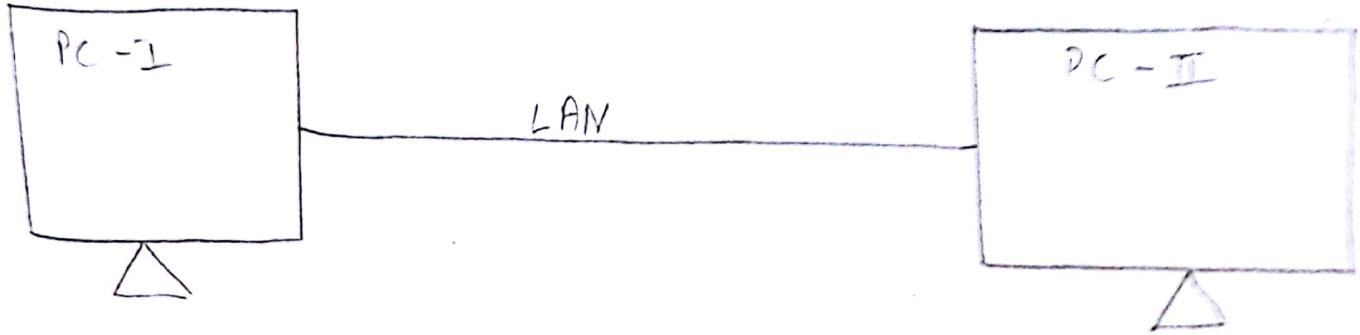


1. Peer to Peer Connectivity	1	12/1/18	22/1/18	1
2. Star Topology	2	15/1/18	22/1/18	2
3. To connect switches with routers.	3	22/1/18	28/1/18	3
4. To implement static routing	4	12/1/18	28/1/18	3
5. To implement AT Routing	6	23/3/18	28/3/18	7
6. To implement OSPF routing	8	23/3/18	26/3/18	8
7. To implement EIGRP.	10	30/3/18	2/4/18	9
8. To implement Standard ACL	13	2/4/18	6/4/18	
9. To implement extended ACL	15	2/4/18	6/4/18	10
10. To implement NAT	17	20/4/18	23/4/18	11
11. To implement VLAN	20	20/4/18	23/4/18	12



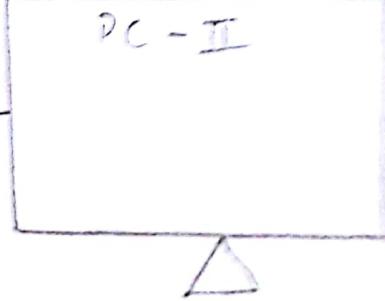
Aim :- Peer to Peer connectivity.



IP - 10.1.1.1

Subnet

mask - 255.0.0.0



IP - 10.2.2.2

Subnet

mask - 255.0.0.0



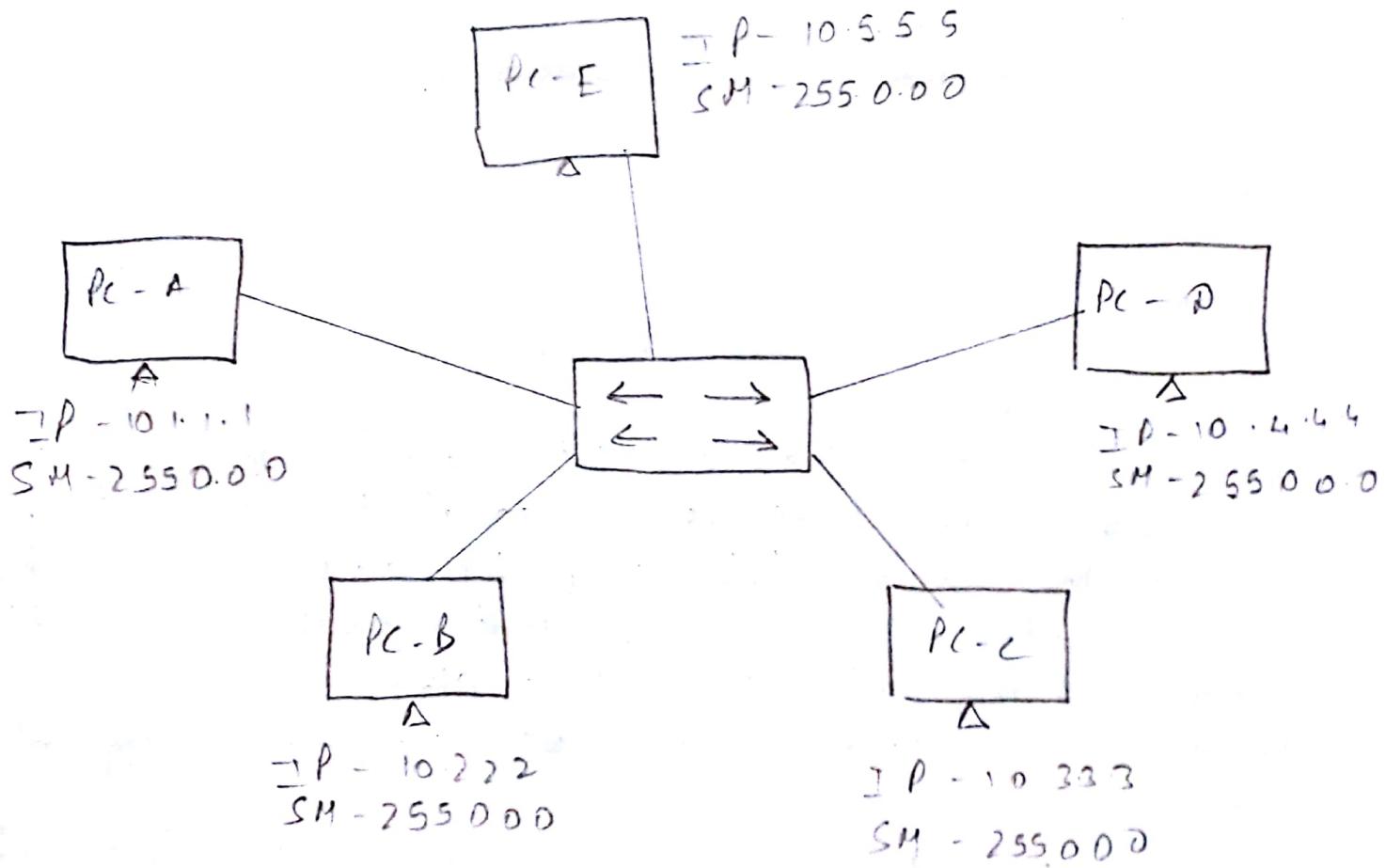
Aim:- Peer to Peer Connectivity.

Steps

1. Connect PCs by LAN wire and make sure firewall is off.
2. Go to the Run Command (Windows+R) and write ncpa.cpl and click ok.
3. Now right click on the Ether net and go to the properties.
4. Now click on the Internet Protocol Version 4 (TCP/IPv4)
5. Click on the use the following IP address and change the IP address e.g. 10.2.2.2 and subnet mask will be added automatically and click ok.
6. Now open the command prompt and write ping IP address of another PC.
7. Now again go to the Run Command and write \\IP address of another PC with which you are connecting.
8. Now right click on the folder which you want to share and go to properties and click on sharing and go to advanced settings.
9. Now click on <sup>this</sup> Share folder and change the permissions by clicking on permissions and click on apply.
10. Now you can share this folder.

/

Aim: To implement Star Topology



Aim : To Implement Star Topology.

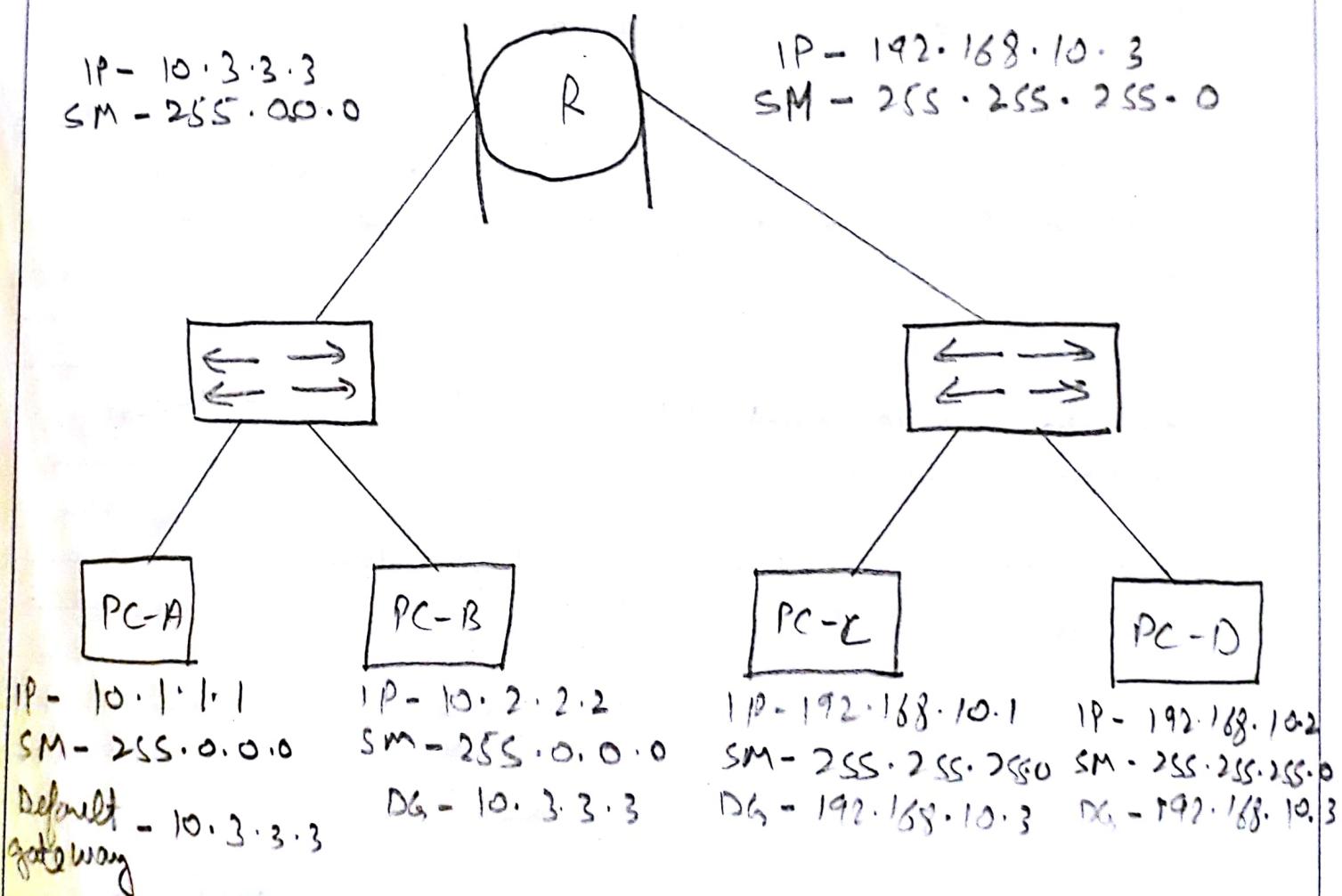
Theory : A star topology is a topology for a local area network (LAN) in which all nodes are individually connected to a central connection point, like a hub or switch.

Step :-

1. Take a switch and 5 PCs and connect them using cables.
2. Assign the IP address to all the PCs.  
Let for PC - A - 10.1.1.1  
PC - B - 10.2.2.2  
PC - C - 10.3.3.3  
PC - D - 10.4.4.4  
PC - E - 10.5.5.5
3. Now if there are less modules then add modules by selecting PT-SWITCH-NH-1GE & make sure which selecting power is off then turn on the power.
4. Now ping the device which you want.



Aim:- To connect two switches with the router.



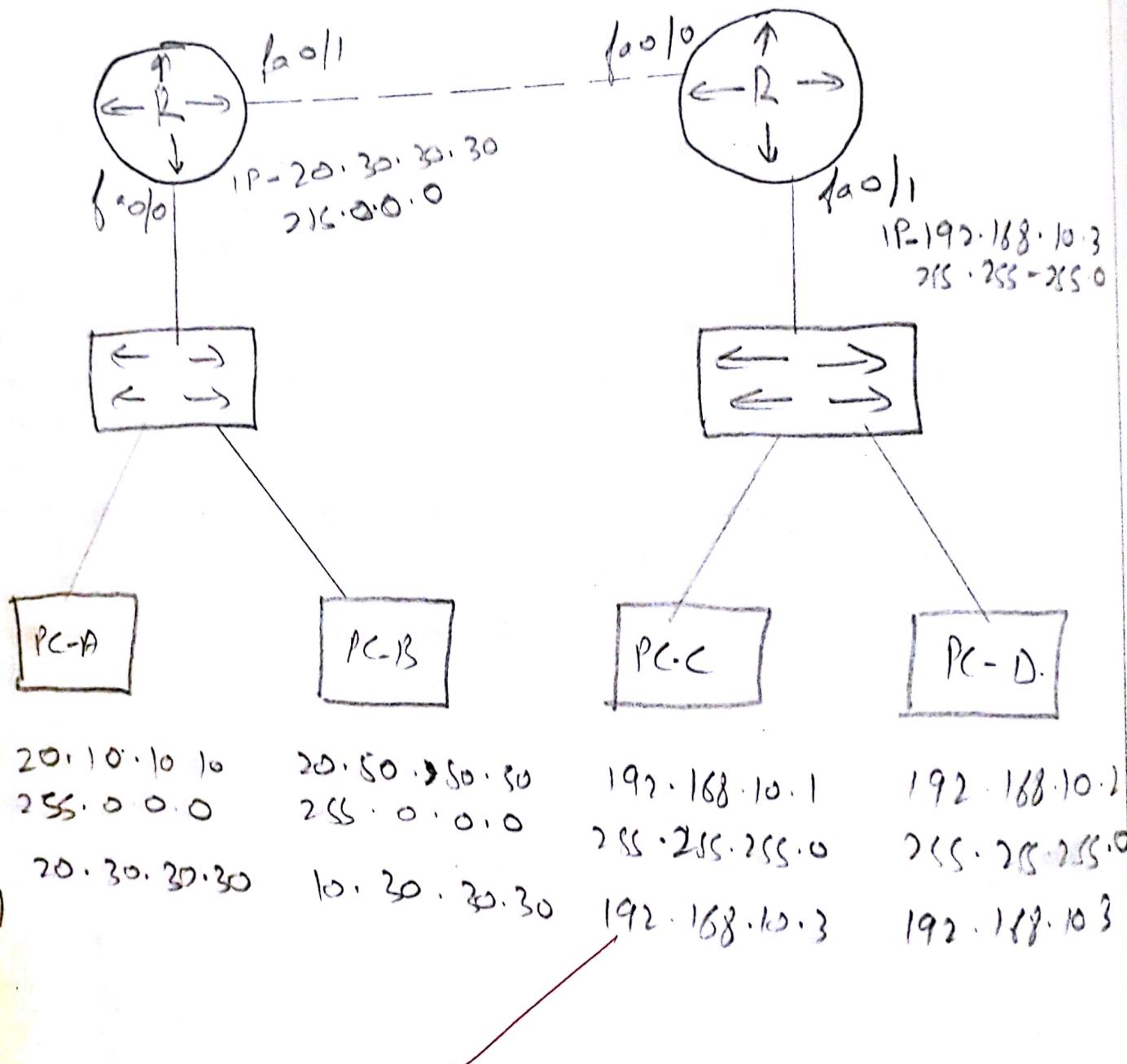
Aim:- To connect two switches with the routers.

Steps :-

1. Connect 2 switches to a router and each router should be further connected with two PCs.
2. For connection with a router add WIC-2 T, NAT 4E and add PT-SWITCH-NH-ICE in switch.
3. Now assign IP addresses to the PCs and the default gateway ie, address which you will give to router.
4. For giving default gateway <sup>follow</sup> these steps →  
Router > enable  
Router # conf t  
Router (Conf) # int fa 0/0  
Router (Conf-if) # ip add 10.3.3.3 255.0.0.0  
Router (Conf-if) # no shut  
The same steps for another fa 0/1.  
5. Enter the command in command prompt:  
ping 10.1.1.1.



Ques - To implement static routing.



Aim:- To implement static routing.

Step : (1) Do the physical connectivity as shown in the topology and drag ports to switch and routers.  
2) Assign the IP addresses, subnet mask and default gateway to all the PCs connected to switch.  
Like, PC-A

IP - 20.10.10.10

Subnetmask - 255.0.0.0

Default gateway - 20.30.30.30

PC-B IP - 20.50.50.50

Subnetmask - 255.0.0.0

Default gateway - 20.30.30.30

PC-C IP - 192.168.10.1

Subnetmask - 255.255.255.0

Default gateway - 192.168.10.3

PC-D IP - 192.168.10.2.

Subnetmask - 255.255.255.0

Default gateway - 192.168.10.3

3) Now open the command line of router 1 and give the following commands :-

~~Router>en~~

~~Router# conf t~~

Router (conf)# hostname R1

Router (conf)# no logging console.

Teacher's Signature :

```
R1 (conf) # int fa 0/0  
R1 (conf-if) # ip add 20.30.30.30, 255.0.0.0  
R1 (conf-if) # no shut
```

Now open the command line of router 2 and repeat the same commands.

Router > en

```
Router # conf t  
Router (conf) # hostname R2  
R2 (conf) # no logging console  
R2 (conf) # no ip domain lookup  
R2 (conf) # no int fa 0/1  
R2 (conf-if) # ip add 192.168.10.3 255.255.255.0  
R2 (conf-if) # no shut
```

4) Now connect two routers →

If router 2 :- Then command is -

```
R2 (conf) # ip route 20.0.0.0 255.0.0.0 fa 0/0 as  
R2 (conf) # ip route 20.0.0.0 255.0.0.0 30.0.0.2
```

If Router 1 :- Then command is

```
R1 (conf) # ip route 192.168.10.0 255.255.255.0 fa 1/1
```

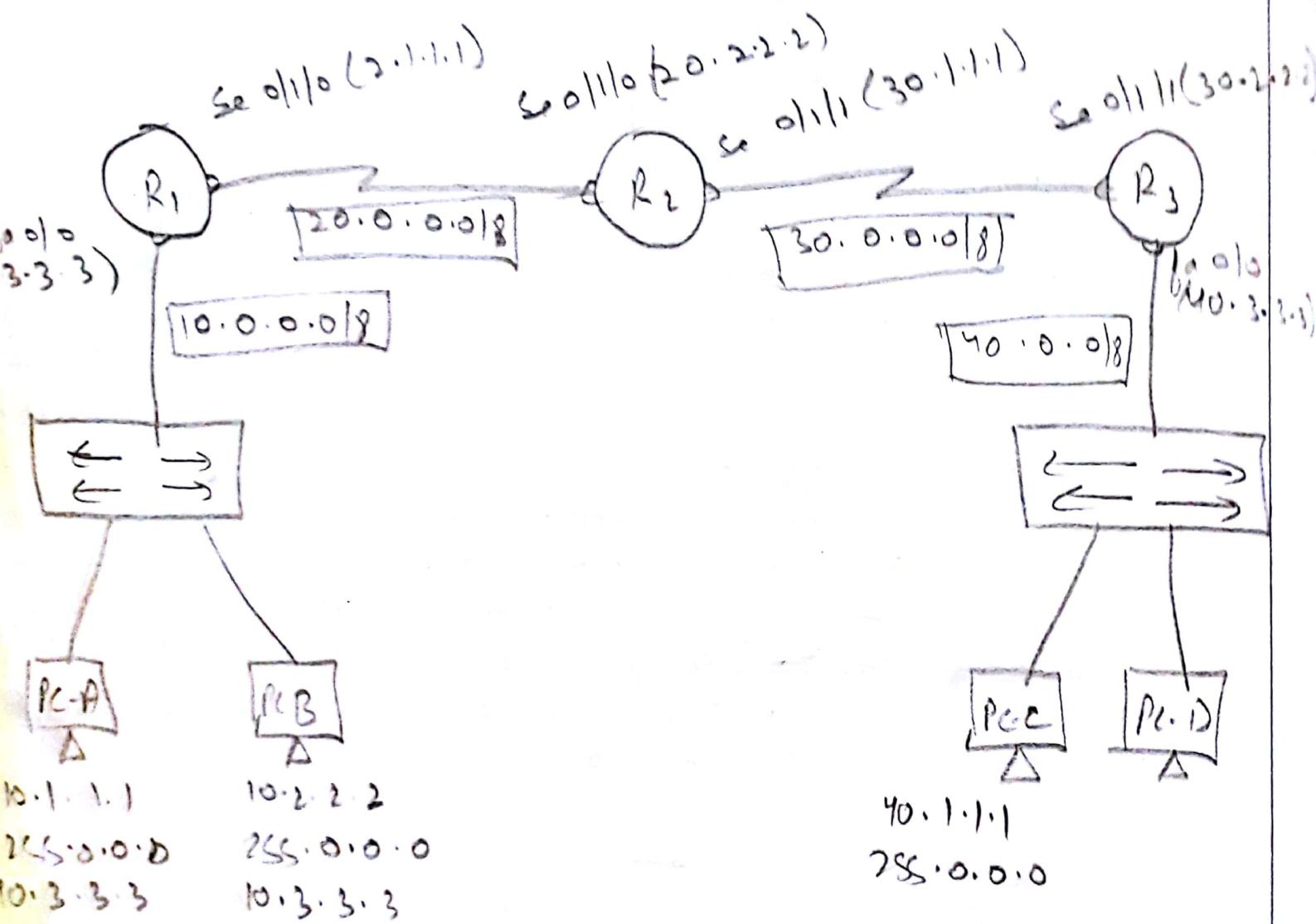
Now two routers are connected.

5) Verify the connectivity.

Ping the PCs with each other eg:-  
for PC-1 ping 192.168.10.2.

Teacher's Signature : 

Aim :- To implement RIP routing.



Aim:- To implement RIP Routing.

- Design IP addresses to PC's.

PC-A  $\rightarrow$  IP - 10.1.1.1

SM - 255.0.0.0

Default gateway - 10.3.3.3

PC-B  $\rightarrow$  IP - 10.2.2.2

Subnet mask - 255.0.0.0

Default gateway - 10.3.3.3

PC-C  $\rightarrow$  IP - 40.1.1.1

Subnet mask - 255.0.0.0

Default gateway - 40.3.3.3

PC-D  $\rightarrow$  IP - 40.2.2.2

Subnet mask - 255.0.0.0

Default gateway - 40.3.3.3

- Now give IP addresses to switches.

Router > en

Router # Conf t

Router (conf) # hostname R1

R1 (conf-if) # if add 10.3.3.3 255.0.0.0

R1 (conf-if) # no exit.

R1 (conf-if) # Int se 0/0

R1 (conf-if) # ip add 20.2.1.1 255.255.0.0

R1 (conf-if) # no shut.

R1 (conf-if) # clock rate 64000.

Do the same steps for other routers.

Teacher's Signature :

- Now, Do the RIP Routing Commands:

For R1 →

R1(Config) # Router S1:p

R1(Config) # netw 10.0.0.0

R1(Config) # netw 20.2.0.0

R1(Config) # Neig 2.

\* Do same steps for other routers.

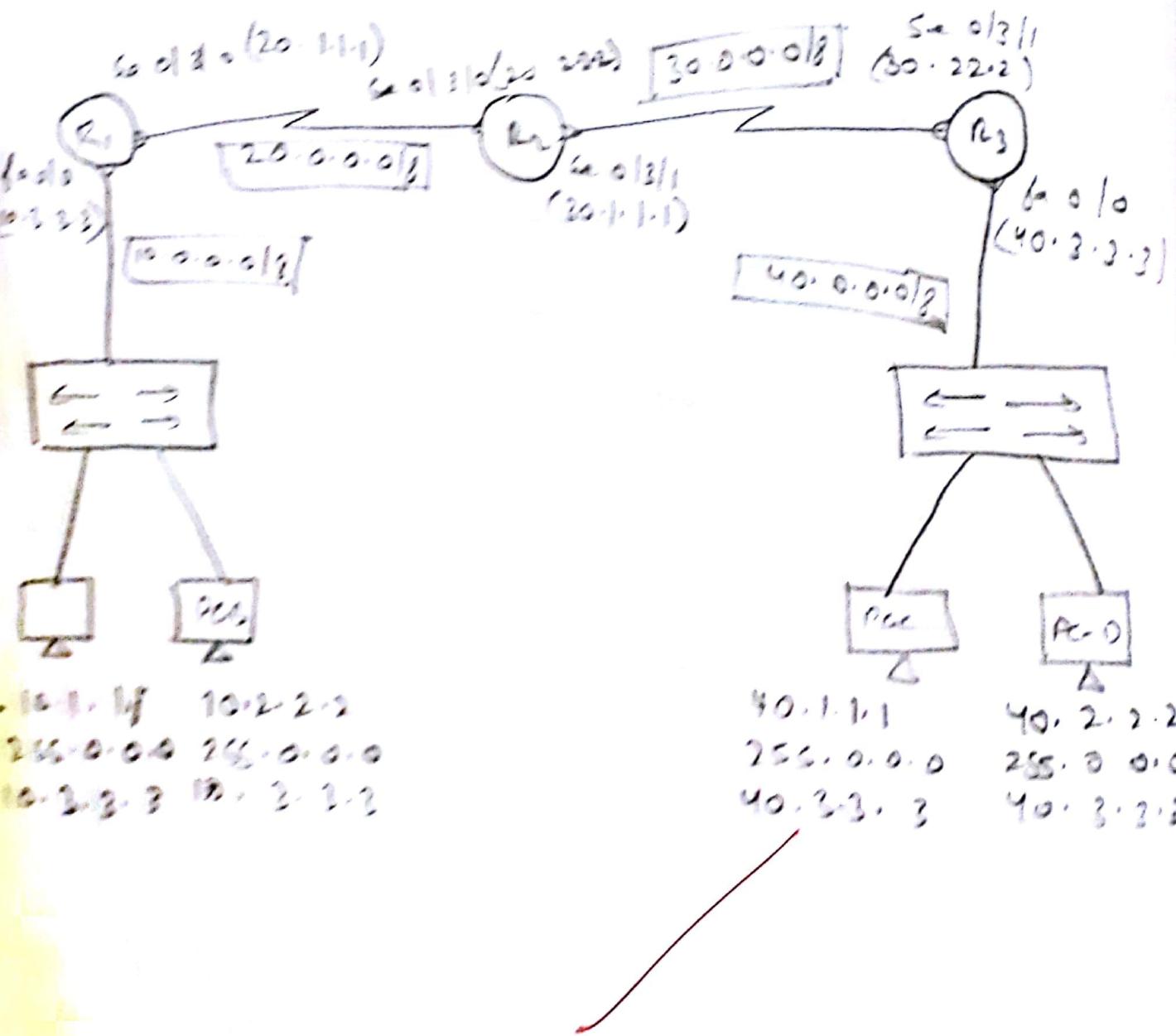
- Verify the connectivity by ping the PC's.

PC - A: Ping 192.168.1.1 & same for all PCs

- RIP routing is done

~~by~~

To perform routing using OSPF routing protocol.



Aim :- To perform routing using ospf protocol.

- Assign IP address to PC's

PC-A → IP - 10.1.1.1

Subnetmask → 255.0.0.0

Default gateway - 10.3.3.3

PC-B → IP - 90.2.2.2

Subnetmask - 255.0.0.0

Default gateway - 10.3.3.2

Do same steps for PC-C & D.

- Assign IP addresses to routers.

R1 → Router > on

Router # conf t

Router (conf) # int fa 0/0

Router (conf-if) # ip add 10.3.3.3 255.0.0.0

Router (conf-if) # no shut.

Router (conf-if) # int se 0/3/0

Router (conf-if) # ip add 20.1.1.1 255.0.0.0

Router (conf-if) # no shut.

~~Do same steps for other routers.~~

- To perform OSPF on routers.

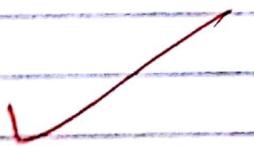
R1 → Router(Config) # routes ospf 10.

Router(Config) # network 10.0.0.0 0.255.255.255  
area 0.

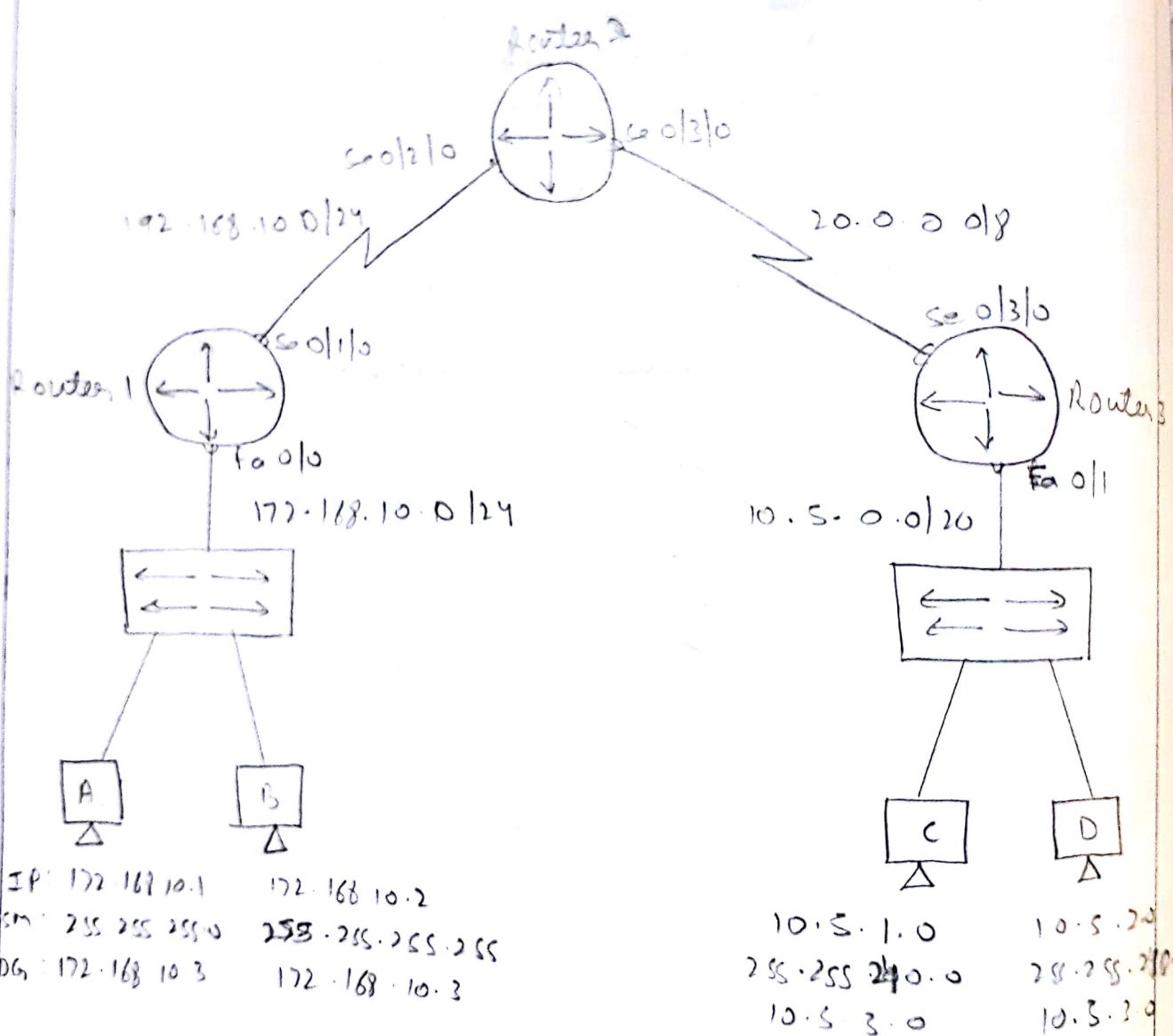
Router(Config) # 20.0.0.0 0.255.255.255 area 0

Do same steps for other routers.

- Now ping → Ping 40.1.1.1.



Ans:- In implementing CBRF routing.



Date 30/3/18

Page No. 10

Expt. No. 7

Aim :- To implement EIGRP Routing

Steps :- 1) Assign IP addresses to PC's.

PC A - IP add - 172.168.10.1

Subnet Mask - 255.255.255.0

Default Gateway - 172.168.10.3

PC B - IP add - 172.168.10.2

Subnet Mask - 255.255.255.0

Default gateway - 172.168.10.3

PC C - IP add - 10.5.1.0

Subnet mask - 255.255.250.0

Default gateway - 10.5.3.0

PC D - IP add - 10.5.2.0

Subnet Mask - 255.255.240.0

Default gateway - 10.5.3.0

2) Now give IP addresses to Router:

Router 1 :-

Router > en

Router # Config t

Router (conf) # Host name R1

R1 (conf) # Int fa 0/0

R1 (conf-if) # ip add 172.168.10.3 255.255.255.0

R1 (conf-if) # no shut.

Teacher's Signature :

```
R1 (conf) # int se 0/1/0
R1 (conf-if) # ip add 192.168.10.1 255.255.255.0
R1 (conf-if) # no shut
R1 (conf-if) # clock rate 64000
```

Now same commands for Router 2:

Router > en

```
Router # config t
Router (conf) # host name R2
R2 (conf) # int se 0/2/0
R2 (conf-if) # ip add 192.168.10.2 255.255.255.0
R2 (conf-if) # no shut
R2 (conf) # int se 0/3/0
R2 (conf-if) # ip add 20.1.1.1 255.0.0.0
R2 (conf-if) # no shut
R2 (conf-if) # clock rate 64000
```

Same commands for Router 3-

3) After giving IP addresses to the routers. Do the EIGRP routing and Commands are as follows:-

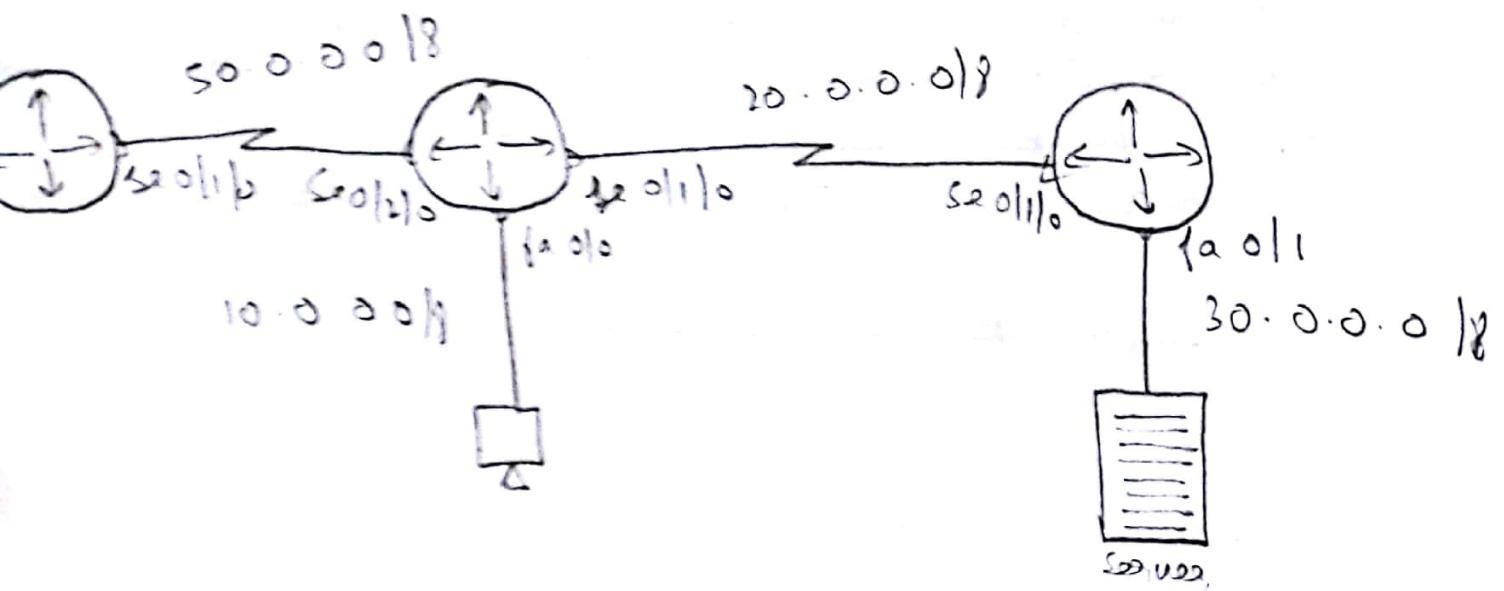
for Router 1 :

```
R1 (conf) # router eigrp 10
R1 (Conf) # netw 172.168.10.0 0.0.0.255
R1 (Conf) # netw 192.168.10.0 0.0.0.255
```

same for Router R2 & R3 ..

- 4) Now Verify your connectivity and ping among PC's and routers.  
For e.g. :- PC A  $\rightarrow$  Ping 10.5.1.0 and in the same way you can do for all others.
- 5) Hence EIGRP is done.

Aim:- To implement Standard ACL (Access Control List)



IP - 10.1.1.1

Subnet Mask - 255.0.0.0

Default Gateway - 10.1.1.1

30.1.1.1

255.0.0.0

30.2.2.2

Aim :- To implement standard ACL (Access Control list).

Steps :- 1) Give IP to PC's and Servers.

PC's IP add - 10.1.1.1

Subnetmask - 255.0.0.0

Default gateway - 10.2.2.2

Server - IP address - 30.1.1.1

Subnetmask - 255.0.0.0

Default gateway - 30.2.2.2

2) Now give IP to Router.

for Router 1:

Router > en

Router # config t.

Router (conf) # hostname R1

R1 (conf) # int se 0/1/0

R1 (conf-if) # ip add 30.1.1.1 255.0.0.0

R1 (conf-if) # no shut.

Same for Router R2 & R3.

3) Now do the routing config eg:- perform  
rip routing

Router 1:

R1 (conf) # router rip

R1 (conf) # netw 30.0.0.0

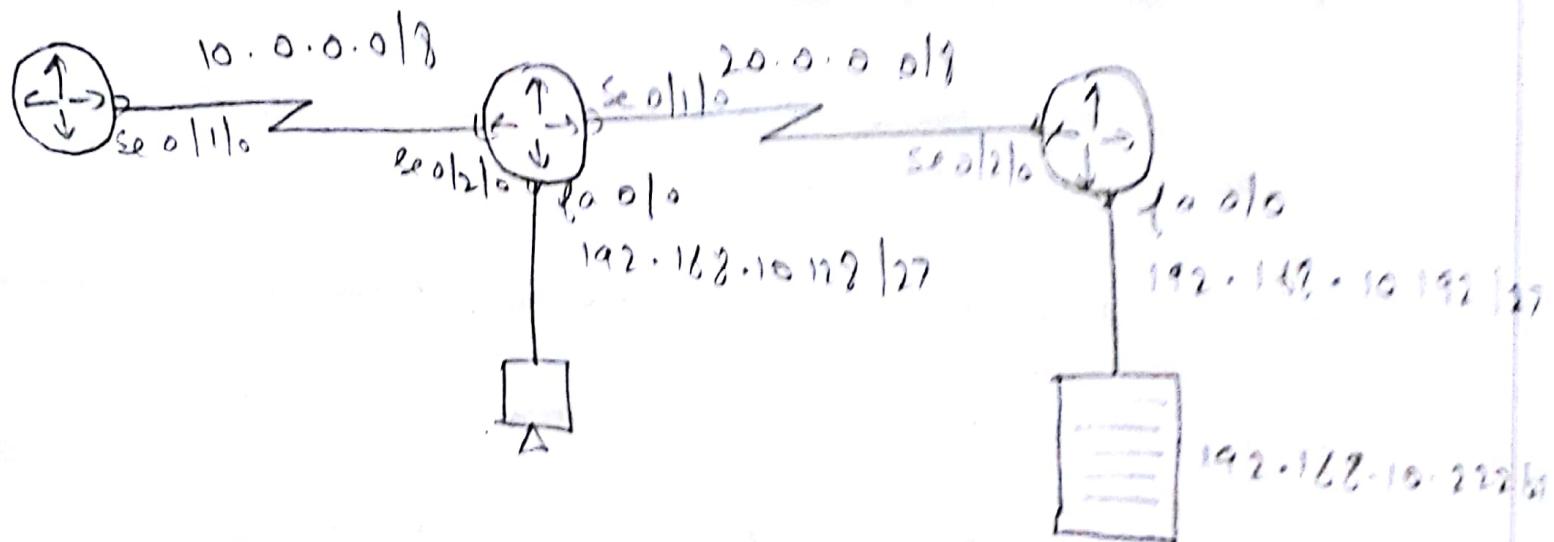
R1 (conf) # net 2

Teacher's Signature :

Same for routers R1 & R2.

- 4) Now Create ACL ping the server through PC or vice versa.
- 5) Now Create ACL and apply ACL on Router R3  
R3(Config)# access-list 10 deny 10.0.0.0  
0.255.255.255.  
R3(Config)# access-list 10 permit any  
R3(Config)# int fa 0/1  
R3(Config)# ip access-group 10 out.
- 6) Now you can verify. If you will ping the server through PC (Finance) it will show destination host unreachable and if you will ping the PC (Finance) through server (sales) then its will show request time out.
- 7) Hence, ACL (standard) is verified.

Aim :- To implement Extended ACL (Access Control List)



IP add - 192.168.10.130

Subnet Mask - 255.255.255.224

Default gateway - 192.168.10.129

192.168.10.222

255.255.255.224

192.168.10.221

Aim:- To implement extended ACL (Access control list).

Steps :- 1) Give IP addresses to PC's or servers.

PC - IP add - 192.168.10.130

Subnet mask - 255.255.255.224

Default gateway - 192.168.10.129

HR Server - IP add - 192.168.10.222

Subnet mask - 255.255.255.224

Default gateway - 192.168.10.221

2) Now give IP to routers :-

Router 1 :-

Router > en

Router # conf +

Router (conf) # hostname R1

R1(conf)# int se0/1/0

R1(conf-if)# ip add 10.1.1.1 255.0.0.0

R1(conf-if)# no shut -

Same for Router R2 & R3.

3) Now perform any routing fag eg:- perform ip routing

Router 1 :

Router > en

Router # conf +

Teacher's Signature : \_\_\_\_\_

Router R1 :

R1 (conf) # Router rip.  
R1 (conf) # network 10.0.0.0  
R1 (conf) # Version 2

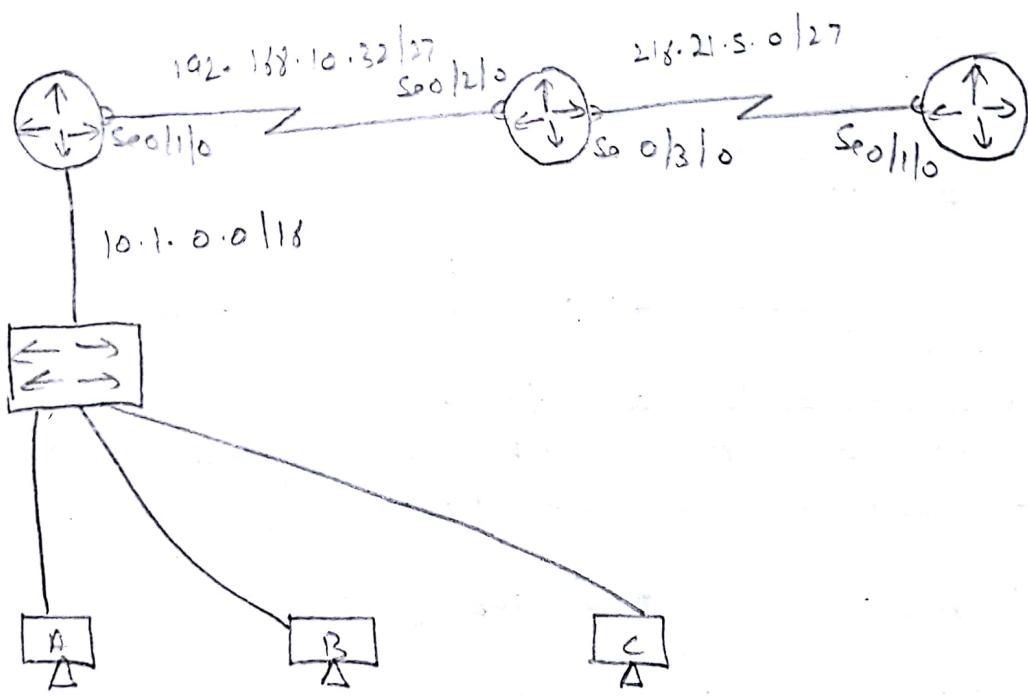
Same for routers R2 & R3.

- 1) Now ping the servers through PC device keys.  
In extended ACL we blocks a particular service not the whole ping.
- 2) Now Create ACL and apply ACL:

R3 (conf) # line vty 0 4  
R3 (conf) # login  
R3 (conf) # password cisco.  
R3 (conf) # enable secret class.  
R3 (conf) # access-list 110 deny top any host  
20.1.1.1 eq 23  
R3 (conf) # access-list 110 permit ip any any  
R3 (conf) # interface fast0  
R3 (conf) # ip access-group 110 in

- 3) Now you can ping and hence extended ACL is done.

Aim :- To implement NAT (Network address Translation)



ID - 10.1.1.1

SM - 2SS.2SS.0.0

DL - 10.1.4.4

10.1.2.2

2SS.2SS.0.0

10.1.4.4

10.1.3.3

2SS.2SS.0.0

10.1.4.4

Aim:- To implement NAT (Network Access translation).

Step:- 1) Give IP addresses to PC.

PC A - IP add - 10.1.1.1

Subnet mask - 255.255.0.0

Default gateway - 10.1.4.4

PC B - IP add - 10.1.2.2

Subnet mask - 255.255.0.0

Default gateway - 10.1.4.4

PC C - IP add - 10.1.3.3

Subnet mask - 255.255.0.0

Default gateway - 10.1.4.4

2) Now give the IP addresses to Router.

Router 1:

Router > en

Router # Conf t

Router (Conf) # hostname R1

R1 (Conf) # int fa 0/0

R1 (Conf) # ip add 10.1.4.4 255.255.0.0

R1 (Conf) # no shut.

Teacher's Signature :

R1(Config)# interface 0/1/0

R1(Config)# ip address 192.168.10.33 255.255.255.252

R1(Config)# no shutdown

Now give similar commands for routers R2, R3.

- 3) Now perform any routing like eg. RIP routing

Router 1:

R1(Config)# router rip

R1(Config)# network 10.1.0.0

R1(Config)# network 192.168.10.32

R1(Config)# version 2.

same for Router R2 & R3.

- 4) Now Ping the routers or PC.

- 5) Now perform NAT

R1(Config)# interface fa 0/0

R1(Config)# ip nat inside

R1(Config)# no shutdown

R1(Config)# interface se 0/1/0

R1(Config)# ip nat outside

R1(Config)# ip nat inside source static 10.1.1.1  
192.168.10.35

R1 (conf-if)# ip nat inside source static 10.1.2.2  
192.168.10.38

R1 (conf-if)# ip nat inside source static 10.1.3.3  
192.168.10.37.

6) Now run Commands :-

R1 (conf)# exit

R1# sh ip nat translations

7) NAT is implemented and verified.



Aim:- To implement Vlan.

Steps

1) IP of PC's :-

PC-A - IP add - 172.16.1.1

Subnet mask - 255.255.0.0

Default gateway - 172.16.2.2

Do same for other PC's also.

2) Give IP add to routers.

Router1 :-

Router > en

Router # conf t

Router (Conf) # host name R1

R1 (Conf) # int fa 0/0/0

R1 (Conf-if) # no shut.

R1 (Conf) # int fa 0/0/1

R1 (Conf-if) # ip add 172.16.2.2 255.255.0.0

R1 (Conf) # exit

R1 (Conf) # int fa 0/0/2

R1 (Conf-if) # ip add 192.168.10.2 255.255.255.0

R1 (Conf) # exit

R1 (Conf) # int fa 0/0/3

R1 (Conf-if) # ip add 10.3.3.3 255.0.0.0

R1 (Conf) # exit

R1 (Conf) # int fa 0/0/4

R1 (Conf-if) # ip add 10.4.4.4 255.0.0.0

Teacher's Signature :

3) Now Create VLAN Configure the switch.

S1 (conf) # Vlan 2

S1 (conf) # name sales

S1 (conf) # Vlan 3

S1 (conf) # name HR

S1 (conf) # Vlan 4

S1 (conf) # name Mkt.

4) Assigning ports to Vlan.

S1 (conf) # int fa 0/1

S1 (conf) # switchport mode trunk

S1 (conf) # int range fa 0/2 - 12

S1 (conf) # switchport mode access

5) Now, display Vlan interface information and create the trunk.

S1 (conf) # int fa 0/4

S1 (conf) # switchport access Vlan 3

S1 (conf) # int fa 0/5

S1 (conf) # switchport access Vlan 4

S1 (conf) # int range fa 0/2 - 3

S1 (conf) # switchport access Vlan 2

S1 (conf) # int fa 0/1

S1 (conf) # switchport mode trunk allowed Vlan  
2,3,4.

Teacher's Signature : \_\_\_\_\_