CSE 1004

NETWORK AND COMMUNICATION

Assessment – 1

L23+L24 | PLBG17

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by

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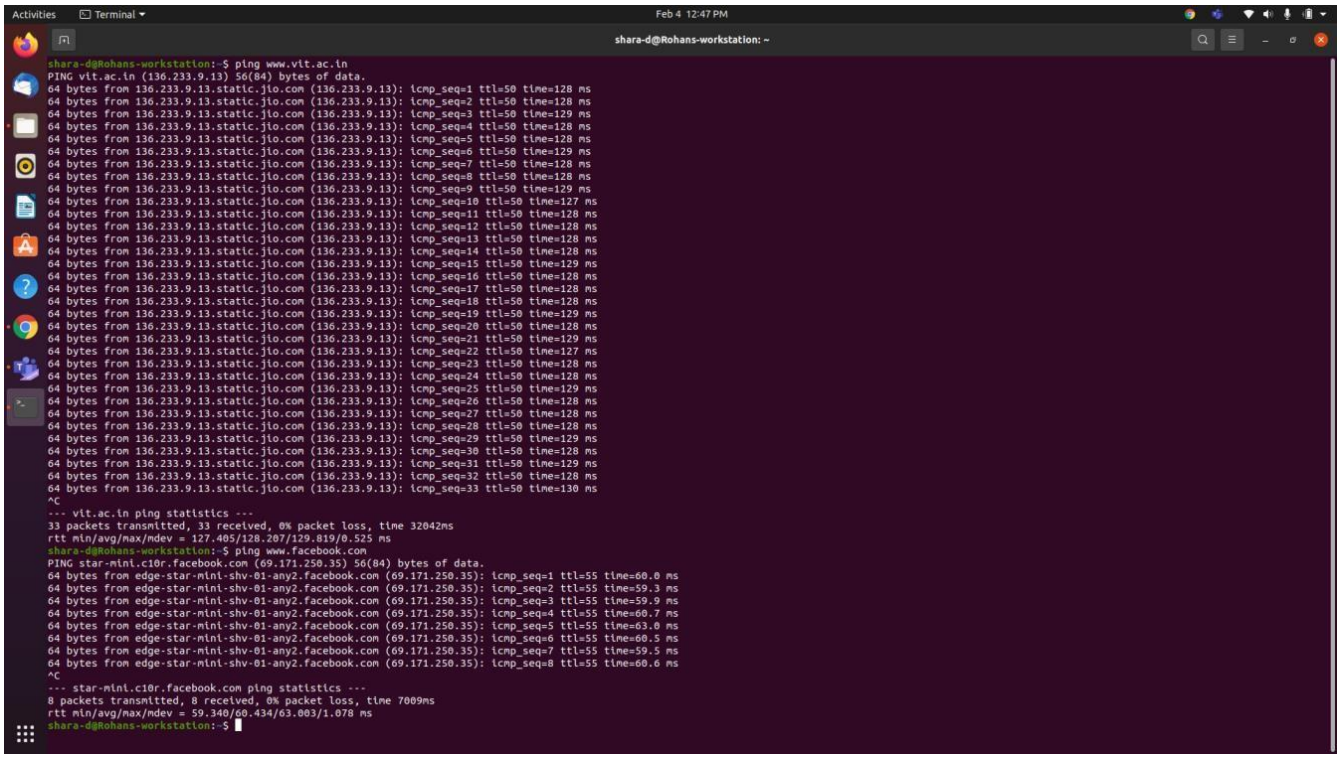
PART 1

Network Commands

shara-d@Rohans-workstation

1. PING

Ping is a computer network administration software utility used to test thereachability of a host on an Internet Protocol network.



2. NETSTAT

The netstat command generates displays that show network status and protocolstatistics. You can display the status of TCP and UDP endpoints in table format,routing table information, and interface information.

netstat displays various types of network data depending on the command lineoption selected. These displays are the most useful for system administration.

```
shara-d@Rohans-workstation:~$ netstat

Command 'netstat' not found, but can be installed with:

sudo apt install net-tools

shara-d@Rohans-workstation:~$ sudo apt install net-tools
[sudo] password for shara-d:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libfprint-2-tod1 libllvm10
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  net-tools
```

```
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 196 kB of archives.
After this operation, 864 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 net-tools amd64 1.60+git20180626.aebd88e-1ubuntu1 [196 kB]
Fetched 196 kB in 1s (334 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 184982 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20180626.aebd88e-1ubuntu1_amd64.deb ...
Unpacking net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
shara-d@Rohans-workstation:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 Rohans-workstatio:47960 del03s13-in-f3.1e:https ESTABLISHED
tcp        0      0 Rohans-workstatio:52228 whatsapp-cdn-shv-:https ESTABLISHED
tcp        0      0 Rohans-workstatio:41088 a23-15-34-67.depl:https ESTABLISHED
tcp        0      0 Rohans-workstatio:48614 52.113.194.132:https    ESTABLISHED
tcp        0      0 Rohans-workstatio:52354 server-13-35-221-:https ESTABLISHED
tcp        0      0 Rohans-workstatio:41560 a23-15-34-72.depl:https ESTABLISHED
tcp        0      0 Rohans-workstatio:39390 ec2-44-238-41-48.:https ESTABLISHED
tcp        0      0 Rohans-workstatio:39544 52.114.132.119:https    ESTABLISHED
tcp        0      0 Rohans-workstatio:42470 0.0.72.34.bc.goog:https ESTABLISHED
tcp        0      0 Rohans-workstatio:33124 172.217.194.188:5228    ESTABLISHED
tcp        0      0 Rohans-workstatio:38414 del03s13-in-f10.1:https ESTABLISHED
tcp        0      0 Rohans-workstatio:41578 a23-15-34-72.depl:https ESTABLISHED
tcp        0      0 Rohans-workstatio:46338 52.113.206.195:https    ESTABLISHED
tcp        0      0 Rohans-workstatio:50246 40.108.182.39:https     ESTABLISHED
tcp        0      0 Rohans-workstatio:44647 52.114.15.54:https      ESTABLISHED
tcp        0      0 Rohans-workstatio:41099 52.114.7.88:https       ESTABLISHED
tcp        0      0 Rohans-workstatio:34396 43.255.166.254:http     TIME_WAIT
tcp        0      0 Rohans-workstatio:41099 52.114.7.88:https       ESTABLISHED
tcp        0      0 Rohans-workstatio:34396 43.255.166.254:http     TIME_WAIT
tcp        0      0 Rohans-workstatio:41099 52.114.7.88:https       ESTABLISHED
tcp        0      0 Rohans-workstatio:34396 43.255.166.254:http     TIME_WAIT
udp        0      0 Rohans-workstati:bootpc _gateway:bootps         ESTABLISHED
udp        0      0 Rohans-workstatio:43898 172.217.194.189:443     ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  2      [ ]         DGRAM                    42188    /run/user/1000/systemd/notify
unix  4      [ ]         DGRAM                    20947    /run/systemd/notify
unix  2      [ ]         DGRAM                    20961    /run/systemd/journal/syslog
unix  18     [ ]         DGRAM                    20971    /run/systemd/journal/dev-log
unix  8      [ ]         DGRAM                    20975    /run/systemd/journal/socket
unix  3      [ ]         SEQPACKET  CONNECTED     64786    @0000d
unix  3      [ ]         SEQPACKET  CONNECTED     64788    @0000e
unix  3      [ ]         SEQPACKET  CONNECTED     52292    @0000c
unix  2      [ ]         DGRAM                    28649    /run/wpa_supplicant/wlp2s0
unix  3      [ ]         STREAM     CONNECTED     62006
unix  3      [ ]         STREAM     CONNECTED     52036
unix  3      [ ]         STREAM     CONNECTED     51104
unix  3      [ ]         STREAM     CONNECTED     52352
unix  3      [ ]         STREAM     CONNECTED     40720
unix  3      [ ]         STREAM     CONNECTED     60939
unix  3      [ ]         STREAM     CONNECTED     42497    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     65675
unix  3      [ ]         STREAM     CONNECTED     54551
unix  3      [ ]         STREAM     CONNECTED     45535    @/dbus-vfs-daemon/socket-cOjdaiK4
unix  3      [ ]         STREAM     CONNECTED     48628    /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     27582
unix  3      [ ]         STREAM     CONNECTED     61263
unix  2      [ ]         STREAM     CONNECTED     61621
unix  3      [ ]         STREAM     CONNECTED     48436    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     44105    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     42249
unix  3      [ ]         STREAM     CONNECTED     62025
unix  3      [ ]         STREAM     CONNECTED     52024
unix  3      [ ]         STREAM     CONNECTED     51176
unix  3      [ ]         STREAM     CONNECTED     52355
unix  3      [ ]         STREAM     CONNECTED     46481
unix  2      [ ]         DGRAM                    30857
unix  3      [ ]         STREAM     CONNECTED     60934
unix  3      [ ]         STREAM     CONNECTED     47245
unix  3      [ ]         STREAM     CONNECTED     45460
unix  3      [ ]         STREAM     CONNECTED     46493    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     30323
unix  3      [ ]         STREAM     CONNECTED     80917
unix  3      [ ]         STREAM     CONNECTED     74439
unix  3      [ ]         STREAM     CONNECTED     57232
unix  3      [ ]         STREAM     CONNECTED     55587
unix  3      [ ]         STREAM     CONNECTED     43326
unix  3      [ ]         DGRAM                    42189
unix  3      [ ]         STREAM     CONNECTED     62024
unix  3      [ ]         STREAM     CONNECTED     64692
unix  3      [ ]         STREAM     CONNECTED     57075    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     51092
unix  3      [ ]         STREAM     CONNECTED     52373
unix  3      [ ]         STREAM     CONNECTED     45244    /run/dbus/system_bus_socket
```

```
unix  3      [ ]         STREAM     CONNECTED     46493    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     30323
unix  3      [ ]         STREAM     CONNECTED     80917
unix  3      [ ]         STREAM     CONNECTED     74439
unix  3      [ ]         STREAM     CONNECTED     57232
unix  3      [ ]         STREAM     CONNECTED     55587
unix  3      [ ]         STREAM     CONNECTED     43326
unix  3      [ ]         DGRAM                    42189
unix  3      [ ]         STREAM     CONNECTED     62024
unix  3      [ ]         STREAM     CONNECTED     64692
unix  3      [ ]         STREAM     CONNECTED     57075    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     51092
unix  3      [ ]         STREAM     CONNECTED     52373
unix  3      [ ]         STREAM     CONNECTED     45244    /run/dbus/system_bus_socket
unix  3      [ ]         DGRAM                    36112
unix  3      [ ]         STREAM     CONNECTED     27523
unix  3      [ ]         STREAM     CONNECTED     42981    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     42813    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     36747
unix  3      [ ]         STREAM     CONNECTED     65685
unix  3      [ ]         STREAM     CONNECTED     46592
unix  3      [ ]         STREAM     CONNECTED     50294    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     44109
unix  3      [ ]         STREAM     CONNECTED     31443    /run/cups/cups.sock
unix  2      [ ]         STREAM     CONNECTED     68280
unix  3      [ ]         STREAM     CONNECTED     48391
unix  3      [ ]         STREAM     CONNECTED     46484    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     42247
unix  3      [ ]         STREAM     CONNECTED     62444
unix  3      [ ]         STREAM     CONNECTED     64704
unix  3      [ ]         STREAM     CONNECTED     50514
unix  3      [ ]         STREAM     CONNECTED     48608
unix  3      [ ]         STREAM     CONNECTED     45275    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     30886
unix  3      [ ]         STREAM     CONNECTED     42419    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     41198
unix  3      [ ]         STREAM     CONNECTED     48632    /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     45443
unix  3      [ ]         STREAM     CONNECTED     43936    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     84557    @/dbus-vfs-daemon/socket-Dd8NqG01
unix  3      [ ]         STREAM     CONNECTED     81476
unix  3      [ ]         STREAM     CONNECTED     60214
unix  3      [ ]         STREAM     CONNECTED     42701    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     43957
unix  3      [ ]         STREAM     CONNECTED     44115    /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     41207    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     62013
unix  3      [ ]         STREAM     CONNECTED     52028
unix  3      [ ]         STREAM     CONNECTED     57701
unix  3      [ ]         STREAM     CONNECTED     46364
unix  3      [ ]         STREAM     CONNECTED     49516    /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     45379    @/tmp/.ICE-unix/1619
unix  3      [ ]         STREAM     CONNECTED     41693
unix  3      [ ]         STREAM     CONNECTED     65679
unix  3      [ ]         STREAM     CONNECTED     53547
unix  3      [ ]         STREAM     CONNECTED     45424
unix  3      [ ]         STREAM     CONNECTED     80236
unix  3      [ ]         STREAM     CONNECTED     61020
unix  3      [ ]         STREAM     CONNECTED     63810    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     77480
unix  2      [ ]         DGRAM                    47327
unix  3      [ ]         STREAM     CONNECTED     74678
unix  3      [ ]         STREAM     CONNECTED     49904
unix  3      [ ]         STREAM     CONNECTED     41697    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     27435
unix  2      [ ]         DGRAM                    30887
unix  3      [ ]         STREAM     CONNECTED     63871
unix  3      [ ]         STREAM     CONNECTED     57811
unix  3      [ ]         STREAM     CONNECTED     55533
unix  3      [ ]         STREAM     CONNECTED     46496    /run/user/1000/bus
unix  3      [ ]         STREAM     CONNECTED     60990
unix  3      [ ]         STREAM     CONNECTED     64960
unix  3      [ ]         STREAM     CONNECTED     36803
unix  3      [ ]         STREAM     CONNECTED     81924
unix  3      [ ]         STREAM     CONNECTED     48060
unix  3      [ ]         STREAM     CONNECTED     83237
unix  3      [ ]         SEQPACKET  CONNECTED     60636
unix  3      [ ]         STREAM     CONNECTED     33625    /run/user/1000/bus
unix  2      [ ]         DGRAM                    27510
unix  2      [ ]         DGRAM                    21696
unix  3      [ ]         STREAM     CONNECTED     85254
unix  3      [ ]         STREAM     CONNECTED     55356
unix  3      [ ]         STREAM     CONNECTED     42768
unix  3      [ ]         STREAM     CONNECTED     34017
unix  3      [ ]         STREAM     CONNECTED     78315
unix  3      [ ]         STREAM     CONNECTED     64880
unix  3      [ ]         STREAM     CONNECTED     38717    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     77105
unix  3      [ ]         STREAM     CONNECTED     65655
unix  3      [ ]         STREAM     CONNECTED     57222
unix  3      [ ]         STREAM     CONNECTED     32469
unix  3      [ ]         STREAM     CONNECTED     60378
unix  3      [ ]         SEQPACKET  CONNECTED     60639
unix  3      [ ]         STREAM     CONNECTED     44100    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     27361
unix  3      [ ]         STREAM     CONNECTED     76448
unix  3      [ ]         STREAM     CONNECTED     45602
unix  3      [ ]         STREAM     CONNECTED     78314
unix  3      [ ]         STREAM     CONNECTED     64959
unix  3      [ ]         STREAM     CONNECTED     79781    /run/user/1000/pulse/native
unix  3      [ ]         STREAM     CONNECTED     63177
unix  3      [ ]         STREAM     CONNECTED     56777
unix  3      [ ]         STREAM     CONNECTED     31841    /run/systemd/journal/stdout
unix  3      [ ]         STREAM     CONNECTED     49916
unix  3      [ ]         STREAM     CONNECTED     47133    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     34825
unix  3      [ ]         STREAM     CONNECTED     84559    /run/user/1000/pulse/native
unix  3      [ ]         STREAM     CONNECTED     52342    @/tmp/.X11-unix/X0
unix  3      [ ]         STREAM     CONNECTED     42863
unix  3      [ ]         STREAM     CONNECTED     45280
shara-d@Rohans-workstation:~$
```

3. TRACERT (TRACEROUTE)

The **tracert command** is used to show details about the path that a packet takes toa specified destination.

```
shara-d@Rohans-workstation:~$ tracert www.vit.ac.in

Command 'tracert' not found, did you mean:

  command 'tracer' from deb pvm-dev (3.4.6-2build2)
  command 'tracert6' from deb ndisc6 (1.0.4-1ubuntu1)

Try: sudo apt install <deb name>
```

```
shara-d@Rohans-workstation:~$ sudo apt install traceroute
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libfprint-2-tod1 libllvm10
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  traceroute
0 upgraded, 1 newly installed, 0 to remove and 1 not upgraded.
Need to get 45.4 kB of archives.
After this operation, 152 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 traceroute amd64 1:2.1.0-2 [45.4 kB]
Fetched 45.4 kB in 0s (130 kB/s)
Selecting previously unselected package traceroute.
(Reading database ... 185031 files and directories currently installed.)
Preparing to unpack .../traceroute_1%3a2.1.0-2_amd64.deb ...
Unpacking traceroute (1:2.1.0-2) ...
Setting up traceroute (1:2.1.0-2) ...
update-alternatives: using /usr/bin/traceroute.db to provide /usr/bin/traceroute (traceroute) in auto mode
update-alternatives: using /usr/bin/lft.db to provide /usr/bin/lft (lft) in auto mode
update-alternatives: using /usr/bin/traceproto.db to provide /usr/bin/traceproto (traceproto) in auto mode
update-alternatives: using /usr/sbin/tcptraceroute.db to provide /usr/sbin/tcptraceroute (tcptraceroute) in auto mode
Processing triggers for man-db (2.9.1-1) ...
shara-d@Rohans-workstation:~$ traceroute www.vit.ac.in
traceroute to www.vit.ac.in (136.233.9.13), 30 hops max, 60 byte packets
 1  _gateway (192.168.1.1)  2.418 ms  2.583 ms  2.866 ms
 2  10.100.190.1 (10.100.190.1)  10.360 ms  9.560 ms  11.097 ms
 3  182.78.218.201 (182.78.218.201)  8.471 ms  8.450 ms  8.390 ms
 4  182.79.198.210 (182.79.198.210)  57.941 ms 182.79.198.206 (182.79.198.206)  57.244 ms 182.79.198.210 (182.79.198.210)  58.505 ms
 5  182.79.198.201 (182.79.198.201)  56.802 ms  56.362 ms  57.872 ms
 6  182.79.142.236 (182.79.142.236)  85.388 ms 116.119.61.119 (116.119.61.119)  77.989 ms 116.119.68.161 (116.119.68.161)  81.394 ms
 7  49.44.129.53 (49.44.129.53)  86.528 ms  80.790 ms  80.487 ms
 8  172.16.92.145 (172.16.92.145)  106.565 ms  98.349 ms 172.26.29.106 (172.26.29.106)  97.075 ms
 9  172.16.2.8 (172.16.2.8)  102.435 ms 172.26.40.5 (172.26.40.5)  99.951 ms 172.16.2.8 (172.16.2.8)  103.323 ms
10  172.16.2.58 (172.16.2.58)  102.826 ms  98.437 ms 49.44.57.12 (49.44.57.12)  100.258 ms
11  136.232.3.189.static.jio.com (136.232.3.189)  137.378 ms  126.516 ms  128.536 ms
12  136.232.3.190.static.jio.com (136.232.3.190)  127.598 ms  131.331 ms  127.845 ms
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
```

4. HOSTNAME

This command tells you the name of the host of your system.

```
shara-d@Rohans-workstation:~$ hostname
Rohans-workstation
```

5. FINGER

This command tells about the user information and gives details of all the users logged in.This tool is generally used by system administrators.

```
shara-d@Rohans-workstation:~$ finger
Login     Name       Tty      Idle  Login Time   Office     Office Phone
shara-d   Sharad    *:0              Feb  4 11:21 (:0)
shara-d@Rohans-workstation:~$ finger www.vit.ac.in
finger: www.vit.ac.in: no such user.
```

6. IPCONFIG

This command is used to configure the kernel-resident network interfaces. It is used at theboot time to set up the interfaces as necessary.

```
shara-d@Rohans-workstation:~$ ipconfig

Command 'ipconfig' not found, did you mean:

  command 'iwconfig' from deb wireless-tools (30~pre9-13ubuntu1)
  command 'ifconfig' from deb net-tools (1.60+git20180626.aebd88e-1ubuntu1)
  command 'iconfig' from deb ipmiutil (3.1.5-1)

Try: sudo apt install <deb name>

shara-d@Rohans-workstation:~$ ifconfig
lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 3403  bytes 382763 (382.7 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3403  bytes 382763 (382.7 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.204  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::15d8:f05b:3d7d:2195  prefixlen 64  scopeid 0x20<link>
        ether 28:3a:4d:36:be:07  txqueuelen 1000  (Ethernet)
        RX packets 767647  bytes 464520171 (464.5 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 155722  bytes 52501558 (52.5 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

7. TELNET

This command is used to create a remote connection with a system over a TCP/IP network.It allows us to administrate other systems by the terminal.

```
shara-d@Rohans-workstation:~$ telnet
telnet> h
Commands may be abbreviated.  Commands are:

close           close current connection
logout          forcibly logout remote user and close the connection
display         display operating parameters
mode            try to enter line or character mode ('mode ?' for more)
open            connect to a site
quit            exit telnet
send            transmit special characters ('send ?' for more)
set             set operating parameters ('set ?' for more)
unset           unset operating parameters ('unset ?' for more)
status          print status information
toggle          toggle operating parameters ('toggle ?' for more)
slc             set treatment of special characters

z               suspend telnet
environ         change environment variables ('environ ?' for more)
```

8. NSLOOKUP

Nslookup is a useful command for getting information from a DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name orIP address mapping or any other specific DNS record.

```
shara-d@Rohans-workstation:~$ nslookup Rohans-workstation
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   Rohans-workstation
Address: 127.0.1.1

shara-d@Rohans-workstation:~$ nslookup www.google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   www.google.com
Address: 216.58.196.100
Name:   www.google.com
Address: 2404:6800:4002:807::2004

shara-d@Rohans-workstation:~$ nslookup www.primevideo.in
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   www.primevideo.in
Address: 94.199.146.85
```

9. FTP

This is a standard network protocol used to transfer files to and from a remote network. We use a desktop FTP client to connect to the remote server and download or upload files.

```
shara-d@Rohans-workstation:~$ ftp
ftp> help
Commands may be abbreviated.  Commands are:

!               dir             mdelete         qc              site
$               disconnect      mdir            sendport        size
account         exit            mget            put             status
append          form            mkdir           pwd             struct
ascii           get             mls             quit            system
bell            glob            mode            quote           sunique
binary          hash            modtime         recv            tenex
bye             help            mput            reget           tick
case            idle            newer           rstatus         trace
cd              image           nmap            rhelp           type
cdup            ipany           nlist           rename          user
chmod           ipv4            ntrans          reset           umask
close           ipv6            open            restart         verbose
cr              lcd             prompt          rmdir           ?
delete          ls              passive         runique
debug           macdef          proxy           send
```

PART 2

OSI Model

Aim: This is an open system interconnection program that transmit message from sender to receiver through server different layers.

Description: The OSI Model deals with connecting open system. This model does not specify the exact services and protocols to use in each layer. Therefore, the OSI Model is not network architecture. This model has seven layers. They are Physical layer, Datalink layer, Network layer, Transport layer, Session layer, Presentation layer and Application layer. At sender side, each layer add the header.

Algorithm:

1. Read the input string and address
2. Add application header
3. Print the string
4. Add the presentation layer header
5. Print the string
6. Add the session layer header
7. Print the string
8. Add the transport layer header
9. Print the string
10. Add the network layer header
11. Print the string
12. Add the datalink layer header
13. Print the string
14. Send to the physical layer
15. Print the string
16. Remove all the layers one by one and printing at each stage

Code:

```
print("Enter the message")

message = input();

print("Starting Encaptulation   ")

print("Adding The Application header")

message = "AH"+message;

print();

print("Message after adding Application Header", message);

print();
```

```
print("Adding The Presentation Layer")

message = "PL"+message;

print("Message after adding Presentation Layer", message);

print();

print("Adding The Session Layer")

message = "SL"+message;

print("Message after adding Session Layer", message);

print();

print("Adding The Transport Layer")

message = "TL"+ message;

print("Message after adding Transport Layer", message);

print();

print("Adding The Network Layer")

message = "NL"+message;

print("Message after adding Network Layer", message);

print();

print("Adding The Datalink Layer")

message = "DL"+message;

print("Message after adding Datalink Layer", message);

print();

print();

print();

print("Starting Decaptulation at the receivers end");

print();

print("Removing The Datalink Layer")
```

```
message = message[2:];

print("Message after Removing Datalink Layer", message);

print();

print("Removing The Network Layer")

message = message[2:];

print("Message after Removing Network Layer", message);

print();

print("Removing The Transport Layer")

message = message[2:];

print("Message after Removing Transport Layer", message);

print();

print("Removing The Session Layer")

message = message[2:];

print("Message after Removing Session Layer", message);

print();

print("Removing The Presentation Layer")

message = message[2:];

print("Message after Removing Presentation Layer", message);

print();

print("Removing The Application header")

message = message[2:];

print("Message after Removing Application Header", message);
```

main.py

```python
print("Enter the message")

message = input();

print("Starting Encaptulation   ")

print("Adding The Application header"
    )

message = "AH"+message;

print();

print("Message after adding
    Application Header", message);

print();

print("Adding The Presentation Layer"
    )

message = "PL"+message;

print("Message after adding
    Presentation Layer", message);

print();

print("Adding The Session Layer")

message = "SL"+message;

print("Message after adding Session
    Layer", message);

print();

print("Adding The Transport Layer")

message = "TL"+ message;

print("Message after adding Transport
    Layer", message);

print();

print("Adding The Network Layer")

message = "NL"+message;

print("Message after adding Network
    Layer", message);

print();

print("Adding The Datalink Layer")

message = "DL"+message;
```

Shell

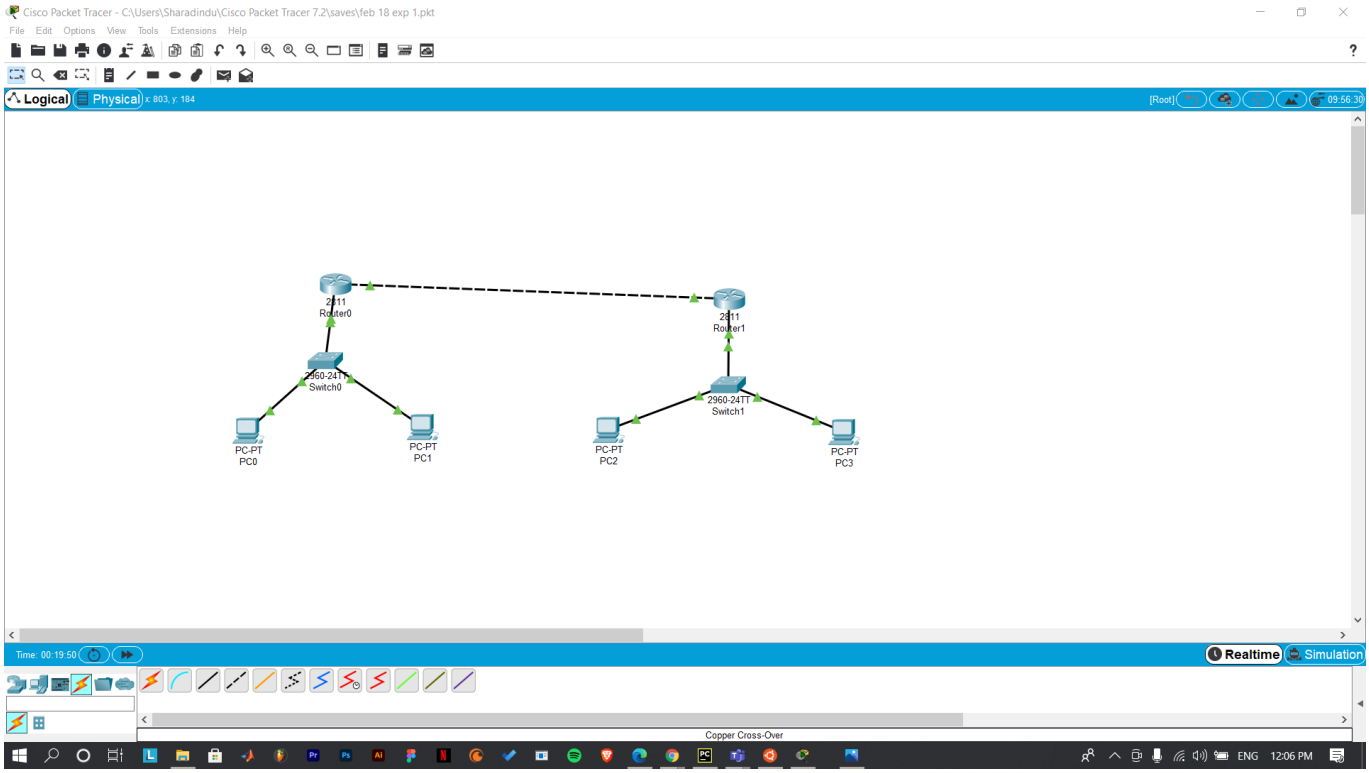
```
Enter the message
Hi
Starting Encaptulation
Adding The Application header

Message after adding Application Header AHHi

Adding The Presentation Layer
Message after adding Presentation Layer PLAHHi

Adding The Session Layer
Message after adding Session Layer SLPLAHHi

Adding The Transport Layer
Message after adding Transport Layer TLSLPLAHHi

Adding The Network Layer
Message after adding Network Layer NLTLSLPLAHHi

Adding The Datalink Layer
Message after adding Datalink Layer
    DLNLTLSLPLAHHi



Starting Decaptulation at the receivers end

Removing The Datalink Layer
Message after Removing Datalink Layer
    NLTLSLPLAHHi

Removing The Network Layer
Message after Removing Network Layer TLSLPLAHHi

Removing The Transport Layer
Message after Removing Transport Layer SLPLAHHi

Removing The Session Layer
Message after Removing Session Layer PLAHHi

Removing The Presentation Layer
Message after Removing Presentation Layer AHHi

Removing The Application header
Message after Removing Application Header Hi
>
```

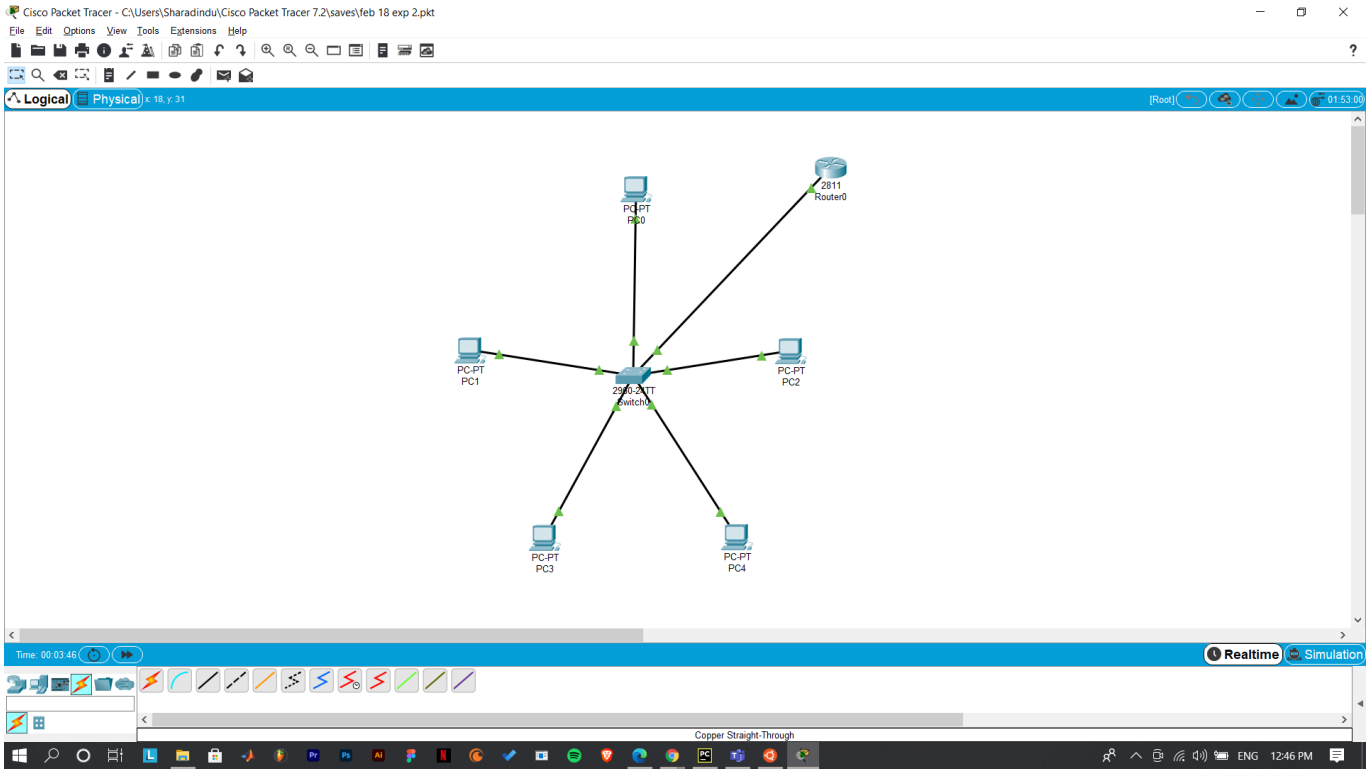
ENG 12:41 PM

PART 3

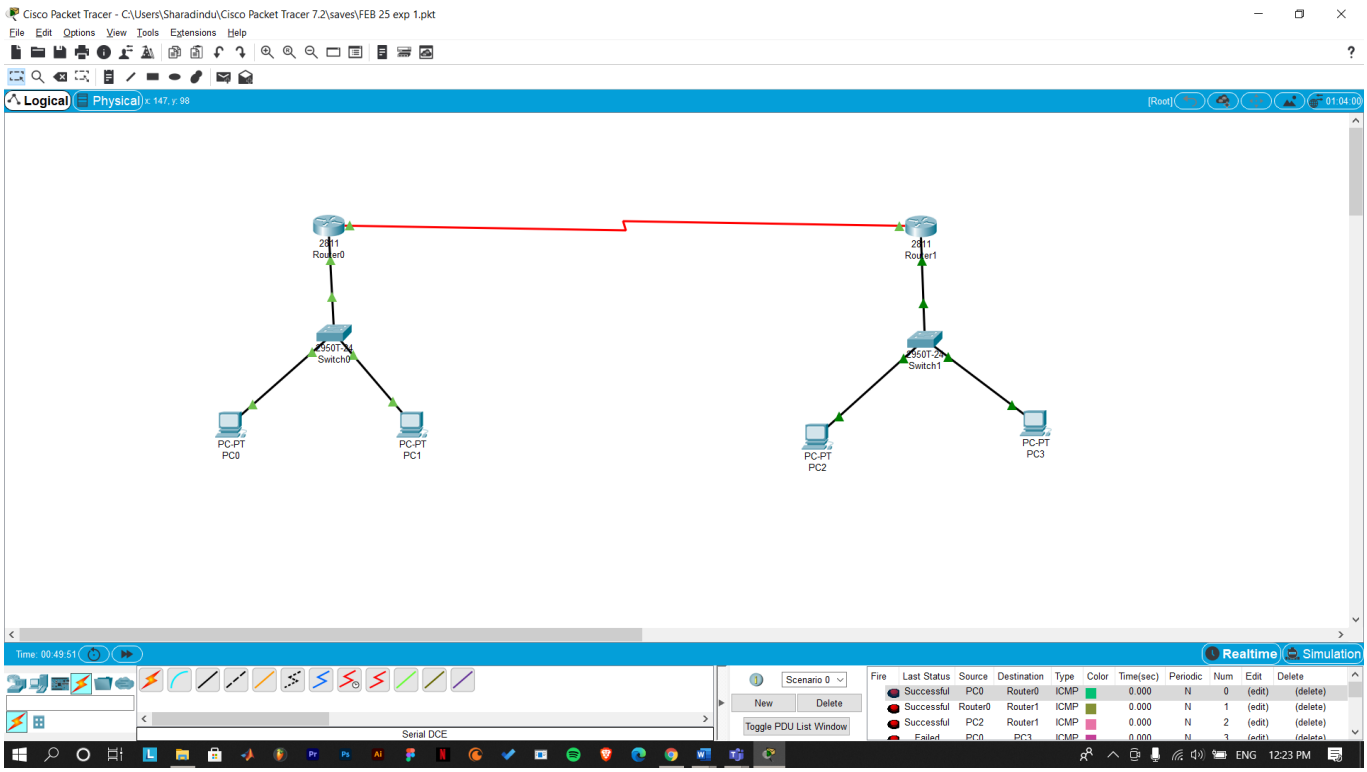
Cisco Packet Tracer

DAY 1:





DAY 2:



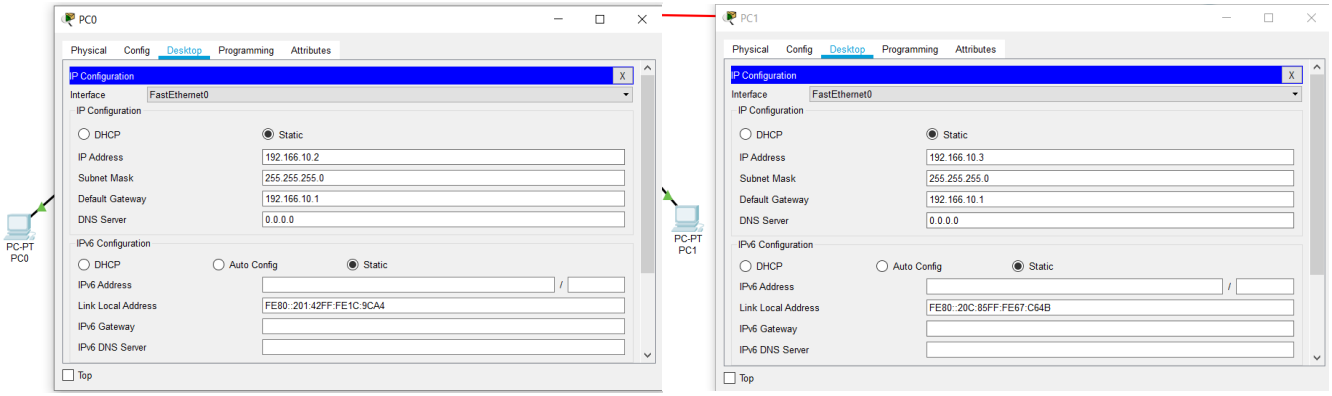
STEPS:

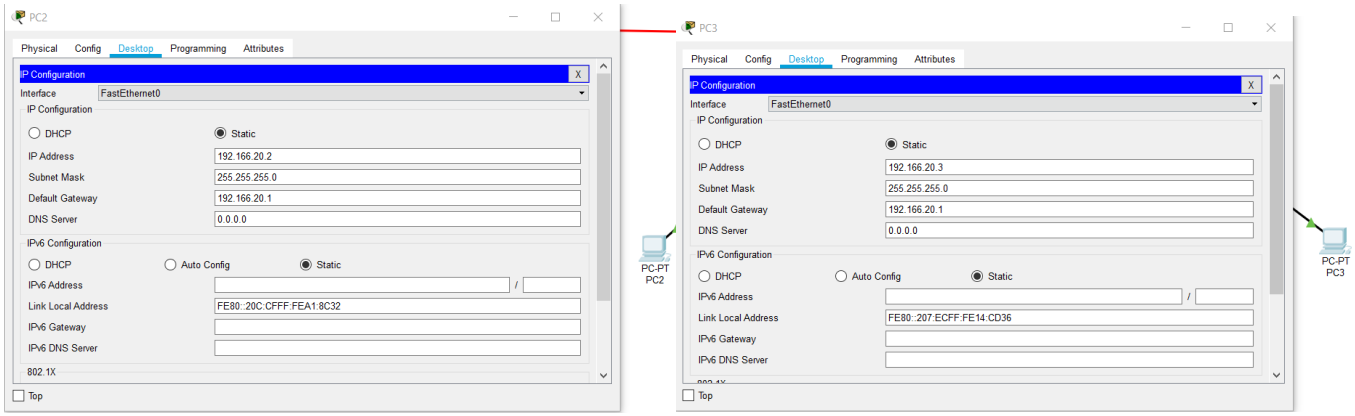
1. Establishing Connections.

Router to router connection is linked using Serial DCE.
All other connections are made using Copper Straight-Through.

2. Configuring the PCs.

Default gateway for the PCs are: 192.168.10.1 (for network 1) and 192.168.20.1 (for network 2)
IP addresses of them are respectively: 192.168.10.2, 192.168.10.3, 192.168.20.2, 192.168.20.3





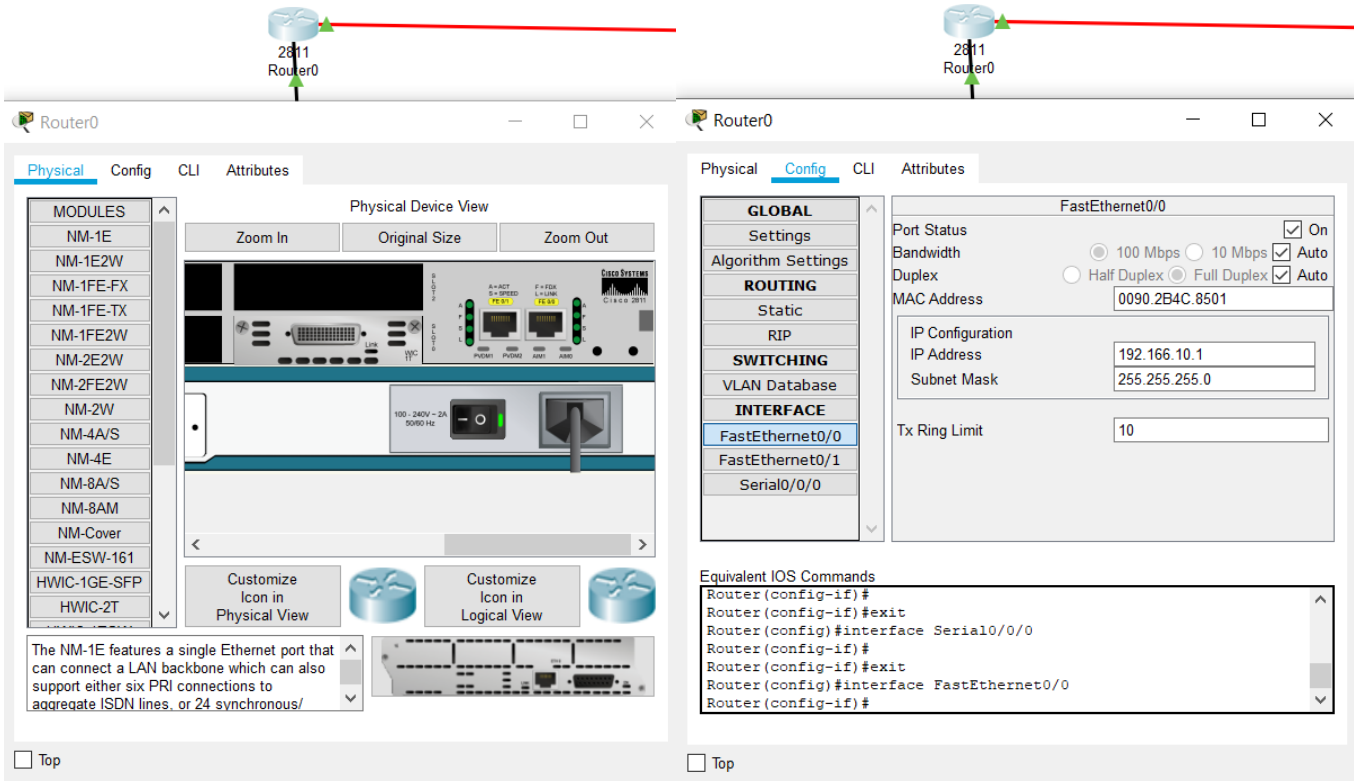
3. Configuring the Routers.

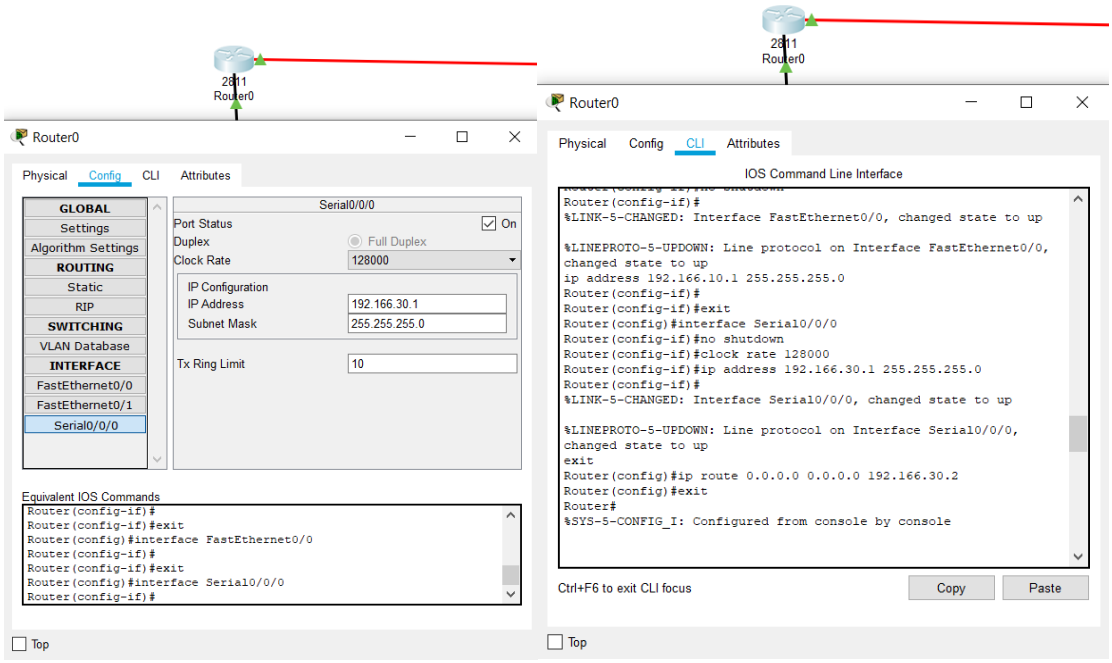
Module used: WIC-1T

Router 0:

WIC-1T Module is drag-and-dropped, followed by turning the Router On-and-Off.
Port status is turned ON.
In Fast Ethernet 0/0 interface, IP address: 192.166.10.1
In Serial 0/0/0 interface, Clock rate changed to 128000, and IP address: 192.166.30.1
In CLI, commands entered:

```
exit
Router(config)#ip route 0.0.0.0 0.0.0.0 192.166.30.2
Router(config)#exit
```

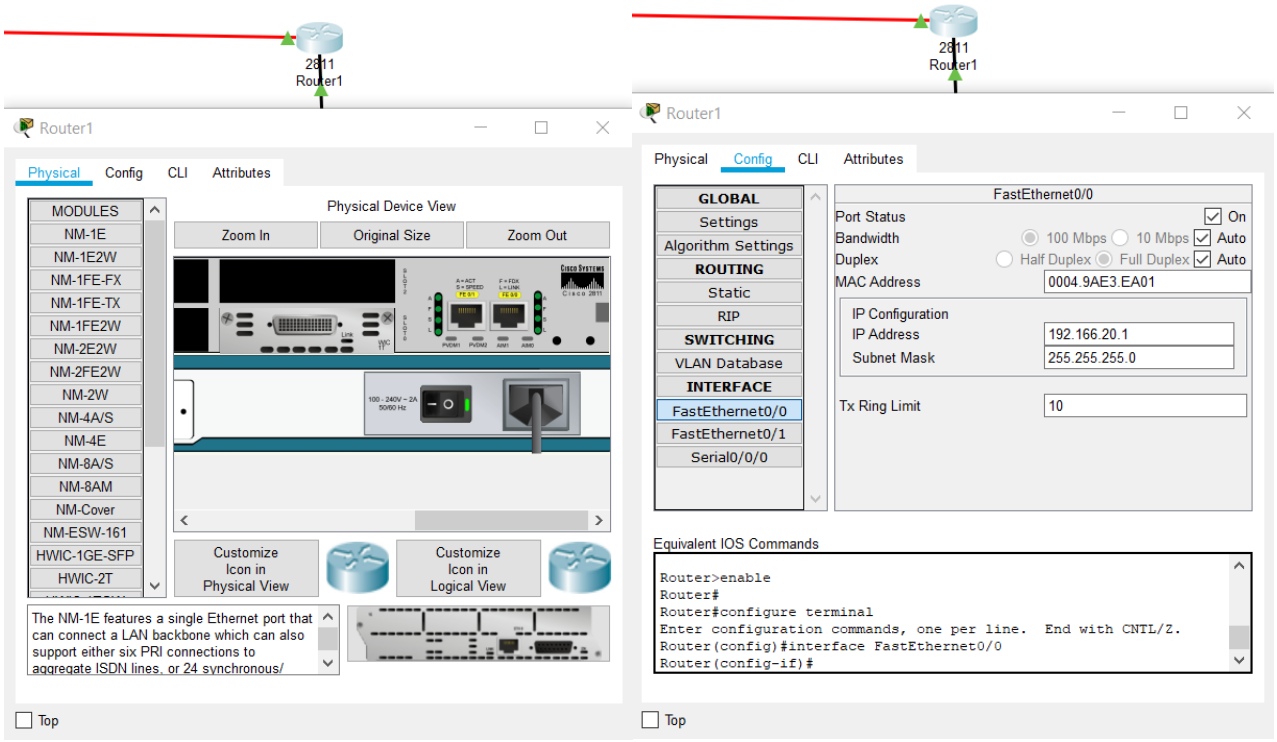


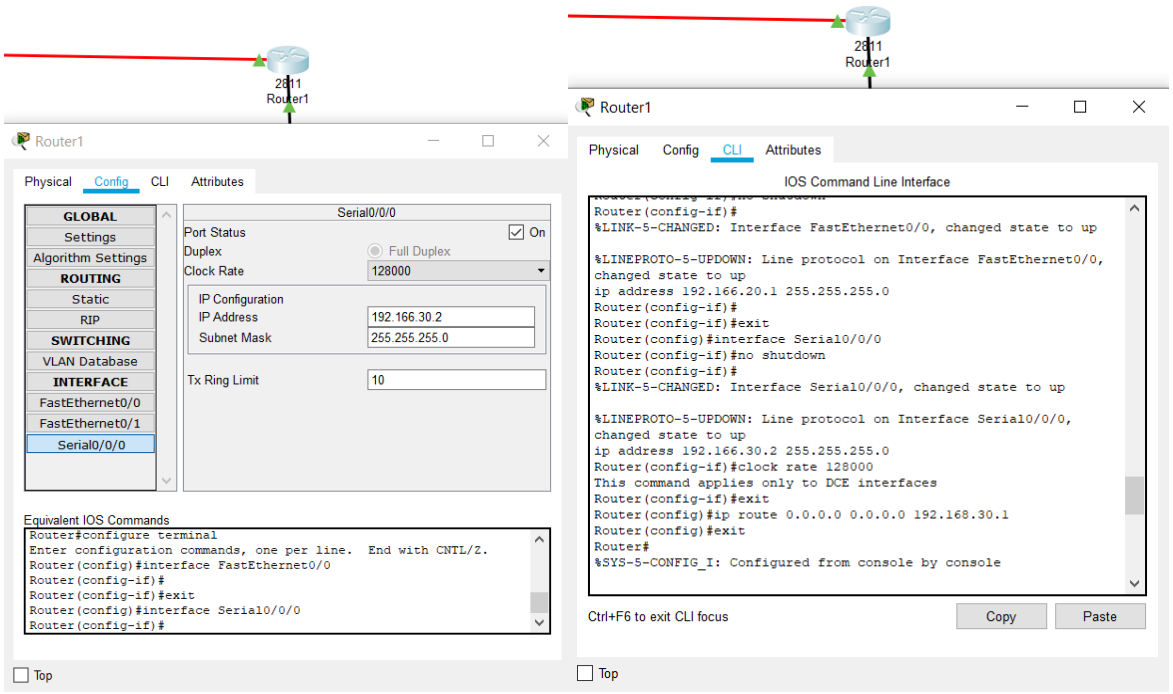


Router 1:

WIC-1T Module is drag-and-dropped, followed by turning the Router On-and-Off.
Port status is turned ON.
In Fast Ethernet 0/0 interface, IP address: 192.166.20.1
In Serial 0/0/0 interface, Clock rate changed to 128000, and IP address: 192.166.30.2
In CLI, commands entered:

```
exit
Router(config)#ip route 0.0.0.0 0.0.0.0 192.166.30.1
Router(config)#exit
```





4. Sending Messages/Signals

Simple PDUs are sent through various routes, like PC0 to Router0, PC2 to Router1, PC0 to PC3, and so on and so forth.