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COMP A SEM-5

EXP 2: Use basic networking commands in Linux.

1.ifconfig

```
administrator@CSLAB02-18:~$ ifconfig
enp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 172.16.20.158 netmask 255.255.254.0 broadcast 172.16.21.255
        ether fc:aa:14:db:73:55 txqueuelen 1000 (Ethernet)
        RX packets 519377 bytes 186125952 (186.1 MB)
        RX errors 0 dropped 1 overruns 0 frame 0
        TX packets 103949 bytes 28760851 (28.7 MB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
        ether ::1 txqueuelen 1000 (Local Loopback)
        RX packets 11172 bytes 1466280 (1.4 MB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 11172 bytes 1466280 (1.4 MB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

2.nslookup www.youtube.com

```
administrator@CSLAB02-18:~$ nslookup www.youtube.com
Server: 127.0.0.53
Address: 127.0.0.53#53
```

Non-authoritative answer:

```
www.youtube.com canonical name = youtube-ui.l.google.com.
Name: youtube-ui.l.google.com
Address: 142.251.42.78
Name: youtube-ui.l.google.com
Address: 172.217.166.78
Name: youtube-ui.l.google.com
Address: 142.250.76.206
Name: youtube-ui.l.google.com
Address: 142.250.67.174
Name: youtube-ui.l.google.com
Address: 172.217.160.174
Name: youtube-ui.l.google.com
Address: 142.250.183.46
Name: youtube-ui.l.google.com
```

3.ping www.youtbe.com

```
administrator@CSLAB02-18:~$ ping www.youtube.com
PING youtube-ui.l.google.com (142.250.183.46) 56(84) bytes of data.
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=1 ttl=59 time=1.70 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=2 ttl=59 time=1.45 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=3 ttl=59 time=1.78 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=4 ttl=59 time=1.70 ms
64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=5 ttl=59 time=1.45 ms
```

64 bytes from bom12s11-in-f14.1e100.net (142.250.183.46): icmp_seq=6 ttl=59 time=1.48 ms
--- youtube-ui.l.google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5009ms
rtt min/avg/max/mdev = 1.454/1.597/1.785/0.136 ms

4. traceroute www.youtube.com

```
administrator@CSLAB02-18:~$ traceroute www.youtube.com
www.youtube.com: Name or service not known
Cannot handle "host" cmdline arg 'www.youtube.com' on position 1 (argc 1)
administrator@CSLAB02-18:~$ traceroute www.youtube.com
traceroute to www.youtube.com (142.250.183.46), 30 hops max, 60 byte packets
 1 _gateway (172.16.20.1) 0.253 ms 0.234 ms 0.231 ms
 2 122.200.18.97 (122.200.18.97) 0.748 ms 0.782 ms 0.524 ms
 3 103.226.140.53 (103.226.140.53) 10.265 ms 9.626 ms 9.592 ms
 4 172.16.2.202 (172.16.2.202) 7.511 ms **
 5 175.100.188.22 (175.100.188.22) 10.862 ms 9.346 ms 8.250 ms
 6 ***
 7 142.250.235.10 (142.250.235.10) 2.537 ms 108.170.226.130 (108.170.226.130) 2.754 ms 216.239.54.146
(216.239.54.146) 2.732 ms
 8 bom12s11-in-f14.1e100.net (142.250.183.46) 1.891 ms 1.572 ms 142.250.239.171 (142.250.239.171) 1.853 ms
```

5. netstat www.youtube.com

```
administrator@CSLAB02-18:~$ netstat www.youtube.com
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address      State
tcp      0      0 CSLAB02-18:54432        93.243.107.34.bc.:https ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State      I-Node Path
unix    2      [ ]     DGRAM    26495   /run/user/1000/systemd/notify
unix    2      [ ]     DGRAM    24873   /run/user/120/systemd/notify
unix    3      [ ]     DGRAM    15553   /run/systemd/notify
unix    2      [ ]     DGRAM    15561   /run/systemd/journal/syslog
unix   22      [ ]     DGRAM    15563   /run/systemd/journal/dev-log
unix    9      [ ]     DGRAM    15583   /run/systemd/journal/socket
unix    3      [ ]     SEQPACKET  CONNECTED  185077
unix    3      [ ]     STREAM   CONNECTED  41410   /run/systemd/journal/stdout
unix    3      [ ]     STREAM   CONNECTED  37857   /run/systemd/journal/stdout
unix    3      [ ]     STREAM   CONNECTED  30310
unix    3      [ ]     STREAM   CONNECTED  29640
unix    3      [ ]     STREAM   CONNECTED  29600   /run/systemd/journal/stdout
unix    3      [ ]     STREAM   CONNECTED  201846
unix    3      [ ]     STREAM   CONNECTED  28500   /run/user/1000/bus
unix    3      [ ]     STREAM   CONNECTED  19932   /run/systemd/journal/stdout
unix    3      [ ]     STREAM   CONNECTED  170971
unix    3      [ ]     SEQPACKET CONNECTED  161686
unix    3      [ ]     STREAM   CONNECTED  30266
unix    3      [ ]     STREAM   CONNECTED  29206   /run/systemd/journal/stdout
unix    3      [ ]     STREAM   CONNECTED  27427
unix    3      [ ]     STREAM   CONNECTED  26165
unix    3      [ ]     STREAM   CONNECTED  23967
unix    3      [ ]     STREAM   CONNECTED  193111
unix    3      [ ]     STREAM   CONNECTED  196174
unix    3      [ ]     SEQPACKET CONNECTED  185035
unix    3      [ ]     STREAM   CONNECTED  30438   /var/run/dbus/system_
```

6.arp

```
administrator@CSLAB02-18:~$ arp -v
Address          HWtype  HWaddress        Flags Mask      Iface
_gateway         ether    00:0c:42:00:8b:e2  C          enp2s0
172.16.20.120   ether    d8:9e:f3:4a:48:b5  C          enp2s0
Entries: 2      Skipped: 0   Found: 2
```

7.ip addr show

```
administrator@CSLAB02-18:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo
    valid_lft forever preferred_lft forever
inet6 ::1/128 scope host
    valid_lft forever preferred_lft forever
2: enp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
link/ether fc:aa:14:db:73:55 brd ff:ff:ff:ff:ff:ff
inet 172.16.20.158/23 brd 172.16.21.255 scope global dynamic noprefixroute enp2s0
    valid_lft 72330sec preferred_lft 72330sec
inet6 fe80::3133:4865:9d9b:6959/64 scope link noprefixroute
    valid_lft forever preferred_lft forever
```

8.dig www.youtube.com

```
administrator@CSLAB02-18:~$ dig www.youtube.com

; <>> DiG 9.11.3-1ubuntu1-Ubuntu <>> www.youtube.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52582
;; flags: qr rd ra; QUERY: 1, ANSWER: 17, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;www.youtube.com.      IN      A
;; ANSWER SECTION:
www.youtube.com.    186    IN      CNAME    youtube-ui.l.google.com.
youtube-ui.l.google.com. 192    IN      A        172.217.166.78
youtube-ui.l.google.com. 192    IN      A        142.250.192.78
youtube-ui.l.google.com. 192    IN      A        142.250.67.174
youtube-ui.l.google.com. 192    IN      A        172.217.160.174
youtube-ui.l.google.com. 192    IN      A        142.251.42.14
youtube-ui.l.google.com. 192    IN      A        142.250.192.14
youtube-ui.l.google.com. 192    IN      A        142.250.70.78
youtube-ui.l.google.com. 192    IN      A        142.250.183.46
youtube-ui.l.google.com. 192    IN      A        142.251.42.78
youtube-ui.l.google.com. 192    IN      A        142.250.71.110
youtube-ui.l.google.com. 192    IN      A        142.250.183.110
youtube-ui.l.google.com. 192    IN      A        142.250.70.46
youtube-ui.l.google.com. 192    IN      A        142.250.70.110
youtube-ui.l.google.com. 192    IN      A        142.250.67.206
youtube-ui.l.google.com. 192    IN      A        142.250.67.142
youtube-ui.l.google.com. 192    IN      A        142.250.76.206
;; Query time: 1 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Tue Jul 30 12:36:57 IST 2024
;; MSG SIZE rcvd: 334
```

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Comp A Sem-5

EXP.3

1. Installing nmap

```
administrator@CSLAB02-19:~$ sudo apt install nmap
```

[sudo] password for administrator:

Reading package lists... Done

Building dependency tree

Reading state information... Done

nmap is already the newest version (7.60-1ubuntu5).

0 upgraded, 0 newly installed, 0 to remove and 338 not upgraded.

2. Basic port scan

```
administrator@CSLAB02-19:~$ nmap www.youtube.com
```

Starting Nmap 7.60 (https://nmap.org) at 2024-08-06 12:00 IST

Nmap scan report for www.youtube.com (142.250.192.110)

Host is up (0.0019s latency).

Other addresses for www.youtube.com (not scanned): 142.250.192.78 142.250.192.14

142.250.183.46 172.217.166.174 142.250.77.78 172.217.166.46 142.250.183.110 142.251.42.46

142.251.42.78 142.250.67.238 172.217.174.78 142.250.77.46 142.250.192.46 142.250.192.142

172.217.160.206 2404:6800:4009:831::200e 2404:6800:4009:829::200e 2404:6800:4009:830::200e

2404:6800:4009:823::200e

rDNS record for 142.250.192.110: bom12s17-in-f14.1.e100.net

Not shown: 998 filtered ports

PORT STATE SERVICE

80/tcp open http

443/tcp open https

Nmap done: 1 IP address (1 host up) scanned in 4.92 seconds

3. Scan system with Hostname and IP address

```
administrator@CSLAB02-19:~$ nmap -v www.youtube.com
```

Starting Nmap 7.60 (https://nmap.org) at 2024-08-06 11:56 IST

Initiating Ping Scan at 11:56

Scanning www.youtube.com (172.217.166.46) [2 ports]

Completed Ping Scan at 11:56, 0.00s elapsed (1 total hosts)

Initiating Parallel DNS resolution of 1 host. at 11:56

Completed Parallel DNS resolution of 1 host. at 11:56, 0.00s elapsed

Scanning Connect Scan at 11:56
 nning www.youtube.com (172.217.166.46) [1000 ports]
 covered open port 443/tcp on 172.217.166.46
 covered open port 80/tcp on 172.217.166.46
 mpleted Connect Scan at 11:56, 4.51s elapsed (1000 total ports)
 map scan report for www.youtube.com (172.217.166.46)
 host is up (0.0016s latency).
 Other addresses for www.youtube.com (not scanned): 142.250.183.110 142.250.67.238
 172.217.160.206 142.251.42.46 142.250.192.46 142.250.192.142 172.217.166.174
 142.250.192.110 172.217.174.78 142.250.77.78 142.250.192.14 142.251.42.78 142.250.192.78
 142.250.77.46 142.250.183.46 2404:6800:4009:829::200e 2404:6800:4009:830::200e
 2404:6800:4009:823::200e 2404:6800:4009:831::200e
 DNS record for 172.217.166.46: bom07s18-in-f14.1e100.net
 Not shown: 998 filtered ports
 PORT STATE SERVICE
 80/tcp open http
 443/tcp open https

Read data files from: /usr/bin/./share/nmap
 Nmap done: 1 IP address (1 host up) scanned in 4.55 seconds

4. Scan device ports

administrator@CSLAB02-19:~\$ nmap scanme.nmap.org

Starting Nmap 7.60 (https://nmap.org) at 2024-08-06 12:10 IST
 Nmap scan report for scanme.nmap.org (45.33.32.156)
 Host is up (0.24s latency).
 Other addresses for scanme.nmap.org (not scanned): 2600:3c01::f03c:91ff:fe18:bb2f
 Not shown: 988 closed ports
 PORT STATE SERVICE
 22/tcp filtered ssh
 80/tcp open http
 111/tcp filtered rpcbind
 135/tcp filtered msrpc
 139/tcp filtered netbios-ssn
 179/tcp filtered bgp
 445/tcp filtered microsoft-ds
 2049/tcp filtered nfs
 3389/tcp filtered ms-wbt-server
 9929/tcp open nping-echo
 12345/tcp filtered netbus
 31337/tcp open Elite

Nmap done: 1 IP address (1 host up) scanned in 36.23 seconds

5. Scan multiple hosts

administrator@CSLAB02-19:~\$ nmap 103.76.228.244 157.240.198.35

Starting Nmap 7.60 (https://nmap.org) at 2024-08-06 12:13 IST
 Nmap scan report for cs-mum-21.webhostbox.net (103.76.228.244)
 Host is up (0.087s latency).
 Not shown: 977 closed ports

PORT	STATE	SERVICE
21/tcp	open	ftp
22/tcp	filtered	ssh
25/tcp	open	smtp
26/tcp	open	rsftp
23/tcp	open	domain
80/tcp	open	http
110/tcp	open	pop3
111/tcp	filtered	rpcbind
135/tcp	filtered	msrpc
139/tcp	filtered	netbios-ssn
143/tcp	open	imap
179/tcp	filtered	bgp
443/tcp	open	https
445/tcp	filtered	microsoft-ds
465/tcp	open	smt�
587/tcp	open	submission
993/tcp	open	imaps
995/tcp	open	pop3s
2049/tcp	filtered	nfs
2222/tcp	open	EtherNetIP-1
3306/tcp	open	mysql
3389/tcp	filtered	ms-wbt-server
12345/tcp	filtered	netbus

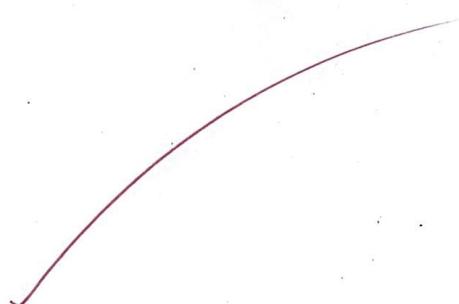
Nmap scan report for edge-star-mini-shv-01-del1.facebook.com (157.240.198.35)

Host is up (0.081s latency).

Not shown: 998 filtered ports

PORT	STATE	SERVICE
80/tcp	open	http
443/tcp	open	https

Nmap done; 2 IP addresses (2 hosts up) scanned in 28.08 seconds



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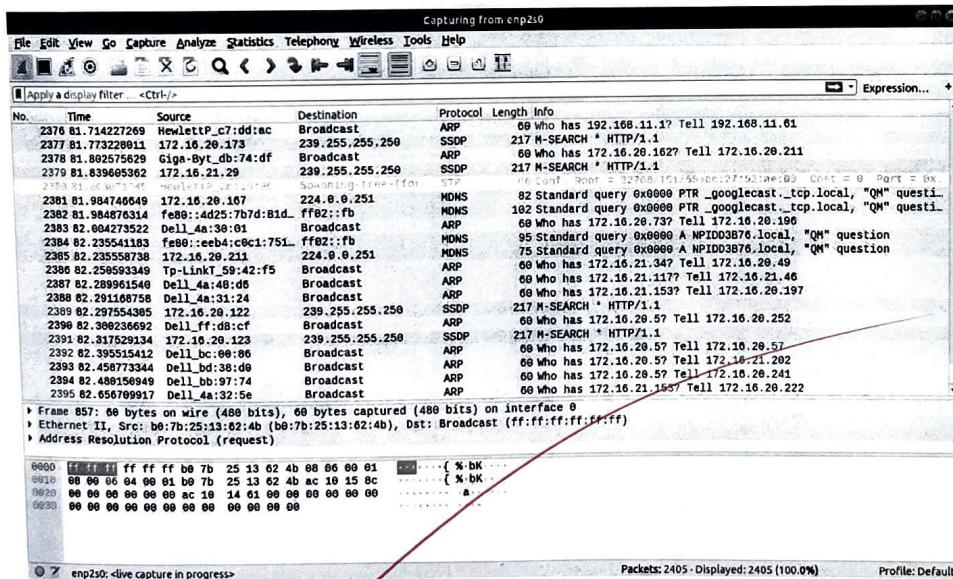
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COMP A (SEM-5)

EXP 4: Use Wireshark to understand the operation of TCP/IP layers.

Installation of Wireshark

```
devops@jammy-jellyfish:~$ sudo apt update
Ign:1 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:2 https://pkg.jenkins.io/debian-stable binary/ Release
Hit:3 https://packages.microsoft.com/repos/azure-cli jammy InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Hit:5 http://gb.archive.ubuntu.com/ubuntu jammy InRelease
Hit:7 http://gb.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:8 https://ppa.launchpadcontent.net/ansible/ansible/ubuntu jammy InRelease
Hit:9 http://gb.archive.ubuntu.com/ubuntu jammy-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up-to-date.
devops@jammy-jellyfish:~$ sudo apt install wireshark
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
libbcg729-0 libcurl-ares2 liblulu5.2-0 libminizip1 libqt5multimedia5
libqt5multimedia5-plugins libqt5multimediasettings5
libqt5multimedialibraries5 libsmi2ldbl libsnappy1v5 libspandsp2
libssh-gcrypt-4 libwireshark-data libwireshark15 libwireshark12 libwsutil13
wireshark-common wireshark-qt
Suggested packages:
snmp-mibs-downloader geoipupdate geoip-database geoip-database-extra
libjs-leaflet libjs-leaflet.markercluster wireshark-doc
The following NEW packages will be installed
libbcg729-0 libcurl-ares2 liblulu5.2-0 libminizip1 libqt5multimedia5
```



TCP

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tcp

No.	Time	Source	Destination	Protocol	Length	Info
492	21.137701059	172.16.20.131	172.16.20.227	TCP	66	52378 - 7680 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_
493	21.137726411	172.16.20.227	172.16.20.131	TCP	54	7680 - 52378 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
512	21.646484353	172.16.20.131	172.16.20.227	TCP	66	[TCP Retransmission] 52378 - 7680 [SYN] Seq=0 Win=64240 Len=0
513	21.646509341	172.16.20.227	172.16.20.131	TCP	54	7680 - 52378 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
533	22.158625004	172.16.20.131	172.16.20.227	TCP	66	[TCP Retransmission] 52378 - 7680 [SYN] Seq=0 Win=64240 Len=0
534	22.158645401	172.16.20.227	172.16.20.131	TCP	54	7680 - 52378 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
551	22.669846845	172.16.20.131	172.16.20.227	TCP	66	[TCP Retransmission] 52378 - 7680 [SYN] Seq=0 Win=64240 Len=0
552	22.669869535	172.16.20.227	172.16.20.131	TCP	54	7680 - 52378 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
576	23.184086614	172.16.20.131	172.16.20.227	TCP	66	[TCP Retransmission] 52378 - 7680 [SYN] Seq=0 Win=64240 Len=0
577	23.184102174	172.16.20.227	172.16.20.131	TCP	54	7680 - 52378 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
702	27.980292774	172.16.20.227	185.125.190.98	TCP	74	36756 - 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 T...
707	28.126751862	185.125.190.98	172.16.20.227	TCP	74	80 - 36756 [SYN, ACK] Seq=0 Ack=1 Win=65160 Len=0 MSS=1460 SA...
708	28.126772140	172.16.20.227	185.125.190.98	TCP	66	36756 - 80 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=989350063 ...
709	28.126828688	172.16.20.227	185.125.190.98	HTTP	153	GET / HTTP/1.1
712	28.263898582	185.125.190.98	172.16.20.227	HTTP	251	HTTP/1.1 204 No Content
713	28.263920240	172.16.20.227	185.125.190.98	TCP	66	36756 - 88 [ACK] Seq=88 Ack=186 Win=64128 Len=0 TSval=9893502...
714	28.263923056	185.125.190.98	172.16.20.227	TCP	66	80 - 36756 [FIN, ACK] Seq=186 Ack=88 Win=65152 Len=0 TSval=14...
715	28.264012435	172.16.20.227	185.125.190.98	TCP	66	36756 - 88 [FIN, ACK] Seq=88 Ack=187 Win=64128 Len=0 TSval=98...
718	28.397495730	185.125.190.98	172.16.20.227	TCP	66	80 - 38756 [ACK] Seq=187 Ack=89 Win=65152 Len=0 TSval=1417141
1827	48.996647512	172.16.20.252	172.16.20.227	TCP	66	64929 - 7680 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_...

Frame 718: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0
 Ethernet II, Src: Routerbo_00:8b:e2 (00:0c:42:00:8b:e2), Dst: Giga-Byt_db:5b:d8 (fc:aa:14:db:5b:d8)
 Internet Protocol Version 4, Src: 185.125.190.98, Dst: 172.16.20.227
 Transmission Control Protocol, Src Port: 80, Dst Port: 36756, Seq: 187, Ack: 89, Len: 0

```
0000  fc aa 14 db 5b d8 00 0c 42 00 8b e2 00 00 45 34  ....[... B .....E4
0010  00 34 72 27 40 00 32 06 9d 95 b9 7d be 62 ac 10  .4r@2 ...}b...
0020  14 e3 00 50 8f 94 d3 ad ec 8d bf 5e e7 a3 80 10  ..P.....
0030  01 fd 8d c7 00 00 01 01 08 0a 54 77 de 83 3a f8  .......Tw:...
0040  49 38
I8
```

Packets: 7435 · Displayed: 328 (4.4%) Profile: Default

http

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http

No.	Time	Source	Destination	Protocol	Length	Info
709	28.126828688	172.16.20.227	185.125.190.98	HTTP	153	GET / HTTP/1.1
712	28.26399582	185.125.190.98	172.16.20.227	HTTP	251	HTTP/1.1 204 No Content
9692	328.116666581	172.16.20.227	185.125.190.98	HTTP	153	GET / HTTP/1.1
9693	328.248758529	185.125.190.98	172.16.20.227	HTTP	251	HTTP/1.1 204 No Content

Frame 712: 251 bytes on wire (2008 bits), 251 bytes captured (2008 bits) on interface 0
 Ethernet II, Src: Routerbo_00:8b:e2 (00:0c:42:00:8b:e2), Dst: Giga-Byt_db:5b:d8 (fc:aa:14:db:5b:d8)
 Internet Protocol Version 4, Src: 185.125.190.98, Dst: 172.16.20.227
 Transmission Control Protocol, Src Port: 80, Dst Port: 36756, Seq: 1, Ack: 88, Len: 185
 Hypertext Transfer Protocol

```
0000  fc aa 14 db 5b d8 00 0c 42 00 8b e2 00 00 45 34  ....[... B .....E4
0010  00 34 72 25 40 00 32 06 9c de b9 7d be 62 ac 10  .4r@2 ...}b...
0020  14 e3 00 50 8f 94 d3 ad eb 53 bf e7 a2 80 10  ..P.....
0030  01 fd 8f 56 00 00 01 01 08 0a 54 77 dd fd 3a f8  ....V.....
0040  48 af 48 54 54 58 2f 31 2e 31 20 32 30 34 20 44  H-HTTP/1.1 204 N
0050  6f 20 43 cf 66 74 65 6e 74 0d 0a 73 05 72 78 65  o Content t- serve
0060  72 3a 20 6e 67 69 6e 78 2f 31 2e 31 38 2e 30 20  r: nginx /1.18.0
I8
```

Packets: 10160 · Displayed: 4 (0.0%) Profile: Default

igmp

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Expression... +

No.	Time	Source	Destination	Protocol	Length	Info
166	4.494733777	172.16.20.245	224.0.0.22	IGMPv3	60	Membership Report / Leave group 224.0.0.252
168	4.499351114	172.16.20.245	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
169	4.499536786	172.16.20.245	224.0.0.22	IGMPv3	60	Membership Report / Leave group 224.0.0.252
111	4.502048252	172.16.20.245	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
118	4.686284783	172.16.20.245	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
1832	41.682591985	172.16.20.65	224.0.0.22	IGMPv3	60	Membership Report / Join group 239.255.255.250 for any sources
1042	41.267441911	172.16.20.65	224.0.0.22	IGMPv3	60	Membership Report / Join group 239.255.255.250 for any sources
1682	59.880595995	172.16.20.211	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.251 for any sources
1690	60.832550391	172.16.20.211	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.251 for any sources
2451	84.693351057	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
2458	84.779417166	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
2485	85.554245738	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Leave group 224.0.0.252
2487	85.554698414	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
2497	85.772426679	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
2501	85.782666880	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.251 for any sources
2593	85.832718964	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 239.255.255.250 for any sources
2541	86.273723269	172.16.20.74	224.0.0.22	IGMPv3	62	Membership Report / Join group 224.0.0.251 for any sources / ...
2548	86.399237940	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Leave group 224.0.0.252
2550	86.390678313	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources
2579	86.774689659	172.16.20.74	224.0.0.22	IGMPv3	60	Membership Report / Join group 224.0.0.252 for any sources

Frame 118: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
 Ethernet II, Src: b0:7b:25:13:5b:01 (b0:7b:25:13:5b:01), Dst: IPv4mcast_16 (01:00:5e:00:00:16)
 Internet Protocol Version 4, Src: 172.16.20.245, Dst: 224.0.0.22
 Internet Group Management Protocol

```
0000  01 00 5e 00 00 16 b0 7b 25 13 5b 01 00 00 46 00  ..A...{.%[...F.
0010  00 28 c8 81 00 00 01 02 bb 32 ac 10 14 f5 e0 00  .(....-2.....
0020  00 16 94 04 00 00 22 00 f9 01 00 00 00 01 04 00  ....". .....
0030  00 00 e0 00 00 fc 00 00 00 00 00 00 00 00 00 00 00  .....
```

Packets: 11250 · Displayed: 120 (1.1%) Profile: Default

UDP

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Expression... +

No.	Time	Source	Destination	Protocol	Length	Info
674	26.655378491	172.16.21.209	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
675	26.675286203	172.16.20.197	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
676	26.762531459	172.16.21.15	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
677	26.799456384	172.16.20.201	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
678	26.878571392	172.16.21.148	239.255.255.250	UDP	698	57262 - 3702 Len=656
682	27.017942288	172.16.20.78	224.0.1.60	SRVLOC	99	Attribute Request, V2 XID: 0xf41cf3 CID: 000100012e4db3aa98ded05942f5
684	27.189045186	fe80::9ade:d0ff:fe5...	ff02::1:2	DHCPv6	128	Solicit XID: 0xf41cf3 CID: 000100012e4db3aa98ded05942f5
685	27.218479989	172.16.20.162	224.0.1.60	SRVLOC	99	Attribute Request, V2 XID: 0xf41cf3 CID: 000100012e4db3aa98ded05942f5
688	27.223482264	172.16.20.55	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
688	27.265664951	172.16.20.169	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
691	27.567335579	172.16.20.223	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
693	27.659421385	172.16.21.269	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
694	27.6847685980	172.16.20.197	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
701	27.960018882	172.16.20.228	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
703	27.982624125	172.16.20.230	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
704	28.020743035	172.16.20.78	224.0.1.60	SRVLOC	99	Attribute Request, V2 XID: 0xf41cf3 CID: 000100012e4db3aa98ded05942f5
718	28.201949680	fe80::9ade:d0ff:fe5...	ff02::1:2	DHCPv6	128	Solicit XID: 0xf41cf3 CID: 000100012e4db3aa98ded05942f5
718	28.237410135	172.16.20.55	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
716	28.269881074	172.16.20.169	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1
721	28.556662774	172.16.20.151	239.255.255.250	SSDP	217	M-SEARCH * HTTP/1.1

Frame 716: 217 bytes on wire (1736 bits), 217 bytes captured (1736 bits) on interface 0
 Ethernet II, Src: Pegatron_f4:74:b5 (e0:69:95:f4:74:b5), Dst: IPv4mcast_7f:ff:fa (01:00:5e:7f:ff:fa)
 Internet Protocol Version 4, Src: 172.16.20.169, Dst: 239.255.255.250
 User Datagram Protocol, Src Port: 54579, Dst Port: 1900
 Simple Service Discovery Protocol

```
0000  01 00 5e 7f ff fa e0 69 95 f4 74 b5 00 00 45 00  ..A...i.t..E.
0010  00 cb fd e0 00 00 01 11 00 8e ac 10 14 a9 ef ff  ..... .
0020  ff fa d5 33 07 6c 00 b7 09 b0 4d 2d 53 45 41 52 3...l..M-SEAR
0030  43 48 28 2a 28 48 54 54 50 2f 31 2d 31 0d 0a 48 CH * HTT P/1.1 - H
0040  4f 53 54 3a 20 32 33 39 26 32 35 35 2e 32 35 35 OST: 239.255.255
0050  2e 32 35 38 3a 31 39 30 30 0d 0a 4d 4e 3a 20 .250:190 0 MN:
0060  22 73 73 64 70 3a 64 69 73 63 6f 76 65 72 22 0d "ssdp:discover"
```

Packets: 8195 · Displayed: 3439 (42.0%) Profile: Default

ARP

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

arp Expression... +

No.	Time	Source	Destination	Protocol	Length	Info
78	3.351516521	Dell_ff:d8:cf	Broadcast	ARP	60	Who has 172.16.20.5? Tell 172.16.20.252
79	3.404985472	HewlettP_C7:e1:20	Broadcast	ARP	60	Who has 192.168.100.1? Tell 192.168.100.11
80	3.442911528	Dell_4a:48:d6	Broadcast	ARP	60	Who has 172.16.21.117? Tell 172.16.21.46
81	3.582925981	b0:7b:25:13:62:2f	Broadcast	ARP	60	Who has 172.16.20.139? Tell 172.16.20.78
82	3.582936015	b0:7b:25:13:62:2f	Broadcast	ARP	60	Who has 172.16.20.70? Tell 172.16.20.78
83	3.582937922	b0:7b:25:13:62:2f	Broadcast	ARP	60	Who has 172.16.21.114? Tell 172.16.20.78
84	3.727847139	HewlettP_C7:dd:ac	Broadcast	ARP	60	Who has 192.168.11.17 Tell 192.168.11.61
85	3.844667293	b0:7b:25:13:62:5b	Broadcast	ARP	60	Who has 172.16.20.97? Tell 172.16.20.111
91	3.987236699	Dell_bc:00:86	Broadcast	ARP	60	Who has 172.16.20.5? Tell 172.16.20.57
92	3.955373298	b0:7b:25:13:5b:33	Broadcast	ARP	60	Who has 172.16.20.89? Tell 172.16.20.140
93	3.956116404	d8:bb:c1:e8:c2:e4	Broadcast	ARP	60	Who has 172.16.20.92? Tell 172.16.20.119
94	3.987810329	Dell_ff:d8:cf	Broadcast	ARP	60	Who has 172.16.20.5? Tell 172.16.20.252
95	3.994869732	b0:7b:25:13:62:4b	Broadcast	ARP	60	Who has 172.16.20.97? Tell 172.16.21.146
96	4.010265582	Giga-Byt_db:5c:3a	Broadcast	ARP	60	Who has 172.16.20.128? Tell 172.16.20.81
98	4.111854662	b0:7b:25:13:5b:33	Broadcast	ARP	60	Who has 172.16.21.114? Tell 172.16.20.140
99	4.114428290	Dell_4a:31:24	Broadcast	ARP	60	Who has 172.16.21.153? Tell 172.16.20.197
104	4.228090234	Dell_4a:31:1d	Broadcast	ARP	60	Who has 172.16.21.117? Tell 172.16.20.85
105	4.292876792	Dell_4a:48:d6	Broadcast	ARP	60	Who has 172.16.21.117? Tell 172.16.21.46
110	4.500752678	c0:06:c3:55:ef:f1	Broadcast	ARP	60	Who has 172.16.20.245? Tell 172.16.20.62
119	4.689037471	Dell_4a:31:24	Broadcast	ARP	60	Who has 172.16.21.153? Tell 172.16.20.197

Frame 110: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0
Ethernet II, Src: c0:06:c3:55:ef:f1 (c0:06:c3:55:ef:f1), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
Address Resolution Protocol (request)

0000 ff ff ff ff ff c0 06 c3 55 ef f1 08 06 00 01U.....
0010 08 00 06 04 00 01 c0 06 c3 55 ef f1 ac 10 14 3eU.....>
0020 00 00 00 00 00 00 ac 10 14 f5 00 00 00 00 00
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

0 wireshark_enp2s0_20240813113255_cye0uf.pcapng Packets: 12444 · Displayed: 6248 (50.2%) Profile: Default

PRAC 05

Create a new simulator instance
\$ns [new Simulator]

Set colors for nodes

\$ns color 1 Blue
\$ns color 2 Red

Open NAM trace file

set nf [open out.nam w]
\$ns namtrace-all \$nf

Define the finish procedure

```
proc finish {} {
    global ns nf
    $ns flush-trace
    close $nf
    exec nam out.nam &
    exit 0
}
```

Create nodes

```
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
```

Define links between nodes

```
$ns duplex-link $n0 $n2 2Mb 10ms DropTail
$ns duplex-link $n1 $n2 2Mb 10ms DropTail
$ns duplex-link $n2 $n3 1.7Mb 10ms DropTail
```

Set queue limit on the link

```
$ns queue-limit $n2 $n3 10
```

Define link orientations for visualization (if supported)

```
$ns duplex-link-op $n0 $n2 orient right-down
$ns duplex-link-op $n1 $n2 orient right-up
$ns duplex-link-op $n2 $n3 orient right
$ns duplex-link-op $n2 $n3 queuePos 0.5
```

Set up TCP agent and sink

```
set tcp [new Agent/TCP/Reno] ;# Ensure you use the correct TCP class
$ns attach-agent $n0 $tcp
```

set sink [new Agent/TCPSink]

```
$ns attach-agent $n3 $sink
$ns connect $tcp $sink
```

Set up FTP application

```
set ftp [new Application/FTP]
$ftp attach-agent $tcp
```

Set up UDP agent and null agent
set udp [new Agent/UDP]
\$ns attach-agent \$n1 \$udp

set null [new Agent/Null]
\$ns attach-agent \$n3 \$null
\$ns connect \$udp \$null

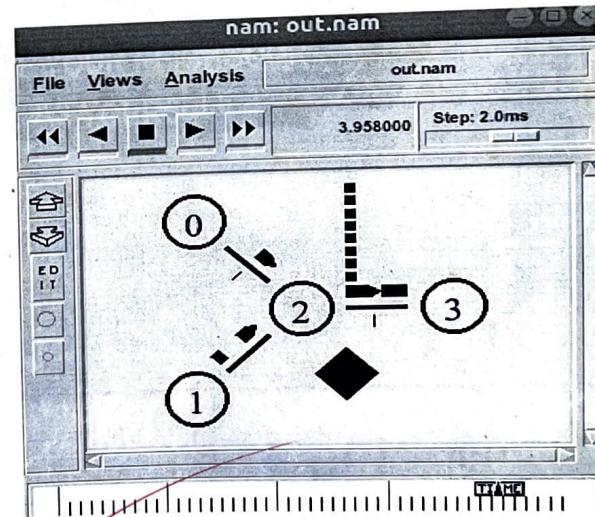
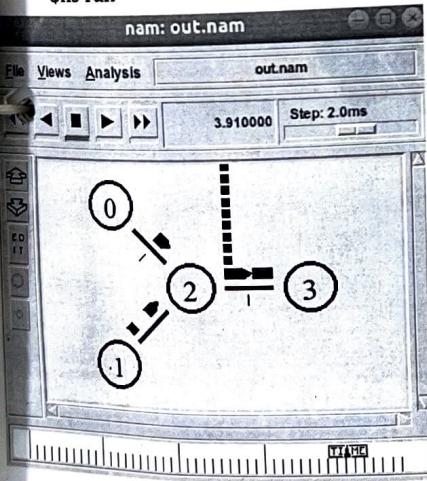
Set up CBR traffic source
set cbr [new Application/Traffic/CBR]
\$cbr attach-agent \$udp
\$cbr set packetSize_ 1000
\$cbr set rate_ 1Mb
\$cbr set random_ false

Schedule events
\$ns at 0.1 "\$cbr start"
\$ns at 1.0 "\$ftp start"
\$ns at 4.0 "\$ftp stop"
\$ns at 4.5 "\$cbr stop"

Detach agents and end simulation
\$ns at 4.5 "\$ns detach-agent \$n0 \$tcp ; \$ns detach-agent \$n3 \$sink"
\$ns at 5.0 "finish"

Print CBR configuration
puts "CBR packet size = [\$cbr set packetSize_]"
puts "CBR rate = [\$cbr set rate_]"

Run the simulation
\$ns run



PRACTICAL 06

ifconfig command

```
administrator@CSLAB02-21:~$ ifconfig
enp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 172.16.20.135 netmask 255.255.254.0 broadcast 172.16.21.255
                inet6 fe80::4c8b:272:4642:a7a3 prefixlen 64 scopeid 0x20<link>
                    ether fc:aa:14:db:5c:33 txqueuelen 1000 (Ethernet)
                    RX packets 14351 bytes 2657833 (2.6 MB)
                    RX errors 0 dropped 0 overruns 0 frame 0
                    TX packets 615 bytes 98821 (98.8 KB)
                    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
enp2s0:: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.0.5 netmask 255.0.0.0 broadcast 10.255.255.255
                ether fc:aa:14:db:5c:33 txqueuelen 1000 (Ethernet)
```

```
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 186 bytes 15856 (15.8 KB)
                    RX errors 0 dropped 0 overruns 0 frame 0
                    TX packets 186 bytes 15856 (15.8 KB)
                    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

sudo ifconfig command

```
administrator@CSLAB02-21:~$ sudo ifconfig
enp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 172.16.20.135 netmask 255.255.254.0 broadcast 172.16.21.255
                inet6 fe80::4c8b:272:4642:a7a3 prefixlen 64 scopeid 0x20<link>
                    ether fc:aa:14:db:5c:33 txqueuelen 1000 (Ethernet)
                    RX packets 17901 bytes 3017796 (3.0 MB)
                    RX errors 0 dropped 0 overruns 0 frame 0
                    TX packets 667 bytes 111728 (111.7 KB)
                    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
enp2s0:: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.0.5 netmask 255.0.0.0 broadcast 10.255.255.255
                ether fc:aa:14:db:5c:33 txqueuelen 1000 (Ethernet)
```

```
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 191 bytes 16400 (16.4 KB)
                    RX errors 0 dropped 0 overruns 0 frame 0
                    TX packets 191 bytes 16400 (16.4 KB)
                    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

route command

```
administrator@CSLAB02-21:~$ route
```

Kernel IP routing table	Destination	Gateway	Genmask	Flags	Metric	Ref	Use Iface
	default	gateway	0.0.0.0	UG	100	0	0 enp2s0
	10.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0 enp2s0
	link-local	0.0.0.0	255.255.0.0	U	1000	0	0 enp2s0
	172.16.20.0	0.0.0.0	255.255.254.0	U	100	0	0 enp2s0

deletion of ip address

```
administrator@CSLAB02-21:~$ sudo route add default gw 10.0.0.5 enp2s0
```

```
administrator@CSLAB02-21:~$ route
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
default	CSLAB02-21	0.0.0.0	UG	0	0	0	enp2s0
default	_gateway	0.0.0.0	UG	100	0	0	enp2s0
10.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0	enp2s0
link-local	0.0.0.0	255.255.0.0	U	1000	0	0	enp2s0

addition of ip address

```
administrator@CSLAB02-21:~$ ip addr show dev enp2s0
2: enp2s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether fc:aa:14:db:5c:33 brd ff:ff:ff:ff:ff:ff
        inet 172.16.20.135/23 brd 172.16.21.255 scope global dynamic noprefixroute enp2s0
            valid_lft 83850sec preferred_lft 83850sec
        inet 10.0.0.5/8 brd 10.255.255.255 scope global enp2s0:
            valid_lft forever preferred_lft forever
        inet 172.16.20.200/23 scope global secondary enp2s0
            valid_lft forever preferred_lft forever
        inet6 fe80::4c8b:272:4642:a7a3/64 scope link noprefixroute
            valid_lft forever preferred_lft forever
```

administrator@CSLAB02-21:~\$ route

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
default	CSLAB02-21	0.0.0.0	UG	0	0	0	enp2s0
default	_gateway	0.0.0.0	UG	20100	0	0	enp2s0
10.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0	enp2s0
10.0.0.0	0.0.0.0	255.0.0.0	U	100	0	0	enp2s0
link-local	0.0.0.0	255.255.0.0	U	1000	0	0	enp2s0
172.16.20.0	0.0.0.0	255.255.254.0	U	100	0	0	enp2s0

change default gateway

```
administrator@CSLAB02-21:~$ sudo route del -net 172.16.20.0 netmask 255.255.254.0 gw 0.0.0.0
administrator@CSLAB02-21:~$ route
```

Kernel IP routing table

Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
default	_gateway	0.0.0.0	UG	100	0	0	enp2s0
10.0.0.0	0.0.0.0	255.0.0.0	U	0	0	0	enp2s0
link-local	0.0.0.0	255.255.0.0	U	1000	0	0	enp2s0

ping

```
administrator@CSLAB02-21:~$ ping 172.16.20.135
PING 172.16.20.135 (172.16.20.135) 56(84) bytes of data.
64 bytes from 172.16.20.135: icmp_seq=119 ttl=64 time=0.045 ms
64 bytes from 172.16.20.135: icmp_seq=120 ttl=64 time=0.042 ms
64 bytes from 172.16.20.135: icmp_seq=121 ttl=64 time=0.045 ms
64 bytes from 172.16.20.135: icmp_seq=122 ttl=64 time=0.045 ms
64 bytes from 172.16.20.135: icmp_seq=123 ttl=64 time=0.044 ms
64 bytes from 172.16.20.135: icmp_seq=124 ttl=64 time=0.049 ms
64 bytes from 172.16.20.135: icmp_seq=125 ttl=64 time=0.043 ms
64 bytes from 172.16.20.135: icmp_seq=126 ttl=64 time=0.038 ms
64 bytes from 172.16.20.135: icmp_seq=127 ttl=64 time=0.045 ms
64 bytes from 172.16.20.135: icmp_seq=128 ttl=64 time=0.046 ms
64 bytes from 172.16.20.135: icmp_seq=129 ttl=64 time=0.045 ms
64 bytes from 172.16.20.135: icmp_seq=130 ttl=64 time=0.044 ms
64 bytes from 172.16.20.135: icmp_seq=131 ttl=64 time=0.046 ms
64 bytes from 172.16.20.135: icmp_seq=132 ttl=64 time=0.048 ms
64 bytes from 172.16.20.135: icmp_seq=133 ttl=64 time=0.046 ms
64 bytes from 172.16.20.135: icmp_seq=134 ttl=64 time=0.045 ms
64 bytes from 172.16.20.135: icmp_seq=135 ttl=64 time=0.047 ms
--- 172.16.20.135 ping statistics ---
135 packets transmitted, 135 received, 0% packet loss, time 136433ms
rtt min/avg/max/mdev = 0.023/0.043/0.099/0.009 ms
```

Practical 7 : Implement error detection method using CRC.

Code :

```
#include <iostream>
#include <math.h>
#include <cstring>
using namespace std;

char exor(char a,char b)
{
    if(a==b)
        return '0';
    else
        return '1';
}

void crc(char data[], char key[])
{
    int datalen = strlen(data);
    int keylen = strlen(key);

    for(int i=0;i<keylen-1;i++)
        data[datalen+i]='0';
    data[datalen+keylen-1]='\0';

    int codelen = datalen+keylen-1;

    char temp[20],rem[20];

    for(int i=0;i<keylen;i++)
        rem[i]=data[i];

    for(int j=keylen;j<=codelen;j++)
    {
        for(int i=0;i<keylen;i++)
            temp[i]=rem[i];

        if(rem[0]=='0')
        {
            for(int i=0;i<keylen-1;i++)
                rem[i]=temp[i+1];
        }
        else
    }
```

```

    {
        for(int i=0;i<keylen-1;i++)
            rem[i]=exor(temp[i+1],key[i+1]);
    }

    if(jl==codelen)
        rem[keylen-1]=data[j];
    else
        rem[keylen-1]='\0';
    }

    for(int i=0;i<keylen-1;i++)
        data[datalen+i]=rem[i];
    data[codelen]='\0';
    cout<<"CRC="<<rem<<"\nDataword="<<data;

}

int main()
{
    char key[20],data[20];

    cout<<"Enter the data:";
    cin>>data;
    cout<<"Enter the key:";
    cin>>key;

    crc(data,key);

    return 0;
}

```

Output :

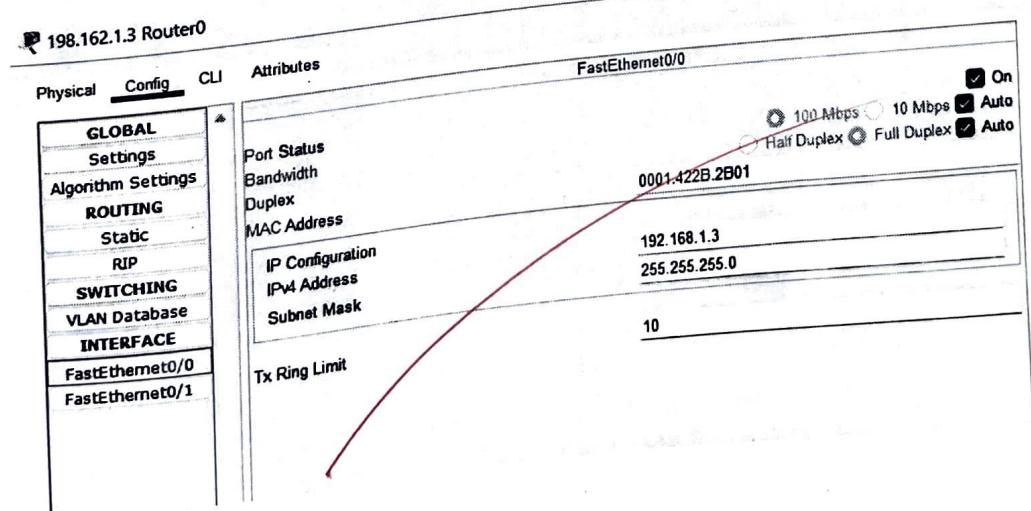
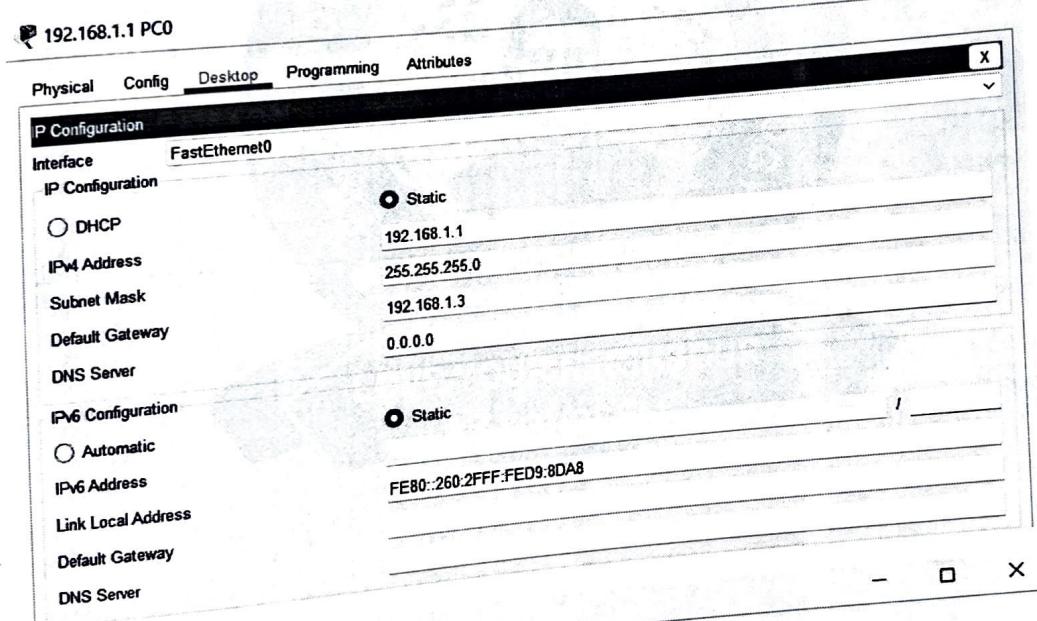
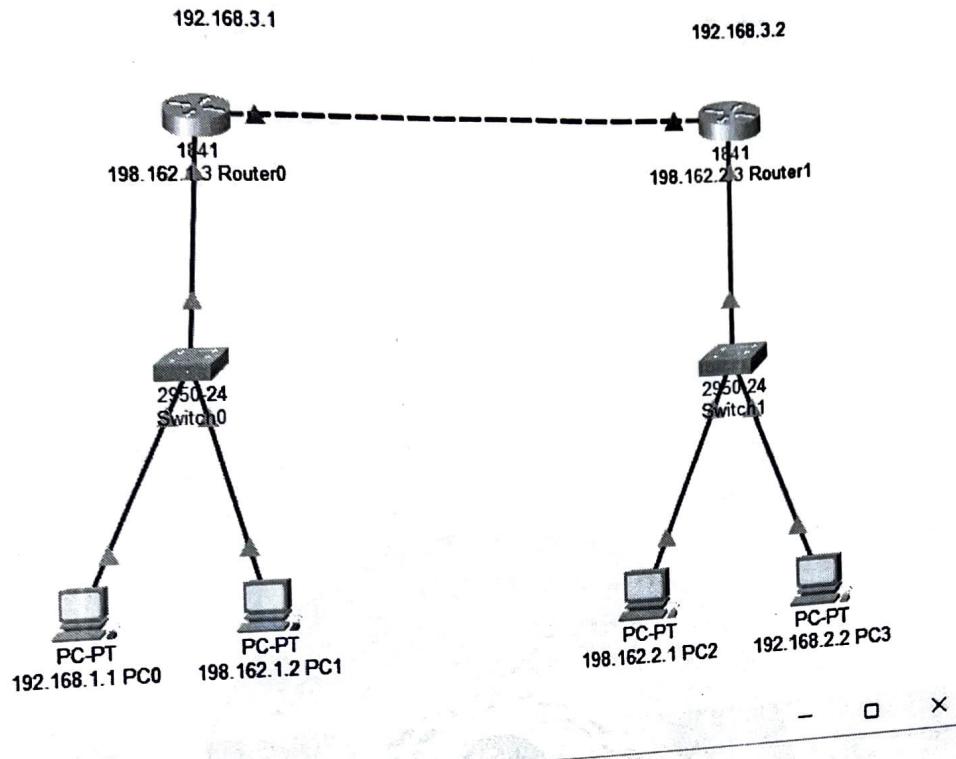
Enter the data:110010101

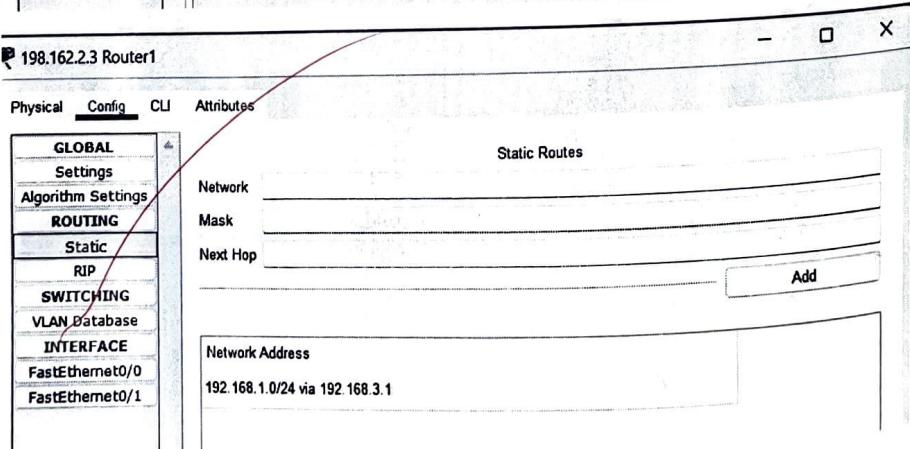
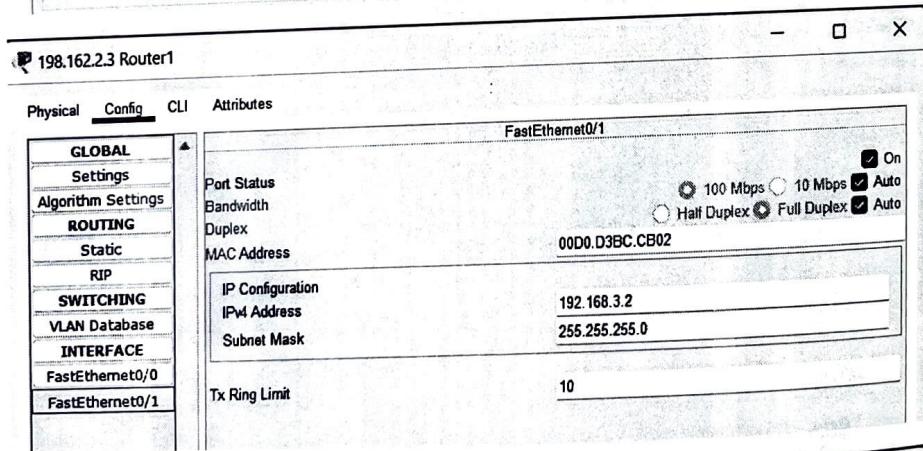
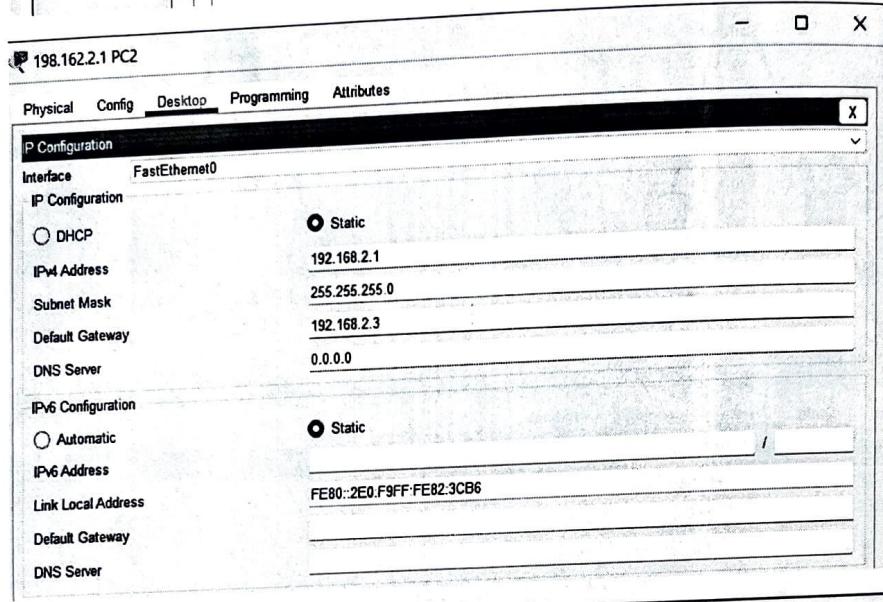
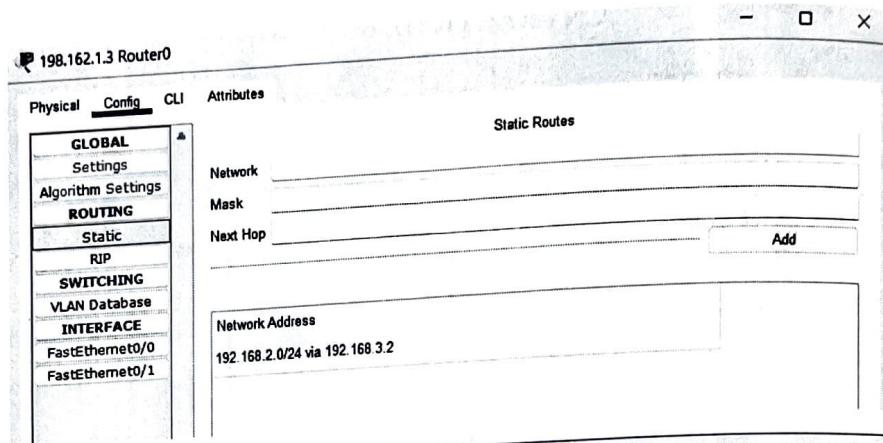
Enter the key:10101

CRC=1011

Dataword=1100101011011011

CN PRACTICAL 8





Practical 09. Socket Programming

Code: Server

```

import java.io.*;
import java.net.*;

public class Server {
    public static void main(String[] args) {
        int port = 12345; // Server port
        try (ServerSocket serverSocket = new ServerSocket(port)) {
            System.out.println("Server is listening on port " + port);
            Socket socket = serverSocket.accept(); // Accept a client connection
            System.out.println("Client connected");
            PrintWriter out = new PrintWriter(socket.getOutputStream(), true);
            out.println("Hello from the server!"); // Send a message to the client
            socket.close(); // Close the connection
        } catch (IOException e) {
            e.printStackTrace();
        }
    }
}

```

Output: Server

```

PS C:\Users\Admin\Desktop\prac9> javac Server.java
PS C:\Users\Admin\Desktop\prac9> java Server
Server is listening on port 12345
Client connected
PS C:\Users\Admin\Desktop\prac9>

```

Code: Client

```

import java.io.*;
import java.net.*;

public class Client {
    public static void main(String[] args) {
        String hostname = "localhost"; // Server hostname
        int port = 12345; // Server port

        try (Socket socket = new Socket(hostname, port)) {
            BufferedReader in = new BufferedReader(new InputStreamReader(socket.getInputStream()));
            String response = in.readLine(); // Read the message from the server
        }
    }
}

```

```
        System.out.println("Server says: " + response);
    } catch (IOException e) {
        e.printStackTrace();
    }
}
```

Output: Client

```
PS C:\Users\Admin\Desktop\prac9> javac Server.java
PS C:\Users\Admin\Desktop\prac9> java Client
Server says: Hello from the server!
PS C:\Users\Admin\Desktop\prac9>
```

PRACTICAL 10

```
administrator@CSLAB02-10:~$ ifconfig  
enp2s0:  
    flags=4163<UP,BROADCAST,RUNNING,  
    MULTICAST> mtu 1500  
        inet 172.16.20.96 netmask  
           255.255.254.0 broadcast 172.16.21.255  
               inet6 fe80::feaa:14ff:fedb:5a22  
                  prefixlen 64 scopeid 0x20<link>  
                     ether fc:aa:14:db:5a:22  
                     txqueuelen 1000 (Ethernet)  
                         RX packets 95317 bytes  
                           60873182 (60.8 MB)  
                             RX errors 0 dropped 97 overruns  
                             0 frame 0  
                             TX packets 36530 bytes 3568925  
                               (3.5 MB)  
                             TX errors 0 dropped 0 overruns 0  
                             carrier 0 collisions 0  
  
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 5151 bytes 423489  
                         (423.4 KB)  
                         RX errors 0 dropped 0 overruns 0  
                         frame 0  
                         TX packets 5151 bytes 423489  
                           (423.4 KB)  
                           TX errors 0 dropped 0 overruns 0  
                           carrier 0 collisions 0  
  
administrator@CSLAB02-10:~$ telnet  
172.16.20.180  
Trying 172.16.20.180...  
Connected to 172.16.20.180.  
Escape character is '^]'.  
Ubuntu 18.04.6 LTS  
CSLAB02-11 login: administrator
```

29
Password:
Last login: Wed Oct 9 15:04:54 IST 2024
from 172.16.20.96 on pts/1
Welcome to Ubuntu 18.04.6 LTS
(GNU/Linux 4.15.0-213-generic x86_64)

* Documentation:
<https://help.ubuntu.com>
* Management:
<https://landscape.canonical.com>
* Support: <https://ubuntu.com/pro>

Expanded Security Maintenance for
Infrastructure is not enabled.

3 updates can be applied immediately.
To see these additional updates run: apt
list --upgradable

194 additional security updates can be
applied with ESM Infra.
Learn more about enabling ESM Infra
service for Ubuntu 18.04 at
<https://ubuntu.com/18-04>

New release '20.04.6 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

```
administrator@CSLAB02-11:~$ cd  
Desktop  
administrator@CSLAB02-11:~/Desktop  
$ cat > fruits.txt  
txt  
^C  
administrator@CSLAB02-11:~/Desktop  
$ cat fruits.txt  
txt  
administrator@CSLAB02-11:~/Desktop  
$ ls  
1022161 ex2.tcl fruits.txt oo.png  
'PRAC6(CN).odt'  
'CCL LAB' fruits jj prac5
```