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# **BASIC NETWORKING AND TROUBLESHOOTING COMMANDS**

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**CSE1004(NETWORK AND COMMUNICATION)LAB:L53-L54**



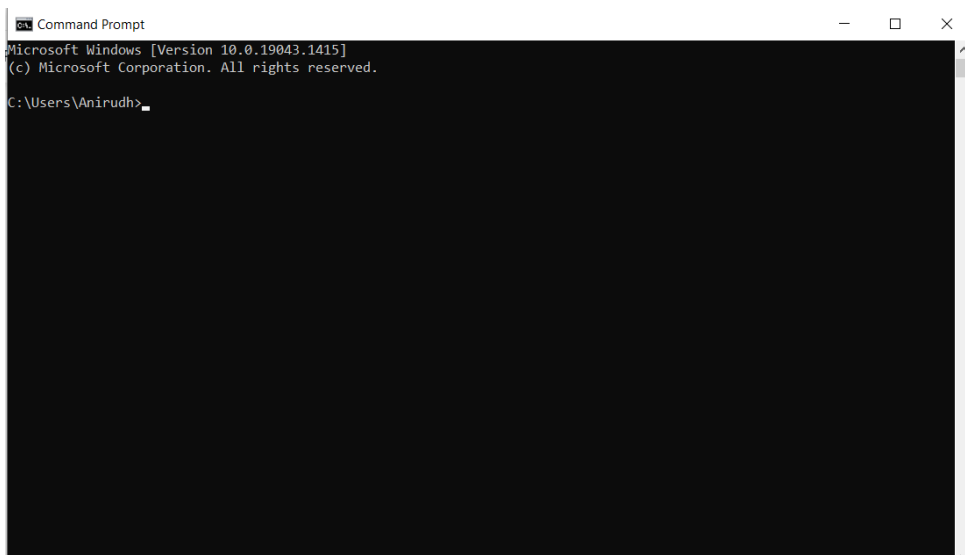
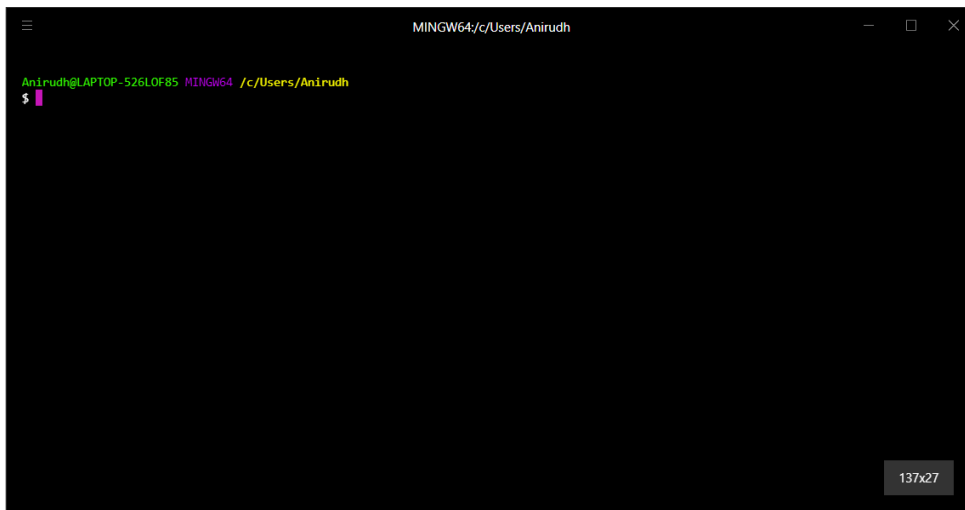
**JANUARY 9, 2022  
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## QUESTION:

Executing Basic Networking and Troubleshooting Commands and getting inference from it.

## PROCEDURE:

- ➔ First open your preferred Command Prompt(Terminal) in Admin Mode
- ➔ Command Prompt Used: Hyper Terminal (Admin mode) / Default Command Prompt(Windows)



- ➔ Get to your default home directory or main directory
- ➔ Try executing basic networking commands
- ➔ you can only type one command per line, and press Enter after each one to execute it.

## RUNTIME EXECUTION:

### 1. COMMAND NAME: ipconfig

**DESCRIPTION:** IPCONFIG stands for **I**nternet **P**rotocol **C**onfiguration. This is a command-line application which displays all the current TCP/IP (Transmission Control Protocol/Internet Protocol) network configuration, refreshes the DHCP (Dynamic Host Configuration Protocol) and DNS (Domain Name Server). It also displays IP address, subnet mask, and default gateway for all adapters. It is available for Microsoft Windows, ReactOS, and Apple macOS. ReactOS version was developed by Ged Murphy and licensed under the General Public License.

#### OUTPUT:

```
Command Prompt
C:\Users\Anirudh>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::972:dd90:7093:48cd%6
    IPv4 Address. . . . . : 192.168.1.2
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::136
                                192.168.1.1

Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Ethernet adapter VMware Network Adapter VMnet1:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::64c6:d396:47a5:19af%2
    IPv4 Address. . . . . : 192.168.237.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Ethernet adapter VMware Network Adapter VMnet8:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::58c4:8ed9:f06f:f106%4
    IPv4 Address. . . . . : 192.168.85.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::8db4:c103:992c:120a%9
    Autoconfiguration IPv4 Address. . : 169.254.18.10
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 

Ethernet adapter VirtualBox Host-Only Network #2:
```

```
Command Prompt
Ethernet adapter VirtualBox Host-Only Network #2:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::710e:f360:39a7:e07e%10
    IPv4 Address. . . . . : 192.168.99.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Wi-Fi:

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

C:\Users\Anirudh>
```

### 2. COMMAND NAME: ipconfig /all

**DESCRIPTION:** Displays the full TCP/IP configuration for all adapters. Adapters can represent physical interfaces, such as installed network adapters, or logical interfaces, such as dial-up connections.

#### OUTPUT:

## ANIRUDH VADERA

### BASIC NETWORKING AND TROUBLESHOOTING COMMANDS

```
Command Prompt
Microsoft Windows [Version 10.0.19043.1415]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Anirudh>ipconfig /all

Windows IP Configuration

Host Name . . . . . : LAPTOP-526LOF85
Primary Dns Suffix . . . . . : 
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . . : 
Description . . . . . : Realtek PCIe GbE Family Controller
Physical Address. . . . . : 3C-7C-3F-59-94-77
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::972:4d90:7093:48cd66(Preferred)
IPv4 Address. . . . . : 192.168.1.2(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : 09 January 2022 06:07:47
Lease Expires . . . . . : 10 January 2022 16:32:47
Default Gateway . . . . . : fe80::130
192.168.1.1
DHCP Server . . . . . : 192.168.1.1
DHCPv6 IAID . . . . . : 104622263
DHCPv6 Client DUID. . . . . : 00-01-00-01-26-E3-9D-7E-3C-7C-3F-59-94-77
DNS Servers . . . . . : 192.168.1.1
Primary WINS Server . . . . . : 192.168.1.1
NetBIOS over Tcpip. . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . : 
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. . . . . : D6-08-53-3C-CB-03
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . : 
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. . . . . : D6-08-53-3C-CB-03
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Ethernet adapter VMware Network Adapter VMnet1:

Connection-specific DNS Suffix . . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet1
Physical Address. . . . . : 08-50-56-C0-00-01
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::64c6:d396:47a5:19af32(Preferred)
IPv4 Address. . . . . : 192.168.237.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 
DHCPv6 IAID . . . . . : 33574998
DHCPv6 Client DUID. . . . . : 00-01-00-01-26-E3-9D-7E-3C-7C-3F-59-94-77
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
                        fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VMware Network Adapter VMnet8:

Connection-specific DNS Suffix . . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet8
Physical Address. . . . . : 08-50-56-C0-00-08
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::58c4:8ed9:f06f:f10654(Preferred)
IPv4 Address. . . . . : 192.168.85.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 201347158
DHCPv6 IAID . . . . . : 201347158
DHCPv6 Client DUID. . . . . : 00-01-00-01-26-E3-9D-7E-3C-7C-3F-59-94-77
```

```
Command Prompt
Wireless LAN adapter Local Area Connection* 1:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . : 
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. . . . . : D6-08-53-3C-CB-03
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . . : 
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. . . . . : D6-08-53-3C-CB-03
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Ethernet adapter VMware Network Adapter VMnet1:

Connection-specific DNS Suffix . . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet1
Physical Address. . . . . : 08-50-56-C0-00-01
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::64c6:d396:47a5:19af32(Preferred)
IPv4 Address. . . . . : 192.168.237.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 
DHCPv6 IAID . . . . . : 33574998
DHCPv6 Client DUID. . . . . : 00-01-00-01-26-E3-9D-7E-3C-7C-3F-59-94-77
DNS Servers . . . . . : fec0:0:0:ffff::1%1
                        fec0:0:0:ffff::2%1
                        fec0:0:0:ffff::3%1
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VMware Network Adapter VMnet8:

Connection-specific DNS Suffix . . : 
Description . . . . . : VMware Virtual Ethernet Adapter for VMnet8
Physical Address. . . . . : 08-50-56-C0-00-08
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::58c4:8ed9:f06f:f10654(Preferred)
IPv4 Address. . . . . : 192.168.85.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 201347158
DHCPv6 IAID . . . . . : 201347158
DHCPv6 Client DUID. . . . . : 00-01-00-01-26-E3-9D-7E-3C-7C-3F-59-94-77
```

### 3. COMMAND NAME: ping 127.0.0.1

**DESCRIPTION:** Ping is used for testing a network host capacity to interact with another host. Just enter the command Ping, followed by the target host's name or IP address. The ping utilities seem to be the most common network tool. This is performed by using the Internet Control Message Protocol, which allows the echo packet to be sent to the destination host and a listening mechanism. If the destination host replies to the requesting host, that means the host is reachable. This utility usually gives a basic image of where there may be a specific networking issue,

### OUTPUT:

```
Command Prompt

C:\Users\Anirudh>ping 127.0.0.1

Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Anirudh>

C:\Users\Anirudh>
```

In the above example, we're pinging *127.0.0.1*, also called the IPv4 localhost IP address or IPv4 loopback IP address, without options.

The *0% loss* reported under *Ping statistics for 127.0.0.1* explains that each ICMP Echo Request message sent to *localhost* was returned. This means that, as far as this network connection goes, it can communicate with localhost as specified just fine.

## BASIC NETWORKING AND TROUBLESHOOTING COMMANDS

**DESCRIPTION:** Netstat is a Common TCP – IP networking command-line method present in most Windows, Linux, UNIX, and other operating systems. The netstat provides the statistics and information in the use of the current TCP-IP Connection network about the protocol.

**-a: This will display all connection and ports**

## OUTPUT:

```

C:\Users\Anirudh>netstat -a

Active Connections

Proto Local Address           Foreign Address         State
TCP    0.0.0.0:135               LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:445               LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:902               LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:912               LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:1042              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:1043              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:3306              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:5040              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:5357              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:6646              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:7680              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:8733              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:9012              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:9013              LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:33060             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49664             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49665             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49666             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49667             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49674             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49689             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49693             LAPTOP-526LOF85:0      LISTENING
TCP    0.0.0.0:49699             LAPTOP-526LOF85:0      LISTENING

```

```

C:\ Command Prompt
UDP [::]:12177 *:.*
UDP [::]:12177 *:.*
UDP [::]:12177 *:.*
UDP [::]:12177 *:.*
UDP [::]:12177 *:.*
UDP [::]:12177 *:.*
UDP [::]:54915 *:.*
UDP [::]:60712 *:.*
UDP [::]:63837 *:.*
UDP [::1]:1900 *:.*
UDP [::1]:51821 *:.*
UDP [fe80::972:4d90:7093:48cd%6]:1900 *:.*
UDP [fe80::972:4d90:7093:48cd%6]:5353 *:.*
UDP [fe80::972:4d90:7093:48cd%6]:51815 *:.*
UDP [fe80::58c4:8ed9:f06f:f106%4]:1900 *:.*
UDP [fe80::58c4:8ed9:f06f:f106%4]:51817 *:.*
UDP [fe80::64c6:d396:47a5:19af%2]:1900 *:.*
UDP [fe80::64c6:d396:47a5:19af%2]:51816 *:.*
UDP [fe80::710e:f360:39a7:e07e%10]:1900 *:.*
UDP [fe80::710e:f360:39a7:e07e%10]:51819 *:.*
UDP [fe80::8db4:c103:992c:120a%9]:1900 *:.*
UDP [fe80::8db4:c103:992c:120a%9]:5353 *:.*
UDP [fe80::8db4:c103:992c:120a%9]:51818 *:.*
UDP [fe80::c0d2:6de7:51e6:3c80%8]:1900 *:.*
UDP [fe80::c0d2:6de7:51e6:3c80%8]:51820 *:.*

```

```

C:\ Command Prompt
TCP 192.168.1.3:62102 103.95.84.97:https ESTABLISHED
TCP 192.168.1.3:62112 104.16.18.94:https ESTABLISHED
TCP 192.168.1.3:62114 104.18.13.5:https ESTABLISHED
TCP 192.168.1.3:62115 174:https TIME_WAIT
TCP 192.168.1.3:62121 193:https TIME_WAIT
TCP 192.168.1.3:62221 20.44.229.112:https ESTABLISHED
TCP 192.168.1.3:62259 104.21.50.114:https ESTABLISHED
TCP 192.168.1.3:62260 104.21.16.43:https ESTABLISHED
TCP 192.168.1.3:62263 52.179.219.14:https TIME_WAIT
TCP 192.168.1.3:62280 server-18-66-85-53:https ESTABLISHED
TCP 192.168.1.3:62308 te4-0:https CLOSE_WAIT
TCP 192.168.1.3:62312 LAPTOP-526L0F85:6646 TIME_WAIT
TCP 192.168.85.1:139 LAPTOP-526L0F85:0 LISTENING
TCP 192.168.99.1:139 LAPTOP-526L0F85:0 LISTENING
TCP 192.168.237.1:139 LAPTOP-526L0F85:0 LISTENING
TCP [::]:135 LAPTOP-526L0F85:0 LISTENING
TCP [::]:445 LAPTOP-526L0F85:0 LISTENING
TCP [::]:1042 LAPTOP-526L0F85:0 LISTENING
TCP [::]:1043 LAPTOP-526L0F85:0 LISTENING
TCP [::]:3306 LAPTOP-526L0F85:0 LISTENING
TCP [::]:5357 LAPTOP-526L0F85:0 LISTENING
TCP [::]:7680 LAPTOP-526L0F85:0 LISTENING
TCP [::]:8733 LAPTOP-526L0F85:0 LISTENING
TCP [::]:9012 LAPTOP-526L0F85:0 LISTENING
TCP [::]:9013 LAPTOP-526L0F85:0 LISTENING
TCP [::]:33060 LAPTOP-526L0F85:0 LISTENING
TCP [::]:49664 LAPTOP-526L0F85:0 LISTENING
TCP [::]:49665 LAPTOP-526L0F85:0 LISTENING
TCP [::]:49666 LAPTOP-526L0F85:0 LISTENING
TCP [::]:49667 LAPTOP-526L0F85:0 LISTENING

```

## 5. COMMAND NAME: netstat -f

**DESCRIPTION:** we execute netstat -f to show all active TCP connections.

We want to see the computers that we're connected to in FQDN format [-f] instead of a simple IP address.

### OUTPUT:

```
Command Prompt - netstat -f
C:\Users\Anirudh>netstat -f

Active Connections

Proto Local Address           Foreign Address         State
TCP   127.0.0.1:1043           LAPTOP-526LOF85:51377   ESTABLISHED
TCP   127.0.0.1:9012           LAPTOP-526LOF85:51488   ESTABLISHED
TCP   127.0.0.1:9100           LAPTOP-526LOF85:51981   ESTABLISHED
TCP   127.0.0.1:9487           LAPTOP-526LOF85:51477   ESTABLISHED
TCP   127.0.0.1:49712         LAPTOP-526LOF85:49713   ESTABLISHED
TCP   127.0.0.1:49713         LAPTOP-526LOF85:49712   ESTABLISHED
TCP   127.0.0.1:49714         LAPTOP-526LOF85:49715   ESTABLISHED
TCP   127.0.0.1:49715         LAPTOP-526LOF85:49714   ESTABLISHED
TCP   127.0.0.1:51377         LAPTOP-526LOF85:1043    ESTABLISHED
TCP   127.0.0.1:51427         LAPTOP-526LOF85:51445   ESTABLISHED
TCP   127.0.0.1:51445         LAPTOP-526LOF85:51427   ESTABLISHED
TCP   127.0.0.1:51477         LAPTOP-526LOF85:9487    ESTABLISHED
TCP   127.0.0.1:51488         LAPTOP-526LOF85:9012    ESTABLISHED
TCP   127.0.0.1:51981         LAPTOP-526LOF85:9100    ESTABLISHED
TCP   127.0.0.1:52733         LAPTOP-526LOF85:65001   ESTABLISHED
TCP   127.0.0.1:62464         LAPTOP-526LOF85:46624    TIME_WAIT
TCP   127.0.0.1:65001         LAPTOP-526LOF85:52733   ESTABLISHED
TCP   192.168.1.3:53413       156.247.107.34.bc.googleusercontent.com:https ESTABLISHED
TCP   192.168.1.3:53419       20.198.162.78:https      ESTABLISHED
TCP   192.168.1.3:61976       dell1s06-in-f14.1e100.net:http ESTABLISHED
TCP   192.168.1.3:61978       sb-in-f188.1e100.net:5228 ESTABLISHED
TCP   192.168.1.3:62027       104.26.6.228:https       ESTABLISHED
TCP   192.168.1.3:62028       104.22.64.104:https      ESTABLISHED
```

## 6. COMMAND NAME: nslookup

**DESCRIPTION:** The Nslookup, which stands for name server lookup command, is a network utility command used to obtain information about internet servers. It provides name server information for the DNS (Domain Name System), i.e. the default DNS server's name and IP Address.

Take note of the prompt at the bottom of the command's output. nslookup remains running in the foreground after the command executes. The prompt at the end of the output lets you enter additional parameters. When you execute **nslookup** without specifying a domain name, the program enters interactive mode.

### OUTPUT:

```
C:\Users\Anirudh>nslookup netflix.com
Server: UnKnown
Address: 192.168.1.1

Non-authoritative answer:
Name: netflix.com
Addresses: 2600:1f18:631e:2f80:77e5:13a7:6533:7584
           2600:1f18:631e:2f82:c8cd:27b2:ac:8dbf
           2600:1f18:631e:2f84:ceae:e049:1e:6a96
           54.160.93.182
           3.211.157.115
           3.225.92.8

C:\Users\Anirudh>
```

## 7. COMMAND NAME: **tracert** [www.google.com](http://www.google.com)

**DESCRIPTION:** The tracert command is a Command Prompt command which is used to get the network packet being sent and received and the number of hops required for that packet to reach to target. This command can also be referred to as a traceroute. It provides several details about the path that a packet takes from the source to the specified destination.

### OUTPUT:

```
Command Prompt

C:\Users\Anirudh>tracert www.google.com

Tracing route to www.google.com [172.217.167.196]
over a maximum of 30 hops:

  0  1 ms    2 ms    1 ms  MYGROUP [192.168.1.1]
  1  3 ms    3 ms    2 ms  103.120.50.4
  2  57 ms   47 ms   20 ms  103.120.50.1
  3  14 ms   12 ms   11 ms  103.56.229.253
  4  12 ms   11 ms   11 ms  72.14.196.180
  5  11 ms   11 ms   13 ms  172.253.68.113
  6  486 ms  12 ms   12 ms  209.85.252.65
  7  12 ms   12 ms   11 ms  del03s18-in-f4.1e100.net [172.217.167.196]

Trace complete.

C:\Users\Anirudh>
```

With the tracert command shown above, we're asking tracert to show us the path from the local computer all the way to the network device with the hostname [www.google.com](http://www.google.com).

In this example, we can see that tracert identified 8 network devices including our router at *192.168.1.1* and all the way through to the *target* of *www.google.com*, which we now know uses the public IP address of [172.217.167.196], one of Google's many IP addresses.

## 8. COMMAND NAME: **hostname**

**DESCRIPTION:** To communicate with each and other, the computer needs a unique address. A hostname can be alphabetic or alphanumeric and contain specific symbols used specifically to define a specific node or device in the network. For example, a hostname should have a domain name (TLD) of the top-level and a distance between one and 63 characters when used in a domain name system (DNS) or on the Internet.

## OUTPUT:

```
Command Prompt

C:\Users\Anirudh>hostname
LAPTOP-526LOF85

C:\Users\Anirudh>
```

## 9. COMMAND NAME: route print

**DESCRIPTION:** In IP networks, routing tables are used to direct packets from one subnet to another. The Route command provides the device's routing tables. To get this result, just type route print. The Route command returns the routing table, and the user can make changes by Commands such as Route Add, Route Delete, and Route Change, which allows modifying the routing table as a requirement.

To display the routing table (both IPv4 and IPv6) in Windows, use the route print command.

## OUTPUT:

```
C:\Users\Anirudh>route print

Interface List
=====
 6...3c 7c 3f 59 94 77 .....Realtek PCIe GbE Family Controller
14...96 08 53 3c cb d3 .....Microsoft Wi-Fi Direct Virtual Adapter
16...d6 08 53 3c cb d3 .....Microsoft Wi-Fi Direct Virtual Adapter #2
2...00 50 56 c0 00 01 .....VMware Virtual Ethernet Adapter for VMnet1
4...00 50 56 c0 00 08 .....VMware Virtual Ethernet Adapter for VMnet8
9...08 00 27 00 40 b4 .....VirtualBox Host-Only Ethernet Adapter
10...08 00 27 00 2c cc .....VirtualBox Host-Only Ethernet Adapter #2
8...94 08 53 3c cb d3 .....Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
1.....Software Loopback Interface 1

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.1.1      192.168.1.3      35
127.0.0.0                  255.0.0.0        On-link         127.0.0.1        331
127.0.0.1                  255.255.255.255 On-link         127.0.0.1        331
127.255.255.255            255.255.255.255 On-link         127.0.0.1        331
169.254.0.0                255.255.0.0      On-link         169.254.18.10    291
169.254.0.0                255.255.0.0      On-link         169.254.72.205   281
169.254.18.10              255.255.255.255 On-link         169.254.18.10    291
169.254.72.205             255.255.255.255 On-link         169.254.72.205   281
169.254.255.255            255.255.255.255 On-link         169.254.18.10    291
169.254.255.255            255.255.255.255 On-link         169.254.72.205   281
192.168.1.0                255.255.255.0    On-link         192.168.1.3      291
192.168.1.3                255.255.255.0    On-link         192.168.1.3      291
192.168.85.0               255.255.255.0    On-link         192.168.85.1     291
192.168.85.1               255.255.255.0    On-link         192.168.85.1     291
192.168.85.255             255.255.255.255 On-link         192.168.85.1     291
192.168.99.0               255.255.255.0    On-link         192.168.99.1     291
192.168.99.1               255.255.255.0    On-link         192.168.99.1     291
192.168.99.255             255.255.255.255 On-link         192.168.99.1     291
192.168.237.0              255.255.255.0    On-link         192.168.237.1    291
192.168.237.1              255.255.255.255 On-link         192.168.237.1    291
192.168.237.255            255.255.255.255 On-link         192.168.237.1    291
224.0.0.0                  240.0.0.0        On-link         127.0.0.1        331
224.0.0.0                  240.0.0.0        On-link         169.254.18.10    291
224.0.0.0                  240.0.0.0        On-link         192.168.99.1     291
224.0.0.0                  240.0.0.0        On-link         169.254.72.205   281
224.0.0.0                  240.0.0.0        On-link         192.168.1.3      291
224.0.0.0                  240.0.0.0        On-link         192.168.85.1     291
224.0.0.0                  240.0.0.0        On-link         192.168.237.1    291
```

```
Command Prompt

224.0.0.0                240.0.0.0          On-link         192.168.237.1     291
255.255.255.255          255.255.255.255    On-link         127.0.0.1         331
255.255.255.255          255.255.255.255    On-link         169.254.18.10     291
255.255.255.255          255.255.255.255    On-link         192.168.99.1      291
255.255.255.255          255.255.255.255    On-link         169.254.72.205    281
255.255.255.255          255.255.255.255    On-link         192.168.1.3       291
255.255.255.255          255.255.255.255    On-link         192.168.85.1      291
255.255.255.255          255.255.255.255    On-link         192.168.237.1     291

Persistent Routes:
None

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
6        281 :::/0          fe80::1
8        291 :::/0          fe80::1
1        331 ::1/128         On-link
9        291 fe80::/64       On-link
10       291 fe80::/64       On-link
6        281 fe80::/64       On-link
8        291 fe80::/64       On-link
4        291 fe80::/64       On-link
2        291 fe80::/64       On-link
6        281 fe80::972:4d90:7093:48cd/128 On-link
4        291 fe80::58c4:8ed9:f06f:f106/128 On-link
2        291 fe80::64c6:d396:47a5:19af/128 On-link
10       291 fe80::710e:f360:39a7:e07e/128 On-link
9        291 fe80::8db4:c103:992c:120a/128 On-link
8        291 fe80::c0d2:6de7:51e6:3c80/128 On-link
1        331 ff00::/8          On-link
9        291 ff00::/8          On-link
10       291 ff00::/8          On-link
6        281 ff00::/8          On-link
8        291 ff00::/8          On-link
4        291 ff00::/8          On-link
2        291 ff00::/8          On-link

Persistent Routes:
None

C:\Users\Anirudh>
```



## 10. COMMAND NAME: arp

**DESCRIPTION:** ARP stands for Address Resolution Protocol. Although network communications can readily be thought of as an IP address, the packet delivery depends ultimately on the media access control (MAC). This is where the protocol for address resolution comes into effect. You can add the remote host IP address, which is an arp -a command, in case you have issues to communicate with a given host. The ARP command provides information like Address, Flags, Mask, IFace, Hardware Type, Hardware Address, etc.

**Arp -a:** It will show the IP address of your computer along with the IP address and MAC address of your router.

### OUTPUT:

```
C:\Users\Anirudh>arp -a

Interface: 192.168.237.1 --- 0x2
    Internet Address      Physical Address      Type
    192.168.237.255       ff-ff-ff-ff-ff-ff    static
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static

Interface: 192.168.85.1 --- 0x4
    Internet Address      Physical Address      Type
    192.168.85.255       ff-ff-ff-ff-ff-ff    static
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static

Interface: 169.254.72.205 --- 0x6
    Internet Address      Physical Address      Type
    169.254.255.255       ff-ff-ff-ff-ff-ff    static
    192.168.1.1           bc-62-d2-33-12-bc    dynamic
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

Interface: 192.168.1.3 --- 0x8
    Internet Address      Physical Address      Type
    192.168.1.1           bc-62-d2-33-12-bc    dynamic
    192.168.1.255         ff-ff-ff-ff-ff-ff    static
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

Interface: 169.254.18.10 --- 0x9
    Internet Address      Physical Address      Type
```

```
Command Prompt

224.77.77.77            01-00-5e-4d-4d-4d    static
239.255.255.250         01-00-5e-7f-ff-fa    static

Interface: 169.254.72.205 --- 0x6
    Internet Address      Physical Address      Type
    169.254.255.255       ff-ff-ff-ff-ff-ff    static
    192.168.1.1           bc-62-d2-33-12-bc    dynamic
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

Interface: 192.168.1.3 --- 0x8
    Internet Address      Physical Address      Type
    192.168.1.1           bc-62-d2-33-12-bc    dynamic
    192.168.1.255         ff-ff-ff-ff-ff-ff    static
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

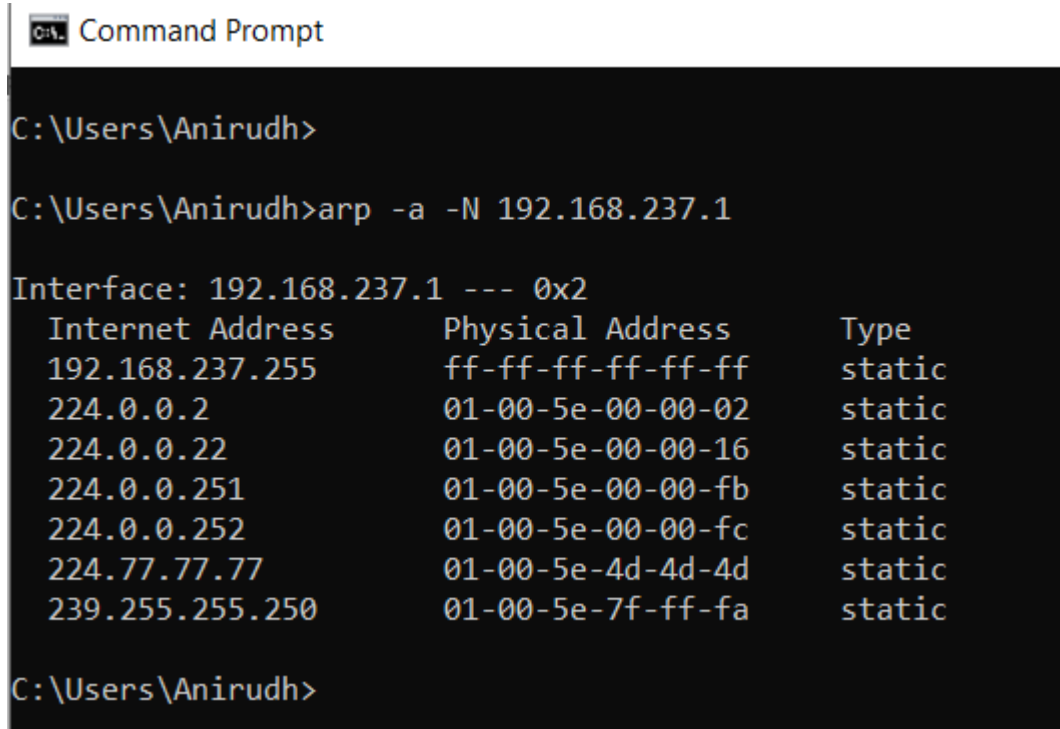
Interface: 169.254.18.10 --- 0x9
    Internet Address      Physical Address      Type
    169.254.255.255       ff-ff-ff-ff-ff-ff    static
    224.0.0.2             01-00-5e-00-00-02    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    224.77.77.77          01-00-5e-4d-4d-4d    static
    239.255.255.250       01-00-5e-7f-ff-fa    static
    255.255.255.255       ff-ff-ff-ff-ff-ff    static

C:\Users\Anirudh>
```

## 11. COMMAND NAME: `arp -a -N 192.168.237.1`

**DESCRIPTION:** To display the ARP cache entry for a specific IP address, specify the IP address with the `-N` option. For example, the following command displays the ARP cache table for the interface that is assigned the IP address 192.168.237.1

### OUTPUT:



```
Command Prompt

C:\Users\Anirudh>
C:\Users\Anirudh>arp -a -N 192.168.237.1

Interface: 192.168.237.1 --- 0x2
    Internet Address      Physical Address      Type
    192.168.237.255       ff-ff-ff-ff-ff-ff     static
    224.0.0.2             01-00-5e-00-00-02     static
    224.0.0.22            01-00-5e-00-00-16     static
    224.0.0.251           01-00-5e-00-00-fb     static
    224.0.0.252           01-00-5e-00-00-fc     static
    224.77.77.77          01-00-5e-4d-4d-4d     static
    239.255.255.250       01-00-5e-7f-ff-fa     static

C:\Users\Anirudh>
```

## 12. COMMAND NAME: `nbtstat`

**DESCRIPTION:** The computer name is sometimes referred to as the NetBIOS name.

Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server.

Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems.

➔ **NbtStat -n command for example, shows the NetBIOS names that are in use by a device.**

➔ **NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.**

## ANIRUDH VADERA

### BASIC NETWORKING AND TROUBLESHOOTING COMMANDS

#### OUTPUT:

```
ca. Command Prompt
C:\Users\Anirudh>nbtstat -n

Ethernet 2:
Node IpAddress: [169.254.18.10] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

VMware Network Adapter VMnet8:
Node IpAddress: [192.168.85.1] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

VirtualBox Host-Only Network #2:
Node IpAddress: [192.168.99.1] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

VMware Network Adapter VMnet1:
Node IpAddress: [192.168.237.1] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

Ethernet:
Node IpAddress: [169.254.72.205] Scope Id: []
```

```
ca. Command Prompt

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

VMware Network Adapter VMnet1:
Node IpAddress: [192.168.237.1] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

Ethernet:
Node IpAddress: [169.254.72.205] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

Wi-Fi:
Node IpAddress: [192.168.1.3] Scope Id: []

NetBIOS Local Name Table

Name                Type                Status
-----
LAPTOP-526LOF85<20> UNIQUE             Registered
LAPTOP-526LOF85<00> UNIQUE             Registered
WORKGROUP            <00>              GROUP             Registered

Local Area Connection* 1:
Node IpAddress: [0.0.0.0] Scope Id: []

No names in cache

Local Area Connection* 2:
Node IpAddress: [0.0.0.0] Scope Id: []

No names in cache

C:\Users\Anirudh>
```

#### 13. COMMAND NAME: nbtstat -r

#### OUTPUT:

```
C:\Users\Anirudh>nbtstat -r

NetBIOS Names Resolution and Registration Statistics
-----

Resolved By Broadcast      = 0
Resolved By Name Server    = 0

Registered By Broadcast    = 36
Registered By Name Server  = 0

C:\Users\Anirudh>
```

## 14. COMMAND NAME: pathping

**DESCRIPTION:** Provides information about network latency and network loss at intermediate hops between a source and destination. This command sends multiple echo Request messages to each router between a source and destination, over a period of time, and then computes results based on the packets returned from each router. Because this command displays the degree of packet loss at any given router or link, you can determine which routers or subnets might be having network problems. Used without parameters, this command displays help.

The following command output is typical of the pathping command. (Using an -n switch causes the display to use numeric IP numbers only, instead of DNS host names. Although fully qualified host names are convenient, they tend to be very long for network routers, which makes the pathping output very difficult to decipher.)

### OUTPUT:

```
C:\Users\Anirudh>pathping -n www.lowewriter.com

Tracing route to www.lowewriter.com [208.91.197.27]
over a maximum of 30 hops:
  0  192.168.1.3
  1  192.168.1.1
  2  103.120.50.4
  3  103.120.50.1
  4  14.142.243.45
  5  172.31.167.54
  6  14.141.123.226
  7  180.87.36.165
  8  180.87.36.6
  9  180.87.37.10
 10  180.87.38.1
 11  *           *           *
Computing statistics for 250 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
     Lost/Sent = Pct  Lost/Sent = Pct
  0                                192.168.1.3
  1    1ms      0/ 100 = 0%      0/ 100 = 0%      192.168.1.1
  2    2ms      0/ 100 = 0%      0/ 100 = 0%      103.120.50.4
  3    3ms      0/ 100 = 0%      0/ 100 = 0%      103.120.50.1
  4    4ms      0/ 100 = 0%      0/ 100 = 0%      14.142.243.45
  5    ---     100/ 100 =100%   100/ 100 =100%   172.31.167.54
  6   44ms      0/ 100 = 0%      0/ 100 = 0%      14.141.123.226
  7   54ms      0/ 100 = 0%      0/ 100 = 0%      180.87.36.165
  8   54ms      0/ 100 = 0%      0/ 100 = 0%      180.87.36.6
  9   34ms      0/ 100 = 0%      0/ 100 = 0%      180.87.37.10
 10   33ms      0/ 100 = 0%      0/ 100 = 0%      180.87.38.1

Trace complete.

C:\Users\Anirudh>
```

## 15. COMMAND NAME: getmac

**DESCRIPTION:** The getmac (short for *get MAC address*) is a simple *Windows* network command-line utility used to find the physical address of the network adapters (NIC) in a computer. This tool is typically used in troubleshooting network issues.

### OUTPUT:

```
Command Prompt
C:\Users\Anirudh>getmac

Physical Address      Transport Name
=====
3C-7C-3F-59-94-77    \Device\NPF{5606780C-91D6-4FBD-AC90-1808F9EA2131}
94-08-53-3C-CB-D3    \Device\NPF{7AB0A623-C5E8-4F3D-AD2F-720E76E89E02}
00-50-56-C0-00-01    \Device\NPF{04630FF9-C0E5-4BF1-9200-C4671C7B1A60}
00-50-56-C0-00-08    \Device\NPF{1C595A00-BE42-4F84-A39E-0C1FD7C3FA5A}
08-00-27-00-40-B4    \Device\NPF{7EE3A5FD-D136-49B3-8C3B-F285F47B2415}
08-00-27-00-2C-CC    \Device\NPF{8822A10E-D262-4518-9EF3-86725D64C419}

C:\Users\Anirudh>
```

## 16. COMMAND NAME: systeminfo

**DESCRIPTION:** The SystemInfo command displays a detailed list of configuration information about your Windows 10 PC. The information listed by this command is too lengthy to mention in full but includes the installed version of Windows 10, the host name, the Product ID, the type and number of CPUs, RAM configuration, network card details and installed hotfixes.

### OUTPUT:

```
Command Prompt
C:\Users\Anirudh>systeminfo

Host Name:                LAPTOP-526LOF85
OS Name:                  Microsoft Windows 10 Home Single Language
OS Version:               10.0.19043 N/A Build 19043
OS Manufacturer:         Microsoft Corporation
OS Configuration:        Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:         Anirudh
Registered Organization:   N/A
Product ID:               00327-35898-35579-AAOEM
Original Install Date:    04-09-2020, 12:55:31
System Boot Time:         09-01-2022, 06:07:28
System Manufacturer:      ASUS TUF Gaming A15 FA506IU_FA566IU
System Model:              x64-based PC
System Type:               1 Processor(s) Installed.
                          [01]: AMD64 Family 23 Model 96 Stepping 1 AuthenticAMD ~2900 Mhz
Processor(s):              American Megatrends Inc. FA506IU.316, 12-03-2021
BIOS Version:              C:\Windows
Windows Directory:         C:\Windows\system32
System Directory:          \Device\HarddiskVolume1
Boot Device:               en-us;English (United States)
System Locale:              00004009
Input Locale:              (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Time Zone:                 15,790 MB
Total Physical Memory:     7,746 MB
Available Physical Memory: 20,910 MB
Virtual Memory: Max Size: 8,197 MB
Virtual Memory: Available: 12,713 MB
Virtual Memory: In Use:    C:\pagefile.sys
Page File Location(s):     WORKGROUP
Domain:                    \\LAPTOP-526LOF85
Logon Server:              16 Hotfix(s) Installed.
                          [01]: KB5006365
                          [02]: KB4534170
                          [03]: KB4537759
                          [04]: KB4542335
                          [05]: KB4545706
                          [06]: KB4577266
                          [07]: KB4577586
                          [08]: KB4580325
                          [09]: KB4586864
                          [10]: KB4591175
                          [11]: KB4590401
                          [12]: KB5000736
                          [13]: KB5008212
                          [14]: KB5006753
                          [15]: KB5007273
                          [16]: KB5005699
```

```
Command Prompt

Network Card(s):
[15]: KB5007273
[16]: KB5005699
6 NIC(s) Installed.
[01]: Realtek PCIe GbE Family Controller
      Connection Name: Ethernet
      DHCP Enabled: Yes
      DHCP Server: 255.255.255.255
      IP address(es)
      [01]: 169.254.72.205
      [02]: fe80::972:4d90:7093:48cd
[02]: Realtek 8822CE Wireless LAN 802.11ac PCI-E NIC
      Connection Name: Wi-Fi
      DHCP Enabled: Yes
      DHCP Server: 192.168.1.1
      IP address(es)
      [01]: 192.168.1.3
      [02]: fe80::c0d2:6de7:51e6:3c80
[03]: VMware Virtual Ethernet Adapter for VMnet1
      Connection Name: VMware Network Adapter VMnet1
      DHCP Enabled: No
      IP address(es)
      [01]: 192.168.237.1
      [02]: fe80::64c6:d396:47a5:19af
[04]: VMware Virtual Ethernet Adapter for VMnet8
      Connection Name: VMware Network Adapter VMnet8
      DHCP Enabled: No
      IP address(es)
      [01]: 192.168.85.1
      [02]: fe80::58c4:8ed9:f06f:f106
[05]: VirtualBox Host-Only Ethernet Adapter
      Connection Name: Ethernet 2
      DHCP Enabled: Yes
      DHCP Server: 255.255.255.255
      IP address(es)
      [01]: 169.254.18.10
      [02]: fe80::8db4:c103:992c:120a
[06]: VirtualBox Host-Only Ethernet Adapter
      Connection Name: VirtualBox Host-Only Network #2
      DHCP Enabled: No
      IP address(es)
      [01]: 192.168.99.1
      [02]: fe80::710e:f360:39a7:e07e

Hyper-V Requirements:      VM Monitor Mode Extensions: Yes
                          Virtualization Enabled In Firmware: Yes
                          Second Level Address Translation: Yes
                          Data Execution Prevention Available: Yes

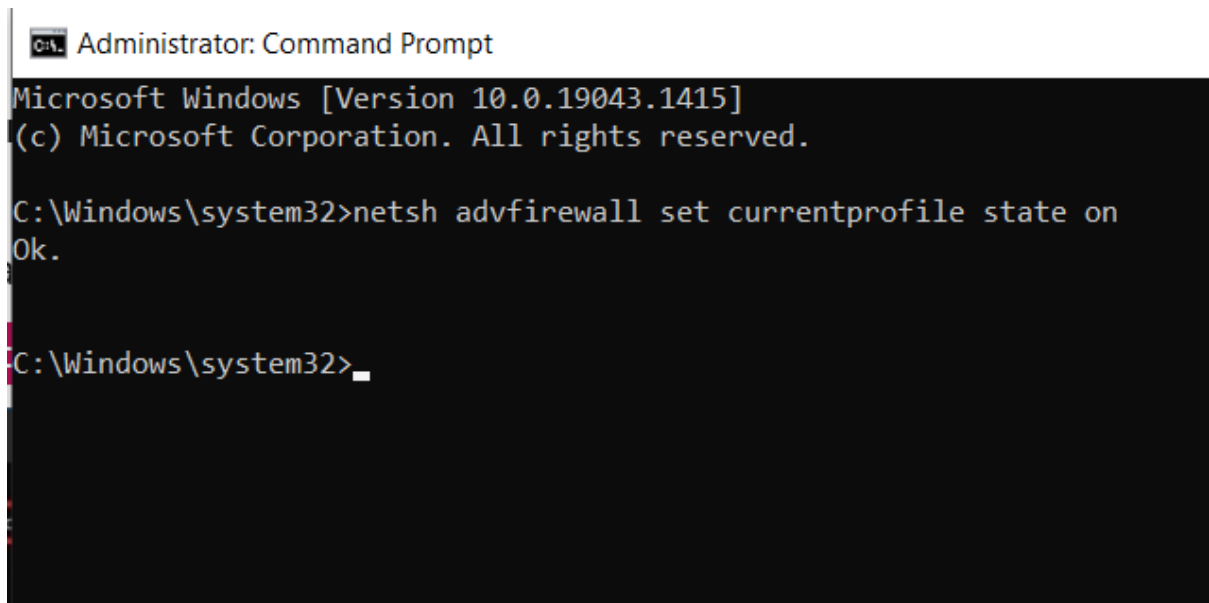
C:\Users\Anirudh>
```

## 17. COMMAND NAME: netsh

**DESCRIPTION:** On Windows 10, **netsh** (Network Shell) is a legacy command-line tool that allows you to display and change virtually any network configuration. For instance, you can use the tool to view current network configuration, [manage wireless connections](#), reset the network stack to fix most common problems, enable or disable the firewall, and a lot more.

### OUTPUT:

**netsh advfirewall set currentprofile state on**  
**To enable windows defender firewall**

A screenshot of a Windows Command Prompt window titled "Administrator: Command Prompt". The window shows the following text: "Microsoft Windows [Version 10.0.19043.1415] (c) Microsoft Corporation. All rights reserved. C:\Windows\system32>netsh advfirewall set currentprofile state on Ok. C:\Windows\system32>". The command "netsh advfirewall set currentprofile state on" has been executed, and the output is "Ok.", indicating that the Windows Defender Firewall has been successfully enabled.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19043.1415]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>netsh advfirewall set currentprofile state on
Ok.

C:\Windows\system32>
```

Here ok means the firewall was successfully enabled.

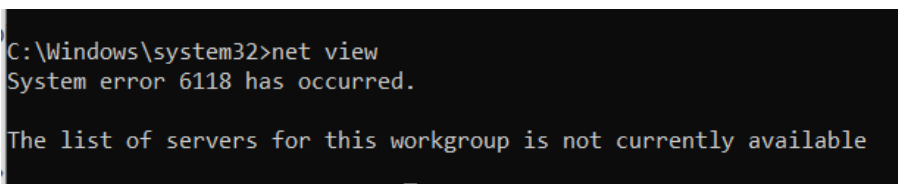
## 18. COMMAND NAME: net view

**DESCRIPTION:** it is used for Viewing devices connected to a network

The caveat with this command is that it may not show all of the devices connected to your network.

It works well enough for private networks but will fail to identify devices such as smartphones and printers, and it can have trouble identifying devices running a different operating system to Windows.

### OUTPUT:

A screenshot of a Windows Command Prompt window showing the execution of the "net view" command. The text displayed is: "C:\Windows\system32>net view System error 6118 has occurred. The list of servers for this workgroup is not currently available". This indicates that the command failed due to a system error (6118), which typically occurs when the network is not accessible or the command is not supported in the current context.

```
C:\Windows\system32>net view
System error 6118 has occurred.

The list of servers for this workgroup is not currently available
```