Date: 06/07/2025

Lab Practical #01:

Study of basic networking commands and IP configuration.

Practical Assignment #01:

1. Perform and explain various networking commands listed below:
   i. ipconfig
   ii. ping
   iii. getmac
   iv. systeminfo
   v. traceroute / tracert
   vi. netstat
   vii. nslookup
   viii. hostname
   ix. pathping
   x. arp

1. ipconfig

Description:

No.	Option	Description
1	Ipconfig	displays your computer's current network configuration, including IP address, subnet mask, default gateway, and DNS servers
2	release	command sends a DHCPRELEASE message to your DHCP server, instructing it to immediately give up your computer's current IP address and configuration.
3	renew	Renews DHCP configuration for all adapters (if an adapter is not specified) or for a specific adapter if the *adapter* parameter is included. This parameter is available only on computers with adapters that are configured to obtain an IP address automatically. To specify an adapter name, type the adapter name that appears when you use **ipconfig** without parameters.
4	all	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.
5	setclassid	Configures the DHCP class ID for a specified adapter. To set the DHCP class ID for all adapters, use the asterisk (*) wildcard character in place of *adapter*. This parameter is available only on computers with adapters that are configured to obtain an IP address automatically.

Date: 06/07/2025

Implementation:

1)

```
C:\Users\student>ipconfig/release

Windows IP Configuration

No operation can be performed on Ethernet 2 while it has its media disconnected.
No operation can be performed on Local Area Connection* 11 while it has its media disconnected.
No operation can be performed on Local Area Connection* 12 while it has its media disconnected.

C:\Users\student>
```

2)

```
C:\Users\student>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet 2:

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

Wireless LAN adapter Local Area Connection* 11:

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

Wireless LAN adapter Local Area Connection* 12:

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

Wireless LAN adapter Wi-Fi 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::44c:9e4b:392f:fed8%20
   IPv4 Address. . . . . . . . . . . : 10.20.42.22
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . : 10.20.1.1

C:\Users\student>
```

3)

```
C:\Users\student>ipconfig/renew

Windows IP Configuration

No operation can be performed on Ethernet 2 while it has its media disconnected.
No operation can be performed on Local Area Connection* 11 while it has its media disconnected.
No operation can be performed on Local Area Connection* 12 while it has its media disconnected.

C:\Users\student>
```

Date: 06/07/2025

4)

```
   Host Name . . . . . . . . . . . . : H202-22
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Mixed
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Ethernet 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek PCIe GbE Family Controller #2
   Physical Address. . . . . . . . . : 2C-58-B9-D7-E3-80
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 11:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #3
   Physical Address. . . . . . . . . : 1E-CE-51-2C-68-AE
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 12:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #4
   Physical Address. . . . . . . . . : 12-CE-51-2C-68-AE
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi 2:

   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Realtek RTL8852BE WiFi 6 802.11ax PCIe Adapter
   Physical Address. . . . . . . . . : 1C-CE-51-2C-68-AE
   DHCP Enabled. . . . . . . . . . . : No
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::44c:9e4b:392f:fed8%20(Preferred)
   IPv4 Address. . . . . . . . . . . : 10.20.42.22(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . : 10.20.1.1
   DHCPv6 IAID . . . . . . . . . . . : 370986577
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2C-3F-8E-BE-BC-0F-F3-6A-08-59
   DNS Servers . . . . . . . . . . . : 10.20.1.1
   NetBIOS over Tcpip. . . . . . . . : Enabled

C:\Users\student>ipconfig/all
```

Date: 06/07/2025

5)

```
C:\Users\student>ipconfig /setclassid

Error: unrecognized or incomplete command line.

USAGE:
    ipconfig [/allcompartments] [/? | /all |
                                 /renew [adapter] | /release [adapter] |
                                 /renew6 [adapter] | /release6 [adapter] |
                                 /flushdns | /displaydns | /registerdns |
                                 /showclassid adapter |
                                 /setclassid adapter [classid] |
                                 /showclassid6 adapter |
                                 /setclassid6 adapter [classid] ]

where
    adapter             Connection name
                       (wildcard characters * and ? allowed, see examples)

    Options:
       /?               Display this help message
       /all             Display full configuration information.
       /release         Release the IPv4 address for the specified adapter.
       /release6        Release the IPv6 address for the specified adapter.
       /renew           Renew the IPv4 address for the specified adapter.
       /renew6          Renew the IPv6 address for the specified adapter.
       /flushdns        Purges the DNS Resolver cache.
       /registerdns     Refreshes all DHCP leases and re-registers DNS names
       /displaydns      Display the contents of the DNS Resolver Cache.
       /showclassid     Displays all the dhcp class IDs allowed for adapter.
       /setclassid      Modifies the dhcp class id.
       /showclassid6    Displays all the IPv6 DHCP class IDs allowed for adapter.
       /setclassid6     Modifies the IPv6 DHCP class id.


The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address
leases for all adapters bound to TCP/IP will be released or renewed.

For Setclassid and Setclassid6, if no ClassId is specified, then the ClassId is removed.

Examples:
    > ipconfig                       ... Show information
    > ipconfig /all                  ... Show detailed information
    > ipconfig /renew                ... renew all adapters
    > ipconfig /renew EL*            ... renew any connection that has its
                                         name starting with EL
    > ipconfig /release *Con*        ... release all matching connections,
                                         eg. "Wired Ethernet Connection 1" or
                                             "Wired Ethernet Connection 2"
    > ipconfig /allcompartments      ... Show information about all
                                         compartments
    > ipconfig /allcompartments /all ... Show detailed information about all
                                         compartments

C:\Users\student>
```

Date: 06/07/2025

2. ping

Description:

No.	Option	Description
1	Ping	Show your internet ping
2	-t	Ping the specified host until stopped. To see statistics and continue - type Control-Break;
3	/t	Specifies ping continue sending echo Request messages to the destination until interrupted. To interrupt and display statistics, press CTRL+ENTER. To interrupt and quit this command, press CTRL+C.
4	/a	Specifies reverse name resolution be performed on the destination IP address. If this operation is successful, ping displays the corresponding host name
5	/n	Specifies the number of echo Request messages be sent. The default is 4.

Implementation:

1)

```
Pinging 192.168.1.101 with 32 bytes of data:
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.

Ping statistics for 192.168.1.101:
    Packets: Sent = 9, Received = 9, Lost = 0 (0% loss),
```

Date: 06/07/2025

2)

```
C:\Users\student>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
            [-r count] [-s count] [[-j host-list] | [-k host-list]]
            [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
            [-4] [-6] target_name

Options:
    -t             Ping the specified host until stopped.
                   To see statistics and continue - type Control-Break;
                   To stop - type Control-C.
    -a             Resolve addresses to hostnames.
    -n count       Number of echo requests to send.
    -l size        Send buffer size.
    -f             Set Don't Fragment flag in packet (IPv4-only).
    -i TTL         Time To Live.
    -v TOS         Type Of Service (IPv4-only. This setting has been deprecated
                   and has no effect on the type of service field in the IP
                   Header).
    -r count       Record route for count hops (IPv4-only).
    -s count       Timestamp for count hops (IPv4-only).
    -j host-list   Loose source route along host-list (IPv4-only).
    -k host-list   Strict source route along host-list (IPv4-only).
    -w timeout     Timeout in milliseconds to wait for each reply.
    -R             Use routing header to test reverse route also (IPv6-only).
                   Per RFC 5095 the use of this routing header has been
                   deprecated. Some systems may drop echo requests if
                   this header is used.
    -S srcaddr     Source address to use.
    -c compartment Routing compartment identifier.
    -p             Ping a Hyper-V Network Virtualization provider address.
    -4             Force using IPv4.
    -6             Force using IPv6.


C:\Users\student>
```

3)

```
Pinging 192.168.1.102 [192.168.1.102] with 32 bytes of data:
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.
Reply from 192.168.1.5: Destination host unreachable.

Ping statistics for 192.168.1.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

4)

Date: 06/07/2025

```
C:\Users\student>ping -t 10.20.42.22

Pinging 10.20.42.22 with 32 bytes of data:
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22: bytes=32 time<1ms TTL=128
Reply from 10.20.42.22:
Ping statistics for 10.20.42.22:
    Packets: Sent = 15, Received = 14, Lost = 1 (6% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
bytes=32 Control-C
```

5)

```
C:\Users\student>ping freefiremax.com

Pinging freefiremax.com [103.224.212.217] with 32 bytes of data:
Reply from 103.224.212.217: bytes=32 time=313ms TTL=46
Reply from 103.224.212.217: bytes=32 time=311ms TTL=46
Reply from 103.224.212.217: bytes=32 time=317ms TTL=46
Reply from 103.224.212.217: bytes=32 time=312ms TTL=46

Ping statistics for 103.224.212.217:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 311ms, Maximum = 317ms, Average = 313ms

C:\Users\student>
```

Date: 06/07/2025

3. Getmac

Description:

No.	Option	Description
1	Getmac	command is a Windows command-line utility used to display the Media Access Control (MAC) address(es) of all network adapters on a local or remote computer
2	/v	Specifies that verbose output is displayed.
3	/s	Specifies the remote system to connect to. This can be an IP address or a hostname (do not use backslashes). The default is the local computer.
4	/nh	Specifies that the "Column Header" should not be displayed in the output. Valid only for TABLE and CSV formats
5	/?	Displays help at the command prompt

1)

```
C:\Users\student>getmac

Physical Address    Transport Name
=================== ============================================================
2C-58-B9-D7-E3-80   Media disconnected
1C-CE-51-2C-68-AE   \Device\Tcpip_{D6A8C989-92B2-4C30-A018-0FFD8ECF2EE6}
```

2)

```
C:\Users\student>getmac /v

Connection Name Network Adapter Physical Address    Transport Name
=============== =============== =================== ============================================================
Ethernet 2      Realtek PCIe Gb 2C-58-B9-D7-E3-80   Media disconnected
Wi-Fi 2         Realtek RTL8852 1C-CE-51-2C-68-AE   \Device\Tcpip_{D6A8C989-92B2-4C30-A018-0FFD8ECF2EE6}
```

3)

```
C:\Users\student>getmac /s h202-22

Physical Address    Transport Name
=================== ============================================================
2C-58-B9-D7-E3-80   Media disconnected
1C-CE-51-2C-68-AE   \Device\Tcpip_{D6A8C989-92B2-4C30-A018-0FFD8ECF2EE6}
```

4)

Date: 06/07/2025

```
C:\Users\student>getmac/?

GETMAC [/S system [/U username [/P [password]]]] [/FO format] [/NH] [/V]

Description:
    This tool enables an administrator to display the MAC address
    for network adapters on a system.

Parameter List:
    /S      system            Specifies the remote system to connect to.

    /U      [domain\]user     Specifies the user context under
                              which the command should execute.

    /P      [password]        Specifies the password for the given
                              user context. Prompts for input if omitted.

    /FO     format            Specifies the format in which the output
                              is to be displayed.
                              Valid values: "TABLE", "LIST", "CSV".

    /NH                       Specifies that the "Column Header" should
                              not be displayed in the output.
                              Valid only for TABLE and CSV formats.

    /V                        Specifies that verbose output is displayed.

    /?                        Displays this help message.

Examples:
    GETMAC /?
    GETMAC /FO csv
    GETMAC /S system /NH /V
    GETMAC /S system /U user
    GETMAC /S system /U domain\user /P password /FO list /V
    GETMAC /S system /U domain\user /P password /FO table /NH
```

5)

```
C:\Users\student>getmac /nh

2C-58-B9-D7-E3-80   Media disconnected
1C-CE-51-2C-68-AE   \Device\Tcpip_{D6A8C989-92B2-4C30-A018-0FFD8ECF2EE6}
```

Date: 06/07/2025

4. SystemInfo

Description:

No.	Option	Description
1	SystemInfo	systeminfo is a Windows command-line tool used to display detailed information about a computer's system configuration, operating system, and network settings, helpful for diagnostics, inventory, and network administration.
2	/?	It shows the help manual for any command in the Command Prompt (CMD)
3	/fo	Specifies the output format. Options: TABLE, LIST, or CSV..
4	/fo csv	Export System Info in CSV Format (for scripting or Excel)
5	/nh	"No Header" – Omits column headers in the output (works with /fo TABLE or /fo CSV)

1)

```
C:\Users\Keval>systeminfo /fo CSV /nh
"LAPTOP-ENDD6VEN","Microsoft Windows 11 Home Single Language","10.0.26100 N/A Build 26100","Microsoft Corporation","Stan
dalone Workstation","Multiprocessor Free","Keval","HP","00342-42635-96465-AAOEM","13-10-2024, 13:49:01","09-08-2025, 10:
37:30","HP","HP Laptop 15s-fr4xxx","x64-based PC","1 Processor(s) Installed.,[01]: Intel64 Family 6 Model 140 Stepping 2
 GenuineIntel ~2496 Mhz","AMI F.33, 04-10-2023","C:\WINDOWS","C:\WINDOWS\system32","\Device\HarddiskVolume1","en-us;Engl
ish (United States)","00004009","(UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi","16,027 MB","7,034 MB","18,971 MB","8,
773 MB","10,198 MB","C:\pagefile.sys","WORKGROUP","\\LAPTOP-ENDD6VEN","3 Hotfix(s) Installed.,[01]: KB5056579,[02]: KB50
62660,[03]: KB5064485","1 NIC(s) Installed.,[01]: Realtek RTL8822CE 802.11ac PCIe Adapter,      Connection Name: Wi-Fi,
     DHCP Enabled:    Yes,      DHCP Server:     10.27.195.60,      IP address(es),      [01]: 10.27.195.130,      [02]:
 fe80::1c23:5f0d:35ed:3e6f,      [03]: 2401:4900:792a:ed09:849c:dd0a:fcb3:260d,      [04]: 2401:4900:792a:ed09:145f:57:7
661:95e7","Status: Running,Required Security Properties:,Available Security Properties:,      Base Virtualization Suppor
t,      Secure Boot,      DMA Protection,      UEFI Code Readonly,      SMM Security Mitigations 1.0,      Mode Based Ex
ecution Control,      APIC Virtualization,Services Configured:,      Hypervisor enforced Code Integrity,Services Running
:,      Hypervisor enforced Code Integrity,App Control for Business policy: Enforced,App Control for Business user mode
policy: Off,Security Features Enabled:","A hypervisor has been detected. Features required for Hyper-V will not be displ
ayed."
```

2)

Date: 06/07/2025

```
C:\Users\Keval>systeminfo /fo csv
"Host Name","OS Name","OS Version","OS Manufacturer","OS Configuration","OS Build Type","Registered Owner","Registered O
rganization","Product ID","Original Install Date","System Boot Time","System Manufacturer","System Model","System Type",
"Processor(s)","BIOS Version","Windows Directory","System Directory","Boot Device","System Locale","Input Locale","Time
Zone","Total Physical Memory","Available Physical Memory","Virtual Memory: Max Size","Virtual Memory: Available","Virtua
l Memory: In Use","Page File Location(s)","Domain","Logon Server","Hotfix(s)","Network Card(s)","Virtualization-based se
curity","Hyper-V Requirements"
"LAPTOP-ENDD6VEN","Microsoft Windows 11 Home Single Language","10.0.26100 N/A Build 26100","Microsoft Corporation","Stan
dalone Workstation","Multiprocessor Free","Keval","HP","00342-42635-96465-AAOEM","13-10-2024, 13:49:01","09-08-2025, 10:
37:30","HP","HP Laptop 15s-fr4xxx","x64-based PC","1 Processor(s) Installed.,[01]: Intel64 Family 6 Model 140 Stepping 2
 GenuineIntel ~2496 Mhz","AMI F.33, 04-10-2023","C:\WINDOWS","C:\WINDOWS\system32","\Device\HarddiskVolume1","en-us;Engl
ish (United States)","00004009","(UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi","16,027 MB","7,024 MB","18,971 MB","8,
778 MB","10,193 MB","C:\pagefile.sys","WORKGROUP","\\LAPTOP-ENDD6VEN","3 Hotfix(s) Installed.,[01]: KB5056579,[02]: KB50
62660,[03]: KB5064485","1 NIC(s) Installed.,[01]: Realtek RTL8822CE 802.11ac PCIe Adapter,      Connection Name: Wi-Fi,
     DHCP Enabled:    Yes,      DHCP Server:     10.27.195.60,      IP address(es),      [01]: 10.27.195.130,      [02]:
 fe80::1c23:5f0d:35ed:3e6f,      [03]: 2401:4900:792a:ed09:849c:dd0a:fcb3:260d,      [04]: 2401:4900:792a:ed09:145f:57:7
661:95e7","Status: Running,Required Security Properties:,Available Security Properties:,      Base Virtualization Suppor
t,      Secure Boot,      DMA Protection,      UEFI Code Readonly,      SMM Security Mitigations 1.0,      Mode Based Ex
ecution Control,      APIC Virtualization,Services Configured:,      Hypervisor enforced Code Integrity,Services Running
:,      Hypervisor enforced Code Integrity,App Control for Business policy: Enforced,App Control for Business user mode
policy: Off,Security Features Enabled:","A hypervisor has been detected. Features required for Hyper-V will not be displ
ayed."
```

3)

Date: 06/07/2025

```
C:\Users\Ayush Parmar>systeminfo /fo LIST

Host Name:                 LAPTOP-9HKGOLTP
OS Name:                   Microsoft Windows 11 Home Single Language
OS Version:                10.0.22631 N/A Build 22631
OS Manufacturer:           Microsoft Corporation
OS Configuration:          Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:          Ayush Parmar
Registered Organization:   HP
Product ID:                00356-24699-05793-AAOEM
Original Install Date:     11-10-2023, 02:44:21 AM
System Boot Time:          04-07-2025, 07:52:57 AM
System Manufacturer:       HP
System Model:              HP Laptop 15s-fq5xxx
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 154 Stepping 4 GenuineIntel ~1300 Mhz
BIOS Version:              AMI F.19, 03-07-2023
Windows Directory:         C:\windows
System Directory:          C:\windows\system32
Boot Device:               \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:              00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     7,863 MB
Available Physical Memory: 1,938 MB
Virtual Memory: Max Size:  13,239 MB
Virtual Memory: Available: 4,739 MB
Virtual Memory: In Use:    8,500 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\LAPTOP-9HKGOLTP
Hotfix(s):                 5 Hotfix(s) Installed.
                           [01]: KB5054980
                           [02]: KB5012170
                           [03]: KB5027397
```

4)

Date: 06/07/2025

```
Type "SYSTEMINFO /?" for usage.

C:\Users\student>systeminfo/u H202-22
ERROR: Invalid syntax. /U can be specified only when /S is specified.
Type "SYSTEMINFO /?" for usage.

C:\Users\student>systeminfo/s H202-22 /U student
WARNING: User credentials cannot be used for local connections

Host Name:                 H202-22
OS Name:                   Microsoft Windows 11 Home Single Language
OS Version:                10.0.22631 N/A Build 22631
OS Manufacturer:           Microsoft Corporation
OS Configuration:          Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:          computer@darshan.ac.in
Registered Organization:   HP
Product ID:                00356-24737-64323-AAOEM
Original Install Date:     05-07-2023, 4.17.28 PM
System Boot Time:          03-06-2025, 8.19.34 AM
System Manufacturer:       HP
System Model:              HP ProOne 240 23.8 inch G10 All-in-One Desktop PC
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 186 Stepping 3 GenuineIntel ~1300 Mhz
BIOS Version:              AMI F.26, 14-10-2024
Windows Directory:         C:\windows
System Directory:          C:\windows\system32
Boot Device:               \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:              00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     7,867 MB
Available Physical Memory: 1,612 MB
Virtual Memory: Max Size:  11,451 MB
Virtual Memory: Available: 3,058 MB
Virtual Memory: In Use:    8,393 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\H202-22
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB5054980
                           [02]: KB5012170
                           [03]: KB5026039
                           [04]: KB5027397
                           [05]: KB5055528
                           [06]: KB5053665
Network Card(s):           2 NIC(s) Installed.
                           [01]: Realtek PCIe GbE Family Controller
                                 Connection Name: Ethernet 2
                                 Status:          Media disconnected
                           [02]: Realtek RTL8852BE WiFi 6 802.11ax PCIe Adapter
                                 Connection Name: Wi-Fi 2
                                 DHCP Enabled:    No
                                 IP address(es)
                                 [01]: 10.20.42.22
                                 [02]: fe80::44c:9e4b:392f:fed8
```

5)

Date: 06/07/2025

```
C:\Users\student>systeminfo

Host Name:                 H202-22
OS Name:                   Microsoft Windows 11 Home Single Language
OS Version:                10.0.22631 N/A Build 22631
OS Manufacturer:           Microsoft Corporation
OS Configuration:          Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:          computer@darshan.ac.in
Registered Organization:   HP
Product ID:                00356-24737-64323-AAOEM
Original Install Date:     05-07-2023, 4.17.28 PM
System Boot Time:          03-06-2025, 8.19.34 AM
System Manufacturer:       HP
System Model:              HP ProOne 240 23.8 inch G10 All-in-One Desktop PC
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 186 Stepping 3 GenuineIntel ~1300 Mhz
BIOS Version:              AMI F.26, 14-10-2024
Windows Directory:         C:\windows
System Directory:          C:\windows\system32
Boot Device:               \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:              00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     7,867 MB
Available Physical Memory: 1,986 MB
Virtual Memory: Max Size:  11,451 MB
Virtual Memory: Available: 3,429 MB
Virtual Memory: In Use:    8,022 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\H202-22
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB5054980
                           [02]: KB5012170
                           [03]: KB5026039
                           [04]: KB5027397
                           [05]: KB5055528
                           [06]: KB5053665
Network Card(s):           2 NIC(s) Installed.
                           [01]: Realtek PCIe GbE Family Controller
                                 Connection Name: Ethernet 2
                                 Status:          Media disconnected
                           [02]: Realtek RTL8852BE WiFi 6 802.11ax PCIe Adapter
                                 Connection Name: Wi-Fi 2
                                 DHCP Enabled:    No
                                 IP address(es)
                                 [01]: 10.20.42.22
                                 [02]: fe80::44c:9e4b:392f:fed8
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

5. Tracert

Description:

No.	Option	Description

Date: 06/07/2025

1	tracert	tracert is a Windows command-line tool used to trace the route and measure the delay of packets from your computer to a destination host, helping diagnose network path or connectivity issues.
2	/d	Do not resolve hostnames (faster output by skipping DNS lookups).
3	/h	Set maximum number of hops
4	/w	Timeout in milliseconds to wait for each reply.
5	/4	Forces IPv4 tracing

1)

```
C:\Users\student>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
               [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d                 Do not resolve addresses to hostnames.
    -h maximum_hops    Maximum number of hops to search for target.
    -j host-list       Loose source route along host-list (IPv4-only).
    -w timeout         Wait timeout milliseconds for each reply.
    -R                 Trace round-trip path (IPv6-only).
    -S srcaddr         Source address to use (IPv6-only).
    -4                 Force using IPv4.
    -6                 Force using IPv6.
```

2)

```
Tracing route to google.com [142.250.183.78]
over a maximum of 30 hops:

  1   134 ms      2 ms      1 ms  10.20.1.1
  2     8 ms      3 ms     93 ms  117.250.171.130
  3     *         *         *     Request timed out.
  4     *         *         *     Request timed out.
  5    47 ms     94 ms     21 ms  142.250.161.230
  6    18 ms     36 ms     18 ms  192.178.110.227
  7    28 ms     19 ms     19 ms  108.170.238.199
  8    34 ms     83 ms    103 ms  142.250.183.78

Trace complete.
```

3)

Date: 06/07/2025

```
Tracing route to google.com [216.58.203.46]
over a maximum of 10 hops:

  1     4 ms     2 ms     2 ms  10.20.1.1
  2    11 ms     3 ms     3 ms  static.ill.117.250.171.130.bsnl.co.in [117.250.171.130]
  3     *        *        *     Request timed out.
  4     *        *        *     Request timed out.
  5    30 ms    96 ms   102 ms  142.250.161.230
  6    29 ms    89 ms   102 ms  192.178.110.227
  7    26 ms   112 ms   100 ms  216.239.54.85
  8    29 ms    18 ms    25 ms  bom12s05-in-f14.1e100.net [216.58.203.46]

Trace complete.
```

4)

```
Tracing route to google.com [216.58.203.46]
over a maximum of 30 hops:

  1     2 ms     9 ms    61 ms  10.20.1.1
  2    24 ms    11 ms    14 ms  static.ill.117.250.171.130.bsnl.co.in [117.250.171.130]
  3     *        *        *     Request timed out.
  4     *        *        *     Request timed out.
  5    24 ms    39 ms   151 ms  142.250.161.230
  6    77 ms   102 ms    94 ms  192.178.110.227
  7    26 ms    19 ms    79 ms  216.239.54.85
  8    26 ms    18 ms    18 ms  bom12s05-in-f14.1e100.net [216.58.203.46]

Trace complete.
```

5)

```
Tracing route to google.com [216.58.203.46]
over a maximum of 30 hops:

  1     2 ms     3 ms     2 ms  10.20.1.1
  2    11 ms     4 ms     3 ms  static.ill.117.250.171.130.bsnl.co.in [117.250.171.130]
  3     *        *        *     Request timed out.
  4     *        *        *     Request timed out.
  5    27 ms    21 ms    20 ms  142.250.161.230
  6    18 ms    18 ms    18 ms  192.178.110.227
  7    96 ms   101 ms   103 ms  216.239.54.85
  8    29 ms    19 ms    85 ms  bom12s05-in-f14.1e100.net [216.58.203.46]

Trace complete.
```

6. Netstat

Description:

No.	Option	Description
1	netstat	is a command-line tool used to display active network connections, open ports, and routing

Date: 06/07/2025

		tables, helping monitor and troubleshoot network-related issues
2	-a	Shows all connections and listening ports
3	-n	Shows IP addresses and port numbers without DNS names (faster)
4	- r	Displays the routing table (same as route print).
5	- o	Displays the owning process ID (PID) for each connection.

1)

```
C:\Users\student>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    10.20.42.22:7680       10.20.15.13:10134      ESTABLISHED
  TCP    10.20.42.22:7680       10.20.15.16:54920      ESTABLISHED
  TCP    10.20.42.22:7680       10.20.15.26:52071      TIME_WAIT
  TCP    10.20.42.22:7680       10.20.15.26:52098      ESTABLISHED
  TCP    10.20.42.22:7680       10.20.15.26:52204      ESTABLISHED
  TCP    10.20.42.22:7680       C31210:51085           ESTABLISHED
  TCP    10.20.42.22:7680       10.20.31.17:61674      TIME_WAIT
  TCP    10.20.42.22:7680       10.20.32.7:52770       ESTABLISHED
  TCP    10.20.42.22:7680       10.20.32.24:50624      ESTABLISHED
  TCP    10.20.42.22:7680       10.20.38.17:56101      ESTABLISHED
  TCP    10.20.42.22:7680       10.20.38.34:55627      TIME_WAIT
  TCP    10.20.42.22:7680       10.20.40.19:51305      ESTABLISHED
  TCP    10.20.42.22:7680       H202-21:62334          ESTABLISHED
```

2)

Date: 06/07/2025

```
Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:445            LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:5040           LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:49664          LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:49665          LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:49666          LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:49667          LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:49670          LAPTOP-9HKGOLTP:0      LISTENING
  TCP    0.0.0.0:49676          LAPTOP-9HKGOLTP:0      LISTENING
  TCP    10.20.68.123:139       LAPTOP-9HKGOLTP:0      LISTENING
  TCP    10.20.68.123:49419     4.213.25.241:https     ESTABLISHED
  TCP    10.20.68.123:58060     a23-38-59-250:http     ESTABLISHED
  TCP    10.20.68.123:58065     a23-212-254-34:https   CLOSE_WAIT
  TCP    10.20.68.123:58066     a23-212-254-34:https   CLOSE_WAIT
  TCP    10.20.68.123:58130     ec2-13-204-106-34:https  ESTABLISHED
  TCP    10.20.68.123:59164     dns:https              ESTABLISHED
  TCP    10.20.68.123:59165     sb-in-f188:5228        ESTABLISHED
  TCP    10.20.68.123:59173     bom12s09-in-f10:https  ESTABLISHED
  TCP    10.20.68.123:59175     hkg12s10-in-f3:https   TIME_WAIT
  TCP    10.20.68.123:59180     172.64.155.209:https   ESTABLISHED
  TCP    10.20.68.123:59181     104.18.32.47:https     ESTABLISHED
  TCP    10.20.68.123:59186     bom07s26-in-f14:https  TIME_WAIT
  TCP    10.20.68.123:59190     dns:https              TIME_WAIT
  TCP    10.20.68.123:59192     bom12s17-in-f10:https  TIME_WAIT
  TCP    10.20.68.123:59200     52.109.124.4:https     ESTABLISHED
  TCP    10.20.68.123:59201     52.109.124.4:https     ESTABLISHED
  TCP    10.20.68.123:59202     52.109.124.29:https    TIME_WAIT
  TCP    10.20.68.123:59203     a23-193-114-80:https   ESTABLISHED
  TCP    10.20.68.123:59204     pnbomb-az-in-f10:https  ESTABLISHED
  TCP    10.20.68.123:59205     52.109.124.29:https    TIME_WAIT
  TCP    10.20.68.123:59212     52.168.112.66:https    ESTABLISHED
  TCP    10.20.68.123:59213     bom12s16-in-f3:https   ESTABLISHED
  TCP    10.20.68.123:59214     bom12s21-in-f14:https  ESTABLISHED
  TCP    10.20.68.123:59217     ip-66-117-22-191:https  ESTABLISHED
  TCP    10.20.68.123:59218     ec2-3-233-158-24:https  ESTABLISHED
```

3)

Date: 06/07/2025

```
Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    10.20.68.123:49419     4.213.25.241:443       ESTABLISHED
  TCP    10.20.68.123:58060     23.38.59.250:80        ESTABLISHED
  TCP    10.20.68.123:58065     23.212.254.34:443      CLOSE_WAIT
  TCP    10.20.68.123:58066     23.212.254.34:443      CLOSE_WAIT
  TCP    10.20.68.123:58130     13.204.106.34:443      ESTABLISHED
  TCP    10.20.68.123:59164     8.8.8.8:443            ESTABLISHED
  TCP    10.20.68.123:59165     74.125.130.188:5228    ESTABLISHED
  TCP    10.20.68.123:59173     142.250.76.170:443     ESTABLISHED
  TCP    10.20.68.123:59180     172.64.155.209:443     ESTABLISHED
  TCP    10.20.68.123:59181     104.18.32.47:443       ESTABLISHED
  TCP    10.20.68.123:59190     8.8.8.8:443            TIME_WAIT
  TCP    10.20.68.123:59192     142.250.192.106:443    TIME_WAIT
  TCP    10.20.68.123:59204     142.251.222.106:443    ESTABLISHED
  TCP    10.20.68.123:59213     142.250.192.67:443     ESTABLISHED
  TCP    10.20.68.123:59214     142.251.42.78:443      ESTABLISHED
  TCP    10.20.68.123:59222     172.217.194.84:443     ESTABLISHED
  TCP    127.0.0.1:49677        127.0.0.1:49678        ESTABLISHED
  TCP    127.0.0.1:49678        127.0.0.1:49677        ESTABLISHED
  TCP    127.0.0.1:49679        127.0.0.1:49680        ESTABLISHED
  TCP    127.0.0.1:49680        127.0.0.1:49679        ESTABLISHED
  TCP    127.0.0.1:49681        127.0.0.1:49682        ESTABLISHED
  TCP    127.0.0.1:49682        127.0.0.1:49681        ESTABLISHED
```

4)

Date: 06/07/2025

```
===========================================================================
Interface List
 16...........................ExpressVPN TUN Driver
 14...fa 54 f6 65 e3 1f ......Microsoft Wi-Fi Direct Virtual Adapter
 10...fe 54 f6 65 e3 1f ......Microsoft Wi-Fi Direct Virtual Adapter #2
 11...f8 54 f6 65 e3 1f ......Realtek RTL8822CE 802.11ac PCIe Adapter
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0        10.20.1.1     10.20.68.123     40
         10.20.0.0      255.255.0.0         On-link      10.20.68.123    296
     10.20.68.123  255.255.255.255         On-link      10.20.68.123    296
    10.20.255.255  255.255.255.255         On-link      10.20.68.123    296
        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
        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      10.20.68.123    296
  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      10.20.68.123    296
===========================================================================
Persistent Routes:
  None

IPv6 Route Table
===========================================================================
Active Routes:
 If Metric Network Destination      Gateway
  1    331 ::1/128                  On-link
 11    296 fe80::/64                On-link
 11    296 fe80::8cc8:10a2:9f93:5e5/128
                                    On-link
  1    331 ff00::/8                 On-link
 11    296 ff00::/8                 On-link
```

5)

Date: 06/07/2025

```
Active Connections

  Proto  Local Address          Foreign Address        State           PID
  TCP    10.20.68.123:49419     4.213.25.241:https     ESTABLISHED     5600
  TCP    10.20.68.123:58060     a23-38-59-250:http     ESTABLISHED     1880
  TCP    10.20.68.123:58065     a23-212-254-34:https   CLOSE_WAIT      1880
  TCP    10.20.68.123:58066     a23-212-254-34:https   CLOSE_WAIT      1880
  TCP    10.20.68.123:58130     ec2-13-204-106-34:https  ESTABLISHED     5024
  TCP    10.20.68.123:59164     dns:https              ESTABLISHED     12888
  TCP    10.20.68.123:59165     sb-in-f188:5228        ESTABLISHED     12888
  TCP    10.20.68.123:59173     bom12s09-in-f10:https  ESTABLISHED     12888
  TCP    10.20.68.123:59180     172.64.155.209:https   ESTABLISHED     12888
  TCP    10.20.68.123:59181     104.18.32.47:https     ESTABLISHED     12888
  TCP    10.20.68.123:59204     pnbomb-az-in-f10:https  TIME_WAIT      0
  TCP    10.20.68.123:59213     bom12s16-in-f3:https   ESTABLISHED     12888
  TCP    10.20.68.123:59214     bom12s21-in-f14:https  TIME_WAIT       0
  TCP    10.20.68.123:59222     si-in-f84:https        ESTABLISHED     12888
  TCP    10.20.68.123:59226     pnbomb-ab-in-f10:https  ESTABLISHED    12888
  TCP    10.20.68.123:59227     pnbomb-ac-in-f14:https  ESTABLISHED    12888
  TCP    10.20.68.123:59228     bom12s13-in-f4:https   CLOSE_WAIT      12888
  TCP    127.0.0.1:49677        LAPTOP-9HKGOLTP:49678  ESTABLISHED     2716
  TCP    127.0.0.1:49678        LAPTOP-9HKGOLTP:49677  ESTABLISHED     2716
  TCP    127.0.0.1:49679        LAPTOP-9HKGOLTP:49680  ESTABLISHED     3424
  TCP    127.0.0.1:49680        LAPTOP-9HKGOLTP:49679  ESTABLISHED     3424
  TCP    127.0.0.1:49681        LAPTOP-9HKGOLTP:49682  ESTABLISHED     4656
  TCP    127.0.0.1:49682        LAPTOP-9HKGOLTP:49681  ESTABLISHED     4656
```

7. Nslookup

Description:

No.	Option	Description
1	Nslookup	is a command-line tool used to query DNS servers and retrieve information about domain names, IP addresses, mail servers, and more
2	-type=A	Lookup IPv4 address records (default).
3	-type=AAAA	Lookup IPv6 address records
4	-type=MX	Displays the routing table (same as route print).
5	8.8.8.8	Reverse IP lookup

1)

```
Default Server:  csp1.zte.com.cn
Address:  fe80::1
```

Date: 06/07/2025

2)

```
C:\Users\student>nslookup freefiremax.com
Server:  UnKnown
Address:  10.20.1.1

Non-authoritative answer:
Name:    freefiremax.com
Address:  103.224.212.217
```

3)

```
Server:  dns.google
Address:  8.8.8.8

Non-authoritative answer:
Name:    openai.com
Addresses:  104.18.33.45
          172.64.154.211
```

4)

```
Server:  csp1.zte.com.cn
Address:  fe80::1

Non-authoritative answer:
Name:    google.com
Address:  2404:6800:4009:831::200e
```

5)

```
Server:  csp1.zte.com.cn
Address:  fe80::1

Non-authoritative answer:
Name:    google.com
Address:  142.251.42.78
```

8. Hostname

Description:

No.	Option	Description
1	Hostname	The hostname command is used to display the name of the current computer (host) on a network.

1)

Date: 06/07/2025

```
C:\Users\Keval>hostname
LAPTOP-ENDD6VEN
```

9. Pathping

Description:

No.	Option	Description
1	Pathping	pathping is especially helpful for detecting where in a network path packet loss occurs. Let me know if you want a comparison with ping and tracert or want results explained.
2	/n	Do not resolve IP addresses to hostnames (faster output)
3	/h	Limit the maximum number of hops (default is 30)
4	/g	Specify a list of gateways (routers) the packet must go through.
5	/p	Set the wait time (in milliseconds) between pings (default is 250ms).

1)

```
Tracing route to google.com [142.250.67.238]
over a maximum of 30 hops:
  0  LAPTOP-9HKGOLTP [192.168.1.3]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                          LAPTOP-9HKGOLTP [192.168.1.3]

Trace complete.
```

2)

Date: 06/07/2025

```
A target name or address must be specified.

Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]
                [-p period] [-q num_queries] [-w timeout]
                [-4] [-6] target_name

Options:
    -g host-list     Loose source route along host-list.
    -h maximum_hops  Maximum number of hops to search for target.
    -i address       Use the specified source address.
    -n               Do not resolve addresses to hostnames.
    -p period        Wait period milliseconds between pings.
    -q num_queries   Number of queries per hop.
    -w timeout       Wait timeout milliseconds for each reply.
    -4               Force using IPv4.
    -6               Force using IPv6.
```

3)

```
Tracing route to google.com [142.250.67.238]
over a maximum of 15 hops:
  0  LAPTOP-9HKGOLTP [192.168.1.3]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                          LAPTOP-9HKGOLTP [192.168.1.3]

Trace complete.
```

4)

```
Tracing route to google.com [142.250.67.238]
over a maximum of 30 hops:
  0  LAPTOP-9HKGOLTP [192.168.1.3]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                          LAPTOP-9HKGOLTP [192.168.1.3]

Trace complete.
```

5)

Date: 06/07/2025

```
Tracing route to google.com [142.250.67.238]
over a maximum of 30 hops:
  0  LAPTOP-9HKGOLTP [192.168.1.3]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                          LAPTOP-9HKGOLTP [192.168.1.3]

Trace complete.
```

10.Arp

Description:

No.	Option	Description
1	Arp	The arp command is used to view and manage the ARP (Address Resolution Protocol) cache on a computer. It helps map IP addresses to MAC (hardware) addresses, which is essential for network communication within a local subnet
2	-a	Display current ARP entries
3	-g	Same as -a
4	-v	Verbose mode – show more details
5	-d*	Delete all ARP entries

1)

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

Interface: 10.27.195.130 --- 0xc
  Internet Address      Physical Address      Type
  10.27.195.60          b6-66-ee-54-63-da     dynamic
  10.27.195.255         ff-ff-ff-ff-ff-ff     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
  239.255.102.18        01-00-5e-7f-66-12     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

2)

Date: 06/07/2025

```
C:\Users\Keval>arp

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

  -a            Displays current ARP entries by interrogating the current
                protocol data.  If inet_addr is specified, the IP and Physical
                addresses for only the specified computer are displayed.  If
                more than one network interface uses ARP, entries for each ARP
                table are displayed.
  -g            Same as -a.
  -v            Displays current ARP entries in verbose mode.  All invalid
                entries and entries on the loop-back interface will be shown.
  inet_addr     Specifies an internet address.
  -N if_addr    Displays the ARP entries for the network interface specified
                by if_addr.
  -d            Deletes the host specified by inet_addr. inet_addr may be
                wildcarded with * to delete all hosts.
  -s            Adds the host and associates the Internet address inet_addr
                with the Physical address eth_addr.  The Physical address is
                given as 6 hexadecimal bytes separated by hyphens. The entry
                is permanent.
  eth_addr      Specifies a physical address.
  if_addr       If present, this specifies the Internet address of the
                interface whose address translation table should be modified.
                If not present, the first applicable interface will be used.
Example:
  > arp -s 157.55.85.212   00-aa-00-62-c6-09  .... Adds a static entry.
  > arp -a                                    .... Displays the arp table.
```

3)

Date: 06/07/2025

```
C:\Users\Keval>arp -g

Interface: 10.27.195.130 --- 0xc
  Internet Address      Physical Address      Type
  10.27.195.60          b6-66-ee-54-63-da     dynamic
  10.27.195.255         ff-ff-ff-ff-ff-ff     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
  239.255.102.18        01-00-5e-7f-66-12     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

4)

```
C:\Users\Keval>arp -v

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

  -a            Displays current ARP entries by interrogating the current
                protocol data.  If inet_addr is specified, the IP and Physical
                addresses for only the specified computer are displayed.  If
                more than one network interface uses ARP, entries for each ARP
                table are displayed.
  -g            Same as -a.
  -v            Displays current ARP entries in verbose mode.  All invalid
                entries and entries on the loop-back interface will be shown.
  inet_addr     Specifies an internet address.
  -N if_addr    Displays the ARP entries for the network interface specified
                by if_addr.
  -d            Deletes the host specified by inet_addr. inet_addr may be
                wildcarded with * to delete all hosts.
  -s            Adds the host and associates the Internet address inet_addr
                with the Physical address eth_addr.  The Physical address is
                given as 6 hexadecimal bytes separated by hyphens. The entry
                is permanent.
  eth_addr      Specifies a physical address.
  if_addr       If present, this specifies the Internet address of the
                interface whose address translation table should be modified.
                If not present, the first applicable interface will be used.
Example:
  > arp -s 157.55.85.212   00-aa-00-62-c6-09  .... Adds a static entry.
  > arp -a                                    .... Displays the arp table.
```

Date: 06/07/2025

5)

Date: 06/07/2025

```
C:\Users\Keval>arp -d*

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s inet_addr eth_addr [if_addr]
ARP -d inet_addr [if_addr]
ARP -a [inet_addr] [-N if_addr] [-v]

  -a            Displays current ARP entries by interrogating the current
                protocol data.  If inet_addr is specified, the IP and Physical
                addresses for only the specified computer are displayed.  If
                more than one network interface uses ARP, entries for each ARP
                table are displayed.
  -g            Same as -a.
  -v            Displays current ARP entries in verbose mode.  All invalid
                entries and entries on the loop-back interface will be shown.
  inet_addr     Specifies an internet address.
  -N if_addr    Displays the ARP entries for the network interface specified
                by if_addr.
  -d            Deletes the host specified by inet_addr. inet_addr may be
                wildcarded with * to delete all hosts.
  -s            Adds the host and associates the Internet address inet_addr
                with the Physical address eth_addr.  The Physical address is
                given as 6 hexadecimal bytes separated by hyphens. The entry
                is permanent.
  eth_addr      Specifies a physical address.
  if_addr       If present, this specifies the Internet address of the
                interface whose address translation table should be modified.
                If not present, the first applicable interface will be used.
Example:
  > arp -s 157.55.85.212   00-aa-00-62-c6-09  .... Adds a static entry.
  > arp -a                                    .... Displays the arp table.

C:\Users\Keval>
```