



Date: 6/11/2024

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:

The ipconfig command is a useful utility in Windows operating systems that provides information about a computer's network interfaces and IP configuration. The ipconfig (Internet Protocol Configuration) command is a command-line utility in Microsoft Windows that provides detailed information about the network interfaces and their configurations on a computer. It is an essential tool for network troubleshooting and management. Here are the details about the command and its various options:

No.	Option	Description
1	Ipconfig /all	Display full configuration information.
2	Ipconfig /release	Release the IPv4 address for the specified adapter.
3	Ipconfig /renew	Renew the IPv4 address for the specified adapter.
4	Ipconfig /flushdns	Purges the DNS Resolver cache.
5	Ipconfig /showclassid	Displays all the dhcp class IDs allowed for adapter.

Implementation:

- ipconfig /all



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Semester 5th | Practical Assignment | Computer Networks (2101CS501)

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```
Microsoft Windows [Version 10.0.22631.3672]
(c) Microsoft Corporation. All rights reserved.

C:\Users\LENOVO>ipconfig

'iipconfig' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\LENOVO>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

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

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  . :

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::7354:580b:59aa:e839%22
    IPv4 Address. . . . . : 10.36.15.20
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 10.36.1.1

Ethernet adapter Bluetooth Network Connection:

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

C:\Users\LENOVO>
```

• Ipconfig /all

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

Windows IP Configuration

    Host Name . . . . . : nirav
    Primary Dns Suffix . . . . . :
    Node Type . . . . . : Mixed
    IP Routing Enabled . . . . . : No
    WINS Proxy Enabled . . . . . : No

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Realtek PCIe GbE Family Controller
    Physical Address. . . . . : E8-D8-45-E5-18-F6
    DHCP Enabled . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #3
    Physical Address. . . . . : E8-D8-45-E5-3D-8E
    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 #4
    Physical Address. . . . . : E2-D8-45-E5-3D-8D
    DHCP Enabled . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix . :
    Description . . . . . : Intel(R) Wi-Fi 6 AX201 160MHz
    Physical Address. . . . . : E8-D8-45-E5-3D-8D
    DHCP Enabled . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::7354:580b:59aa:e839%22(Preferred)
    IPv4 Address. . . . . : 10.36.15.20(Preferred)
    Subnet Mask . . . . . : 255.255.0.0
    Lease Obtained . . . . . : Tuesday, June 11, 2024 8:59:26 AM
    Lease Expires . . . . . : Tuesday, June 11, 2024 5:14:13 PM
    Default Gateway . . . . . : 10.36.1.1
    DHCP Server . . . . . : 10.36.1.2
    DHCPv6 IAID . . . . . : 266391621
    DHCPv6 Client DUID . . . . . : 08-01-80-01-2A-76-1E-E4-AB-DF-E5-18-F6
    DNS Servers . . . . . : 8.8.8.8
    NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . :
    Description . . . . . : Bluetooth Device (Personal Area Network)
    Physical Address. . . . . : E8-D8-45-E5-3D-91
    DHCP Enabled . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

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```

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- Ipconfig /release

```
DHCPv6 IAID . . . . . : 266391621
DHCPv6 Client DUID . . . . . : 00-01-80-01-2A-76-1E-10-E4-A8-DF-E5-18-F6
DNS Servers . . . . . : 8.8.8.8
. . . . . : 4.2.2.2
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter Bluetooth Network Connection:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . : 
Description . . . . . : Bluetooth Device (Personal Area Network)
Physical Address. . . . . : E0-D0-45-EE-3D-91
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

C:\Users\LENOVO>
C:\Users\LENOVO>ipconfig /release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

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

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 . : 

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . : 
Link-local IPv6 Address . . . . : fe80::7354:500b:59aa:e839%22
Default Gateway . . . . . : 

Ethernet adapter Bluetooth Network Connection:

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

C:\Users\LENOVO>
```

- Ipconfig /renew

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

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.
No operation can be performed on Bluetooth Network Connection while it has its media disconnected.

Ethernet adapter Ethernet:

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

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 . : 

Wireless LAN adapter Wi-Fi:

Connection-specific DNS Suffix . : 
Link-local IPv6 Address . . . . : fe80::7354:500b:59aa:e839%22
IPv4 Address. . . . . : 10.36.15.29
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . : 10.36.1.1

Ethernet adapter Bluetooth Network Connection:

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

C:\Users\LENOVO>
```



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- Ipconfig /flushdns

```
C:\Users\LENOVO>ipconfig /flushdns
Windows IP Configuration
Successfully flushed the DNS Resolver Cache.
C:\Users\LENOVO>
```

- Ipconfig /showclassid

```
C:\Users\LENOVO>ipconfig /showclassid "Wi-Fi"
Windows IP Configuration
There are no DHCPv4 classes defined for Wi-Fi.
C:\Users\LENOVO>
```



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2. ping

Description:

The ping command is a network utility used to test the reachability of a host on an Internet Protocol (IP) network and to measure the round-trip time for messages sent from the originating host to a destination computer. It helps diagnose network connectivity issues.

No.	Option	Description
1	ping -t example	Ping the specified host until stopped.
2	ping -n count example	Number of echo requests to send.
3	ping -a example	Resolve addresses to hostnames.
4	Ping -i TTL	Time To Live.
5	Ping -l size	Send Echo Request messages with a specified buffer size in bytes.

Implementation:

- ping -t www.google.com

```
C:\Users\LENOVO>ping -t google.com

Pinging google.com [142.250.192.14] with 32 bytes of data:
Reply from 142.250.192.14: bytes=32 time=19ms TTL=116
Reply from 142.250.192.14: bytes=32 time=44ms TTL=116
Reply from 142.250.192.14: bytes=32 time=23ms TTL=116
Reply from 142.250.192.14: bytes=32 time=95ms TTL=116
Reply from 142.250.192.14: bytes=32 time=23ms TTL=116
Reply from 142.250.192.14: bytes=32 time=25ms TTL=116
Reply from 142.250.192.14: bytes=32 time=23ms TTL=116
Reply from 142.250.192.14: bytes=32 time=26ms TTL=116
Reply from 142.250.192.14: bytes=32 time=51ms TTL=116
Reply from 142.250.192.14: bytes=32 time=26ms TTL=116
Reply from 142.250.192.14: bytes=32 time=21ms TTL=116
Reply from 142.250.192.14: bytes=32 time=41ms TTL=116
Reply from 142.250.192.14: bytes=32 time=27ms TTL=116
Reply from 142.250.192.14: bytes=32 time=36ms TTL=116
Reply from 142.250.192.14: bytes=32 time=29ms TTL=116
Reply from 142.250.192.14: bytes=32 time=21ms TTL=116
Reply from 142.250.192.14: bytes=32 time=52ms TTL=116
Reply from 142.250.192.14: bytes=32 time=65ms TTL=116
Reply from 142.250.192.14: bytes=32 time=236ms TTL=116
Reply from 142.250.192.14: bytes=32 time=82ms TTL=116
Reply from 142.250.192.14: bytes=32 time=93ms TTL=116
Reply from 142.250.192.14: bytes=32 time=191ms TTL=116
Reply from 142.250.192.14: bytes=32 time=33ms TTL=116
Reply from 142.250.192.14: bytes=32 time=25ms TTL=116
Reply from 142.250.192.14: bytes=32 time=162ms TTL=116
Reply from 142.250.192.14: bytes=32 time=21ms TTL=116
Reply from 142.250.192.14: bytes=32 time=152ms TTL=116
Reply from 142.250.192.14: bytes=32 time=76ms TTL=116
Reply from 142.250.192.14: bytes=32 time=88ms TTL=116
Reply from 142.250.192.14: bytes=32 time=103ms TTL=116
Request timed out.
Reply from 142.250.192.14: bytes=32 time=23ms TTL=116
Reply from 142.250.192.14: bytes=32 time=98ms TTL=116
Reply from 142.250.192.14: bytes=32 time=42ms TTL=116
Reply from 142.250.192.14: bytes=32 time=38ms TTL=116
Reply from 142.250.192.14: bytes=32 time=50ms TTL=116
Reply from 142.250.192.14: bytes=32 time=56ms TTL=116
Reply from 142.250.192.14: bytes=32 time=25ms TTL=116
Reply from 142.250.192.14: bytes=32 time=24ms TTL=116
Reply from 142.250.192.14: bytes=32 time=98ms TTL=116
Reply from 142.250.192.14: bytes=32 time=26ms TTL=116
Reply from 142.250.192.14: bytes=32 time=225ms TTL=116
Reply from 142.250.192.14: bytes=32 time=29ms TTL=116
Reply from 142.250.192.14: bytes=32 time=54ms TTL=116
Reply from 142.250.192.14: bytes=32 time=29ms TTL=116
Reply from 142.250.192.14: bytes=32 time=25ms TTL=116
Reply from 142.250.192.14: bytes=32 time=19ms TTL=116
Reply from 142.250.192.14: bytes=32 time=22ms TTL=116
Reply from 142.250.192.14: bytes=32 time=19ms TTL=116
Request timed out.
Reply from 142.250.192.14: bytes=32 time=22ms TTL=116
```

- ping -n count www.google.com

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```
C:\Users\LENOVO>
C:\Users\LENOVO>ping -n 5 google.com

Pinging google.com [172.217.166.174] with 32 bytes of data:
Reply from 172.217.166.174: bytes=32 time=28ms TTL=116
Reply from 172.217.166.174: bytes=32 time=21ms TTL=116
Reply from 172.217.166.174: bytes=32 time=23ms TTL=116
Reply from 172.217.166.174: bytes=32 time=29ms TTL=116
Reply from 172.217.166.174: bytes=32 time=26ms TTL=116

Ping statistics for 172.217.166.174:
    Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 21ms, Maximum = 29ms, Average = 25ms

C:\Users\LENOVO>|
```

- ping -a google.com

```
C:\Users\LENOVO>ping -a google.com

Pinging google.com [172.217.166.174] with 32 bytes of data:
Reply from 172.217.166.174: bytes=32 time=80ms TTL=116
Reply from 172.217.166.174: bytes=32 time=78ms TTL=116
Reply from 172.217.166.174: bytes=32 time=91ms TTL=116
Reply from 172.217.166.174: bytes=32 time=205ms TTL=116

Ping statistics for 172.217.166.174:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 78ms, Maximum = 205ms, Average = 113ms

C:\Users\LENOVO>|
```

- ping -l TTL google.com



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```
C:\Users\LENOVO>ping -i 68 google.com

Pinging google.com [142.250.183.110] with 32 bytes of data:
Reply from 142.250.183.110: bytes=32 time=23ms TTL=116
Reply from 142.250.183.110: bytes=32 time=115ms TTL=116
Reply from 142.250.183.110: bytes=32 time=21ms TTL=116
Reply from 142.250.183.110: bytes=32 time=21ms TTL=116

Ping statistics for 142.250.183.110:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 21ms, Maximum = 115ms, Average = 45ms

C:\Users\LENOVO>
```

- ping -l size

```
C:\Users\LENOVO>ping -l 50 google.com

Pinging google.com [2404:6800:4009:832::200e] with 50 bytes of data:
Reply from 2404:6800:4009:832::200e: time=79ms
Reply from 2404:6800:4009:832::200e: time=67ms
Reply from 2404:6800:4009:832::200e: time=58ms
Reply from 2404:6800:4009:832::200e: time=59ms

Ping statistics for 2404:6800:4009:832::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 58ms, Maximum = 79ms, Average = 65ms

C:\Users\LENOVO>
```

3. getmac

Description:

The getmac command is a Windows command-line utility that displays the Media Access Control (MAC) addresses for the network interfaces on a system. It can be used to retrieve the physical address (MAC address) of all network adapters, whether they are active or inactive.

No.	Option	Description
-----	--------	-------------

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1	getmac /fo csv	Specifies the format in which the output is to be displayed. Valid values: "TABLE", "LIST", "CSV"
2	getmac /v	Specifies that verbose output is displayed.
3	getmac /nh	Resolve addresses to hostnames.
4	getmac /s system	Specifies the remote system to connect to.
5	Getmac /u	Specifies the user context under which the command should execute

Implementation:

- getmac /fo csv1

```
C:\Users\LENOVO>getmac /fo csv
"Physical Address","Transport Name"
"E0-D0-45-EE-3D-8D","\Device\Tcpip_{F8ABF95F-DED6-427A-B0AE-2E3E615C0244}"
"E4-A8-DF-E5-18-F6","Media disconnected"
"E0-D0-45-EE-3D-91","Media disconnected"

C:\Users\LENOVO>|
```

- getmac /v

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

Connection Name Network Adapter Physical Address Transport Name
=====
Wi-Fi Intel(R) Wi-Fi E0-D0-45-EE-3D-8D \Device\Tcpip_{F8ABF95F-DED6-427A-B0AE-2E3E615C0244}
Ethernet Realtek PCIe Gb E4-A8-DF-E5-18-F6 Media disconnected
Bluetooth Netwo Bluetooth Devic E0-D0-45-EE-3D-91 Media disconnected

C:\Users\LENOVO>|
```

- getmac /nh

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

E0-D0-45-EE-3D-8D \Device\Tcpip_{F8ABF95F-DED6-427A-B0AE-2E3E615C0244}
E4-A8-DF-E5-18-F6 Media disconnected
E0-D0-45-EE-3D-91 Media disconnected

C:\Users\LENOVO>|
```

- getmac /s



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```
C:\Users\LENOVO>getmac /S NIRAV

Physical Address      Transport Name
=====
E0-D0-45-EE-3D-8D    Media disconnected
E4-A8-DF-E5-18-F6    \Device\Tcpip_{5CC4BD96-33C1-45AD-8805-9202E2248588}

C:\Users\LENOVO>
```

- getmac /u

```
C:\Users\LENOVO>GETMAC /S NIRAV /U WORKGROUP
WARNING: User credentials cannot be used for local connections.

Physical Address      Transport Name
=====
E0-D0-45-EE-3D-8D    Media disconnected
E4-A8-DF-E5-18-F6    \Device\Tcpip_{5CC4BD96-33C1-45AD-8805-9202E2248588}

C:\Users\LENOVO>
```

4. systeminfo

Description:

The 'systeminfo' command is a command-line utility in Windows that provides detailed information about the system's hardware and software configuration. It displays information such as the operating system version, hardware details, network configuration, and other system properties.

No.	Option	Description
1	systeminfo /S	Specifies the remote system to connect to.
2	systeminfo /FO format	Specifies the user context under which the command should execute. Valid values: "TABLE", "LIST", "CSV".
3	systeminfo /NH	Specifies that the "Column Header" should not be displayed in the output. Valid only for TABLE and CSV formats.
4	systeminfo /P	Specifies the password for the given user context. Prompts for input if omitted.
5	systeminfo /U	Specifies the user context under which the command should execute.



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Implementation:

- systeminfo /S

```
C:\Users\LENOVO>systeminfo /S NIRAV

Host Name:                NIRAV
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:         LENOVO
Registered Organization:   N/A
Product ID:                00356-24607-04717-AAOEM
Original Install Date:     11/28/2022, 8:12:20 PM
System Boot Time:          6/13/2024, 12:12:20 PM
System Manufacturer:       LENOVO
System Model:              82K1
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 140 Stepping 2 GenuineIntel ~3187 Mhz
BIOS Version:              LENOVO H4CN23WW(V1.08), 2/11/2022
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:      7,975 MB
Available Physical Memory:  2,551 MB
Virtual Memory: Max Size:   20,775 MB
Virtual Memory: Available:  12,040 MB
Virtual Memory: In Use:      8,735 MB
Page File Location(s):      C:\pagefile.sys
Domain:                     WORKGROUP
Logon Server:                \\NIRAV
Hotfix(s):                  5 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
                           [05]: KB5037959
Network Card(s):            3 NIC(s) Installed.
                           [01]: Intel(R) Wi-Fi 6 AX201 160MHz
                               Connection Name: Wi-Fi
                               Status: Media disconnected
                           [02]: Realtek PCIe GbE Family Controller
                               Connection Name: Ethernet
                               Status: Media disconnected
                           [03]: Remote NDIS based Internet Sharing Device
                               Connection Name: Ethernet 2
                               DHCP Enabled: Yes
                               DHCP Server: 192.168.152.100
                               IP address(es)
                               [01]: 192.168.152.237
                               [02]: fe80::2e40:928:fb0c:33b
                               [03]: 2409:4080:ce9f:32da:a1e1:9eal:ac4a:1e69
                               [04]: 2409:4080:ce84:62a5:a1e1:9eal:ac4a:1e69
                               [05]: 2409:4080:ce84:62a5:22b9:ffdc:643:d436
                               [06]: 2409:4080:ce1f:e8e6:a1e1:9eal:ac4a:1e69
                               [07]: 2409:4080:ce1f:e8e6:1eb3:ada4:1130:5d5c
                               [08]: 2409:4080:ce1c:8eeb:c93c:82ac:53eb:6233
                               [09]: 2409:4080:ce1c:8eeb:a1e1:9eal:ac4a:1e69
                               [10]: 2409:4080:ce0f:1c8b:a1e1:9eal:ac4a:1e69
                               [11]: 2409:4080:ce0f:1c8b:64c:c174:9ad2:1646
                               [12]: 2409:4080:ce9f:32da:bf7f:efeb:3b42:a05b
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.

C:\Users\LENOVO>
```

- systeminfo /FO format



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```
C:\Users\LENOVO>systeminfo /FO LIST

Host Name:                NIRAV
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:         LENOVO
Registered Organization:   N/A
Product ID:               00356-24607-04717-AAOEM
Original Install Date:     11/28/2022, 8:12:20 PM
System Boot Time:         6/13/2024, 12:12:20 PM
System Manufacturer:      LENOVO
System Model:              82K1
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 140 Stepping 2 GenuineIntel ~3187 Mhz
BIOS Version:              LENOVO H4CN23WW(V1.08), 2/11/2022
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:     7,975 MB
Available Physical Memory: 2,103 MB
Virtual Memory: Max Size: 20,775 MB
Virtual Memory: Available: 11,933 MB
Virtual Memory: In Use:    8,842 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\NIRAV
Hotfix(s):                  5 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
                           [05]: KB5037959
Network Card(s):           3 NIC(s) Installed.
                           [01]: Intel(R) Wi-Fi 6 AX201 160MHz
                               Connection Name: Wi-Fi
                               Status: Media disconnected
                           [02]: Realtek PCIe GbE Family Controller
                               Connection Name: Ethernet
                               Status: Media disconnected
                           [03]: Remote NDIS based Internet Sharing Device
                               Connection Name: Ethernet 2
                               DHCP Enabled: Yes
                               DHCP Server: 192.168.152.100
                               IP address(es)
                               [01]: 192.168.152.237
                               [02]: fe80::2e40:928:fb0c:33b
                               [03]: 2409:4080:ce9f:32da:a1e1:9eal:ac4a:1e69
                               [04]: 2409:4080:ce84:62a5:a1e1:9eal:ac4a:1e69
                               [05]: 2409:4080:ce84:62a5:22b9:ffdc:643:d436
                               [06]: 2409:4080:ce1f:e8e6:a1e1:9eal:ac4a:1e69
                               [07]: 2409:4080:ce1f:e8e6:1eb3:ada4:1130:5d5c
                               [08]: 2409:4080:ce1c:8eeb:c93c:82ac:53eb:6233
                               [09]: 2409:4080:ce1c:8eeb:a1e1:9eal:ac4a:1e69
                               [10]: 2409:4080:ce0f:1c8b:a1e1:9eal:ac4a:1e69
                               [11]: 2409:4080:ce0f:1c8b:64c:c174:9ad2:1646
                               [12]: 2409:4080:ce9f:32da:bf7f:efeb:3b42:a05b
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.
C:\Users\LENOVO>
```

- systeminfo /U



DARSHAN INSTITUTE OF ENGINEERING & TECHNOLOGY

Semester 5th | Practical Assignment | Computer Networks (2101CS501)

Date: 6/11/2024

```
C:\Users\LENOVO>systeminfo
WARNING: User credentials cannot be used for local connections

Host Name:                             NIRA-V
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:                       LENOVO
Registered Organization:                 N/A
Product ID:                             00356-24607-04717-AAOEM
Original Install Date:                   11/28/2022, 8:12:20 PM
System Boot Time:                       6/13/2024, 12:12:20 PM
System Manufacturer:                   LENOVO
System Model:                           82K1
System Type:                             x64-based PC
Processor(s):                           1 Processor(s) Installed.
                                           [01]: Intel64 Family 6 Model 140 Stepping 2 GenuineIntel ~3187 Mhz
BIOS Version:                           LENOVO H4CN23WW(V1.08), 2/11/2022
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:                   7,975 MB
Available Physical Memory:                2,012 MB
Virtual Memory: Max Size:                20,775 MB
Virtual Memory: Available:               11,734 MB
Virtual Memory: In Use:                  9,041 MB
Page File Location(s):                  C:\pagefile.sys
Domain:                                 WORKGROUP
Logon Server:                           \\NIRA-V
Hotfix(s):                              5 Hotfix(s) Installed.
                                           [01]: KB5037591
                                           [02]: KB5012170
                                           [03]: KB5027397
                                           [04]: KB5039212
                                           [05]: KB5037959
Network Card(s):                        3 NIC(s) Installed.
                                           [01]: Intel(R) Wi-Fi 6 AX201 160MHz
                                           Connection Name: Wi-Fi
                                           Status: Media disconnected
                                           [02]: Realtek PCIe GbE Family Controller
                                           Connection Name: Ethernet
                                           Status: Media disconnected
                                           [03]: Remote NDIS based Internet Sharing Device
                                           Connection Name: Ethernet 2
                                           DHCP Enabled: Yes
                                           DHCP Server: 192.168.152.100
                                           IP address(es)
                                           [01]: 192.168.152.237
                                           [02]: fe80::2e40:928:fb0c:33b
                                           [03]: 2409:4080:ce9f:32da:a1e1:9eal:ac4a:1e69
                                           [04]: 2409:4080:ce84:62a5:a1e1:9eal:ac4a:1e69
                                           [05]: 2409:4080:ce84:62a5:22b9:ffdc:643:d436
                                           [06]: 2409:4080:ce1f:e8e6:a1e1:9eal:ac4a:1e69
                                           [07]: 2409:4080:ce1f:e8e6:1eb3:ada4:1130:5d5c
                                           [08]: 2409:4080:ce1c:8eeb:c93c:82ac:53eb:6233
                                           [09]: 2409:4080:ce1c:8eeb:a1e1:9eal:ac4a:1e69
                                           [10]: 2409:4080:ce0f:1c8b:a1e1:9eal:ac4a:1e69
                                           [11]: 2409:4080:ce0f:1c8b:64c:c174:9ad2:1646
                                           [12]: 2409:4080:ce9f:32da:bf7f:efeb:3b42:a05b
Hyper-V Requirements:                   A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

- systeminfo /NH

```
C:\Users\LENOVO>systeminfo /fo CSV /nh
"NIRA-V","Microsoft Windows 11 Home Single Language","10.0.22631 N/A Build 22631","Microsoft Corporation","Standalone Workstation","Multiprocessor Free","LENOVO","N/A","00356-24607-04717-AAOEM","11/28/2022, 8:12:20 PM","6/13/2024, 12:12:20 PM","LENOVO","82K1","x64-based PC","1 Processor(s) Installed. [01]: Intel64 Family 6 Model 140 Stepping 2 GenuineIntel ~3187 Mhz","LENOVO H4CN23WW(V1.08), 2/11/2022","C:\WINDOWS","C:\WINDOWS\system32","\\Device\HarddiskVolume1","en-us;English (United States)","00004009","(UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi","1,937 MB","20,775 MB","11,682 MB","9,173 MB","C:\pagefile.sys","WORKGROUP","\\NIRA-V","5 Hotfix(s) Installed. [01]: KB5037591, [02]: KB5012170, [03]: KB5027397, [04]: KB5039212, [05]: KB5037959","3 NIC(s) Installed. [01]: Intel(R) Wi-Fi 6 AX201 160MHz, Connection Name: Wi-Fi, Status: Media disconnected, [02]: Realtek PCIe GbE Family Controller, Connection Name: Ethernet, Status: Media disconnected, [03]: Remote NDIS based Internet Sharing Device, Connection Name: Ethernet 2, DHCP Enabled: Yes, DHCP Server: 192.168.152.100, IP address(es) [01]: 192.168.152.237, [02]: fe80::2e40:928:fb0c:33b, [03]: 2409:4080:ce9f:32da:a1e1:9eal:ac4a:1e69, [04]: 2409:4080:ce84:62a5:a1e1:9eal:ac4a:1e69, [05]: 2409:4080:ce84:62a5:22b9:ffdc:643:d436, [06]: 2409:4080:ce1f:e8e6:a1e1:9eal:ac4a:1e69, [07]: 2409:4080:ce1f:e8e6:1eb3:ada4:1130:5d5c, [08]: 2409:4080:ce1c:8eeb:c93c:82ac:53eb:6233, [09]: 2409:4080:ce1c:8eeb:a1e1:9eal:ac4a:1e69, [10]: 2409:4080:ce0f:1c8b:a1e1:9eal:ac4a:1e69, [11]: 2409:4080:ce0f:1c8b:64c:c174:9ad2:1646, [12]: 2409:4080:ce9f:32da:bf7f:efeb:3b42:a05b","A hypervisor has been detected. Features required for Hyper-V will not be displayed."
```

- systeminfo /P



Date: 6/11/2024

```
C:\Users\LENOVO>systeminfo /S NIRAV /U WORKGROUP /P 123
WARNING: User credentials cannot be used for local connections

Host Name:                NIRAV
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:        LENOVO
Registered Organization:  N/A
Product ID:              00356-24607-04717-AAOEM
Original Install Date:   11/28/2022, 8:12:20 PM
System Boot Time:        6/13/2024, 12:12:20 PM
System Manufacturer:     LENOVO
System Model:             82K1
System Type:             x64-based PC
Processor(s):             1 Processor(s) Installed.
                          [01]: Intel64 Family 6 Model 140 Stepping 2 GenuineIntel ~3187 Mhz
BIOS Version:             LENOVO H4CN23WW(V1.08), 2/11/2022
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:    7,975 MB
Available Physical Memory: 1,254 MB
Virtual Memory: Max Size: 20,775 MB
Virtual Memory: Available: 11,392 MB
Virtual Memory: In Use:   9,383 MB
Page File Location(s):    C:\pagefile.sys
Domain:                   WORKGROUP
Logon Server:             \\NIRAV
Hotfix(s):                5 Hotfix(s) Installed.
                          [01]: KB5037591
                          [02]: KB5012170
                          [03]: KB5027397
                          [04]: KB5039212
                          [05]: KB5037959
Network Card(s):          3 NIC(s) Installed.
                          [01]: Intel(R) Wi-Fi 6 AX201 160MHz
                              Connection Name: Wi-Fi
                              Status: Media disconnected
                          [02]: Realtek PCIe GbE Family Controller
                              Connection Name: Ethernet
                              Status: Media disconnected
                          [03]: Remote NDIS based Internet Sharing Device
                              Connection Name: Ethernet 2
                              DHCP Enabled: Yes
                              DHCP Server: 192.168.152.100
                              IP address(es)
                              [01]: 192.168.152.237
                              [02]: fe80::2e40:928:fb0c:33b
                              [03]: 2409:4080:ce9f:32da:e116:a1d2:74d0:4afb
                              [04]: 2409:4080:ce9f:32da:bf7f:efeb:3b42:a05b
Hyper-V Requirements:     A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

5. tracert

Description:

The 'tracert' (short for "trace route") command in Windows is a diagnostic tool used to track the path that packets take from your computer to a specified destination (like a website or IP address). It shows each hop along the route and the time it takes for each hop.

No.	Option	Description
1	tracert -d	Do not resolve addresses to hostnames.
2	tracert -h	Maximum number of hops to search for target.
3	tracert -w	Wait timeout milliseconds for each reply.
4	tracert -4	Force using IPv4.
5	tracert -6	Force using IPv6.

Implementation:

- tracert -d

Date: 6/11/2024

```
C:\Users\LENOVO>tracert -d google.com

Tracing route to google.com [2404:6800:4009:82c::200e]
over a maximum of 30 hops:

  1      1 ms      <1 ms      <1 ms      2409:4080:ce9f:32da::bd
  2      *          *          *          Request timed out.
  3     42 ms     36 ms     38 ms     2405:200:324:eeee:20::36
  4     41 ms     45 ms     41 ms     2405:200:801:2700::6c
  5     45 ms    339 ms     47 ms     2405:200:801:2700::6b
  6      *          *          *          Request timed out.
  7     61 ms     49 ms     59 ms     2001:4860:1:1::a7c
  8     60 ms     45 ms     59 ms     2404:6800:8157::1
  9     65 ms     48 ms     66 ms     2001:4860:0:1::5cd2
 10    362 ms     47 ms     57 ms     2001:4860:0:1::269f
 11     57 ms     65 ms     55 ms     2404:6800:4009:82c::200e

Trace complete.

C:\Users\LENOVO>
```

- tracert -h

```
C:\Users\LENOVO>tracert -h 5 google.com

Tracing route to google.com [2404:6800:4009:82c::200e]
over a maximum of 5 hops:

  1      <1 ms      1 ms      <1 ms      2409:4080:ce9f:32da::bd
  2      *          *          *          Request timed out.
  3     53 ms     36 ms     36 ms     2405:200:324:eeee:20::36
  4    352 ms     36 ms     37 ms     2405:200:801:2700::6c
  5     47 ms     37 ms     38 ms     2405:200:801:2700::6b

Trace complete.
```

- tracert -w



Date: 6/11/2024

```
C:\Users\LENOVO>tracert -h 5 -w 1000 google.com

Tracing route to google.com [2404:6800:4009:82c::200e]
over a maximum of 5 hops:

  1      1 ms      <1 ms      <1 ms      2409:4080:ce9f:32da::bd
  2      *         *         *         Request timed out.
  3     52 ms     39 ms     38 ms     2405:200:324:eeee:20::36
  4    352 ms    35 ms     38 ms     2405:200:801:2700::6c
  5     47 ms    37 ms     38 ms     2405:200:801:2700::6b

Trace complete.
```

- tracert -4

```
C:\Users\LENOVO>tracert -4 -h 5 google.com

Tracing route to google.com [142.251.42.110]
over a maximum of 5 hops:

  1      1 ms      1 ms      1 ms      192.168.162.25
  2      *         *         *         Request timed out.
  3      *         *         *         Request timed out.
  4      *         *         *         Request timed out.
  5     50 ms     47 ms     38 ms     172.17.185.2

Trace complete.
```

- tracert -6

```
C:\Users\LENOVO>tracert -6 -h 5 google.com

Tracing route to google.com [2404:6800:4009:82c::200e]
over a maximum of 5 hops:

  1      2 ms      2 ms      1 ms      2409:4080:ce9f:32da::47
  2      *         *         *         Request timed out.
  3     51 ms     37 ms     39 ms     2405:200:324:eeee:20::34
  4     38 ms     38 ms     38 ms     2405:200:801:2700::68
  5     65 ms     32 ms     37 ms     2405:200:801:2700::67

Trace complete.
```




Date: 6/11/2024

6. netstat

Description:

The 'netstat' (network statistics) command is a powerful networking tool in Windows that displays various network connections, routing tables, interface statistics, masquerade connections, and multicast memberships. It's widely used for diagnosing network issues and monitoring network performance.

No.	Option	Description
1	netstat -a	Displays all connections and listening ports.
2	netstat -e	Displays Ethernet statistics. This may be combined with the -s option.
3	netstat -f	Displays Fully Qualified Domain Names (FQDN) for foreign addresses.
4	netstat -i	Displays the time spent by a TCP connection in its current state.
05	netstat -x	Displays NetworkDirect connections, listeners, and shared endpoints.

Date: 6/11/2024

Implementation:

- netstat -a

```
C:\Users\LENOVO>netstat -a

Active Connections

Proto Local Address          Foreign Address         State
TCP 0.0.0.0:135             nirav:0                 LISTENING
TCP 0.0.0.0:445             nirav:0                 LISTENING
TCP 0.0.0.0:5040            nirav:0                 LISTENING
TCP 0.0.0.0:7680            nirav:0                 LISTENING
TCP 0.0.0.0:49664           nirav:0                 LISTENING
TCP 0.0.0.0:49665           nirav:0                 LISTENING
TCP 0.0.0.0:49666           nirav:0                 LISTENING
TCP 0.0.0.0:49667           nirav:0                 LISTENING
TCP 0.0.0.0:49668           nirav:0                 LISTENING
TCP 0.0.0.0:49670           nirav:0                 LISTENING
TCP 127.0.0.1:9080          nirav:0                 LISTENING
TCP 127.0.0.1:27017         nirav:0                 LISTENING
TCP 127.0.0.1:49722         nirav:65001             ESTABLISHED
TCP 127.0.0.1:49740         nirav:0                 LISTENING
TCP 127.0.0.1:49740         nirav:64293             ESTABLISHED
TCP 127.0.0.1:49740         nirav:64465             FIN_WAIT_2
TCP 127.0.0.1:64293        nirav:49740             ESTABLISHED
TCP 127.0.0.1:64465        nirav:49740             CLOSE_WAIT
TCP 127.0.0.1:65001        nirav:0                 LISTENING
TCP 127.0.0.1:65001        nirav:49722             ESTABLISHED
TCP 192.168.162.173:139     nirav:0                 LISTENING
TCP 192.168.162.173:64511  10.71.11.186:ms-do      SYN_SENT
TCP 192.168.162.173:64512  10.71.14.239:ms-do      SYN_SENT
TCP 192.168.162.173:64514  49.44.192.32:https      ESTABLISHED
TCP [::]:135                nirav:0                 LISTENING
TCP [::]:445                nirav:0                 LISTENING
TCP [::]:7680              nirav:0                 LISTENING
TCP [::]:49664             nirav:0                 LISTENING
TCP [::]:49665             nirav:0                 LISTENING
TCP [::]:49666             nirav:0                 LISTENING
TCP [::]:49667             nirav:0                 LISTENING
TCP [::]:49668             nirav:0                 LISTENING
TCP [::]:49670             nirav:0                 LISTENING
TCP [::]:49669             nirav:0                 LISTENING
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:49427 [2603:1046:a06:6::]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:49428 [2603:1046:a06:6::]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64476 [2603:1046:1400:1::2]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64479 sc-in-f188:5228         ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64487 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64488 [2603:1046:1404:1::18]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64489 [2603:1046:1404:1::18]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64492 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64493 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64494 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64495 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64496 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64497 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64498 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64499 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64500 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64501 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64502 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64503 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64504 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64505 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64506 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64507 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64508 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64509 [2603:1046:1400:1::e]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64510 [64:ff9b:34b6:8d3f]:https ESTABLISHED
TCP [2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64517 [64:ff9b:2877:f9e4]:https ESTABLISHED
UDP 0.0.0.0:5050             *:*
```

- netstat -e

Date: 6/11/2024

```
C:\Users\LENOVO>netstat -e
Interface Statistics
```

	Received	Sent
Bytes	32617176	4636848
Unicast packets	27762	21144
Non-unicast packets	12	1074
Discards	0	0
Errors	0	0
Unknown protocols	0	

```
C:\Users\LENOVO>|
```

- netstat -f

```
C:\Users\LENOVO>netstat -f
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:49722	nirav:65001	ESTABLISHED
TCP	127.0.0.1:49740	nirav:64293	ESTABLISHED
TCP	127.0.0.1:64293	nirav:49740	ESTABLISHED
TCP	127.0.0.1:65001	nirav:49722	ESTABLISHED
TCP	192.168.162.173:64540	10.65.8.11:ms-do	SYN_SENT
TCP	192.168.162.173:64541	192.168.137.155:ms-do	SYN_SENT
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:49427	[2603:1040:a06:6::]:https	ESTABLISHED
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:49428	[2603:1040:a06:6::]:https	ESTABLISHED
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64476	[2603:1046:1400:1::2]:https	ESTABLISHED
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64479	sc-in-f188.1e100.net:5228	ESTABLISHED
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64524	[2603:1046:1400:1::e]:https	TIME_WAIT
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64525	[2603:1046:1400:1::e]:https	ESTABLISHED
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64526	[2603:1046:1404:1::18]:https	TIME_WAIT
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64527	[2603:1046:1404:1::18]:https	TIME_WAIT
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64533	[2603:1046:1400:1::e]:https	ESTABLISHED
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64538	[2603:1046:1406::5]:https	TIME_WAIT
TCP	[2409:4080:ce9f:32da:a0ef:dd47:4d27:f222]:64539	[2603:1046:1404:1::18]:https	ESTABLISHED

- netstat -i

```
C:\Users\LENOVO>netstat -i
```

Active Connections

Proto	Local Address	Foreign Address	State	Time in State (ms)
TCP	127.0.0.1:49722	nirav:65001	ESTABLISHED	27693791
TCP	127.0.0.1:49740	nirav:64293	ESTABLISHED	1101560
TCP	127.0.0.1:64293	nirav:49740	ESTABLISHED	1101560
TCP	127.0.0.1:65001	nirav:49722	ESTABLISHED	27693791

```
C:\Users\LENOVO>|
```

- netstat -x



Date: 6/11/2024

```
C:\Users\LENOVO>netstat -x
Active NetworkDirect Connections, Listeners, SharedEndpoints
Mode    IfIndex Type          Local Address      Foreign Address     PID
C:\Users\LENOVO>
```

7. nslookup

Description:

The 'nslookup' (name server lookup) command is a network administration command-line tool available in many computer operating systems for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or for any other specific DNS record.

No.	Option	Description
1	nslookup	Displays information that you can use to diagnose Domain Name System infrastructure
2	nslookup is	Lists information for a DNS domain
3	nslookup finger	Connects with the finger server on the current computer.
4	nslookup -port	Specify a different port.
5	nslookup -timeout	Set timeout for a reply.

Implementation:

- nslookup

```
C:\Users\LENOVO>nslookup
Default Server:  UnKnown
Address:  192.168.162.25
> |
```

- nslookup is

```
C:\Users\LENOVO>nslookup is
Server:  UnKnown
Address:  192.168.162.25

DNS request timed out.
        timeout was 2 seconds.
Name:    is.
```



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- nslookup finger

```
C:\Users\LENOVO>nslookup finger
Server: UnKnown
Address: 192.168.162.25

*** UnKnown can't find finger: Non-existent domain
```

- nslookup -port

```
C:\Users\LENOVO>nslookup -port=53 google.com
Server: UnKnown
Address: 192.168.162.25

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4009:832::200e
           142.251.42.110
```

- nslookup -timeout

```
C:\Users\LENOVO>nslookup -timeout=10 google.com
Server: UnKnown
Address: 192.168.162.25

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4009:832::200e
           142.251.42.110
```

8. hostname

Description:

The 'hostname' command in Windows displays the name of the current host, which is typically the computer name.



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No.	Option	Description
1	hostname -a	Displays all connections and listening ports.
2	hostname -e	Displays Ethernet statistics. This may be combined with the -s option.

Implementation:

```
C:\Users\LENOVO>hostname  
nirav
```

```
C:\Users\LENOVO>hostname -a  
sethostname: Use the Network Control Panel Applet to set hostname.  
hostname -s is not supported.
```

9. pathping

Description:

The 'pathping' command is a network diagnostic tool available in Windows that combines the functionality of 'ping' and 'tracert'. It provides information about network latency and packet loss along the path between the local computer and a specified destination, similar to 'tracert', while also measuring the round-trip time of each hop, similar to ping.

No.	Option	Description
1	pathping -4	Force using IPv4.
2	pathping -g	Loose source route along host-list.
3	pathping -n	Do not resolve addresses to hostnames.
4	pathping -q	Number of queries per hop.
5	pathping -w	Wait timeout milliseconds for each reply.

Implementation:

- pathping -4

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```
C:\Users\LENOVO>pathping -4 -h 5 google.com

Tracing route to google.com [142.250.66.14]
over a maximum of 5 hops:
 0  nirav [192.168.162.173]
 1  192.168.162.25
 2  * * *
Computing statistics for 25 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0                                Lost/Sent = Pct  Lost/Sent = Pct
 0                                0/ 100 = 0%      0/ 100 = 0%      nirav [192.168.162.173]
 1  15ms      0/ 100 = 0%      0/ 100 = 0%      |
                        192.168.162.25
Trace complete.
```

- pathping -g

```
C:\Users\LENOVO>pathping -g -h 5 google.com

Tracing route to google.com [142.251.42.110]
over a maximum of 5 hops:
 0  nirav [192.168.152.237]
 1  * * *
Computing statistics for 0 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0                                Lost/Sent = Pct  Lost/Sent = Pct
 0                                0/ 100 = 0%      0/ 100 = 0%      nirav [192.168.152.237]
Trace complete.
```

- pathping -n

```
C:\Users\LENOVO>pathping -n -h 5 google.com

Tracing route to google.com [142.251.42.110]
over a maximum of 5 hops:
 0  192.168.152.237
 1  192.168.152.100
 2  * * *
Computing statistics for 25 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0                                Lost/Sent = Pct  Lost/Sent = Pct
 0                                0/ 100 = 0%      0/ 100 = 0%      192.168.152.237
 1  0ms      0/ 100 = 0%      0/ 100 = 0%      |
                        192.168.152.100
Trace complete.
```

- pathping -q

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```
C:\Users\LENOVO>pathping -q 3 -h 5 google.com

Tracing route to google.com [142.251.42.110]
over a maximum of 5 hops:
  0  nirav [192.168.152.237]
  1  192.168.152.100
  2  * * *
Computing statistics for 0 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
  0                               Lost/Sent = Pct  Lost/Sent = Pct
  0                               0/  3 =  0%      |
  1    0ms      0/  3 =  0%      0/  3 =  0%      192.168.152.100

Trace complete.
```

- pathping -w

```
C:\Users\LENOVO>pathping -w 100 -h 5 google.com

Tracing route to google.com [142.251.42.110]
over a maximum of 5 hops:
  0  nirav [192.168.152.237]
  1  192.168.152.100
  2  * * *
Computing statistics for 25 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
  0                               Lost/Sent = Pct  Lost/Sent = Pct
  0                               32/ 100 = 32%    |
  1    8ms      32/ 100 = 32%    0/ 100 =  0%     192.168.152.100

Trace complete.
```

Description:

The 'arp' (Address Resolution Protocol) command in Windows displays and modifies the local Address Resolution Protocol (ARP) cache, which maps IP addresses to physical MAC (Media Access Control) addresses on a local network.



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No.	Option	Description
1	arp -a	Display ARP Cache for All Interfaces
2	arp -g	Displays the ARP cache for a specific interface.
3	arp /?	Display and modify the entries in the address resolution protocol.

Implementation:

- arp -a

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

Interface: 192.168.152.237 --- 0xa
Internet Address      Physical Address      Type
192.168.152.100       c2-e2-54-23-0e-6c     dynamic
192.168.152.255       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
239.255.255.250       01-00-5e-7f-ff-fa     static
255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.162.173 --- 0x16
Internet Address      Physical Address      Type
192.168.162.25        62-b6-93-0b-36-0b     dynamic
192.168.162.255       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
239.255.255.250       01-00-5e-7f-ff-fa     static
255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

- arp -g

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

Interface: 192.168.152.237 --- 0xa
Internet Address      Physical Address      Type
192.168.152.100       c2-e2-54-23-0e-6c     dynamic
192.168.152.255       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
239.255.255.250       01-00-5e-7f-ff-fa     static
255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 192.168.162.173 --- 0x16
Internet Address      Physical Address      Type
192.168.162.25        62-b6-93-0b-36-0b     dynamic
192.168.162.255       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
239.255.255.250       01-00-5e-7f-ff-fa     static
255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

- arp /?

```
C:\Users\LENOVO>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.
```