Fr. Conceicao Rodrigues College of Engineering

Department of Computer Engineering

Academic Term: July-Nov 2023-24

Class: T.E. (Computer B)
Subject Name: Computer Network Lab
Subject Code: CSL 502

Experiment No:	**1**
Date of Performance:	**27/ 07/2023**
Roll No:	**9614**
Name of the Student:	**AQIB FIRDOUS KHAN**

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

THEORY:
(Write the theory of commands you have studied and attach Screenshot of it)

EXPERIMENT NO.2

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

THEORY:

1. **ifconfig**

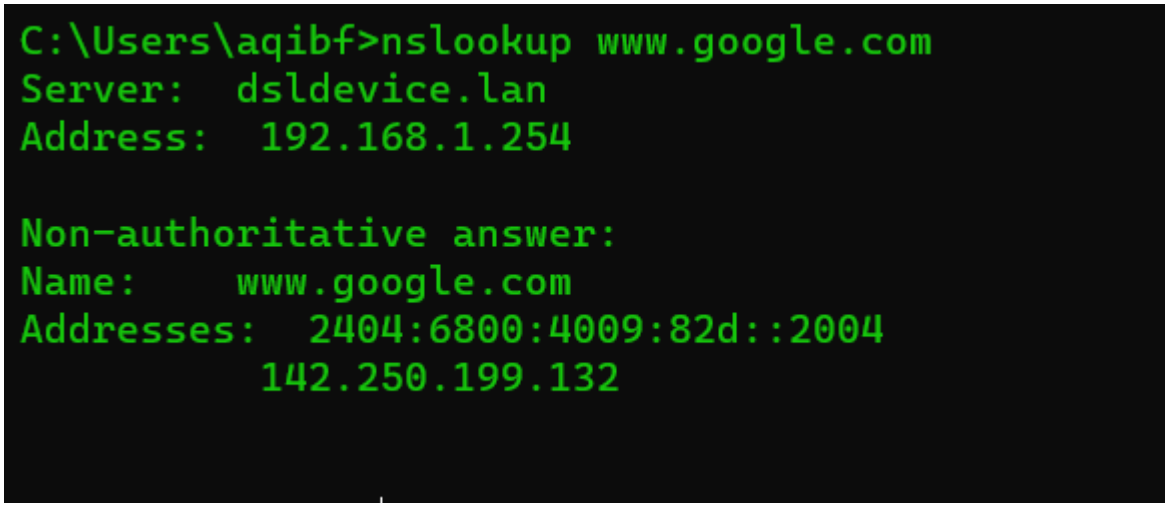
ifconfig(interface configuration) command is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary. After that, it is usually used when needed during debugging or when you need system tuning. Also, this command is used to assign the IP address and netmask to an interface or to enable or disable a given interface.

ip

```
C:\Users\aqibf>ipconfig

Windows IP Configuration


Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 10:

   Media State . . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . . : 2402:e280:3d3e:2ea:b54b:91f6:4147:4b7
2
   Temporary IPv6 Address. . . . . . . : 2402:e280:3d3e:2ea:e1c1:c175:6cd1:245
d
   Link-local IPv6 Address . . . . . . : fe80::d128:d69f:dd13:956d%17
   IPv4 Address. . . . . . . . . . . . : 192.168.1.9
   Subnet Mask . . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . . : fe80::1%17
                                         192.168.1.254

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

C:\Users\aqibf>
```

2. NSLOOKUP

Nslookup (stands for “Name Server Lookup”) is a useful command for getting information from DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS related problems.



3. Ping

PING (Packet Internet Groper) command is used to check the network connectivity between host and server/host. This command takes as input the IP address or the URL and sends a data packet to the specified address with the message "PING" and get a response from the server/host this time is recorded which is called latency. Fast ping low latency means faster connection. Ping uses **ICMP(Internet Control Message Protocol)** to send an **ICMP echo message** to the specified host if that host is available then it sends **ICMP reply message**. Ping is generally measured in millisecond every modern operating system has this ping pre-installed.

```
C:\Users\aqibf>ping www.google.com

Pinging www.google.com [2404:6800:4009:82c::2004] with 32 bytes of data:
Reply from 2404:6800:4009:82c::2004: time=8ms
Reply from 2404:6800:4009:82c::2004: time=7ms
Reply from 2404:6800:4009:82c::2004: time=8ms
Reply from 2404:6800:4009:82c::2004: time=6ms

Ping statistics for 2404:6800:4009:82c::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 6ms, Maximum = 8ms, Average = 7ms
```

4. TRACEROUTE

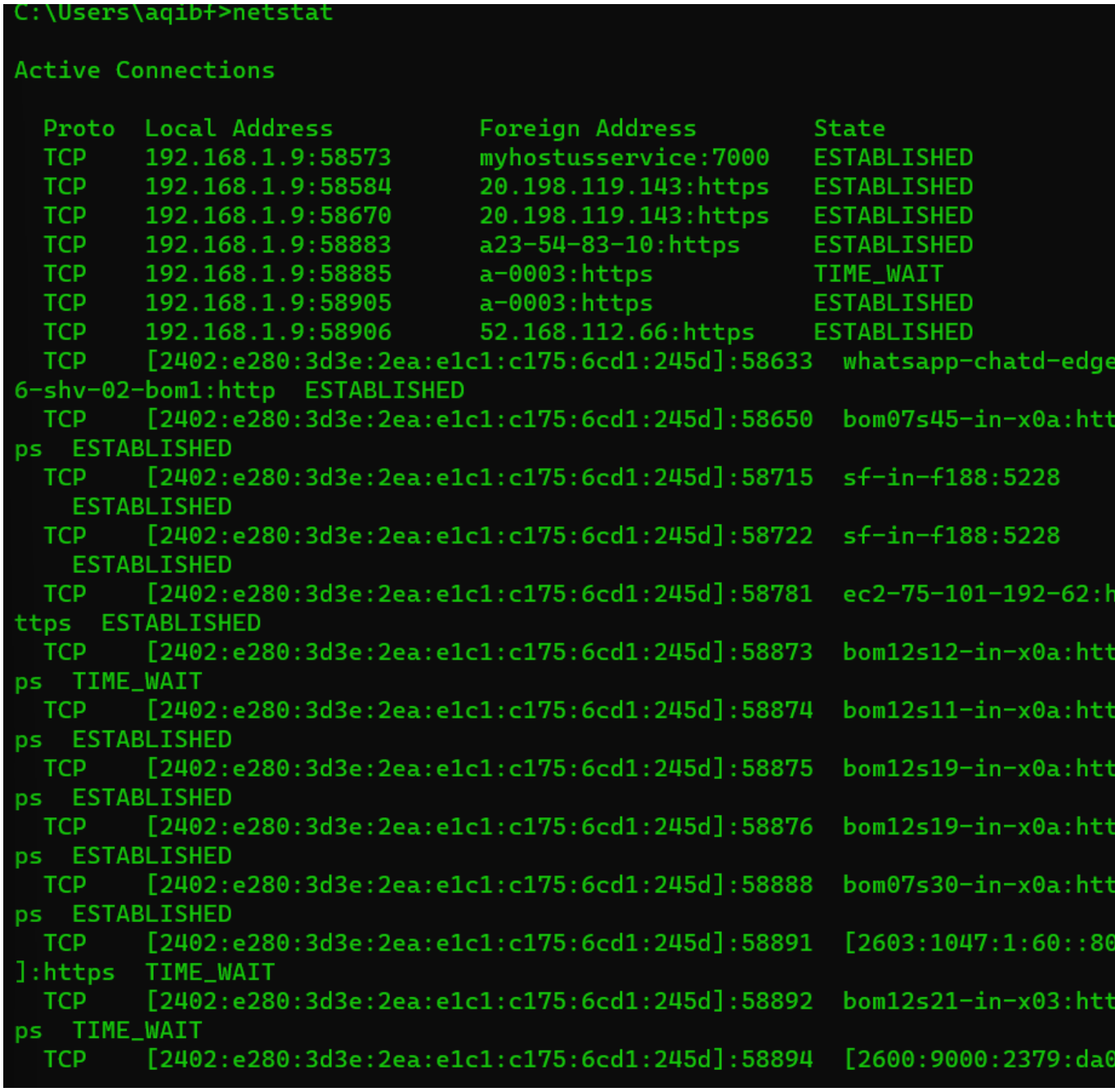
traceroute command in Linux prints the route that a packet takes to reach the host. This command is useful when you want to know about the route and about all the hops that a packet takes. Below image depicts how traceroute command is used to reach the Google(172.217.26.206) host from the local machine and it also prints detail about all the hops that it visits in between

```
C:\Users\aqibf>tracert www.google.com

Tracing route to www.google.com [2404:6800:4009:82c::2004]
over a maximum of 30 hops:

  1     5 ms     4 ms     2 ms  2402:e280:3d3e:2ea::1
  2     8 ms     6 ms     7 ms  2402:e280:4100::2
  3     7 ms     6 ms     7 ms  2001:4860:1:1::e9e
  4    40 ms     9 ms     6 ms  2404:6800:8027::1
  5     7 ms     6 ms     7 ms  2001:4860:0:1::1900
  6     8 ms     6 ms     6 ms  2001:4860:0:1::269d
  7     8 ms    21 ms    13 ms  bom07s35-in-x04.1e100.net [2404:6800:4009
c::2004]

Trace complete.
```

.

5. Netstat

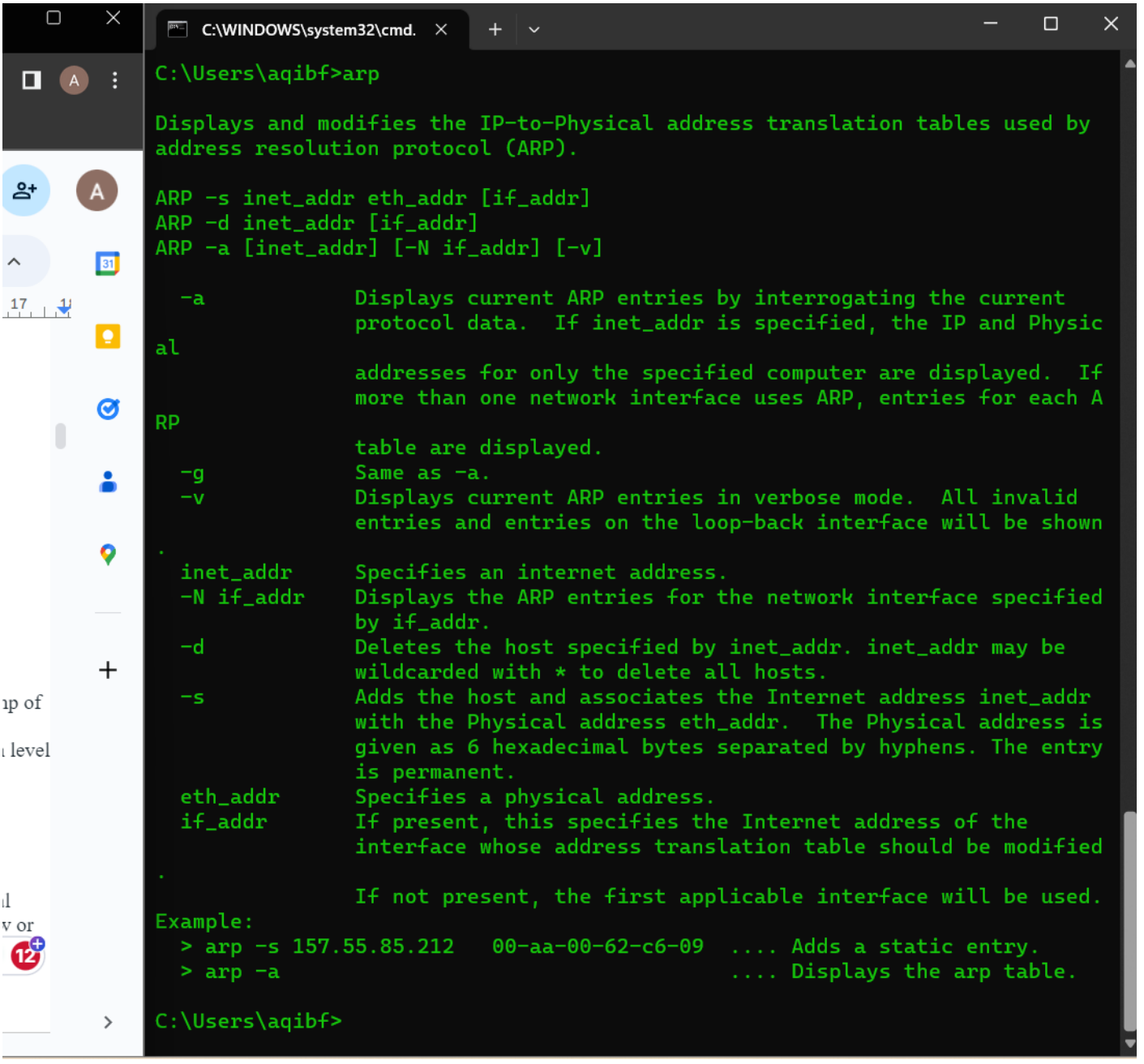
Netstat command displays various network related information such as network connections, routing tables, interface statistics, masquerade connections, multicast memberships, etc.,



```
C:\Users\aqibf>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.9:58573      myhostusservice:7000   ESTABLISHED
  TCP    192.168.1.9:58584      20.198.119.143:https   ESTABLISHED
  TCP    192.168.1.9:58670      20.198.119.143:https   ESTABLISHED
  TCP    192.168.1.9:58883      a23-54-83-10:https     ESTABLISHED
  TCP    192.168.1.9:58885      a-0003:https           TIME_WAIT
  TCP    192.168.1.9:58905      a-0003:https           ESTABLISHED
  TCP    192.168.1.9:58906      52.168.112.66:https    ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58633  whatsapp-chatd-edge
6-shv-02-bom1:http  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58650  bom07s45-in-x0a:htt
ps  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58715  sf-in-f188:5228
    ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58722  sf-in-f188:5228
    ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58781  ec2-75-101-192-62:h
ttps  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58873  bom12s12-in-x0a:htt
ps  TIME_WAIT
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58874  bom12s11-in-x0a:htt
ps  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58875  bom12s19-in-x0a:htt
ps  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58876  bom12s19-in-x0a:htt
ps  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58888  bom07s30-in-x0a:htt
ps  ESTABLISHED
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58891  [2603:1047:1:60::80
]:https  TIME_WAIT
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58892  bom12s21-in-x03:htt
ps  TIME_WAIT
  TCP    [2402:e280:3d3e:2ea:e1c1:c175:6cd1:245d]:58894  [2600:9000:2379:da0
```

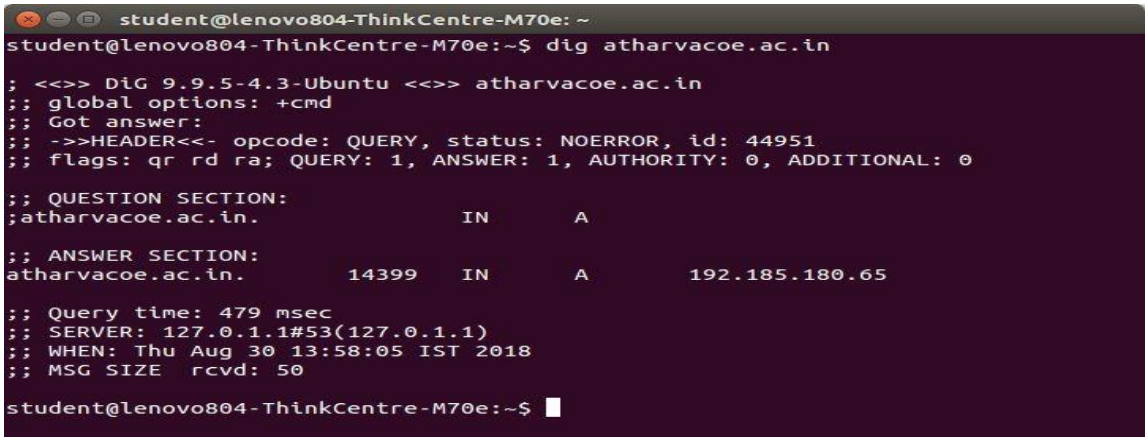
6. **ARP**

arp command manipulates the System's ARP cache. It also allows a complete dump of the ARP cache. ARP stands for Address Resolution Protocol. The primary function of this protocol is to resolve the IP address of a system to its mac address; hence, it works between level 2(Data link layer) and level 3(Network layer).



Dig

dig command stands for ***Domain Information Groper***. It is used for retrieving information about DNS name servers. It is basically used by network administrators. It is used for verifying and troubleshooting DNS problems and to perform DNS lookups. Dig command replaces older tools such as nslookup and the host.



SCHTASKS:Schedules commands and programs to run on a computer.

```
Folder: \Microsoft\Windows\BrokerInfrastructure
TaskName                                 Next Run Time          Status

======================================== ====================== ============
===
BgTaskRegistrationMaintenanceTask        N/A                    Ready


Folder: \Microsoft\Windows\capabilityaccessmanager
TaskName                                 Next Run Time          Status

======================================== ====================== ============
===
maintenancetasks                         N/A                    Ready


Folder: \Microsoft\Windows\CertificateServicesClient
TaskName                                 Next Run Time          Status

======================================== ====================== ============
===
UserTask                                 N/A                    Ready

UserTask-Roam                            N/A                    Ready


Folder: \Microsoft\Windows\Chkdsk
TaskName                                 Next Run Time          Status

======================================== ====================== ============
===
ProactiveScan                            N/A                    Ready

SyspartRepair                            N/A                    Ready


Folder: \Microsoft\Windows\CloudExperienceHost
TaskName                                 Next Run Time          Status
```

DEFRAG: Defragments a disk and optimizes its performance

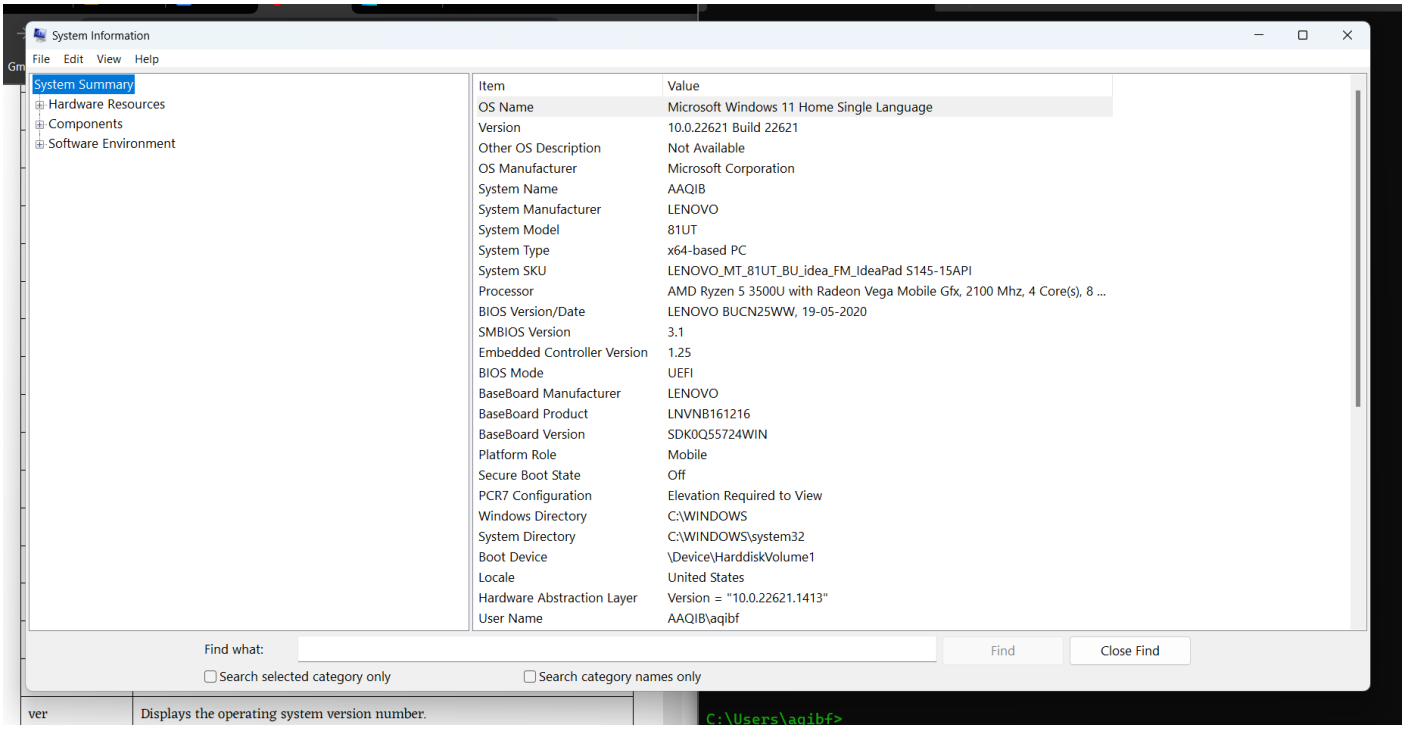
```
C:\Users\aqibf>defrag

Defrag <Volumes> <Operations> [<Options>]

Volumes:
  /C | /AllVolumes      On each volume run only the preferred operations fro
m
                        the given list of operations.
  /E | /VolumesExcept <volume paths>
                        Perform all the given operations on each volume exce
pt.
                        those specified. If the exception list is empty, thi
s
                        behaves as /AllVolumes.
  volume paths          Specifies the drive letter followed by a colon, moun
t point
                        or volume name. More than one volume can be specifie
d.  Run
                        all the given operations on each specified volume..

Operations:
  /A | /Analyze         Perform analysis.
  /B | /BootOptimize    Perform boot optimization to increase boot performan
ce.
  /D | /Defrag          Perform traditional defrag (this is the default). On
 a tiered
                        volume, traditional defrag is performed only on the
Capacity
                        tier.
  /G | /TierOptimize    On tiered volumes, optimize files to reside on the a
ppropriate
                        storage tier.
  /K | /SlabConsolidate On thinly provisioned volumes, perform slab consolid
ation to
                        increase slab usage efficiency.
  /L | /Retrim          On thinly provisioned volumes, perform retrim to rel
ease free
                        slabs. On SSDs perform retrim to improve write perfo
```

cipher: Displays or alters the encryption of directories and files on NTFS partitions.

```
C:\Users\aqibf>cipher

 Listing C:\Users\aqibf\
 New files added to this directory will not be encrypted.

U .android
U .atom
U .cache
U .dist
U .dotnet
U .eclipse
U .emulator_console_auth_token
U .gitconfig
U .gradle
U .idlerc
U .m2
U .ms-ad
U .p2
U .vscode
U a.java
U AndroidStudioProjects
U banker.py
U blog
U Contacts
U cpracs2
U Documents
U Downloads
U eclipse
U eclipse-workspace
U EDM
U env
U Exp.txt
U exp6.py
U Exp6.txt
U FarmerHelperApp
U Favorites
U file.txt
```

winver: Displays the Windows version and build information.

MSINFO32: DISPLAYS DETAILED SYSTEM INFORMATION



GETMAC: Display the MAC addresses of network interfaces

```
C:\Users\aqibf>getmac

Physical Address    Transport Name

=================== ============================================================
==
82-30-00-C0-F9-38   \Device\Tcpip_{E99EF6C8-DC08-4037-8DC1-A981B6791222}

80-30-49-C0-DE-44   Media disconnected



C:\Users\aqibf>
```

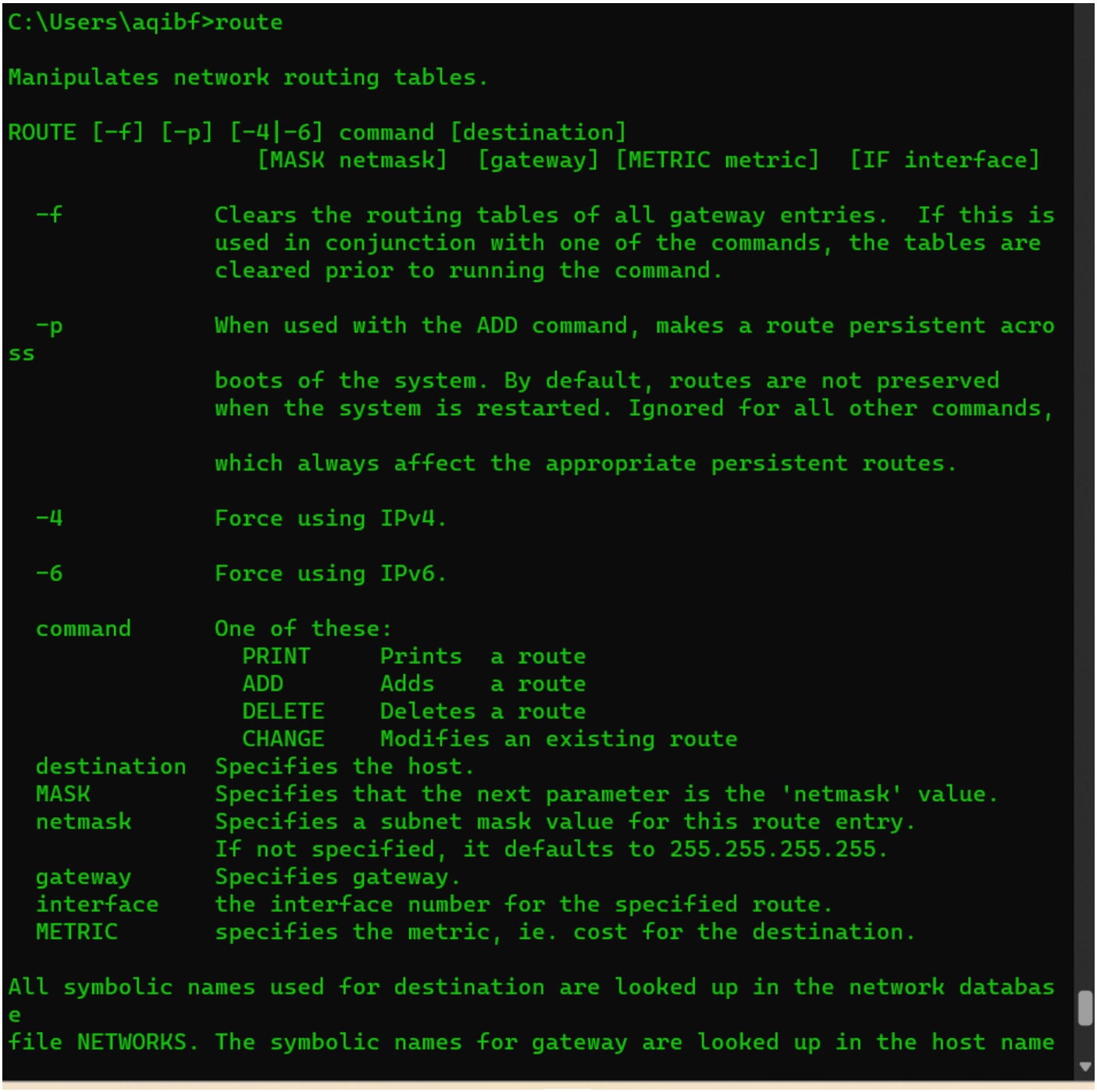
netsh wlan: Configure wireless network settings

```
C:\Users\aqibf>netsh wlan

The following commands are available:

Commands in this context:
?               - Displays a list of commands.
add             - Adds a configuration entry to a table.
connect         - Connects to a wireless network.
delete          - Deletes a configuration entry from a table.
disconnect      - Disconnects from a wireless network.
dump            - Displays a configuration script.
export          - Saves WLAN profiles to XML files.
help            - Displays a list of commands.
IHV             - Commands for IHV logging.
refresh         - Refresh hosted network settings.
reportissues    - Generate WLAN smart trace report.
set             - Sets configuration information.
show            - Displays information.
start           - Start hosted network.
stop            - Stop hosted network.

To view help for a command, type the command, followed by a space, and then
 type ?.
```

netsh dns: Configure DNS settings

```
C:\Users\aqibf>netsh dns

The following commands are available:

Commands in this context:
?               - Displays a list of commands.
add             - Adds a configuration entry to a table.
delete          - Deletes a configuration entry from a table.
dump            - Displays a configuration script.
help            - Displays a list of commands.
set             - Sets configuration information.
show            - Displays information.

To view help for a command, type the command, followed by a space, and then
 type ?.
```

Route: View or modify the network routing table



NBTSTAT : Display NetBIOS over TCP/IP protocol statistics

```
C:\Users\aqibf>nbtstat

Displays protocol statistics and current TCP/IP connections using NBT
(NetBIOS over TCP/IP).

NBTSTAT [ [-a RemoteName] [-A IP address] [-c] [-n]
        [-r] [-R] [-RR] [-s] [-S] [interval] ]

  -a   (adapter status) Lists the remote machine's name table given its name
  -A   (Adapter status) Lists the remote machine's name table given its
                        IP address.
  -c   (cache)          Lists NBT's cache of remote [machine] names and thei
r IP addresses
  -n   (names)          Lists local NetBIOS names.
  -r   (resolved)       Lists names resolved by broadcast and via WINS
  -R   (Reload)         Purges and reloads the remote cache name table
  -S   (Sessions)       Lists sessions table with the destination IP address
es
  -s   (sessions)       Lists sessions table converting destination IP
                        addresses to computer NETBIOS names.
  -RR  (ReleaseRefresh) Sends Name Release packets to WINS and then, starts
Refresh

  RemoteName   Remote host machine name.
  IP address   Dotted decimal representation of the IP address.
  interval     Redisplays selected statistics, pausing interval seconds
               between each display. Press Ctrl+C to stop redisplaying
               statistics.
```

CONCLUSION: Hence, in this experiment, we have successfully studied some important networking command and also implemented them in Linux