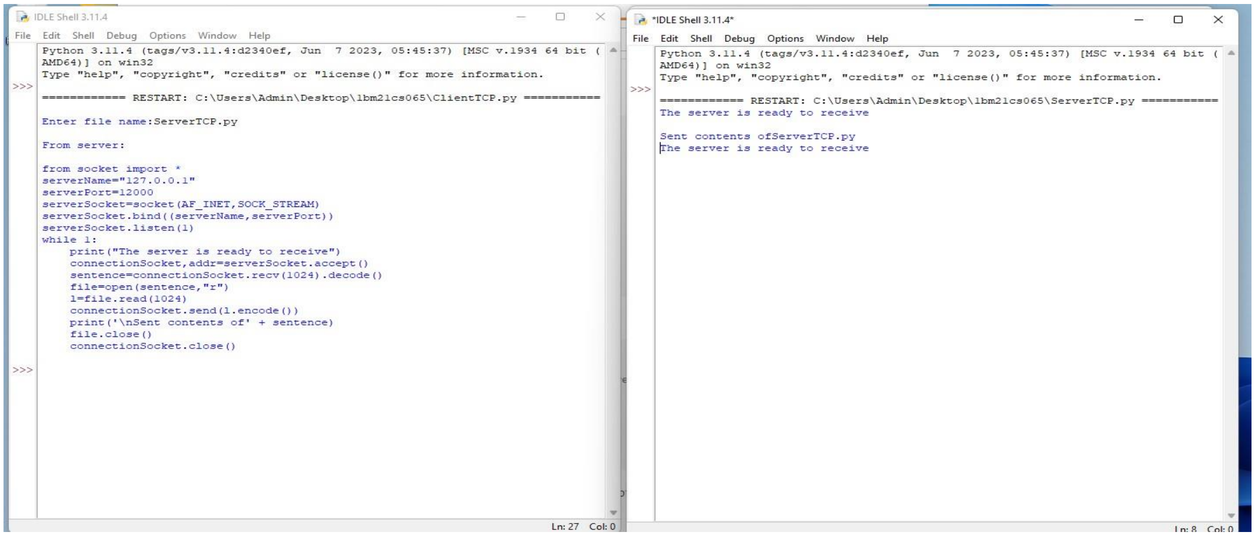
IDLE Shell 3.11.4
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: C:\Users\Admin\Desktop\1bm21cs065\ClientTCP.py ===========
Enter file name:ServerTCP.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: 27 Col: 0
IDLE Shell 3.11.4
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
============ RESTART: C:\Users\Admin\Desktop\1bm21cs065\ServerTCP.py ===========
The server is ready to receive
Sent contents ofServerTCP.py
The server is ready to receive
Ln: 8 Col: 0

EXPERIMENT NO-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()

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Experiment 4

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:-

1 Client UDP.py.

```
from socket input*
server Name ="127.0.0.1"
serverPort = 12000
client Socket =socket (AF_INET, SOCK_DGRAM)

sentence = input ("\n Enter file name:")
clientSocket = send to (bytes(sentence, "utf-8"),
(serverName, serverPort))
file contents, serverAddress = client socket .recv from(2048)
print("\n Reply from Server:\n")
print (file contents.decode ("utf-8"))
# for i in filecontents:
# print (str(i), end ="")
client Socket.close()
client Socket.close ()
```

2. Server UDP.py

```
from socket import*
server Port =12000
serverSocket = Socket (AF-INET, SOCK-DGRAM)
serverSocket .bind(("127 .0.0.1", server Port))
print("The server is ready to receive").
```

```
while 1:
   sentence, clientAddress = serverSocket.recvfrom(2048)
 sentence = sentence.decode("utf-8")
  file = open(sentence,"r")
  con=file.read(2048)

serverSocket.sendto (bytes (con,"utf -8"),clientAddress)

print('\n Sent contents of ', end='')
 print (sentence)
 # for i in sentence:
     # print (str(i), end='')
  file.close()
```

output:

when you run ServerUDP.py

The server is ready to receive

when you run ClientUDP.py

Enter file name: serverUDP.py
Reply from server:
(The files from server UDP.py will be copied and displayed here)

In ServerUDP.py
The server is ready to receive

Sent contents of ServerUDP.py
The server is ready to receive

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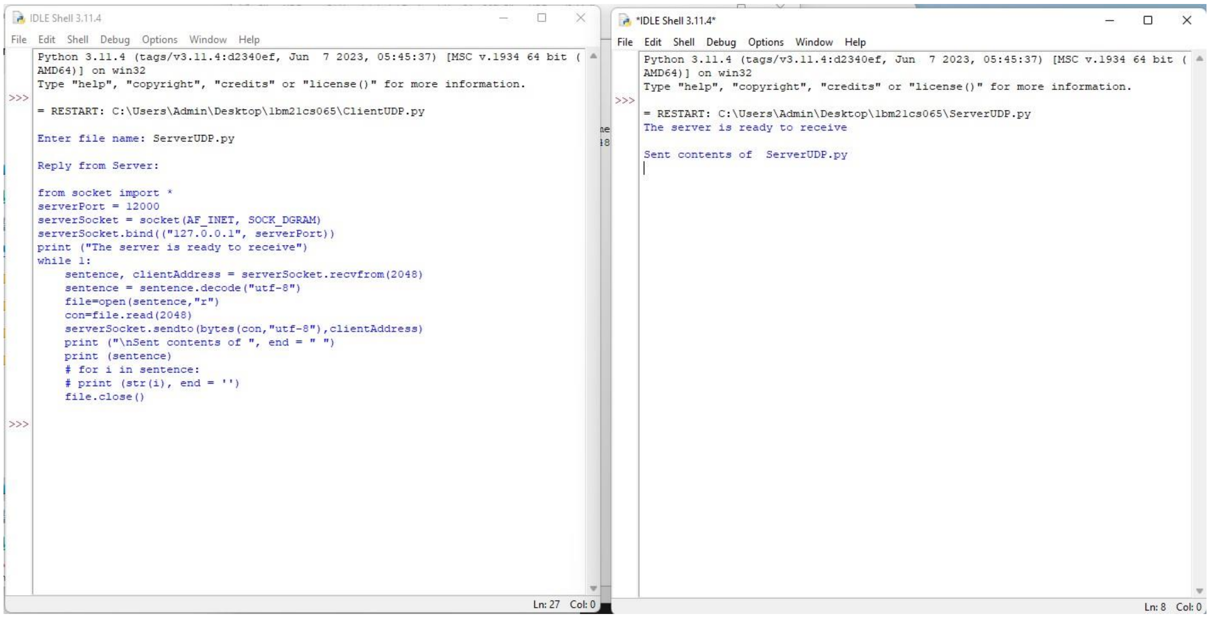
IDLE Shell 3.11.4
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Admin\Desktop\1bm21cs065\ClientUDP.py
Enter file name: ServerUDP.py
Reply from Server:
from socket import *
serverPort = 12000
serverSocket = socket(AF_INET, SOCK_DGRAM)
serverSocket.bind(("127.0.0.1", serverPort))
print ("The server is ready to receive")
while 1:
sentence, clientAddress = serverSocket.recvfrom(2048)
sentence = sentence.decode("utf-8")
file=open(sentence,"r")
con=file.read(2048)
serverSocket.sendto(bytes(con,"utf-8"),clientAddress)
print ("\nSent contents of ", end = " ")
print (sentence)
# for i in sentence:
# print (str(i), end = '')
file.close()
>>>
Ln: 27 Col: 0
IDLE Shell 3.11.4
File Edit Shell Debug Options Window Help
Python 3.11.4 (tags/v3.11.4:d2340ef, Jun 7 2023, 05:45:37) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\Admin\Desktop\1bm21cs065\ServerUDP.py
The server is ready to receive
Sent contents of ServerUDP.py
Ln: 8 Col: 0

EXPERIMENT NO-17

Tool Exploration -Wireshark

31/8/23 Experiments

Wireshark.

→ wireshark captures network ~~packets~~ packets from various interfaces. It enables us to captures specific types of traffic based protocols, source and destination addresses, and all keywords within packet payload

→ Its real time monitoring capability is invaluable for observing ~~network~~ ongoing network activities. This feature helps in detecting ~~any~~ sudden traffic spikes, and unusual protocol behaviour.

→ It also decrypts and encrypted protocols.

→ In command prompt : type ipconfig.

> ipconfig

Window IP configuration

Ethernet adapter Ethernet:

Connection-specific DNS suffix :

Link-local IPv6 Address . . . . : fe80::e587:e9fd:248:4cdb%2

IPv4 Address. . . . . : 10.124.2.84

Subnet Mask . . . . : 255.255.0.0

Default Gateway. . . . . . . : 10.124.0.11

→ It shows us IPV6, IPV4 addresses, subnet mask and default gateway.

→ the selected protocol appears at the bottom with ~~all~~ source and destination addresses and all keywords within packet payload

Bafna Gold
Date: Page:

→ when user clicks on these keywords for example destination address the destination address will be highlighted.
→ for example when we select a TCP protocol. it shows:-
Source port : 5228
Destination port : 58545
Sequence number : 1
sequence number (raw) : 4247384453.
Acknowledgement Number : 1
Acknowledgement Number : 2
Acknowledgement number (raw) : 3944402357.
Flags : 0x010 (ACK)
window : 265.
checksum : 0x9008.
→ Raw USB traffic can be captured.
→ various settings timers and filters can be set that ensure only triggered traffic appear.
→ Information of packet include SID number time, source IP address, destination IP address, protocol name, length and other important information.

NL
31/8/23