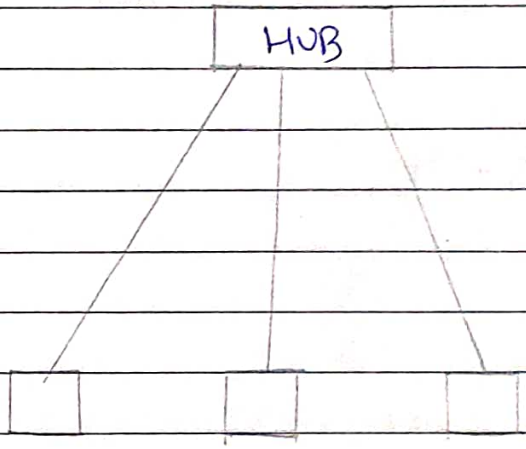
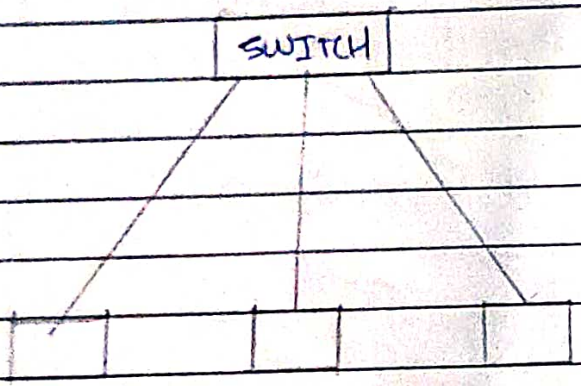
LAB 1

Select the 3 end devices (PC-PT, PC0, PC1, and PC2)
select generic hub (Hub - PT Hub1)
Connect the end devices to the hub using copper straight through
Set IP address for all the end devices



Sending msg from PC0 to PC1
Set PC0 as the sender and PC1 as the receiver
PC0 sends the message to Hub1
Hub1 broadcasts the message to PC1 and PC2
PC2 discards the message
PC1 sends the acknowledgement to Hub1
Hub1 broadcasts the message to PC0 and PC2
PC2 discards it

Select 3 generic end divices (PC PT PC3 PC4 P
Select a generic switch (switch PT switch1)
Set IP address to the all PC's
Connect the end divices to the switch using
copper straight through
Set IP address for all end devices
Config -> Fast ethernet -> IP address)

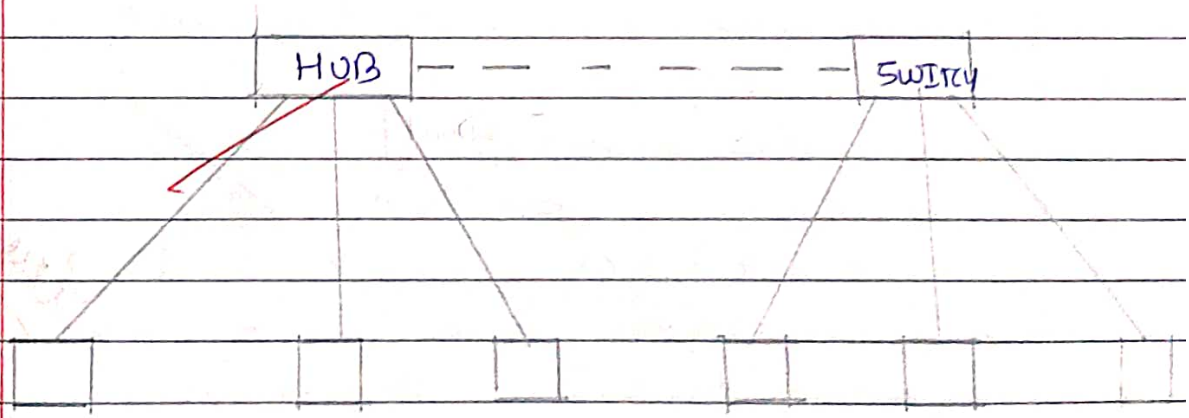


Sending message from PC3 to PC5
PC3 sends message to switch1
Switch on broad cast the message to PC5
PC5 send acknowledgement to switch1
Switch broadcast it to PC3

Connect the above hub and switch networks using copper cross-over

sending message from PC0 to PC4
PC0 -> Hub
Hub -> PC1, PC2 and switch
PC1 and PC2 reject
Switch -> PC5
PC5 -> switch

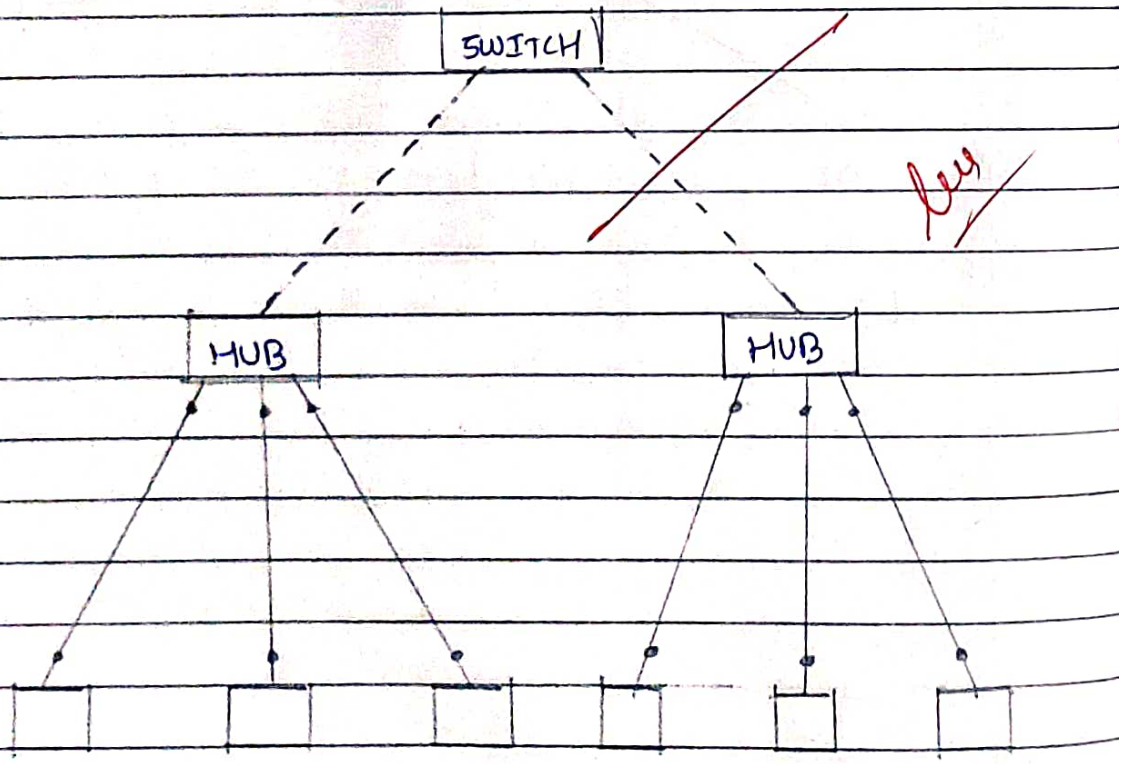
switch - hub
Hub - PC0, PC1, PC2
PC1 & PC2 rejects
PC0 accepts the data



Connecting 2 hub networks via switch

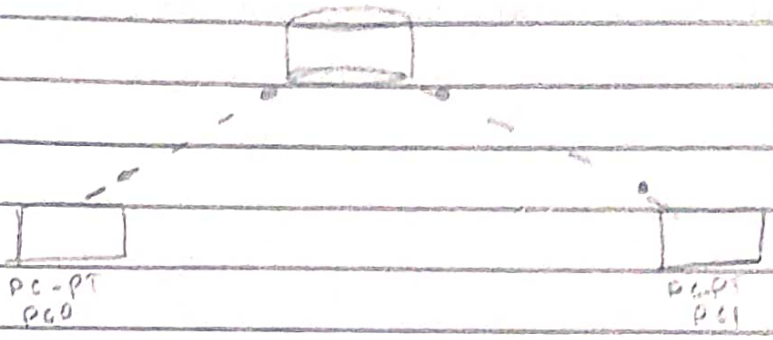
Sending message from PC0 to PC3.

PC0 -> HUB1
HUB1 -> PC1 and switch
PC1 discards
switch -> HUB2
HUB2 -> PC2 and PC3
PC2 discards
PC3 sends acknowledgment to Hub 2
Hub2 -> PC2 and switch
PC2 discards
Switch -> Hub1
Hub1 -> PC0 and PC1
PC1 discard & PC0 accepts



How to Configure Ip address to PC and Router in Packet Tracer

Experiment-2



Set the IP address of both end devices

PC0 - 10.0.0.1

PC1 - 20.0.0.1

Configure the router

-> go to CLI

Enable router

go to configuration by typing configure terminal

Router (config) # interface fastEthernet 0/0

Router (config-if) # ip address 10.00.1 255.0.0.0

Router (config-if) # no shutdown

Router (config-if) #exit

Router (config) # interface fastEthernet 1/0

Router (config-if) # ip address 20.0.0.1 255.0.0.0

Router (config-if) # no shutdown

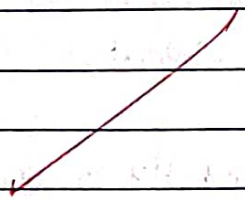
Router (config-if) # exit

Lights all are green from red.

Click on PC1 -> Desktop -> Command prompt

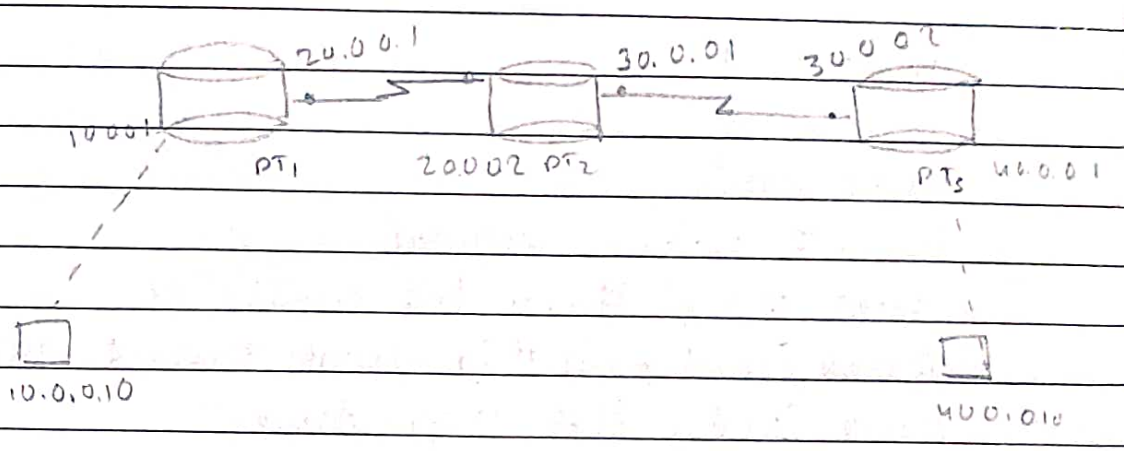
Now give this command ping 20.0.0.10 press enter

connectivity between 10.0.0.1 and 20.0.0.1 is done
Now PC1 communicates with PC2



Under standing Ping Response, Destination unreachable, Request time out, Reply

Create a topology
Configure ip address to end device
After configuring we will get green light



Router PT-1

Router > enable
Router # configure terminal
Router (config) # interface fastEthernet 0/0
Router (config-if) # ip address 10.0.0.1 255.0.0.0
Router (config-if) # no shutdown
Router (config-if) # exit.
Router (config) # interface serial 2/0
Router (config-if) # ip address 20.0.0.1 255.0.0.0
Router (config-if) # no shutdown
Router (config-if) # exit.

Router PT-2
Router > enable
Router # configure terminal
Router (config) # interface serial 2/0
Router (config-if) # ip address 20.0.0.2 255.0.0.0
Router (config-if) # no shutdown
Router (config) # exit

Router(config)# interface serial 3/0
Router(config-if)# ip address 30.0.0.1 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit

Router PT-3

Router>enable
Router# configure terminal
Router(config)# interface serial 2/0
Router(config-if)# ip address 30.0.0.2 255.0.0.0
Router(config-if)# no shutdown
Router(config-if)# exit

on PC-1

ping 10.0.0.1
pinging 10.0.0.1

ping 20.0.0.1
pinging 20.0.0.1

ping 20.0.0.2
Request timeout

Adding connection
R1
Router> show ip route
C 10.0.0.0 is directly connected
C 20.0.0.0 is directly connected
Router>enable
Router# configure terminal

Router (config) # ip route 30.0.0.0 255.0.0.0 20.0.0.2
Router (config) # ip route 40.0.0.0 255.0.0.0 20.0.0.2

R2

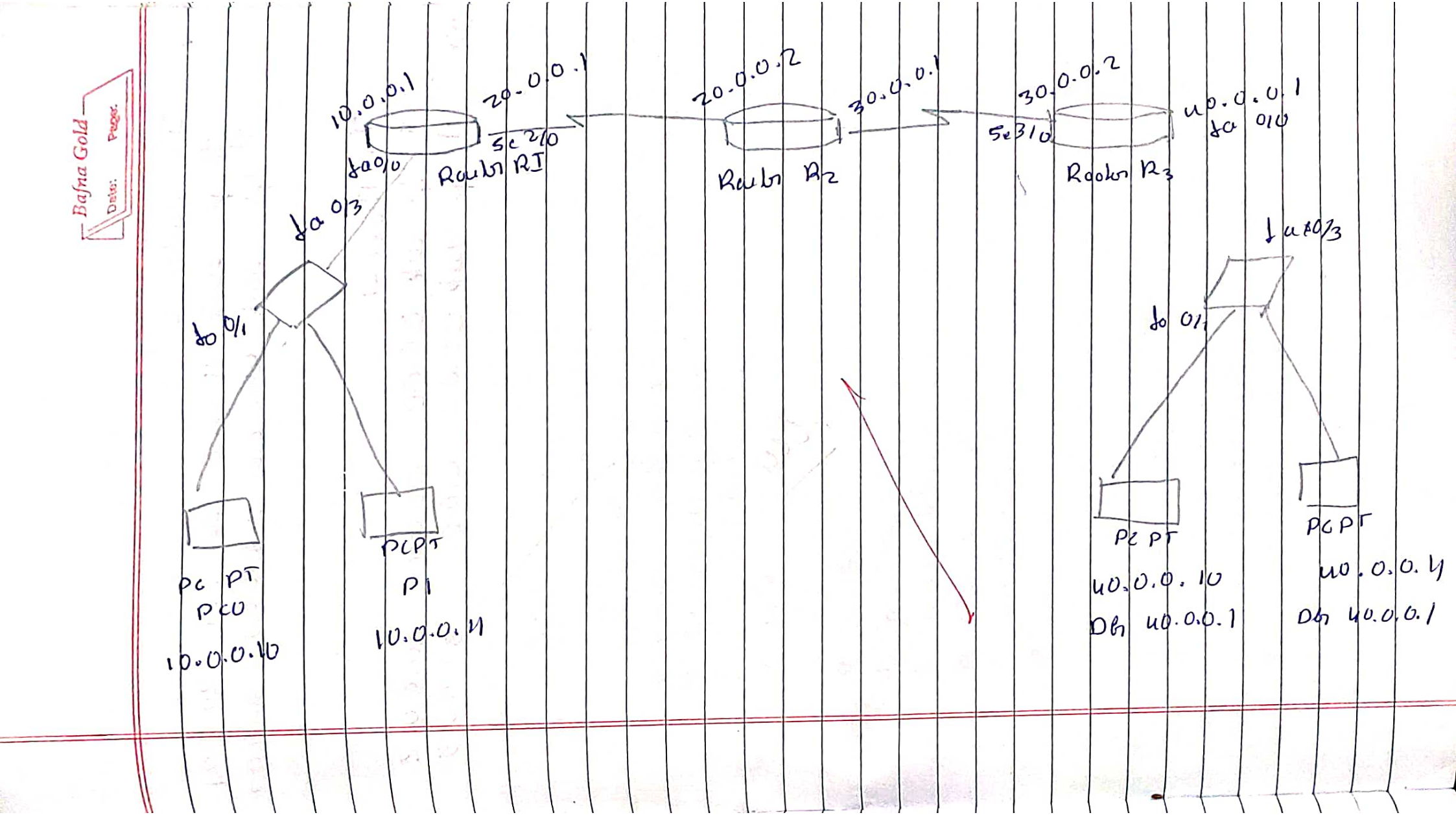
Router > show ip route
C 20.0.0.0 is directly connected
C 30.0.0.0 is directly connected
Router # configure terminal 20.0.0.1
Router (config) # ip route 10.0.0.0 255.0.0.0
Router (config) # ip route 40.0.0.0 255.0.0.0 30.0.0.2

R3
Router > show ip route
C 30.0.0.0 is directly connected
C 40.0.0.0 is directly connected
Router # Configure terminal
Router (config) # ip route 20.0.0.0 255.0.0.0 30.0.0.1
Router (config) # ip route 10.0.0.0 255.0.0.0 30.0.0.1

ping result

PC-1
> ping 40.0.0.1
successful

PC-2
> Ping 10.0.0.1
successful


10.0.0.1
20.0.0.1
20.0.0.2
30.0.0.1
30.0.0.2
40.0.0.1
Fa0/0
Se2/0
Router R1
Router R2
Se3/0
Router R3
Fa 0/3
Fa 0/1
Fa 0/0
Fa 0/3
Fa 0/1
PC PT
PC0
10.0.0.10
PC PT
PC1
10.0.0.11
PC PT
40.0.0.10
Dft 40.0.0.1
PC PT
40.0.0.11
Dft 40.0.0.1

In Router-2

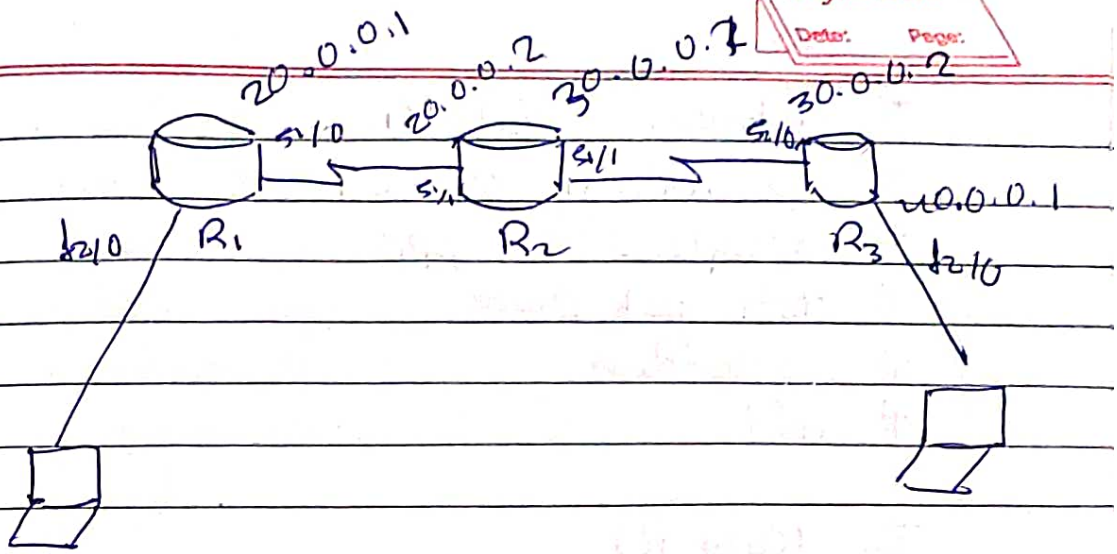
ip route 10.0.0.0 255.0.0.0 20.0.0.1

ip route 40.0.0.0 255.0.0.0 30.0.0.2

In Router-1

ip route 0.0.0.0 0.0.0.0 20.0.0.2

In R3 # ip route 0.0.0.0 0.0.0. 30.0.0.3



10.0.0.10
Def gw 10.0.0.1

40.0.0.10
Def gw 40.0.0.1

In Router R1
interface fastEthernet 2/0
ip address 10.0.0.1 255.0.0.0
no shutdown
exit

interface serial 1/0
ip address 20.0.0.1 255.0.0.0
encapsulation ppp ~~20.00.1 2~~
clock rate 64000
no shutdown
exit

In Router R2
interface serial 1/0
ip address 20.0.0.2 255.0.0.0
encapsulation ppp
no shutdown
exit

interface serial 1/1
ip address 30.0.0.1 255.0.0.0
encapsulation ppp
clock rate 64000
no shutdown
exit

In Router R3
interface serial 1/0
ip address 30.0.0.2 255.0.0.0
encapsulation ppp
no shutdown
exit

interface fastethernet 2/0
ip address 40.0.0.1 255.0.0.0
no shutdown
exit

Configure RIP to all routers by command

In Router R1
router rip
network 10.0.0.0
network 20.0.0.0
exit

In Router R2
router rip
network 20.0.0.0
30.0.0.0
#

In Router R3
router rip
network 20.0.0.0
network 40.0.0.0
exit

How to Configure http and DNS Server

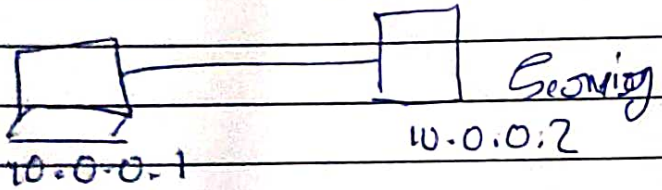
2 end devices

1 Server

DNS → Domain Name Ip services

nslookup bmsce.ac.in [for ip address]

Configure both ip address for end devices and Services



Http → on

DNS → on

in server

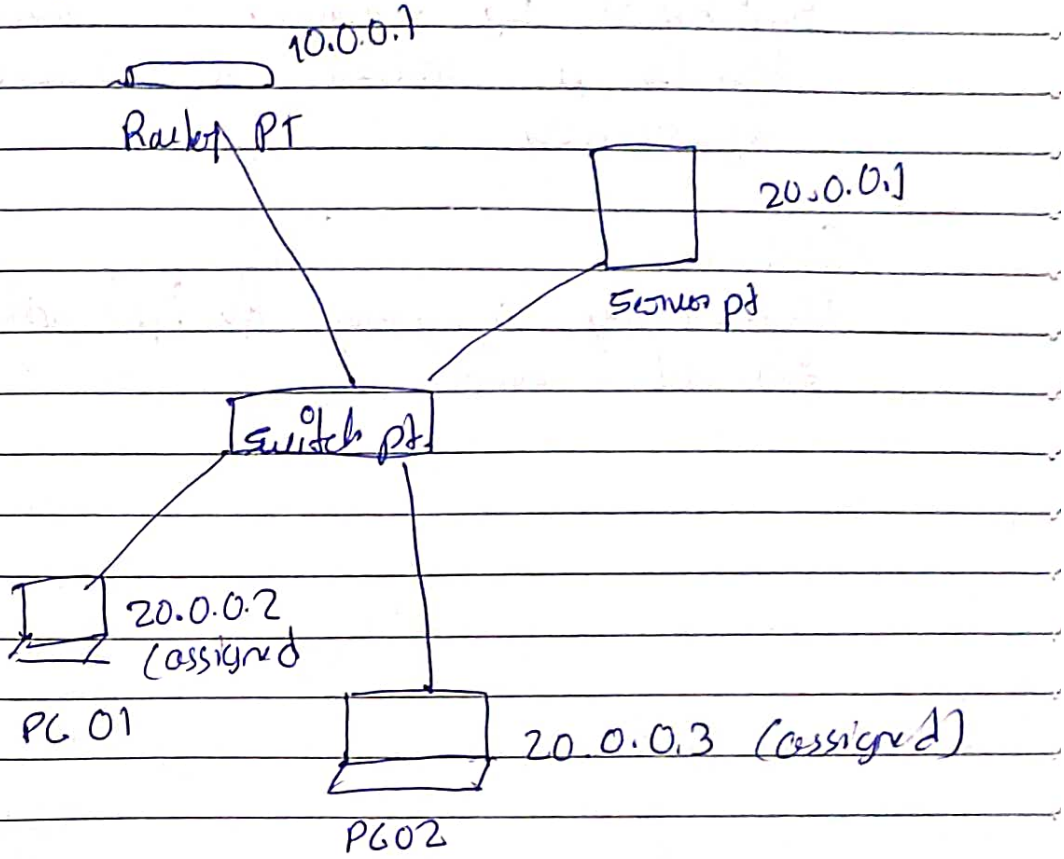
In Server Save a link in DNF

then in end device search for the same link which gets to the server

If we edit in http in html that edit will be resulted in browser

6

Configure DHCP within the Lan;



Configure router:
using CLI
then configure Server

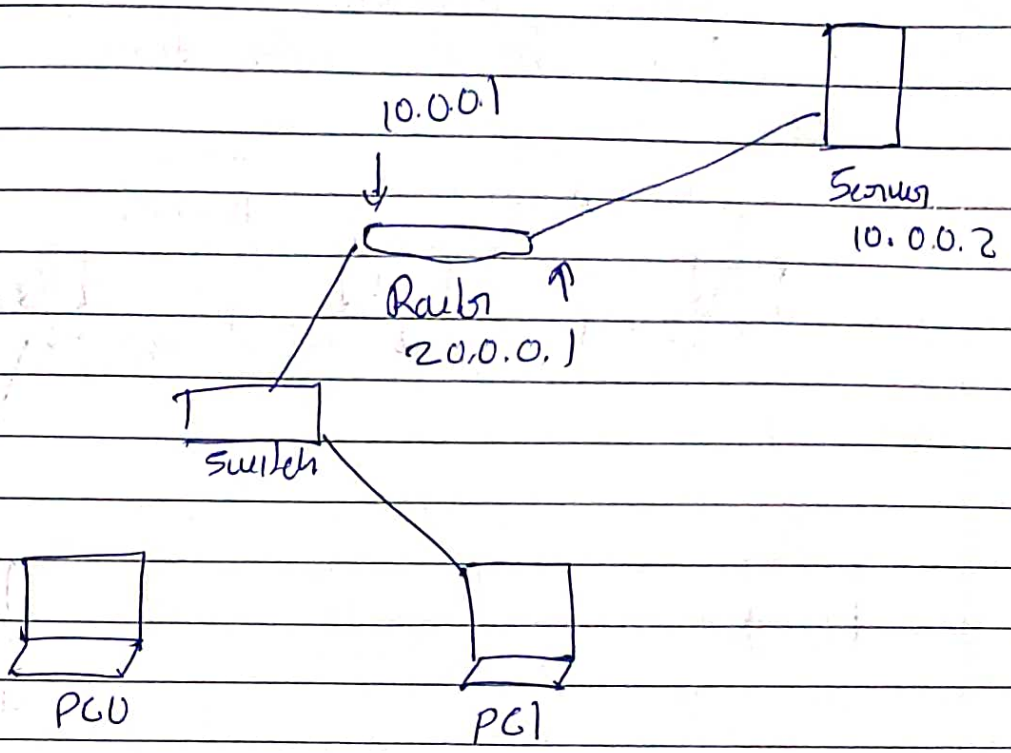
Server
↓
Services → DHCP → Gateway is router address
10.0.0.1
DNS Server: Server ip address 20.0.0.1
TFTP Server: Server ip address 20.0.0.1
Save
exit

In end device
Desktop → Ip Configure → Select DHCP
Then the ip address is configured dynamically

Outcome:
Dynamically assigning the ip address for end devices.

Bafna Gold
Date: Page:

Router, Server and Switches



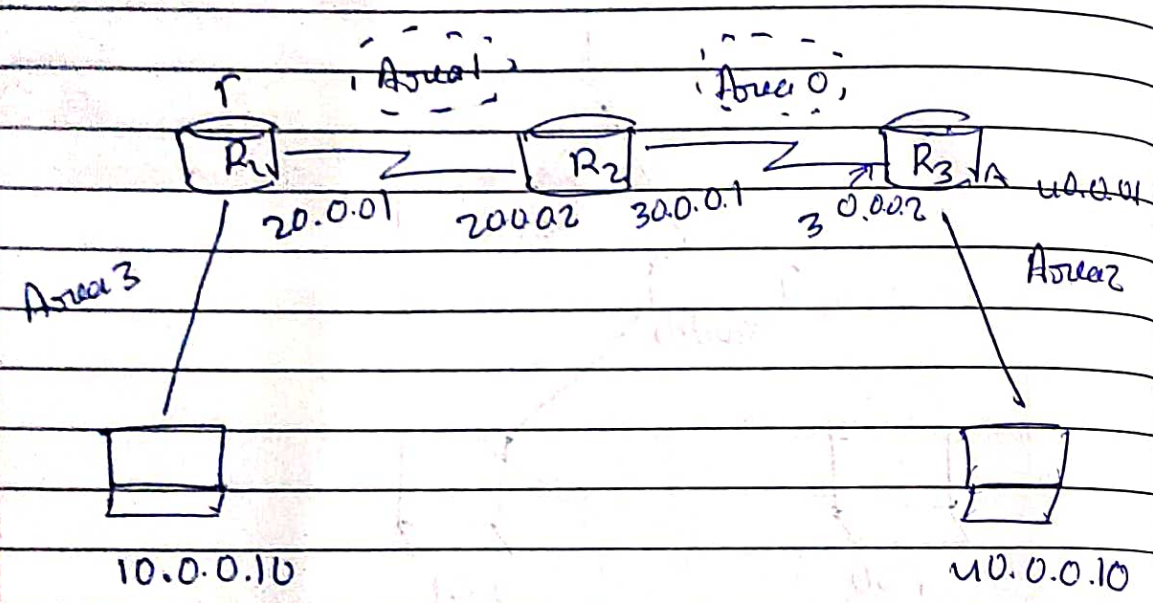
In Server Configure ip address (10.0.0.2)
In Router configure using CLI

-> enable -> config terminal

router > (config - if # interface fastethernet 1/0
ip address 10.0.0.1 255.0.0.0
no shut down
exit

for Router and Server terminal
-> interface fastethernet 1/0
ip address 20.0.0.1 255.0.0.0
ip helper address 10.0.0.2
no shutdown
exit

OSPF protocol
(Open Shortest path first)



Step 1: Configure ip address for all the routers and end devices
encapsulation
clock rate

In R1
R1(config)# interface fastEthernet 0/0
R1(config-if)# ip address 10.0.0.1 255.0.0.0
R1(config-if)# no shutdown
R1(config-if)# exit

R1(config)# interface serial 2/0
R1(config-if)# ip address 20.0.0.1 255.0.0.0
R1(config-if)# encapsulation ppp
R1(config-if)# clock rate 64000
no shutdown
exit

In Router R_2

R2(config)# interface serial 2/0
R2(config-if)# ip address 20.0.0.2 255.0.0.0
encapsulation ppp
no shutdown
exit

R2(config)# interface serial 3/0
R2(config-if)# ip address 30.0.0.1 255.0.0.0
encapsulation ppp
clock rate 64000
no shut
exit

In Router R_3-

R3(config)# interface serial 2/0
R3(config-if)# ip address 30.0.0.2 255.0.0.0
encapsulation ppp
no shutdown
exit

R3(config)# interface fast Ethernet 0/0
R3(config-if)# ip address 40.0.0.1 255.0.0.0
no shutdown
exit

Configure ospf:-

In Router R_1

R1(config)# router ospf 1
R1(config-router)# router-id 1.1.1.1
network 10.0.0.0 0.255.255.255 area 3

network 20.0.0.0 0.255.255.255 area 1
exit

In router R2

R2 (config) # router ospf 1
R2 (config-router) # router-id 2.2.2.2
network 20.0.0.0 0.255.255.255 area 1
network 30.0.0.0 0.255.255.255 area 0
exit

In Router R3

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

Add virtual links

In R1
R1 (config) # interface loopback 0
(config-if) # ip add 172.16.1.252 255.255.0.0
no shutdown

In R2:

R2 (config) # interface loopback 0
R2 (config-if) # ip add 172.16.1.253 255.255.0.0
no shutdown

R3

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

In Router R1;

R1(config) # router ospf 1
R1(config-router # area 1 virtual-link 2.2.2.2

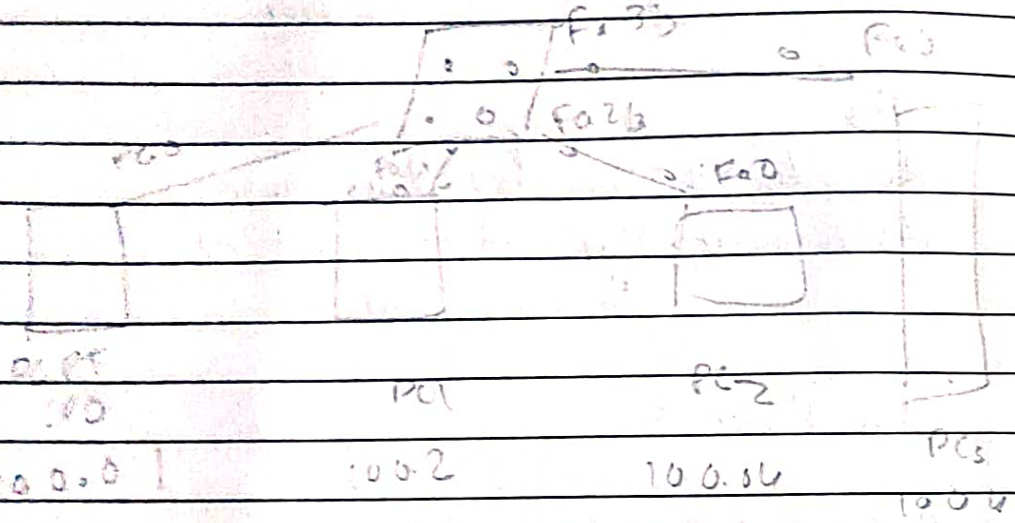
In router R2:

R2(config-router) # area 1 virtual link 1.1.1.1

In R3 show ip route

O/P

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



* Create a topology of 3 PC's and a server
* Assign IP address to all PC's and server
* Connect them through the switch
* Use the inspect tool to click on a pc to (ARP) table
* Command in cmd for the same is arp-a initially ARP table is empty
* Also in CLI of switch the command show mac address table can be given as every transaction to see how the switch learns by transaction & build the address table
* Use the capture button on the simulation page to go step by step so that the changes in ARP can be clearly noted

PING OUTPUT

PC> Ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data

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

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

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

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

Ping statistics for 10.0.0.4

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

Approximate round trip time in milliseconds:

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

PC>arp -a

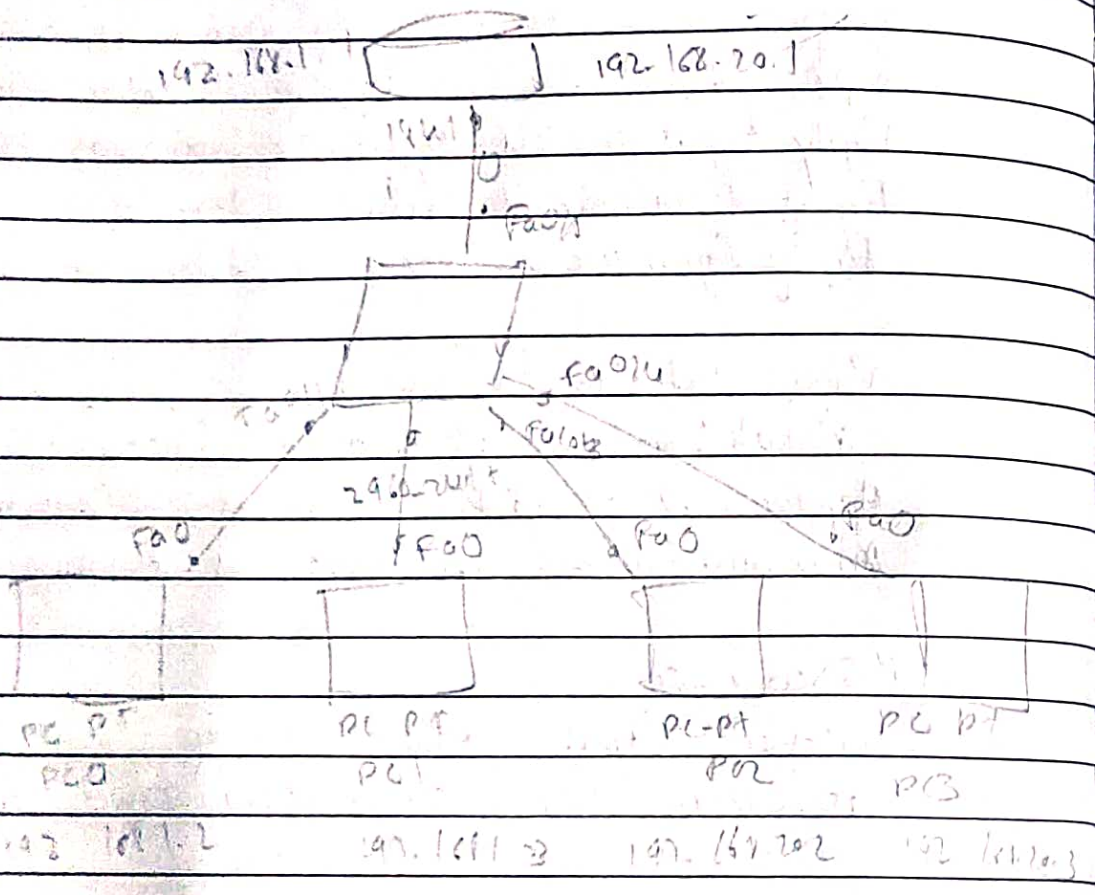
Internet address	Physical Address	Type
10.0.0.4	0060.2f00.324d	dynamic

OBSERVATION.

- When we ping 1 PC and Server the address of server when we ping is known to PC & vice-versa
- When we ping b/w other two PC's simultaneously the address of each other can known
- Every time a host requests a MAC address in order to send a packet to another host in the LAN. It checks its ARP cache to see if the IP to MAC address translation already exists if the translation doesn't exist in portion ARP

LAB-9

To Construct a VLAN & make a PC Communicate among VLAN



- Create a topology as shown above choose 1841 router and 2960-24TT switch here
- Set the IP address of the router and PC's respectively we use class c type address
- also set gateways
- In switch go to config tab and select VLAN Database. Give any VLAN no like 2 and name as VLAN
- Select the interface by clicking U/I & make it trunk

- Next select the switches only 2nd interface which has interface 0/3 & 0/4 click on each of them & set VLAN number 2
- Go to router -> Config tab & select VLAN Database & enter the name vlan & no 2 create
- Go to router -> CLI & type the following commands

Step 1: Config T
2: interface fa 0/0
3: Ip addres 192.168.1.1 255.255.255.0
4: No shut
5: Exit
6: Config t
7: Interface fa 0/0.1
8: encapsulation dot1q 2
9: ip address 192.168.20.1 255.255.255.0
10: No shut
11: Exit

Ping Trace PC command line 1.0

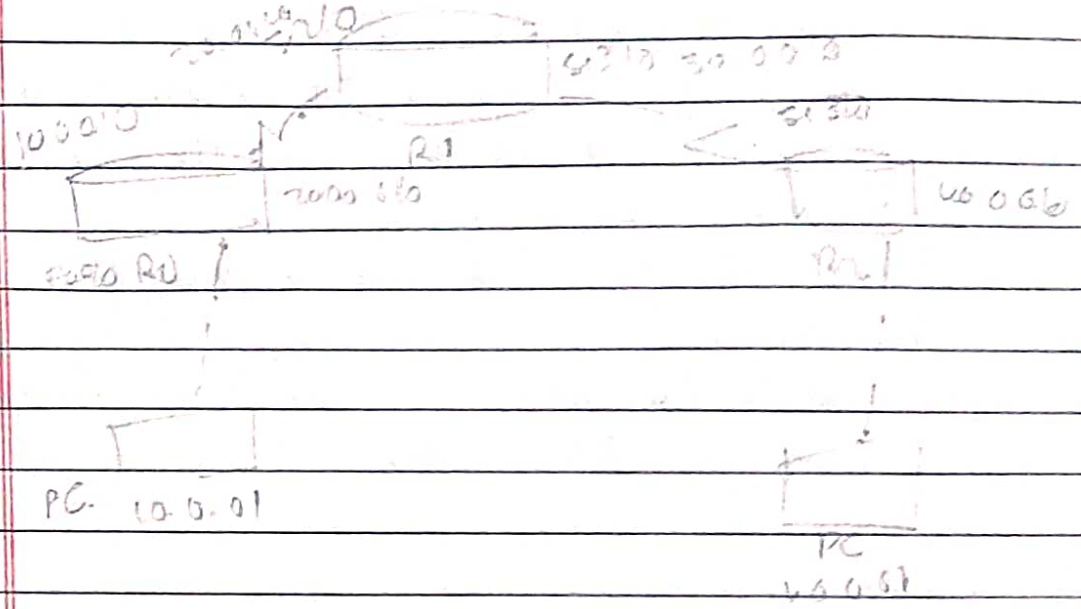
OBSERVATION

we can have one device on one VLAN & another on another VLAN connected to the same switch. They will only hear other broadcast traffic from within their VLANs or if they were connected to us switches

These VLAN / ~~class type address~~ doesn't use IP address instead deal with subnets / class C type addresses

Bafna Gold
Date: Page:

Demonstrate the TTL / life of a Packet



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

Observations

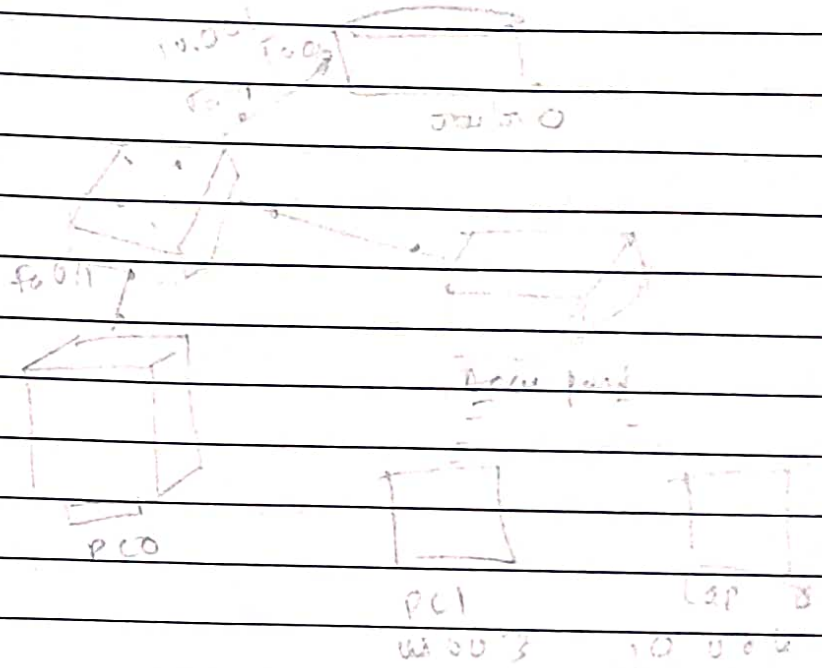
-> The no of hops the packet travel before being discarded as TTL

-> Datagram TTL field is set by the sender & reduced by each router along the path to its destination.

->The router reduces TTL value by one while forwarding the packets

-> When the TTL value is 0, the router discards it & sends an ICMP message

To construct a WLAN & make the nodes communicate with each other



Procedure

Construct the above topology

Configure PC0 & router0 as normally done

Configure access point - Port 1 → SSID New - WLAN

Select WEP & give any key of length 10 hex key 1234567890

Configure PC1 & laptop with wireless standard

Switch off the device Drag the existing PT HOST NM1 to the component listed in PHS Drag WMP300N wireless interface to the empty port switch on the device in the config tab a new wireless interface would have been added Now configure SSID WEP key IP address & gateway to the device

Ping from every device to every other device

To understand the operation of TELNET by accessing the router in any mode from a PC in CLI mode

Procedure

Create a topology as shown above

Configure the IP address & gateway for PC0

Configure the router by accessing the terminal

Commands

Step 1: enable

Config t

host name R1

enable secret P1

interface fastethernet 0/0

ip address 10.0.0.1 255.0.0.0

No shut

line vty 0 5

Login

password P0

Exit End

wr

- Ping message to router
  Password key way does verification mfa
  password has unable to PT
  Accessing router CLI from PC
  show ip route

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

```
#include <stdio.h>
int coor[17]
void xor (int x[], int y[])
{
  int k=0;
  for (int i=1; i<16; i++)
  {
    if (x[i] = y[i])
      coor[k++]=0;
    else
    coor[i]=1;
  }
  }

void main()
{
  int dd[17], div[33], z[17], i, k;
  printf ("Enter the dataword");
    for (i=0; i<17; i++)
    scanf ("%d", &dd[i]);
  for (i=1; i<33; i++)
    div[i]=0
  for (i=0; i<17; i++)
    z[i]=0;
```

```
printf("Enter dividend");
    for(i=0; i<17; i++)
        scanf("%d", &add2[i]);
    i=0;
    k=0;
    for(i=i; i<17; i++)
        coor[k++] = div[i];
while(i<33)
{
    if(coor[0]==0)
        xor(coor, ze);
    else
        xor(coor, dd);
    coor[16] = div[k++];
}
k=0;
for(i=17; i<33; i++)
    div[i] = coor[k++];
printf("Quotient");
    for(i=0; i<3; i++)
        printf("%d", div[i]);
for(i=0; i<17; i++)
    arr[i]=0
printf("Add vector and");
k=0;
for(i=1; i<17; i++)
    coor[k++] = div[i];
wh(i<33)
```

write a program for congestion control using leaky bucket algorithm

Code

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
int bucket, size, out, num, remaining;
printf("Enter Bucket size and the output rate");
scanf("%d %d", &bucket, &size);
remaining = bucket;
while(1)
{
num = rand() % 1000;
if (num < remaining)
{
remaining = remaining - num;
printf("packet %d byte are accepted", num);
}
else
{
printf("Packet of %d byte is dropped", num);
}
if(bucket - remaining > out)
{
remaining += out;
}
```