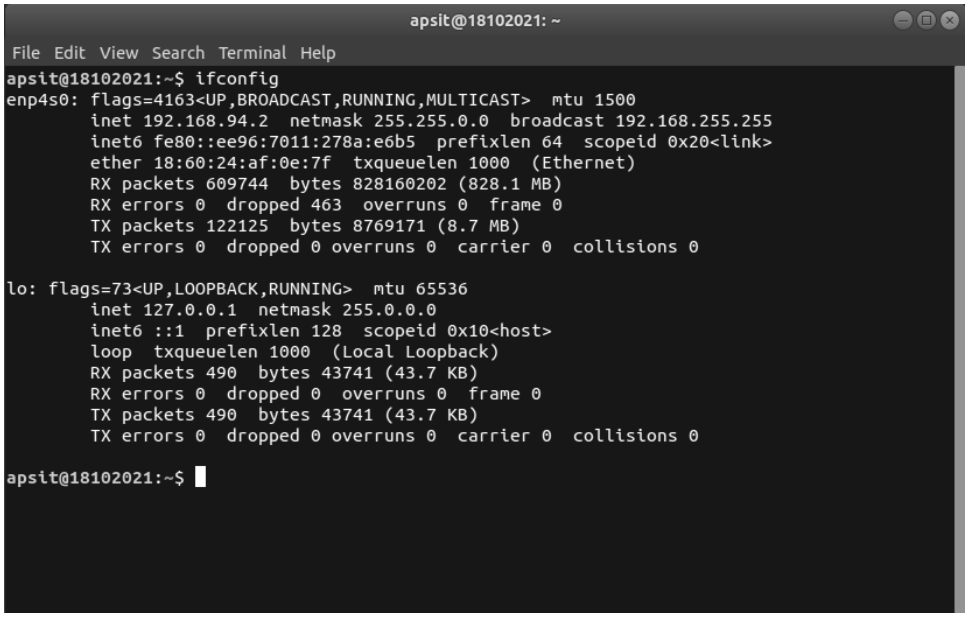
Experiment 1

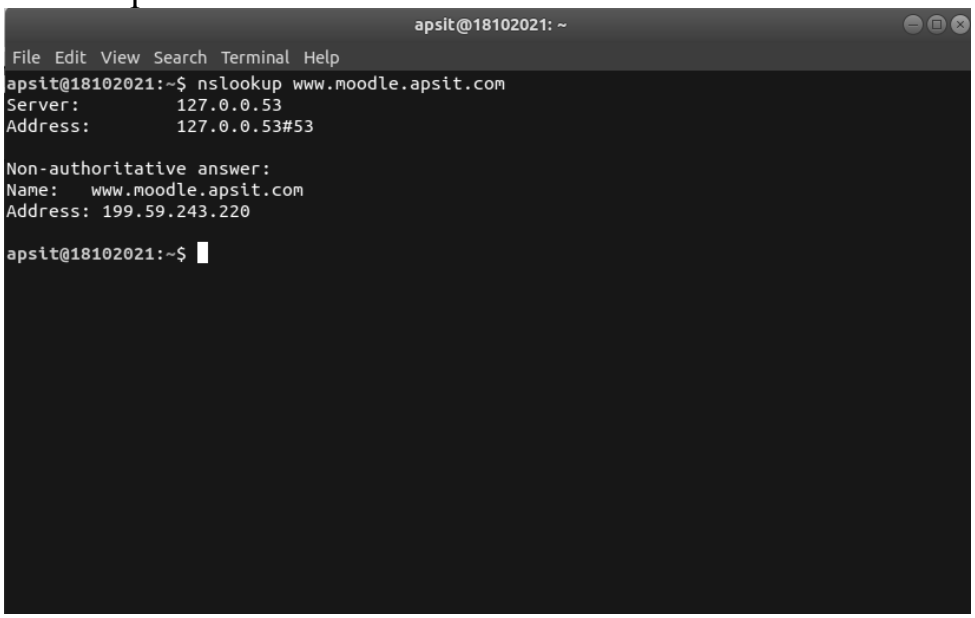
Aim: Use basic networking commands in Linux (ping, tracert, nslookup, netstat, ARP, RARP, ip, ifconfig, dig, route)

Output:

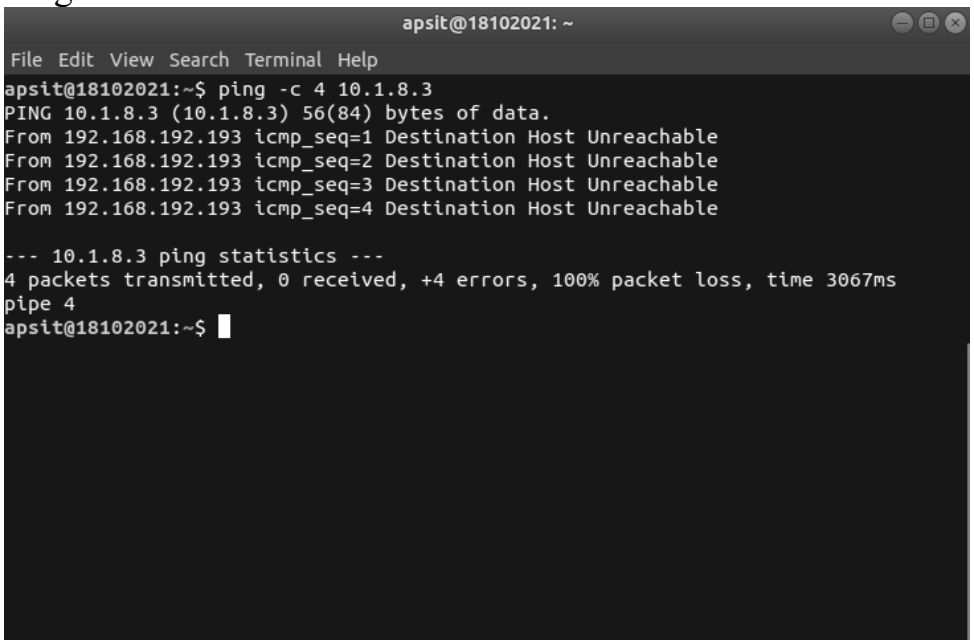
1. Ifconfig



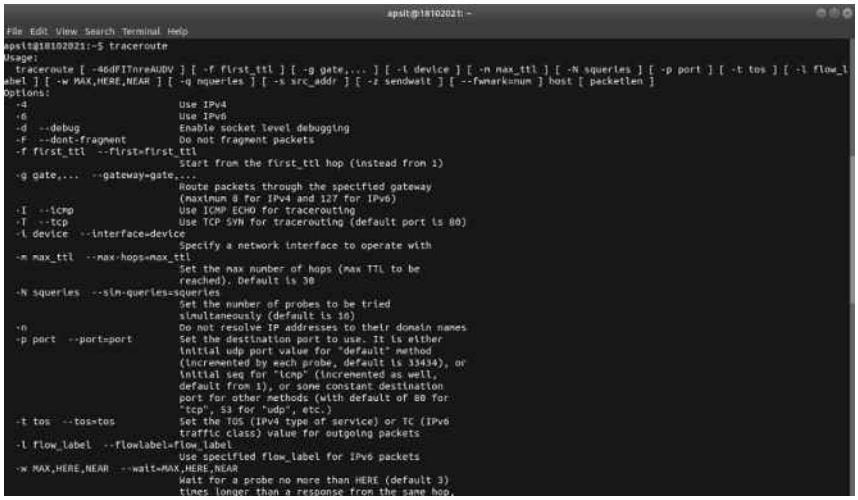
2. Nslookup



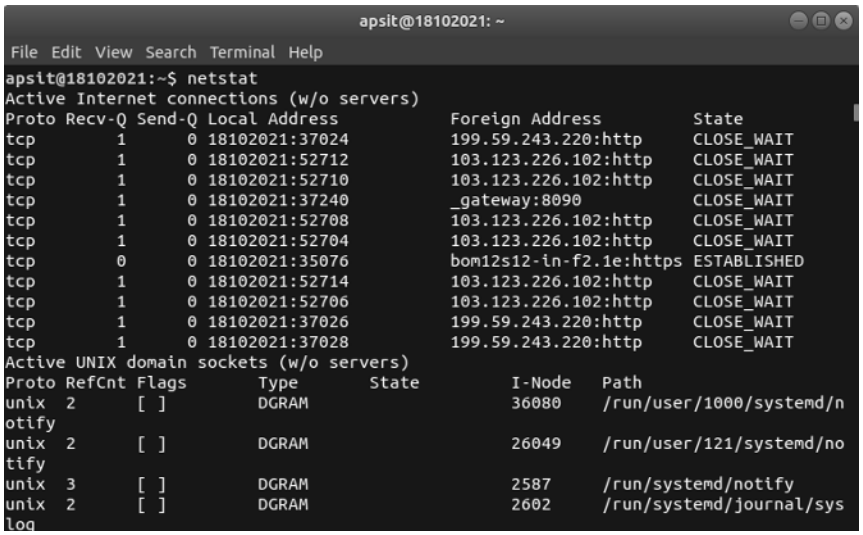
3. Ping



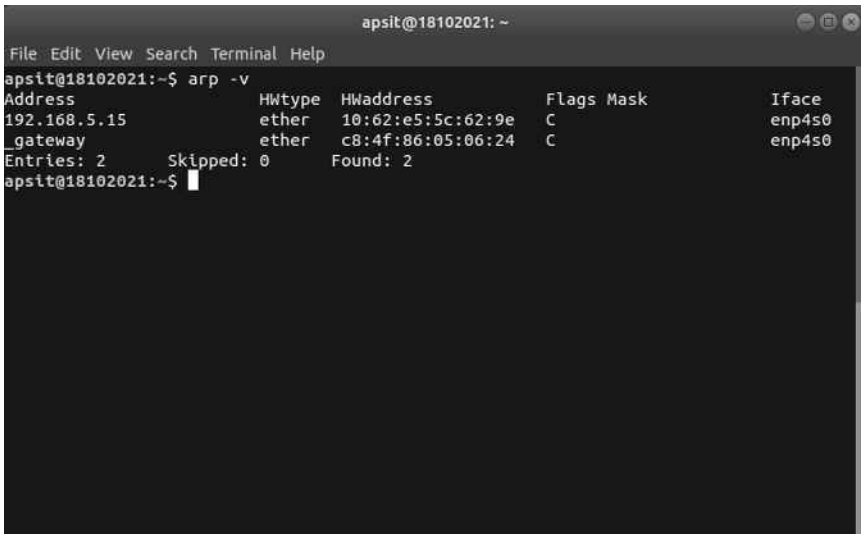
4. Traceroute



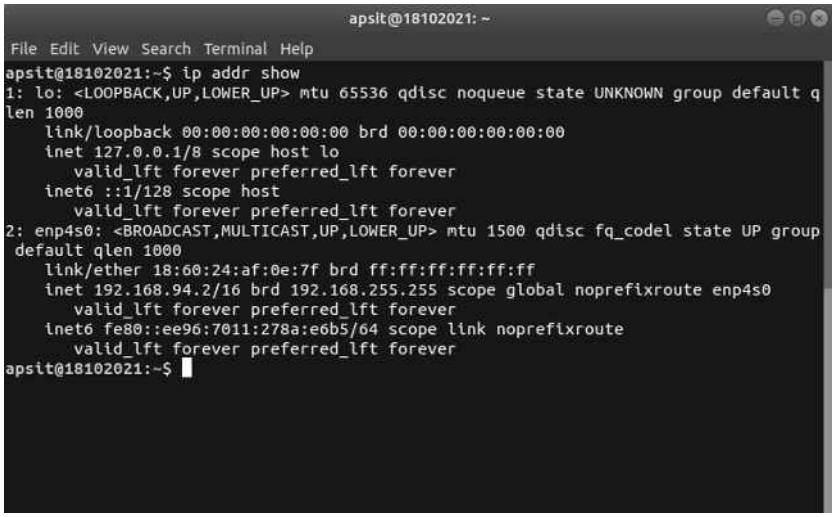
5. Netstat



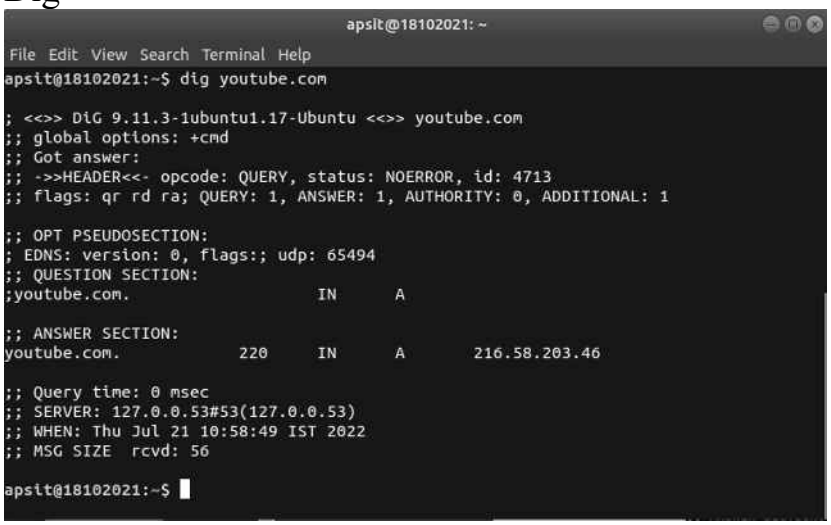
6. ARP



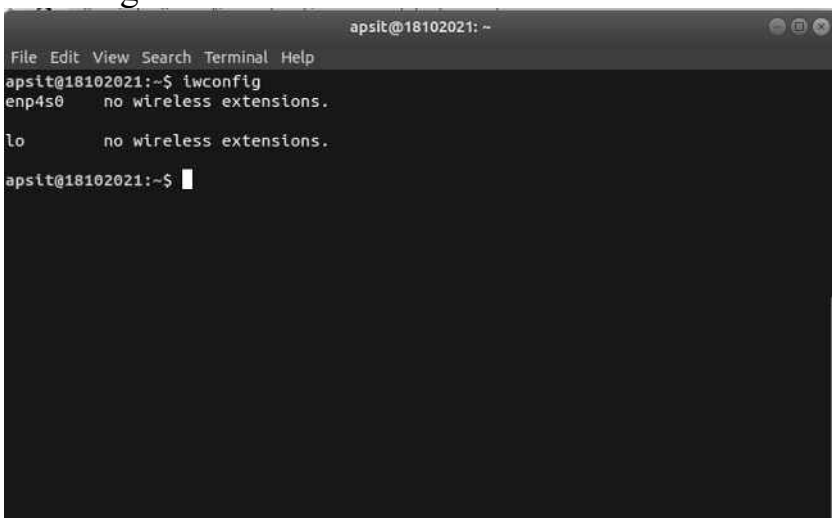
7. IP



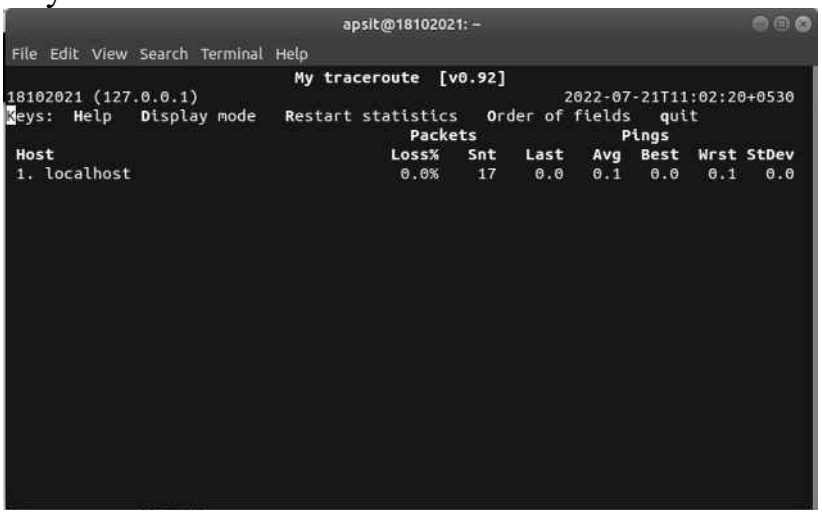
8. Dig



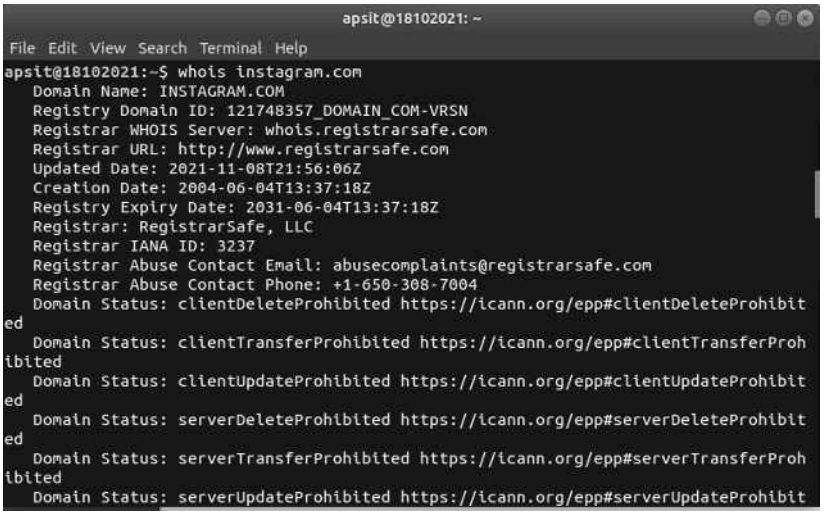
9. Iwconfig



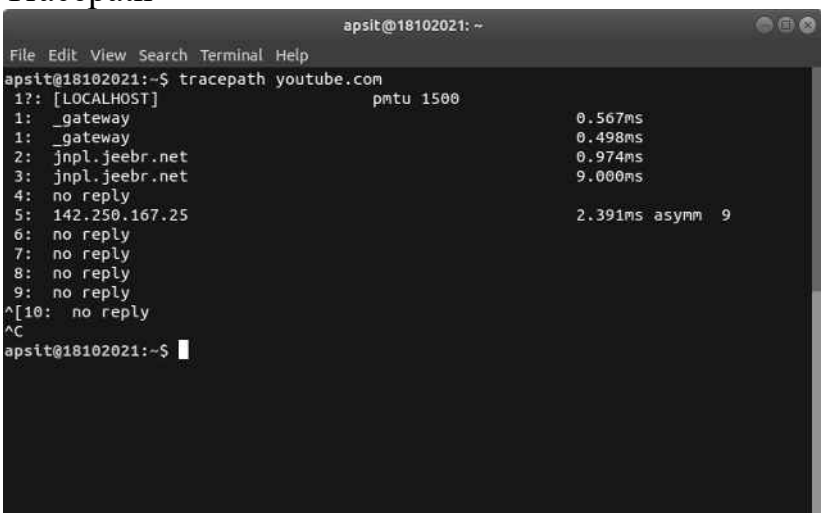
10. My traceroute



11. Whois



12.Tracepath



Experiment 2

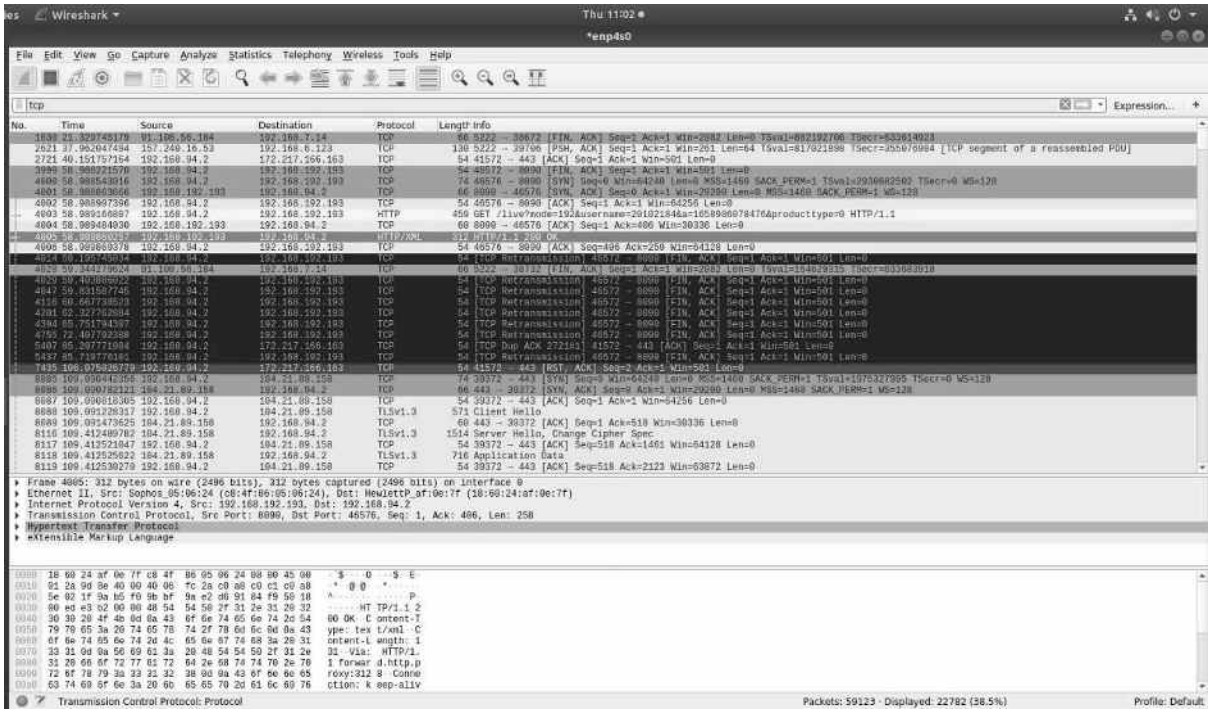
Aim: Use Wire shark to understand the operation of TCP/IP layers:

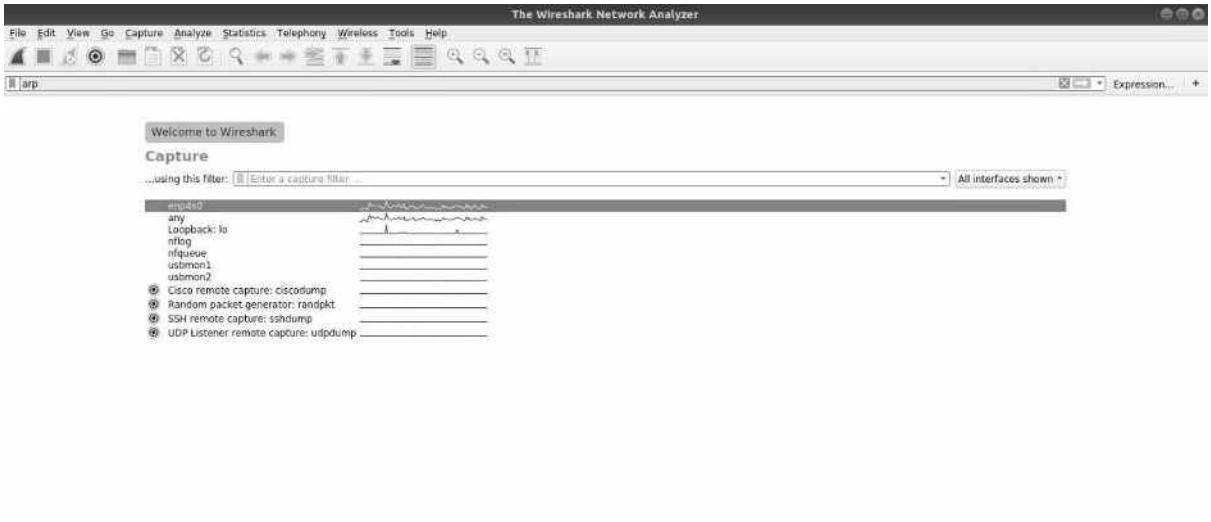
- Ethernet Layer: Frame header, Frame size etc.
- Data Link Layer: MAC address, ARP (IP and MAC address binding)
- Network Layer: IP Packet (header, fragmentation), ICMP (Query and Echo)
- Transport Layer: TCP Ports, TCP handshake segments etc.

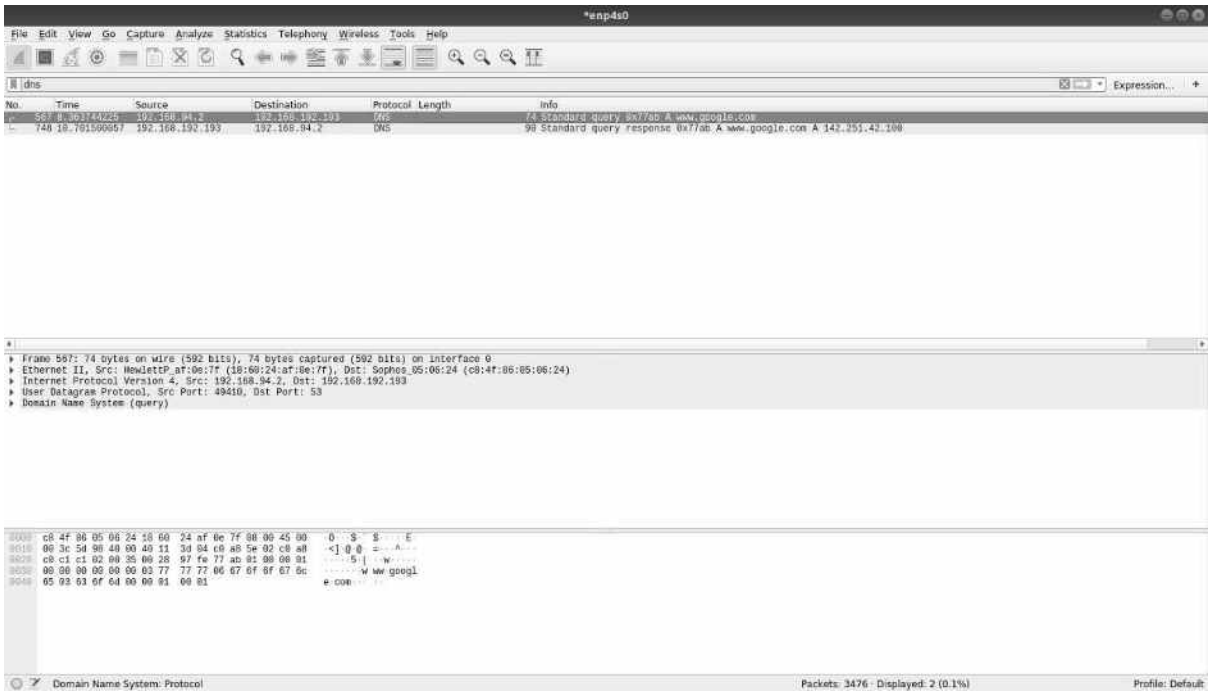
Application Layer: DHCP, FTP, HTTP header formats

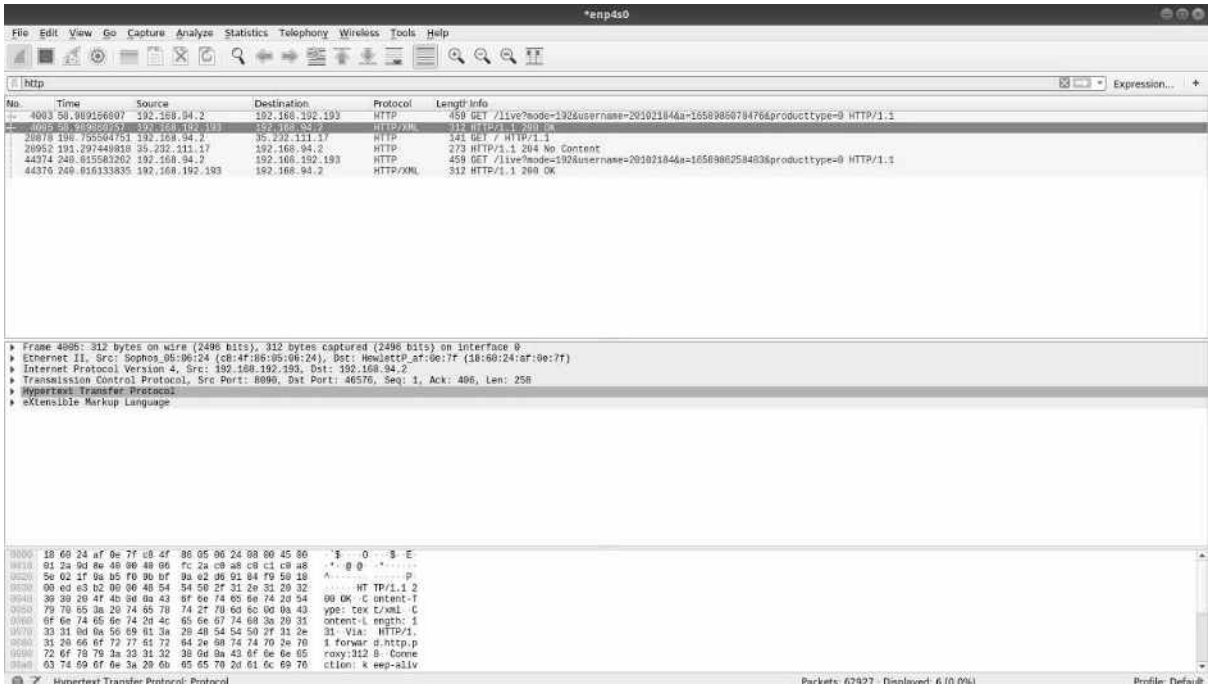
Output:

Steps to install wireshark
1. sudo apt install wireshark
2. sudo wireshark




The Wireshark Network Analyzer
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
arp
Expression...
Welcome to Wireshark
Capture
...using this filter: Enter a capture filter ...
All interfaces shown
enp4s0
any
Loopback: lo
nflog
nfqueue
usbmon1
usbmon2
Cisco remote capture: ciscodump
Random packet generator: randpkt
SSH remote capture: sshdump
UDP Listener remote capture: udpdump


*enp4s0
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
dns
Expression...
No. Time Source Destination Protocol Length Info
567 8.303744225 192.168.94.2 192.168.192.193 DNS 74 Standard query 0x77ab A www.google.com
748 10.781500057 192.168.192.193 192.168.94.2 DNS 90 Standard query response 0x77ab A www.google.com A 142.251.42.100
Frame 567: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
Ethernet II, Src: HewlettP_af:0e:7f (18:60:24:af:0e:7f), Dst: Sophos_05:06:24 (c8:4f:86:05:06:24)
Internet Protocol Version 4, Src: 192.168.94.2, Dst: 192.168.192.193
User Datagram Protocol, Src Port: 49410, Dst Port: 53
Domain Name System (query)
c8 4f 86 05 06 24 18 60 24 af 0e 7f 08 00 45 00
00 3c 5d 98 40 00 40 11 3d 04 c0 a8 5e 02 c0 a8
c0 c1 c1 02 00 35 00 28 97 fe 77 ab 01 00 00 01
00 00 00 00 00 00 03 77 77 77 06 67 6f 6f 67 6c
65 03 63 6f 6d 00 00 01 00 01
Domain Name System: Protocol
Packets: 3476 · Displayed: 2 (0.1%)
Profile: Default


*enp4s0
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
http
Expression...
No. Time Source Destination Protocol Length Info
4003 58.989156807 192.168.94.2 192.168.192.193 HTTP 459 GET /live?mode=192&username=201021844a=1658986078476&producttype=9 HTTP/1.1
4005 58.989880757 192.168.192.193 192.168.94.2 HTTP/XML 312 HTTP/1.1 200 OK
20878 190.755504751 192.168.94.2 35.232.111.17 HTTP 141 GET / HTTP/1.1
20952 191.297449818 35.232.111.17 192.168.94.2 HTTP 273 HTTP/1.1 204 No Content
44374 240.615582202 192.168.94.2 192.168.192.193 HTTP 459 GET /live?mode=192&username=201021844a=1658986258483&producttype=9 HTTP/1.1
44376 240.616133835 192.168.192.193 192.168.94.2 HTTP/XML 312 HTTP/1.1 200 OK
Frame 4005: 312 bytes on wire (2496 bits), 312 bytes captured (2496 bits) on interface 0
Ethernet II, Src: Sophos_05:06:24 (c8:4f:86:05:06:24), Dst: HewlettP_af:0e:7f (18:60:24:af:0e:7f)
Internet Protocol Version 4, Src: 192.168.192.193, Dst: 192.168.94.2
Transmission Control Protocol, Src Port: 8090, Dst Port: 46576, Seq: 1, Ack: 406, Len: 258
Hypertext Transfer Protocol
eXtensible Markup Language
0000 18 60 24 af 0e 7f c8 4f 86 05 06 24 08 00 45 00
0010 01 2a 9d 8e 40 00 40 06 fc 2a c0 a8 c0 c1 c0 a8
0020 5e 02 1f 9a b5 f0 9b bf 9a e2 d6 91 84 f9 50 18
0030 00 ed e3 b2 00 00 48 54 54 50 2f 31 2e 31 20 32
0040 30 30 20 4f 4b 0d 0a 43 6f 6e 74 65 6e 74 2d 54
0050 79 70 65 3a 20 74 65 78 74 2f 78 6d 6c 0d 0a 43
0060 6f 6e 74 65 6e 74 2d 4c 65 6e 67 74 68 3a 20 31
0070 33 31 0d 0a 56 69 61 3a 20 48 54 54 50 2f 31 2e
0080 31 20 66 6f 72 77 61 72 64 2e 68 74 74 70 2e 70
0090 72 6f 78 79 3a 33 31 32 38 0d 0a 43 6f 6e 6e 65
00a0 63 74 69 6f 6e 3a 20 6b 65 65 70 2d 61 6c 69 76
Hypertext Transfer Protocol: Protocol
Packets: 62927 · Displayed: 6 (0.0%)
Profile: Default

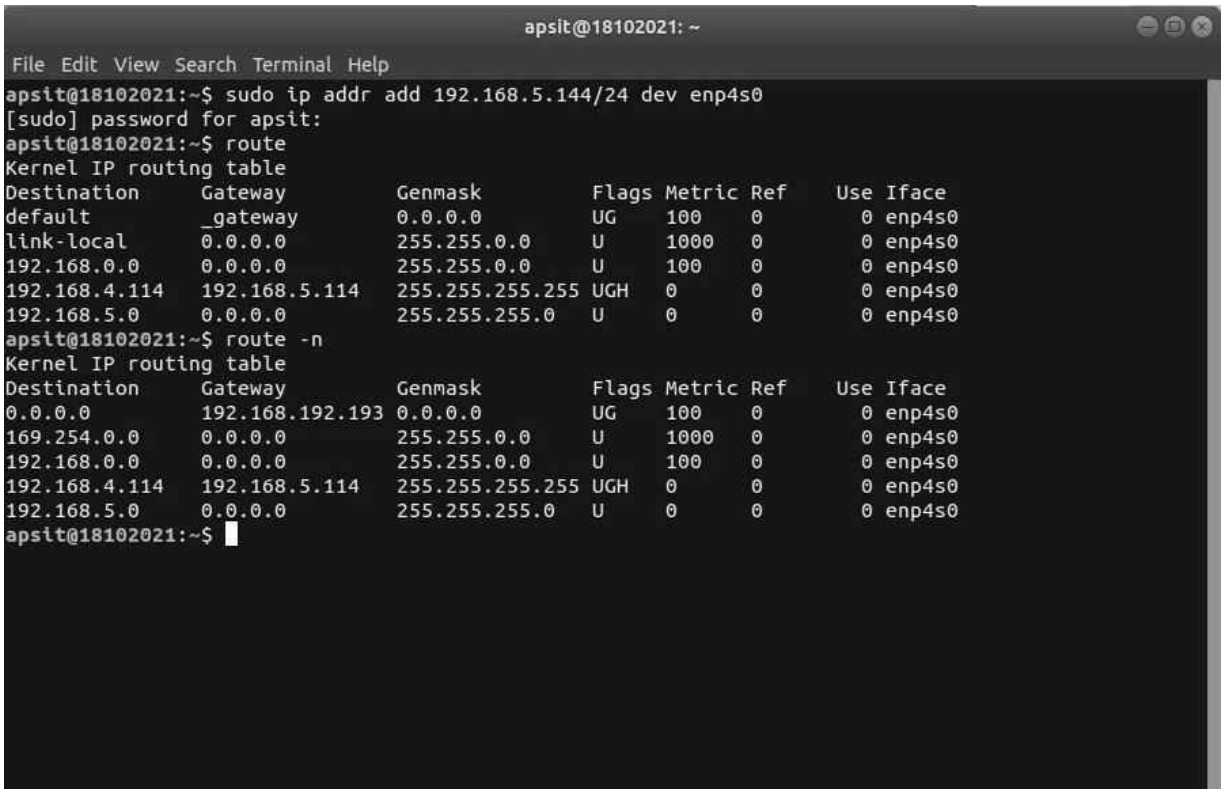
Experiment 3

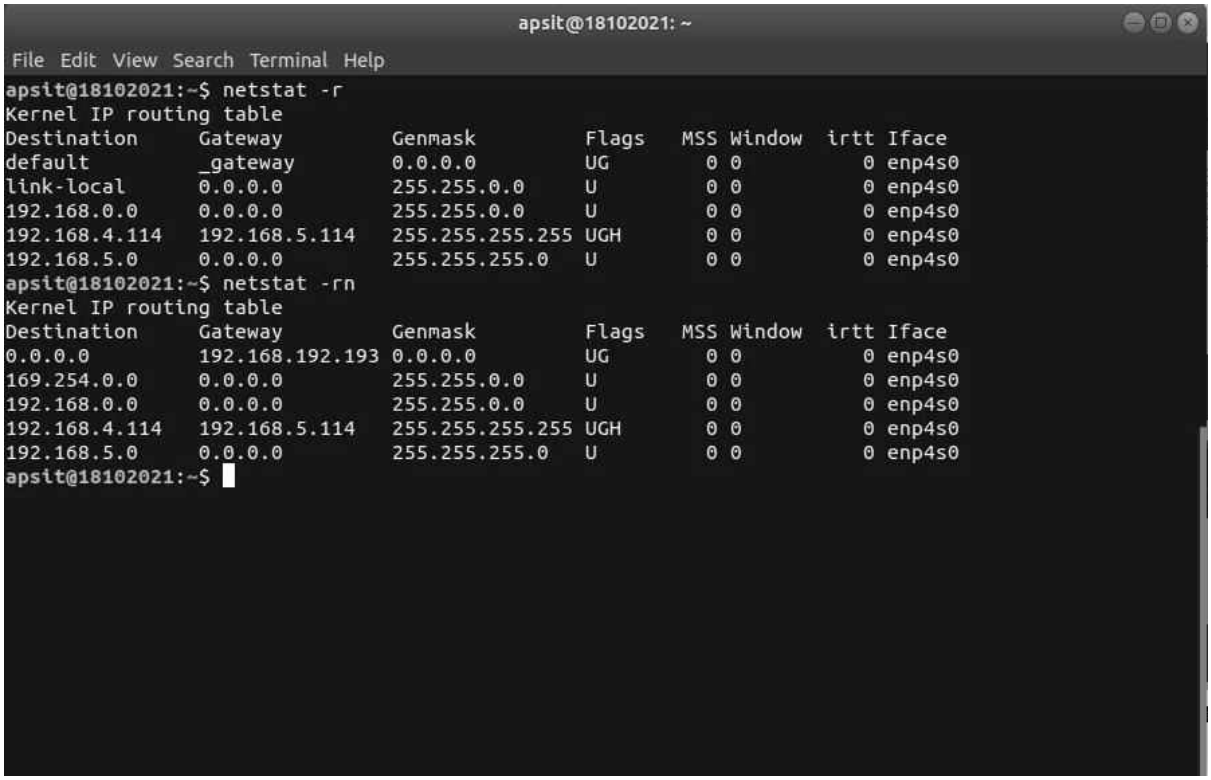
Aim: a. Using netstat and route commands of Linux, do the following:

- View current routing table
- Add and delete routes
- Change default gateway

b. Perform packet filtering by enabling IP forwarding using IPtables in Linux.

Output:

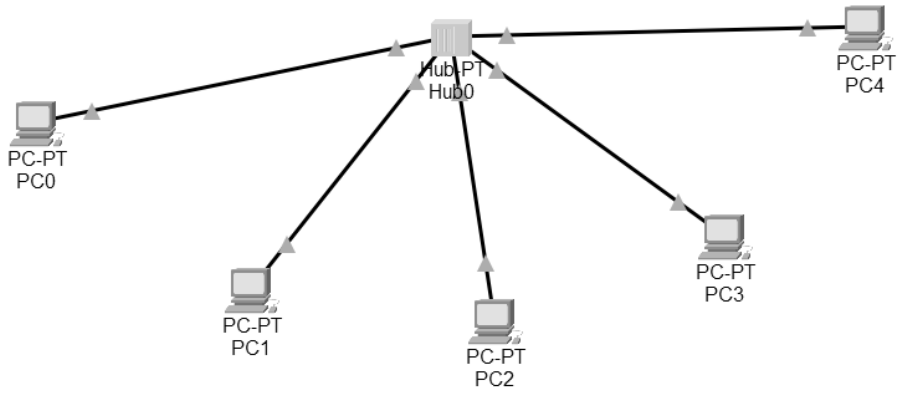



apsit@18102021: ~
File Edit View Search Terminal Help
apsit@18102021:~$ netstat -r
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
default _gateway 0.0.0.0 UG 0 0 0 enp4s0
link-local 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.4.114 192.168.5.114 255.255.255.255 UGH 0 0 0 enp4s0
192.168.5.0 0.0.0.0 255.255.255.0 U 0 0 0 enp4s0
apsit@18102021:~$ netstat -rn
Kernel IP routing table
Destination Gateway Genmask Flags MSS Window irtt Iface
0.0.0.0 192.168.192.193 0.0.0.0 UG 0 0 0 enp4s0
169.254.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.0.0 0.0.0.0 255.255.0.0 U 0 0 0 enp4s0
192.168.4.114 192.168.5.114 255.255.255.255 UGH 0 0 0 enp4s0
192.168.5.0 0.0.0.0 255.255.255.0 U 0 0 0 enp4s0
apsit@18102021:~$

Experiment 4

Aim: Build a simple network topology and configure it for static routing protocol using packet tracer.

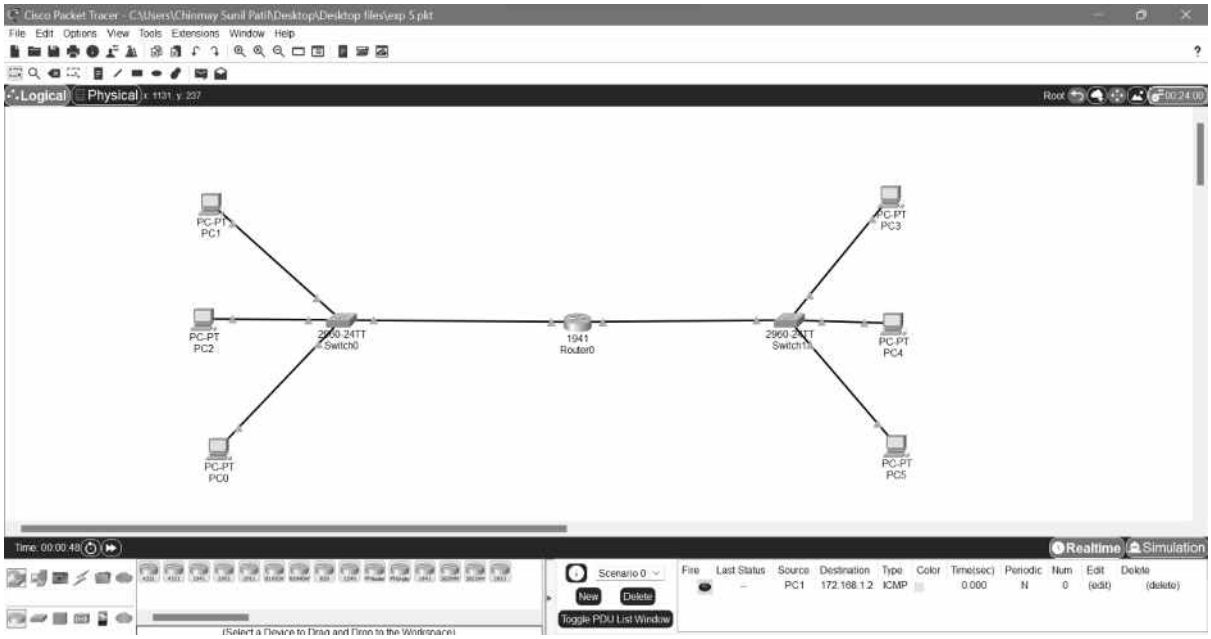
Output:

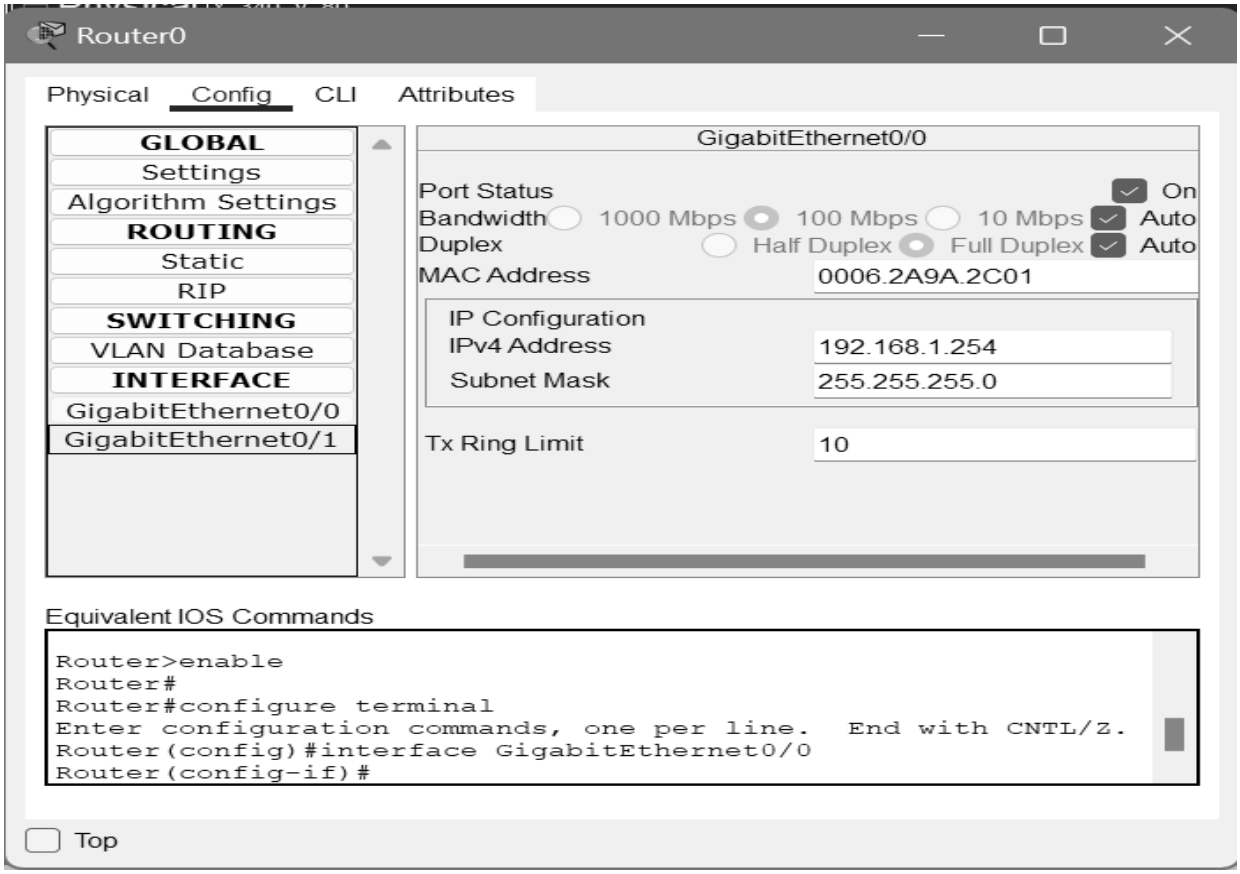


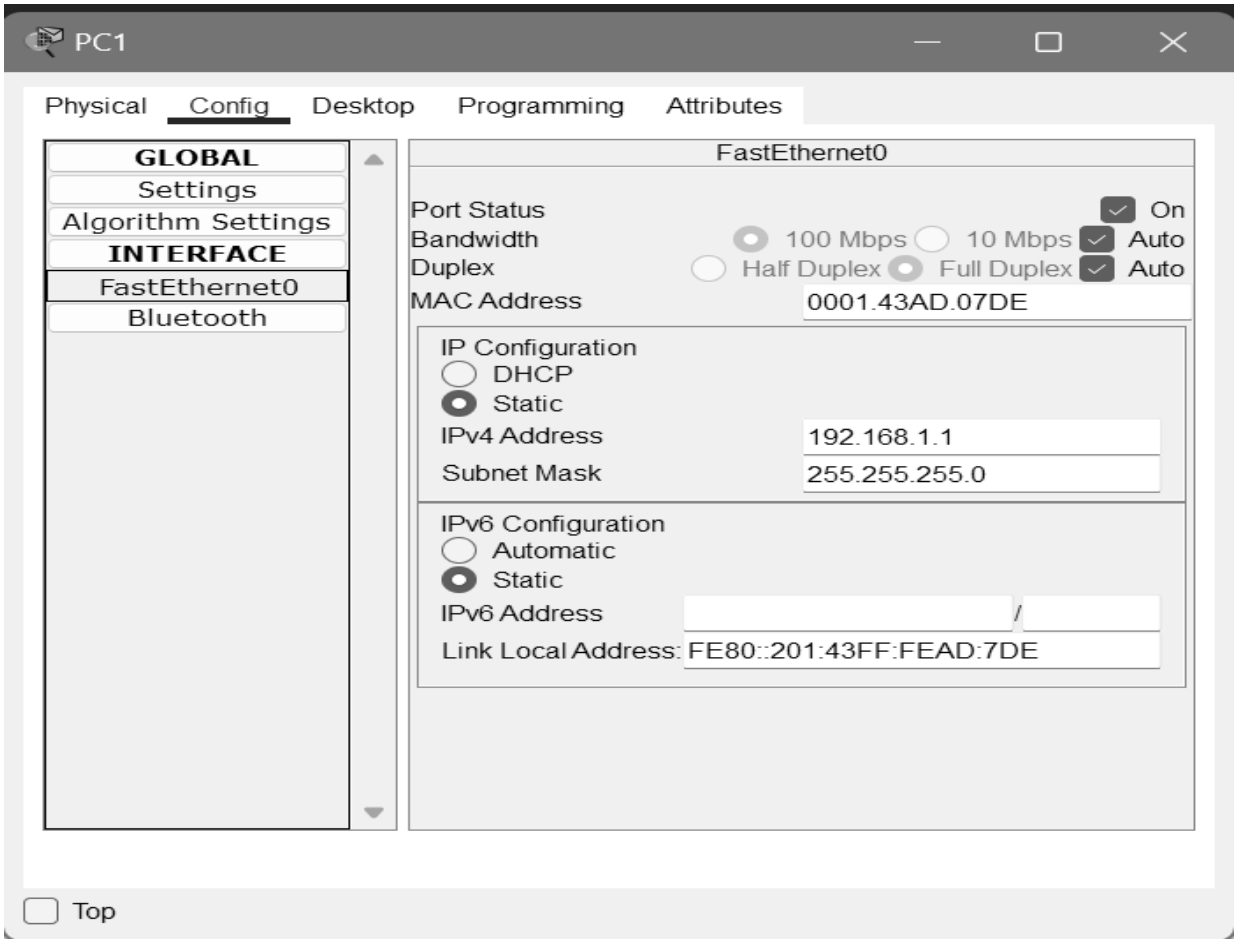
Experiment 5

Aim: Single n/w tpology for static routing protocol

Output:



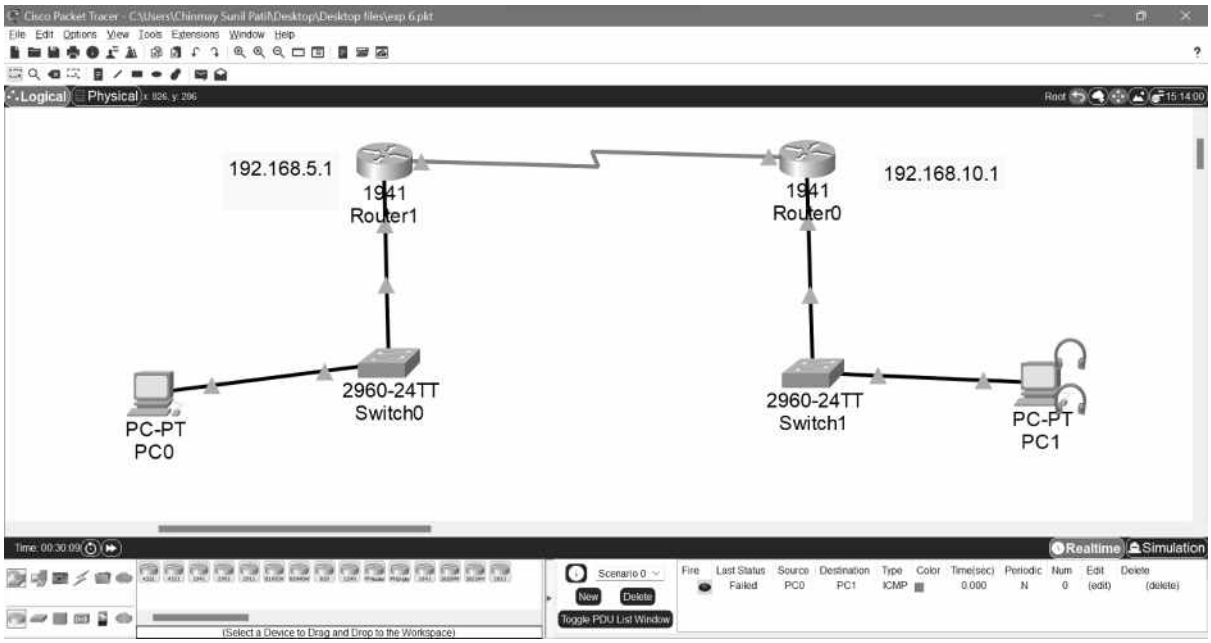

Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0006.2A9A.2C01
IP Configuration
IPv4 Address
192.168.1.254
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Top

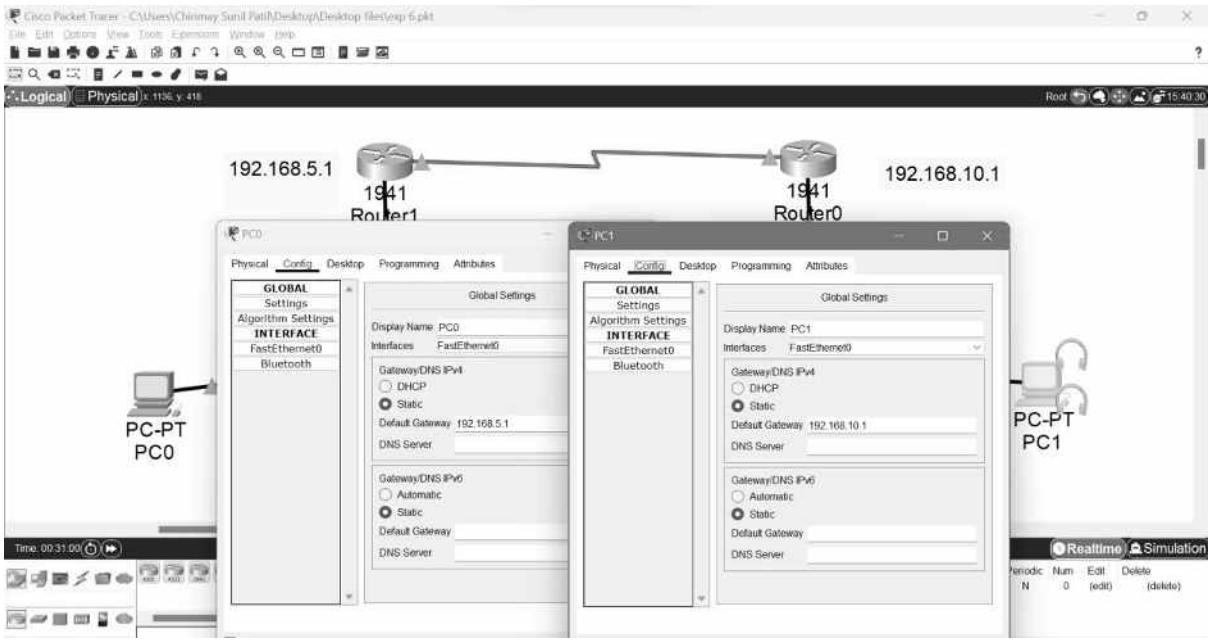

PC1
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
FastEthernet0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.43AD.07DE
IP Configuration
DHCP
Static
IPv4 Address
192.168.1.1
Subnet Mask
255.255.255.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address:
FE80::201:43FF:FEAD:7DE
Top

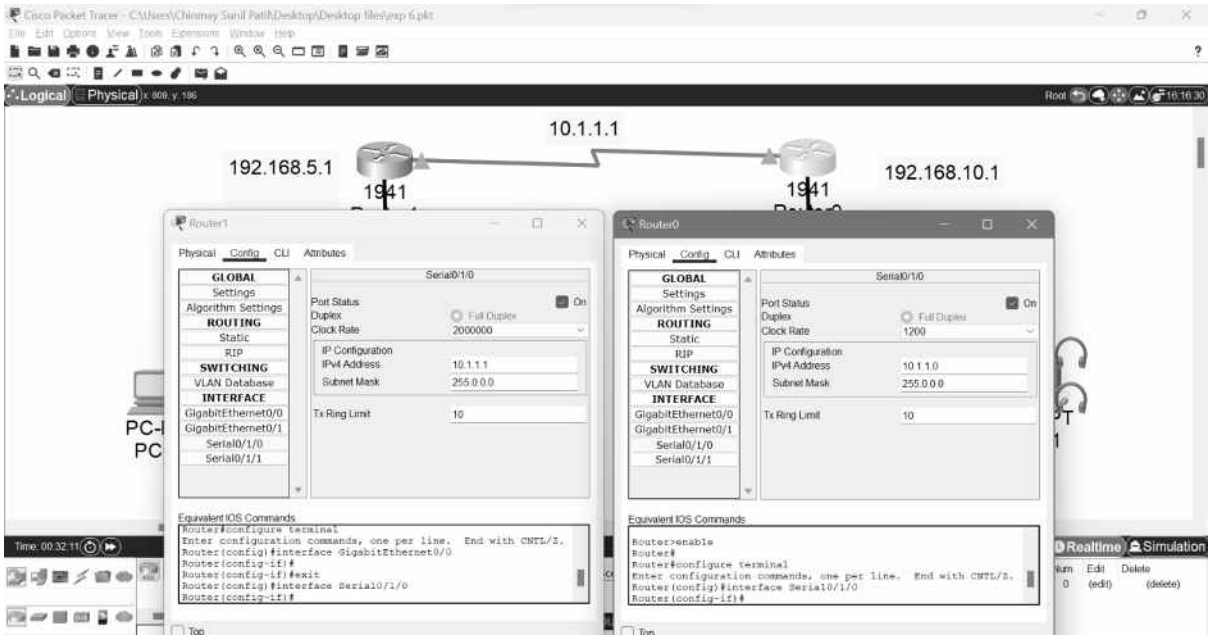
Experiment 6

Aim: To configure static routing in packet tracer (Simulation of router configuration).

Output:





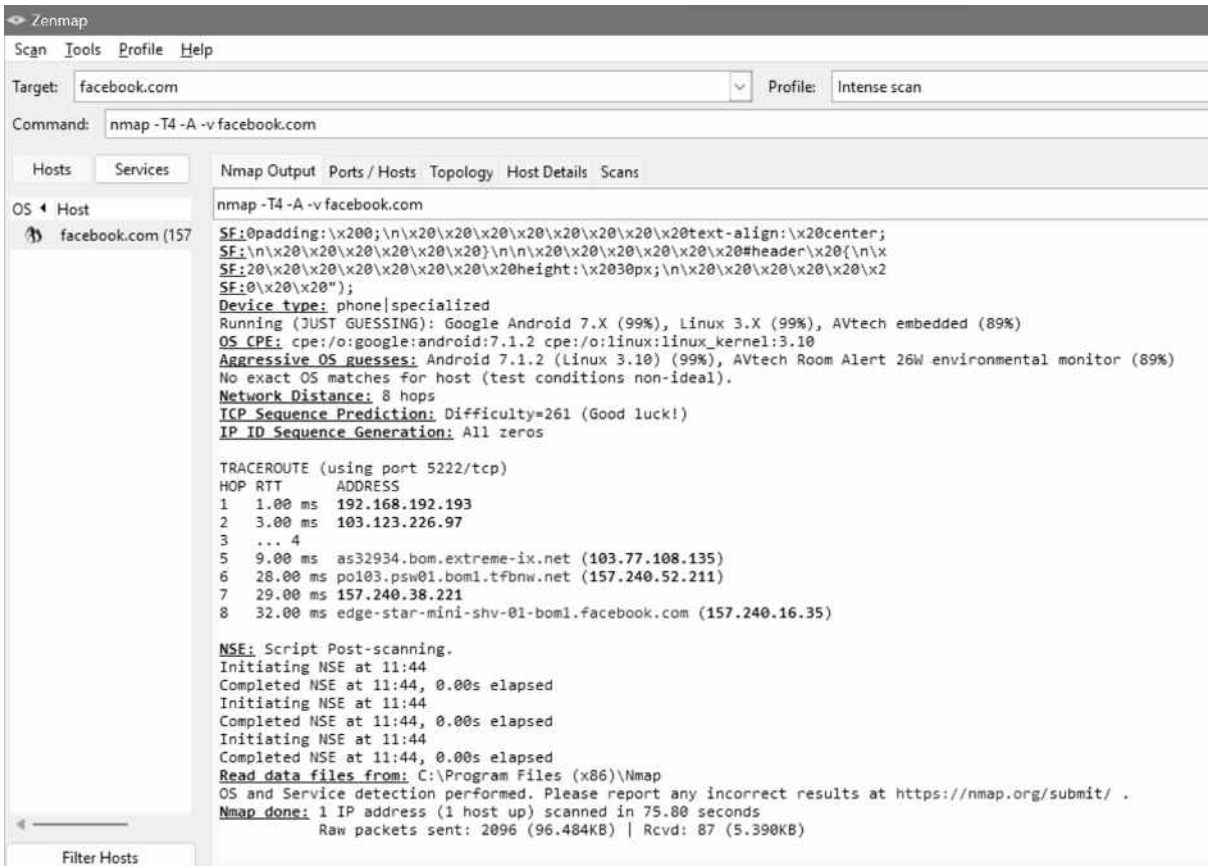

Cisco Packet Tracer - C:\Users\Chinmay Sunil Patil\Desktop\Desktop files\exp 6.pkt
Logical
Physical
10.1.1.1
192.168.5.1
192.168.10.1
1941
1941
Router1
Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
Serial0/1/0
Serial0/1/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
1200
IP Configuration
IPv4 Address
10.1.1.1
10.1.1.0
Subnet Mask
255.0.0.0
Tx Ring Limit
10
Equivalent IOS Commands
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial0/1/0
Router(config-if)#
Realtime
Simulation

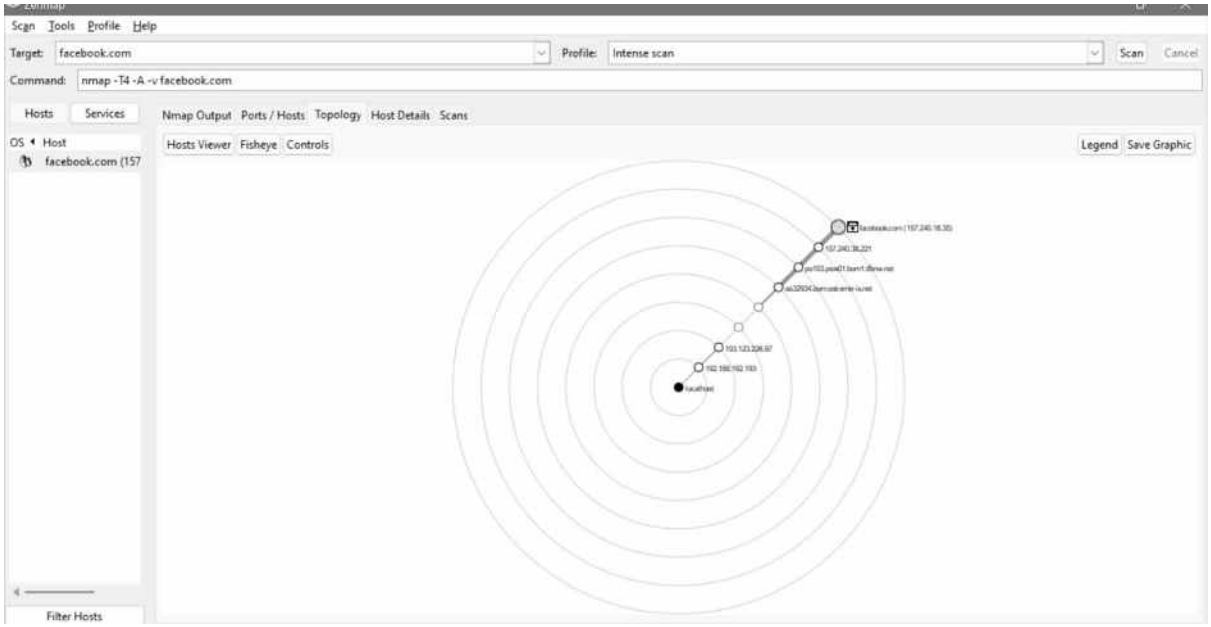
Experiment 7

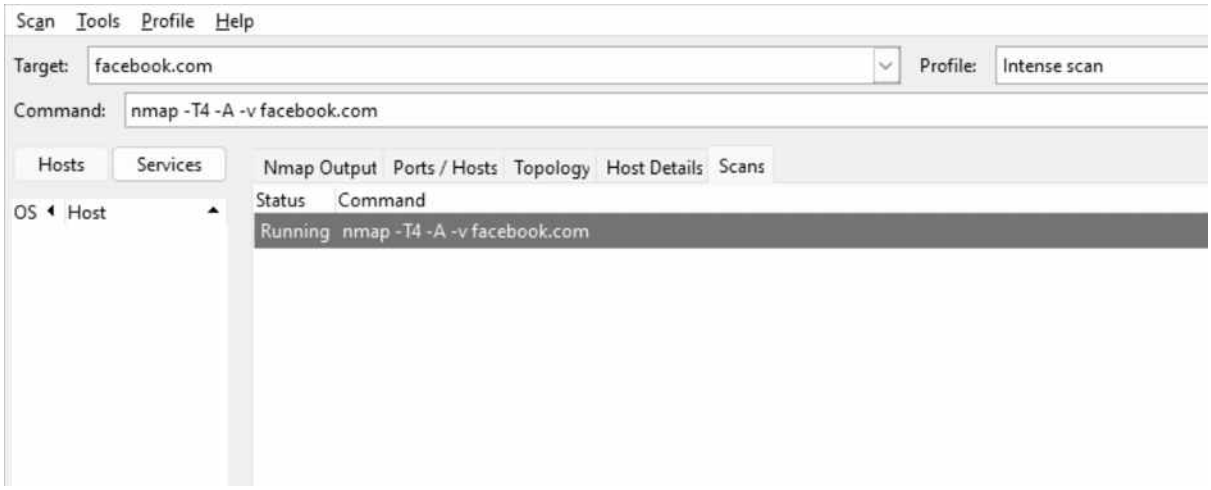
Aim: Perform network discovery using discovery tools-Nmap

Output:

sudo apt install nmap
wget http://archive.ubuntu.com/ubuntu/pool/universe/n/nmap/zenmap_7.60-1ubuntu5_all.deb
sudo apt install ./zenmap_7.60-1ubuntu5_all.deb
sudo zenmap
sudo apt install alien




Scan Tools Profile Help
Target: facebook.com
Profile: Intense scan
Scan
Cancel
Command: nmap -T4 -A -v facebook.com
Hosts
Services
Nmap Output
Ports / Hosts
Topology
Host Details
Scans
OS Host
facebook.com (157
Hosts Viewer
Fisheye
Controls
Legend
Save Graphic
Filter Hosts


Scan Tools Profile Help
Target: facebook.com
Profile: Intense scan
Command: nmap -T4 -A -v facebook.com
Hosts
Services
Nmap Output
Ports / Hosts
Topology
Host Details
Scans
OS Host
Status
Command
Running
nmap -T4 -A -v facebook.com

Experiment 8

Aim: Socket programming using TCP. Design TCP iterative Client and Server application to reverse the given input sentence.

Output:

Server.c

(Code):

```
#include<stdio.h>
#include<unistd.h>
#include<string.h>
#include<sys/socket.h>
#include<stdlib.h>
#include<netinet/in.h>
#include<sys/types.h>
#define MAXLINE 20
#define SERV_PORT 5777
void main(int argc,char *argv) {
int i,j;
ssize_t n;
char line[MAXLINE],revline[MAXLINE];
int listenfd,connfd,clilen;
struct sockaddr_in servaddr,cliaddr;
listenfd=socket(AF_INET,SOCK_STREAM,0);
bzero(&servaddr,sizeof(servaddr));
servaddr.sin_family=AF_INET;
servaddr.sin_port=htons(SERV_PORT);
bind(listenfd,(struct sockaddr*)&servaddr,sizeof(servaddr));
listen(listenfd,1);
for(;;)
{
clilen=sizeof(cliaddr);
connfd=accept(listenfd,(struct sockaddr*)&cliaddr,&clilen);
printf("CONNECT TO CLIENT\n");
while(1)
{
if((n=read(connfd,line,MAXLINE))==0)
break;
line[n-1]='\0';
j=0;
for(i=n-2;i>=0;i--)
revline[j++]=line[i];
revline[j]='\0';
write(connfd,revline,n);
```

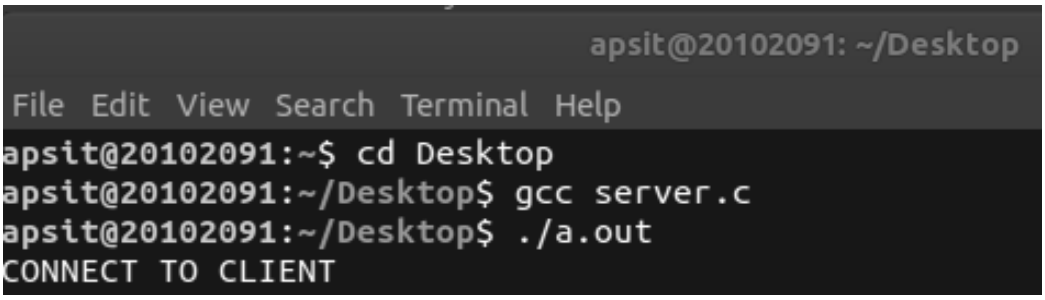
```
}
}
}
```

Client.c

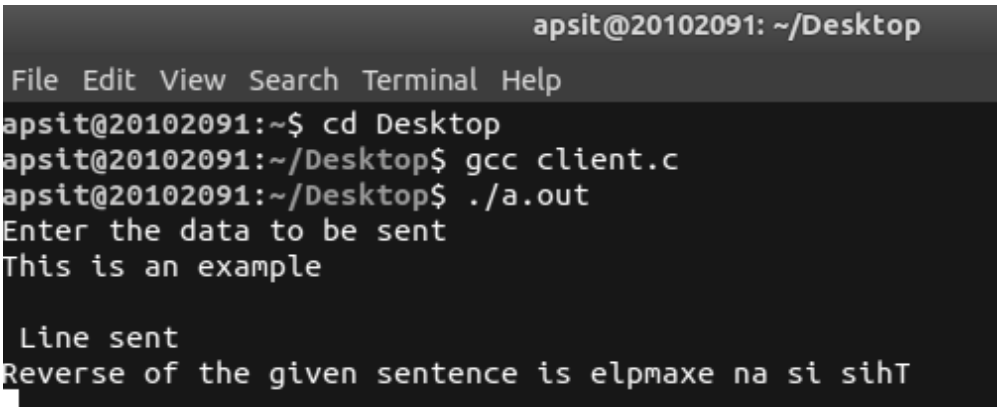
(Code):

```
#include<stdio.h>
#include<unistd.h>
#include<string.h>
#include<sys/socket.h>
#include<stdlib.h>
#include<netinet/in.h>
#include<sys/types.h>
#define MAXLINE 20
#define SERV_PORT 5777
void main(int argc,char *argv)
{
char sendline[MAXLINE],revline[MAXLINE]; int sockfd;
struct sockaddr_in servaddr; sockfd=socket(AF_INET,SOCK_STREAM,0);
bzero(&servaddr,sizeof(servaddr));
servaddr.sin_family=AF_INET;servaddr.sin_port=ntohs(SERV_PORT);
connect(sockfd,(struct sockaddr*)&servaddr,sizeof(servaddr));
printf("Enter the data to be sent\n");
while(fgets(sendline,MAXLINE,stdin)!=NULL)
{
write(sockfd,sendline,strlen(sendline));
printf("\n Line sent");
read(sockfd,revline,MAXLINE);
printf("\nReverse of the given sentence is %s",revline);
printf("\n");
}
exit(0);
}
```

Server-Side Output:



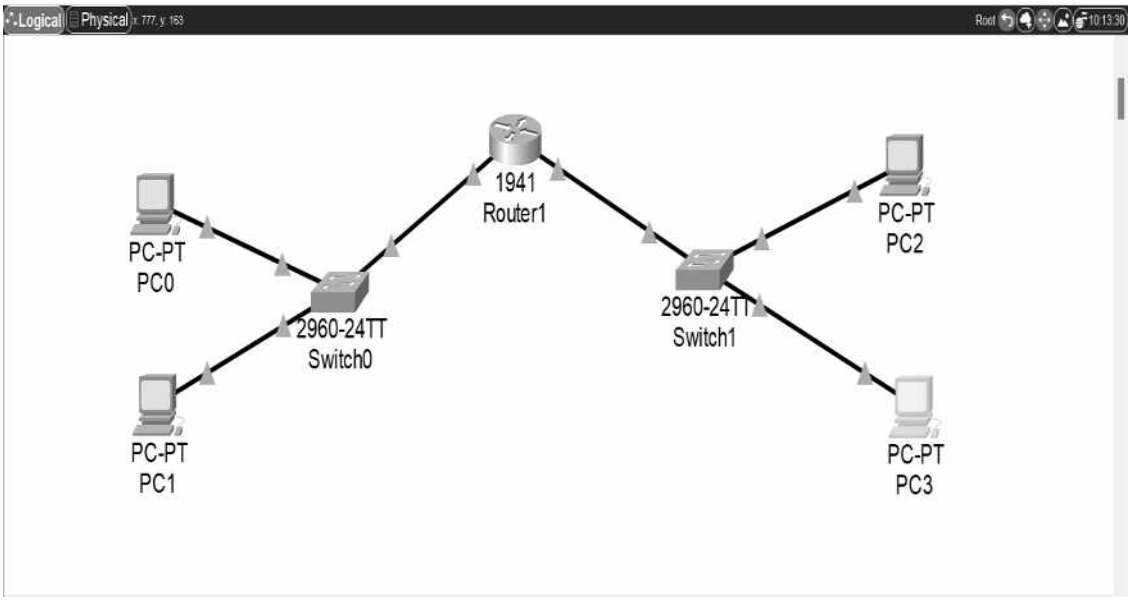
Client-Side Output:



Experiment 9

Aim: Implementation of DHCP using packet tracer.

Output:



Router1

Physical Config CLI Attributes

IOS Command Line Interface

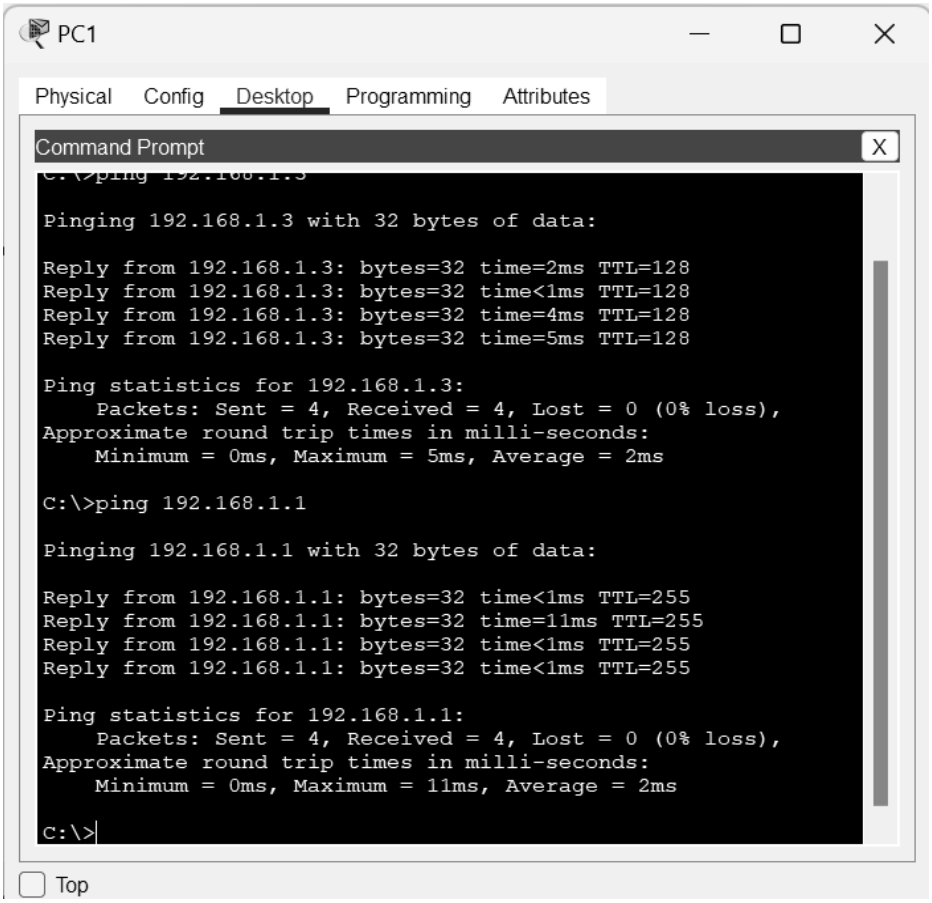
```
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#no ip address
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state
to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/1, changed state to up

Router(config-if)#
Router(config-if)#ex
Router(config)#ip dhcp pool LAN1
Router(dhcp-config)#network 192.168.1.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.1.1
Router(dhcp-config)#exit
Router(config)#ip dhcp excluded-address 192.168.1.1
Router(config)#ip dhcp pool LAN2
Router(dhcp-config)#network 192.168.2.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.2.1
Router(dhcp-config)#exit
Router(config)#ip dhcp excluded-address 192.168.2.1
Router(config)#
```

Copy Paste

Top



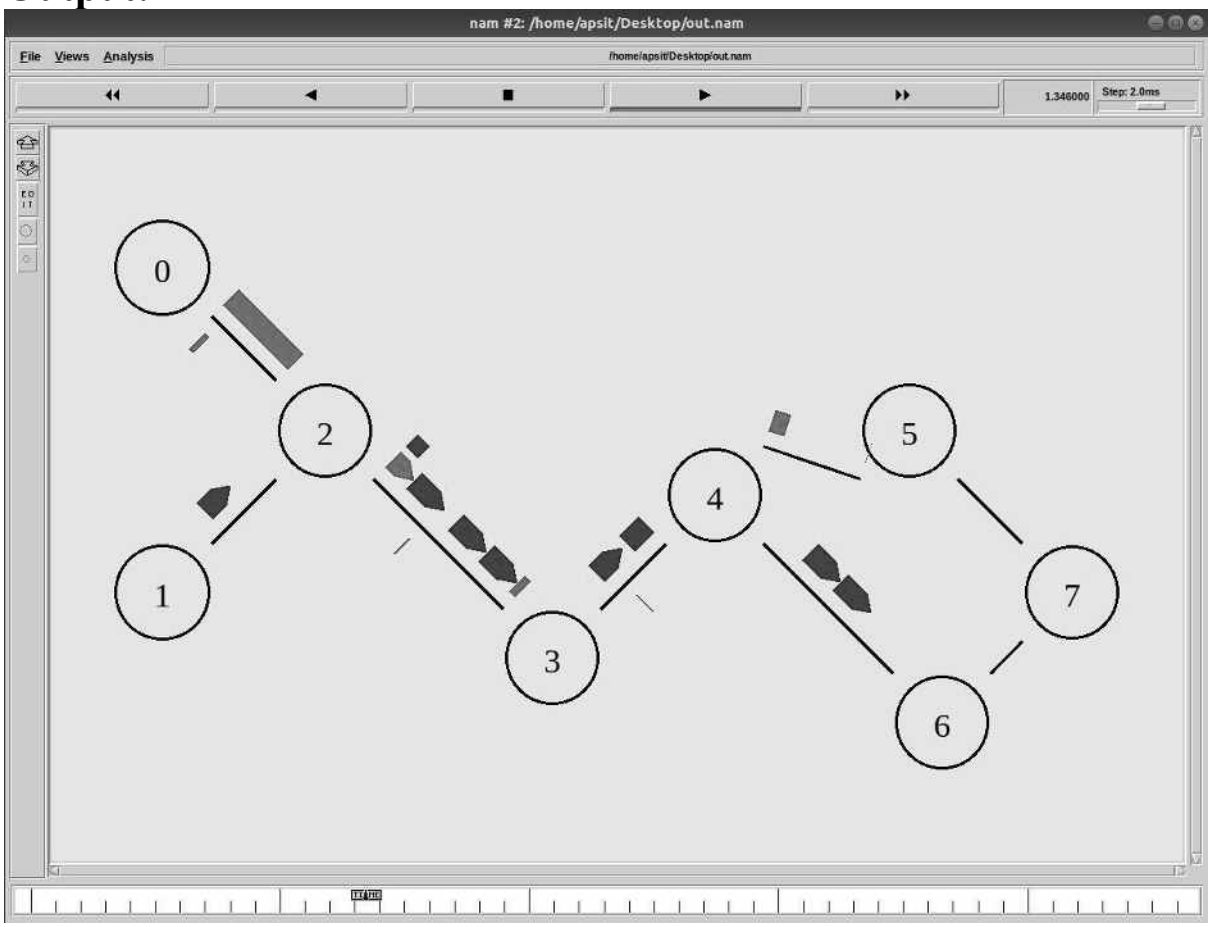
Experiment 11

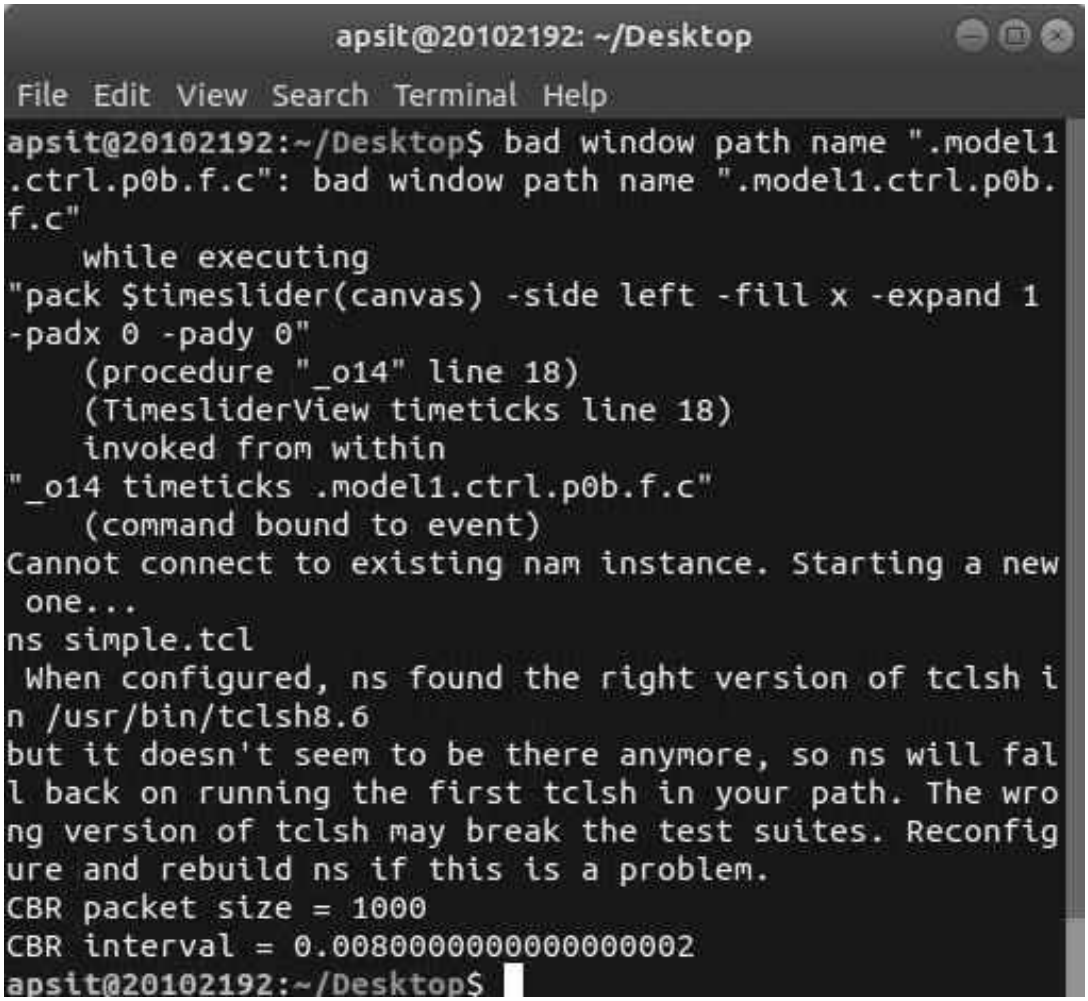
Crimping Tool

Experiment 12

Aim: Installation of NS2.

Output:




apsit@20102192: ~/Desktop
File Edit View Search Terminal Help
apsit@20102192:~/Desktop$ bad window path name ".model1
.ctrl.p0b.f.c": bad window path name ".model1.ctrl.p0b.
f.c"
    while executing
"pack $timeslider(canvas) -side left -fill x -expand 1
-padx 0 -pady 0"
    (procedure "_o14" line 18)
    (TimesliderView timeticks line 18)
    invoked from within
"_o14 timeticks .model1.ctrl.p0b.f.c"
    (command bound to event)
Cannot connect to existing nam instance. Starting a new
 one...
ns simple.tcl
 When configured, ns found the right version of tclsh i
n /usr/bin/tclsh8.6
but it doesn't seem to be there anymore, so ns will fal
l back on running the first tclsh in your path. The wro
ng version of tclsh may break the test suites. Reconfig
ure and rebuild ns if this is a problem.
CBR packet size = 1000
CBR interval = 0.0080000000000000002
apsit@20102192:~/Desktop$