Date: 14/ 06/2024

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:

Ipconfig (standing for "Internet Protocol configuration") is a console application program of some computer operating systems that displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings

No.	Option	Description
1	/all	Display Full configuration information
2	/release	Release the IPv4 address for the specified adapter.
3	/release6	Release the IPv6 address for the specified adapter.
4	/renew	Renew the IPv6 address for the specified adapter.
5	/renew6	Renew the IPv6 address for the specified adapter.

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Implementation:

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

Windows IP Configuration

    Host Name . . . . . . . . . . . . : DESKTOP-FKIOJGD
    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. . . . . . . . . : 54-48-10-B5-68-6D
    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
    Physical Address. . . . . . . . . : 92-32-4B-61-57-F9
    DHCP Enabled. . . . . . . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 10:

    Media State . . . . . . . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
    Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
    Physical Address. . . . . . . . . : A2-32-4B-61-57-F9
    DHCP Enabled. . . . . . . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    Description . . . . . . . . . . . : Qualcomm QCA9377 802.11ac Wireless Adapter
    Physical Address. . . . . . . . . : 90-32-4B-61-57-F9
    DHCP Enabled. . . . . . . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    IPv6 Address. . . . . . . . . . . : 2402:3a80:4431:7cdd:6c37:8803:8a16:4115(Preferred)
    Temporary IPv6 Address. . . . . . : 2402:3a80:4431:7cdd:e571:1c54:ef5f:da27(Preferred)
    Link-local IPv6 Address . . . . . : fe80::620f:ddd8:66cb:6d4%20(Preferred)
    IPv4 Address. . . . . . . . . . . : 192.168.164.190(Preferred)
    Subnet Mask . . . . . . . . . . . : 255.255.255.0
    Lease Obtained. . . . . . . . . . : 15 June 2024 11:17:18
    Lease Expires . . . . . . . . . . : 15 June 2024 13:05:08
    Default Gateway . . . . . . . . . : fe80::c0ba:17ff:feda:41cd%20
                                        192.168.164.177
    DHCP Server . . . . . . . . . . . : 192.168.164.177
    DHCPv6 IAID . . . . . . . . . . . : 311439947
    DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2B-6B-41-4F-54-48-10-B5-68-6D
    DNS Servers . . . . . . . . . . . : 192.168.164.177
    NetBIOS over Tcpip. . . . . . . . : Enabled
```

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```
C:\Users\Ritesh>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.

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 Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2402:a00:182:29f4:1708:f1f0:ee6:9dac
   Temporary IPv6 Address. . . . . . : 2402:a00:182:29f4:c876:229c:1dc6:b558
   Link-local IPv6 Address . . . . . : fe80::620f:ddd8:66cb:6d4%20
   Default Gateway . . . . . . . . . : fe80::1%20
```

```
C:\Users\Ritesh>ipconfig /release6

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.
Adapter Wi-Fi is not enabled for DHCP.

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 Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2402:a00:182:29f4:1708:f1f0:ee6:9dac
   Temporary IPv6 Address. . . . . . : 2402:a00:182:29f4:c876:229c:1dc6:b558
   Link-local IPv6 Address . . . . . : fe80::620f:ddd8:66cb:6d4%20
   IPv4 Address. . . . . . . . . . . : 192.168.1.4
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::1%20
                                       192.168.1.1
```

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```
C:\Users\Ritesh>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* 10 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* 10:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2402:a00:182:29f4:1708:f1f0:ee6:9dac
   Temporary IPv6 Address. . . . . . : 2402:a00:182:29f4:c876:229c:1dc6:b558
   Link-local IPv6 Address . . . . . : fe80::620f:ddd8:66cb:6d4%20
   IPv4 Address. . . . . . . . . . . : 192.168.1.4
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::1%20
                                       192.168.1.1
```

```
C:\Users\Ritesh>ipconfig /renew6

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* 10 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* 10:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2402:a00:182:29f4:1708:f1f0:ee6:9dac
   Temporary IPv6 Address. . . . . . : 2402:a00:182:29f4:c876:229c:1dc6:b558
   Link-local IPv6 Address . . . . . : fe80::620f:ddd8:66cb:6d4%20
   IPv4 Address. . . . . . . . . . . : 192.168.1.4
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::1%20
                                       192.168.1.1
```

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2. ping

Description:

Ping is a command-line utility, available on virtually any operating system with network connectivity, that acts as a test to see if a networked device is reachable. The ping command sends a request over the network to a specific device.

No.	Option	Description
1	-a	Resolve addresses to hostnames.
2	-n count	Number of echo request to send.
3	-l size	Send buffer size.
4	-f	Set Don't Fragment flag in packet (IPv4-only).
5	-i TTL	Time to live.

Implementation:

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

Pinging www.google.com [2404:6800:4009:81f::2004] with 32 bytes of data:
Reply from 2404:6800:4009:81f::2004: time=35ms
Reply from 2404:6800:4009:81f::2004: time=42ms
Reply from 2404:6800:4009:81f::2004: time=40ms
Reply from 2404:6800:4009:81f::2004: time=43ms

Ping statistics for 2404:6800:4009:81f::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 35ms, Maximum = 43ms, Average = 40ms
```

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

Pinging www.google.com [2404:6800:4009:81f::2004] with 32 bytes of data:
Reply from 2404:6800:4009:81f::2004: time=41ms
Reply from 2404:6800:4009:81f::2004: time=38ms
Reply from 2404:6800:4009:81f::2004: time=36ms
Reply from 2404:6800:4009:81f::2004: time=39ms
Reply from 2404:6800:4009:81f::2004: time=39ms

Ping statistics for 2404:6800:4009:81f::2004:
    Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 36ms, Maximum = 41ms, Average = 38ms
```

```
C:\Users\Ritesh>ping -l 5 www.google.com

Pinging www.google.com [2404:6800:4009:82e::2004] with 5 bytes of data:
Reply from 2404:6800:4009:82e::2004: time=33ms
Reply from 2404:6800:4009:82e::2004: time=36ms
Reply from 2404:6800:4009:82e::2004: time=35ms
Reply from 2404:6800:4009:82e::2004: time=38ms

Ping statistics for 2404:6800:4009:82e::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 33ms, Maximum = 38ms, Average = 35ms
```

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```
C:\Users\Ritesh>ping -f www.google.com

Pinging www.google.com [142.251.42.36] with 32 bytes of data:
Reply from 142.251.42.36: bytes=32 time=21ms TTL=59
Reply from 142.251.42.36: bytes=32 time=22ms TTL=59
Reply from 142.251.42.36: bytes=32 time=22ms TTL=59
Reply from 142.251.42.36: bytes=32 time=26ms TTL=59

Ping statistics for 142.251.42.36:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 21ms, Maximum = 26ms, Average = 22ms
```

```
C:\Users\Ritesh>ping -i 5 www.google.com

Pinging www.google.com [2404:6800:4009:805::2004] with 32 bytes of data:
Reply from 2404:6800:4009:805::2004: TTL expired in transit.
Reply from 2404:6800:4009:805::2004: TTL expired in transit.
Reply from 2404:6800:4009:805::2004: TTL expired in transit.
Reply from 2404:6800:4009:805::2004: TTL expired in transit.

Ping statistics for 2404:6800:4009:805::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

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

No.	Option	Description
1	/S	Specifies the remote system to connect to.
2	/U	Specifies the user context under which the command should execute.
3	/P	Specifies the password for the given user context. Prompts for input if omitted.
4	/V	Specifies that verbose output is displayed.
5	/FO	Specifies the format in which the output is to be displayed. Valid values: "TABLE", "LIST", "CSV".

Implementation:

```
C:\Users\Ritesh>getmac /S DESKTOP-FKIOJGD

Physical Address      Transport Name
==================    =========================================================
90-32-4B-61-57-F9     \Device\Tcpip_{E615D4D7-197E-4EB6-9E2D-7295376C1788}
54-48-10-B5-68-6D     Media disconnected
N/A                   Hardware not present
```

```
C:\Users\Ritesh>getmac /S DESKTOP-FKIOJGD /u maindom
WARNING: User credentials cannot be used for local connections.

Physical Address      Transport Name
==================    ===============================================
90-32-4B-61-57-F9     \Device\Tcpip_{E615D4D7-197E-4EB6-9E2D-7295376C1788}
54-48-10-B5-68-6D     Media disconnected
N/A                   Hardware not present
```

```
C:\Users\Ritesh>getmac /S DESKTOP-FKIOJGD /u maindom /p
Type the password for maindom:****

WARNING: User credentials cannot be used for local connections.

Physical Address      Transport Name

==================    ===============================================
90-32-4B-61-57-F9     \Device\Tcpip_{E615D4D7-197E-4EB6-9E2D-7295376C1788}

54-48-10-B5-68-6D     Media disconnected

N/A                   Hardware not present
```

```
C:\Users\Ritesh>getmac /S DESKTOP-FKIOJGD /u maindom /p /fo list
Type the password for maindom:****

WARNING: User credentials cannot be used for local connections.

Physical Address: 90-32-4B-61-57-F9
Transport Name:   \Device\Tcpip_{E615D4D7-197E-4EB6-9E2D-7295376C1788}

Physical Address: 54-48-10-B5-68-6D
Transport Name:   Media disconnected

Physical Address: N/A
Transport Name:   Hardware not present
```

```
C:\Users\Ritesh>getmac /S DESKTOP-FKIOJGD /u maindom /p /fo list /v
Type the password for maindom:****

WARNING: User credentials cannot be used for local connections.

Connection Name:  Wi-Fi
Network Adapter:  Qualcomm QCA9377 802.11ac Wireless Adapter
Physical Address: 90-32-4B-61-57-F9
Transport Name:   \Device\Tcpip_{E615D4D7-197E-4EB6-9E2D-7295376C1788}

Connection Name:  Ethernet
Network Adapter:  Realtek PCIe GBE Family Controller
Physical Address: 54-48-10-B5-68-6D
Transport Name:   Media disconnected

Connection Name:  Citrix Virtual Adapter
Network Adapter:  Citrix Virtual Adapter
Physical Address: N/A
Transport Name:   Hardware not present
```

4. systeminfo

Description:

This tool displays operating system configuration information for a local or remote machine, including service pack levels.

No.	Option	Description
1	/s	Specifies the remote system to connect to.
2	/u	Specifies the user context under which the command should execute.
3	/p	Specifies the password for the given user context. Prompts for input if omitted.
4	/fo	Specifies the format in which the output is to be displayed. Valid values: "TABLE", "LIST", "CSV".
5	/nh	Specifies that the "Column Header" should be displayed in the output. Valid only for "TABLE" and "CSV" formats.

Implementation:

```
C:\Users\Ritesh>systeminfo /s DESKTOP-FKIOJGD

Host Name:                 DESKTOP-FKIOJGD
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:          Ritesh
Registered Organization:
Product ID:                00327-35813-85490-AAOEM
Original Install Date:     01-02-2023, 02:42:01
System Boot Time:          13-06-2024, 22:33:00
System Manufacturer:       Dell Inc.
System Model:              Vostro 3578
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 142 Stepping 10 GenuineIntel ~1600 Mhz
BIOS Version:              Dell Inc. 1.16.0, 16-12-2021
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:     16,249 MB
Available Physical Memory: 8,514 MB
Virtual Memory: Max Size:  18,681 MB
Virtual Memory: Available: 7,825 MB
Virtual Memory: In Use:    10,856 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\DESKTOP-FKIOJGD
Hotfix(s):                 5 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
                           [05]: KB5037959
Network Card(s):           3 NIC(s) Installed.
                           [01]: Qualcomm QCA9377 802.11ac Wireless Adapter
                                 Connection Name: Wi-Fi
                                 DHCP Enabled:    Yes
                                 DHCP Server:     192.168.1.1
                                 IP address(es)
                                 [01]: 192.168.1.4
                                 [02]: fe80::620f:ddd8:66cb:6d4
                                 [03]: 2402:a00:182:29f4:c876:229c:1dc6:b558
                                 [04]: 2402:a00:182:29f4:1708:f1f0:ee6:9dac
                           [02]: Realtek PCIe GBE Family Controller
                                 Connection Name: Ethernet
                                 Status:          Media disconnected
                           [03]: Citrix Virtual Adapter
                                 Connection Name: Citrix Virtual Adapter
                                 Status:          Hardware not present
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

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```
C:\Users\Ritesh>systeminfo /s DESKTOP-FKIOJGD /u maindom
WARNING: User credentials cannot be used for local connections

Host Name:                 DESKTOP-FKIOJGD
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:          Ritesh
Registered Organization:
Product ID:                00327-35813-85490-AAOEM
Original Install Date:     01-02-2023, 02:42:01
System Boot Time:          13-06-2024, 22:33:00
System Manufacturer:       Dell Inc.
System Model:              Vostro 3578
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 142 Stepping 10 GenuineIntel ~1500 Mhz
BIOS Version:              Dell Inc. 1.16.0, 16-12-2021
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:     16,249 MB
Available Physical Memory: 8,375 MB
Virtual Memory: Max Size:  18,681 MB
Virtual Memory: Available: 7,751 MB
Virtual Memory: In Use:    10,930 MB
Page File Location(s):     C:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\DESKTOP-FKIOJGD
Hotfix(s):                 5 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
                           [05]: KB5037959
Network Card(s):           3 NIC(s) Installed.
                           [01]: Qualcomm QCA9377 802.11ac Wireless Adapter
                                 Connection Name: Wi-Fi
                                 DHCP Enabled:    Yes
                                 DHCP Server:     192.168.1.1
                                 IP address(es)
                                 [01]: 192.168.1.4
                                 [02]: fe80::620f:ddd8:66cb:6d4
                                 [03]: 2402:a00:182:29f4:c876:229c:1dc6:b558
                                 [04]: 2402:a00:182:29f4:1708:f1f0:ee6:9dac
                           [02]: Realtek PCIe GBE Family Controller
                                 Connection Name: Ethernet
                                 Status:          Media disconnected
                           [03]: Citrix Virtual Adapter
                                 Connection Name: Citrix Virtual Adapter
                                 Status:          Hardware not present
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

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```
C:\Users\Ritesh>systeminfo /s DESKTOP-FKIOJGD /u maindom /p
Type the password for maindom:****


Host Name:                   DESKTOP-FKIOJGD
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:            Ritesh
Registered Organization:
Product ID:                  00327-35813-85490-AAOEM
Original Install Date:       01-02-2023, 02:42:01
System Boot Time:            13-06-2024, 22:33:00
System Manufacturer:         Dell Inc.
System Model:                Vostro 3578
System Type:                 x64-based PC
Processor(s):                1 Processor(s) Installed.
                             [01]: Intel64 Family 6 Model 142 Stepping 10 GenuineIntel ~1600 Mhz
BIOS Version:                Dell Inc. 1.16.0, 16-12-2021
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:       16,249 MB
Available Physical Memory:   8,286 MB
Virtual Memory: Max Size:    18,681 MB
Virtual Memory: Available:   7,679 MB
Virtual Memory: In Use:      11,002 MB
Page File Location(s):       C:\pagefile.sys
Domain:                      WORKGROUP
Logon Server:                \\DESKTOP-FKIOJGD
Hotfix(s):                   5 Hotfix(s) Installed.
                             [01]: KB5037591
                             [02]: KB5012170
                             [03]: KB5027397
                             [04]: KB5039212
                             [05]: KB5037959
Network Card(s):             3 NIC(s) Installed.
                             [01]: Qualcomm QCA9377 802.11ac Wireless Adapter
                                   Connection Name: Wi-Fi
                                   DHCP Enabled:    Yes
                                   DHCP Server:     192.168.1.1
                                   IP address(es)
                                   [01]: 192.168.1.4
                                   [02]: fe80::620f:ddd8:66cb:6d4
                                   [03]: 2402:a00:182:29f4:c876:229c:1dc6:b558
                                   [04]: 2402:a00:182:29f4:1708:f1f0:ee6:9dac
                             [02]: Realtek PCIe GBE Family Controller
                                   Connection Name: Ethernet
                                   Status:          Media disconnected
                             [03]: Citrix Virtual Adapter
                                   Connection Name: Citrix Virtual Adapter
                                   Status:          Hardware not present
Hyper-V Requirements:        A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

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```
C:\Users\Ritesh>systeminfo /s DESKTOP-FKIOJGD /u maindom /p /fo list
Type the password for maindom:****


Host Name:               DESKTOP-FKIOJGD
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:        Ritesh
Registered Organization:
Product ID:              00327-35813-85490-AAOEM
Original Install Date:   01-02-2023, 02:42:01
System Boot Time:        13-06-2024, 22:33:00
System Manufacturer:     Dell Inc.
System Model:            Vostro 3578
System Type:             x64-based PC
Processor(s):            1 Processor(s) Installed.
                         [01]: Intel64 Family 6 Model 142 Stepping 10 GenuineIntel ~1600 Mhz
BIOS Version:            Dell Inc. 1.16.0, 16-12-2021
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:   16,249 MB
Available Physical Memory: 8,248 MB
Virtual Memory: Max Size: 18,681 MB
Virtual Memory: Available: 7,648 MB
Virtual Memory: In Use:  11,033 MB
Page File Location(s):   C:\pagefile.sys
Domain:                  WORKGROUP
Logon Server:            \\DESKTOP-FKIOJGD
Hotfix(s):               5 Hotfix(s) Installed.
                         [01]: KB5037591
                         [02]: KB5012170
                         [03]: KB5027397
                         [04]: KB5039212
                         [05]: KB5037959
Network Card(s):         3 NIC(s) Installed.
                         [01]: Qualcomm QCA9377 802.11ac Wireless Adapter
                               Connection Name: Wi-Fi
                               DHCP Enabled:    Yes
                               DHCP Server:     192.168.1.1
                               IP address(es)
                               [01]: 192.168.1.4
                               [02]: fe80::620f:ddd8:66cb:6d4
                               [03]: 2402:a00:182:29f4:c876:229c:1dc6:b558
                               [04]: 2402:a00:182:29f4:1708:f1f0:ee6:9dac
                         [02]: Realtek PCIe GBE Family Controller
                               Connection Name: Ethernet
                               Status:          Media disconnected
                         [03]: Citrix Virtual Adapter
                               Connection Name: Citrix Virtual Adapter
                               Status:          Hardware not present
Hyper-V Requirements:    A hypervisor has been detected. Features required for Hyper-V will not be displayed.
```

5. traceroute/tracert

Description:

The tracert command is Windows' version of traceroute. It is used for tracing the path between two systems.
It will display the different routers or hops needed to travel from the source system to the destination system.

No.	Option	Description
1	-d	Do not resolve addresses to hostnames.
2	-h	Maximum number of hops to search for target.
3	-6	Force using IPv6.

4	-w	Wait timeout milliseconds for each reply.
5	-4	Force using IPv4.

Implementation:

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

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

  1      *         *         *        Request timed out.
  2     22 ms      6 ms      7 ms    2402:a00:182:1::1111
  3     12 ms     15 ms      8 ms    2402:a00:80::1001
  4     35 ms     34 ms     35 ms    2402:a00:80::2e
  5     34 ms     31 ms     34 ms    2001:4860:1:1::2818
  6     36 ms     32 ms     32 ms    2404:6800:812d::1
  7     34 ms     28 ms     31 ms    2001:4860:0:1::539e
  8     37 ms     37 ms     34 ms    2001:4860:0:1::78b6
  9     35 ms     36 ms     32 ms    2001:4860::9:4001:67bd
 10     36 ms     35 ms     35 ms    2001:4860::9:4001:7734
 11     35 ms     35 ms     36 ms    2001:4860:0:1::87b3
 12     39 ms     35 ms     38 ms    2001:4860:0:1::2131
 13     37 ms     46 ms     33 ms    2404:6800:4009:82e::2004

Trace complete.
```

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

Tracing route to www.google.com [2404:6800:4009:82e::2004]
over a maximum of 5 hops:

  1      *         *         *       Request timed out.
  2     13 ms      9 ms      6 ms   undefined.hostname.localhost [2402:a00:182:1::1111]
  3     11 ms      8 ms      8 ms   undefined.hostname.localhost [2402:a00:80::1001]
  4     38 ms     33 ms     33 ms   undefined.hostname.localhost [2402:a00:80::2e]
  5     33 ms     31 ms     35 ms   2001:4860:1:1::2818

Trace complete.
```

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```
C:\Users\Ritesh>tracert -w 100 www.google.com

Tracing route to www.google.com [2404:6800:4009:821::2004]
over a maximum of 30 hops:

  1     *          *          *        Request timed out.
  2     9 ms       7 ms       6 ms    undefined.hostname.localhost [2402:a00:182:1::1111]
  3    10 ms       8 ms       7 ms    undefined.hostname.localhost [2402:a00:80::1001]
  4    38 ms      31 ms      35 ms    undefined.hostname.localhost [2402:a00:80::2e]
  5    40 ms      32 ms      33 ms    2001:4860:1:1::2818
  6    39 ms      38 ms      37 ms    2404:6800:8095::1
  7    38 ms      33 ms      31 ms    2001:4860:0:1::1686
  8    37 ms      31 ms      33 ms    2001:4860:0:1::77d8
  9    35 ms      36 ms      35 ms    2001:4860::9:4001:ddce
 10    32 ms      35 ms      31 ms    2001:4860::9:4001:67bd
 11    36 ms      36 ms      34 ms    2001:4860::9:4001:7734
 12    36 ms       *         34 ms    2001:4860:0:1::8769
 13    33 ms      36 ms      35 ms    2001:4860:0:1::2a47
 14    36 ms      35 ms      31 ms    bom12s11-in-x04.1e100.net [2404:6800:4009:821::2004]

Trace complete.
```

```
C:\Users\Ritesh>tracert -4 www.google.com

Tracing route to www.google.com [142.251.42.36]
over a maximum of 30 hops:

  1     5 ms       9 ms       3 ms    gpon.net [192.168.1.1]
  2    52 ms       5 ms       7 ms    182.237.14.17
  3     9 ms       7 ms       8 ms    10.244.21.1 [10.244.21.1]
  4     *         34 ms      28 ms    103.241.47.61
  5    33 ms      31 ms      31 ms    142.250.47.236
  6    31 ms      32 ms      30 ms    72.14.238.215
  7    32 ms      26 ms      28 ms    142.251.69.45
  8    31 ms      31 ms      27 ms    bom12s20-in-f4.1e100.net [142.251.42.36]

Trace complete.
```

Date: 14/ 06/2024

```
C:\Users\Ritesh>tracert -6 www.google.com

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

  1     *        *        *     Request timed out.
  2     6 ms     8 ms     8 ms  undefined.hostname.localhost [2402:a00:182:1::1111]
  3    18 ms     6 ms     8 ms  undefined.hostname.localhost [2402:a00:80::1001]
  4    31 ms    31 ms    34 ms  undefined.hostname.localhost [2402:a00:80::2e]
  5    31 ms    31 ms    32 ms  2001:4860:1:1::2818
  6    37 ms    31 ms    35 ms  2404:6800:8095::1
  7    36 ms    31 ms    32 ms  2001:4860:0:1::1686
  8    39 ms    32 ms    30 ms  2001:4860:0:1::77d4
  9    37 ms    36 ms    32 ms  2001:4860::9:4001:67bc
 10    39 ms    37 ms    35 ms  2001:4860::9:4000:d773
 11    43 ms    34 ms    33 ms  2001:4860:0:1::3133
 12    41 ms    32 ms    32 ms  bom12s18-in-x04.1e100.net [2404:6800:4009:82b::2004]

Trace complete.
```

6. netstat
Description:
Displays protocol statistics and current TCP/IP network connections.

No.	Option	Description
1	-a	Displays all connections and listening ports.
2	-e	Displays Ethernet statistics. This may be combined with the -s option.
3	-f	Displays Fully Qualified Domain Names (FQDN) for foreign addresses.
4	-i	Displays the time spent by a TCP connection in its current state.
5	-n	Displays addresses and port numbers in numerical form.

Date: 14/06/2024

Implementation:

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

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:445            DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:5040           DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:49664          DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:49665          DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:49666          DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:49667          DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:49668          DESKTOP-FKIOJGD:0       LISTENING
  TCP    0.0.0.0:52052          DESKTOP-FKIOJGD:0       LISTENING
  TCP    127.0.0.1:3148         DESKTOP-FKIOJGD:0       LISTENING
  TCP    127.0.0.1:3148         DESKTOP-FKIOJGD:64558   ESTABLISHED
  TCP    127.0.0.1:5700         DESKTOP-FKIOJGD:0       LISTENING
  TCP    127.0.0.1:8884         DESKTOP-FKIOJGD:0       LISTENING
  TCP    127.0.0.1:27017        DESKTOP-FKIOJGD:0       LISTENING
  TCP    127.0.0.1:64558        DESKTOP-FKIOJGD:3148    ESTABLISHED
  TCP    192.168.1.4:139        DESKTOP-FKIOJGD:0       LISTENING
  TCP    192.168.1.4:49247      20.198.119.143:https    ESTABLISHED
  TCP    192.168.1.4:65339      20.44.8.230:8883        ESTABLISHED
  TCP    192.168.1.4:65346      20.212.88.117:https     ESTABLISHED
  TCP    [::]:135               DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:445               DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:49664             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:49665             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:49666             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:49667             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:49668             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::]:52052             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::1]:5700             DESKTOP-FKIOJGD:0       LISTENING
  TCP    [::1]:52196            DESKTOP-FKIOJGD:0       LISTENING
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49286  g2600-140f-0004-0000-0000-0000-17da-f911:https  CLOSE_WAIT
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49325  [2606:4700:4400::6812:25e4]:https  ESTABLISHED
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49327  [2606:2800:147:120f:30c:1ba0:fc6:3001]:http  TIME_WAIT
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49328  g2600-1417-0075-048f-0000-0000-0000-1b01:http  TIME_WAIT
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49329  g2600-1417-0075-048c-0000-0000-0000-21cc:http  TIME_WAIT
  UDP    0.0.0.0:5050           *:*
```

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

                           Received            Sent

Bytes                    1101598575        89179951
Unicast packets              919275          522242
Non-unicast packets            4130            7392
Discards                          0               0
Errors                            0               0
Unknown protocols                 0
```

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

Active Connections

  Proto  Local Address          Foreign Address        State          Time in State (ms)
  TCP    127.0.0.1:3148         DESKTOP-FKIOJGD:64558   ESTABLISHED     8315888
  TCP    192.168.1.4:49247      20.198.119.143:https    ESTABLISHED     2351480
  TCP    127.0.0.1:64558        DESKTOP-FKIOJGD:3148    ESTABLISHED     8315888
  TCP    192.168.1.4:65339      20.44.8.230:8883        ESTABLISHED     5023393
  TCP    192.168.1.4:65346      20.212.88.117:https     ESTABLISHED     4952783
```

Date: 14/ 06/2024

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

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:3148         DESKTOP-FKIOJGD:64558   ESTABLISHED
  TCP    127.0.0.1:64558        DESKTOP-FKIOJGD:3148    ESTABLISHED
  TCP    192.168.1.4:49247      20.198.119.143:https    ESTABLISHED
  TCP    192.168.1.4:65339      20.44.8.230:8883        ESTABLISHED
  TCP    192.168.1.4:65346      20.212.88.117:https     ESTABLISHED
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49286  g2600-140f-0004-0000-0000-0000-17da-f911.deploy.static.akamaitechnologies.com:https  CLOSE_WAIT
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49325  [2606:4700:4400::6812:25e4]:https  ESTABLISHED
```

```
C:\Users\Ritesh>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:3148         127.0.0.1:64558        ESTABLISHED
  TCP    127.0.0.1:64558        127.0.0.1:3148         ESTABLISHED
  TCP    192.168.1.4:49247      20.198.119.143:443     ESTABLISHED
  TCP    192.168.1.4:65339      20.44.8.230:8883       ESTABLISHED
  TCP    192.168.1.4:65346      20.212.88.117:443      ESTABLISHED
  TCP    [2402:a00:182:29f4:c876:229c:1dc6:b558]:49286  [2600:140f:4::17da:f911]:443  CLOSE_WAIT
```

7. nslookup

Description:

Displays information that you can use to diagnose Domain Name System (DNS) infrastructure. Before using this tool, you should be familiar with how DNS works. The nslookup command-line tool is available only if you have installed the TCP/IP protocol.

No.	Option	Description
1	nslookup exit	Exits the nslookup command-line tool.
2	nslookup finger	Connects with the finger server on the current computer.
3	nslookup hep	Displays a short summary of subcommands.
4	nslookup server	Changes the default server to the specified DNS domain.
5	nslookup ls	Lists information for a DNS domain.

Implementation:

```
C:\Users\Ritesh>nslookup 8.8.8.8
Server:  gpon.net
Address:  fe80::1

Name:    dns.google
Address:  8.8.8.8
```

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```
C:\Users\Ritesh>nslookup /?
Usage:
   nslookup [-opt ...]              # interactive mode using default server
   nslookup [-opt ...] - server     # interactive mode using 'server'
   nslookup [-opt ...] host          # just look up 'host' using default server
   nslookup [-opt ...] host server # just look up 'host' using 'server'
```

8. hostname

Description:

Print the current name of host.

Implementation:

```
C:\Users\Ritesh>hostname /?

Prints the name of the current host.

hostname
```

```
C:\Users\Ritesh>hostname
DESKTOP-FKIOJGD
```

9. pathping

Description:

It is commonly used to troubleshoot network issues, particularly the ones related to latency and network performance. It is considered an alternative to tracert and it combines ping and tracert commands.

No.	Option	Description
1	-n	Does not resolve addresses to hostnames.
2	-h	Sets the maximum number of hops to search for the target.
3	-g	Specifies loose source route along the host-list.
4	-q	Sets the number of queries per hop
5	-w	Waits the specified number of milliseconds for each reply.

Implementation:

```
C:\Users\Ritesh>pathping google.com

Tracing route to google.com [142.250.71.110]
over a maximum of 30 hops:
  0  DESKTOP-FKIOJGD [192.168.1.4]
  1  gpon.net [192.168.1.1]
  2  182.237.14.17
  3     *       10.244.21.1 [10.244.21.1]
  4  103.241.47.61
  5  142.250.47.236
  6  142.251.76.31
  7  192.178.86.247
  8  pnbomb-ad-in-f14.1e100.net [142.250.71.110]

Computing statistics for 200 seconds...
```

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

Tracing route to google.com [142.250.71.110]
over a maximum of 5 hops:
  0  DESKTOP-FKIOJGD [192.168.1.4]
  1  gpon.net [192.168.1.1]
  2  182.237.14.17
  3     *       10.244.21.1 [10.244.21.1]
  4  103.241.47.61
  5  142.250.47.236

Computing statistics for 125 seconds...
```

Date: 14/ 06/2024

```
C:\Users\Ritesh>pathping -n google.com

Tracing route to google.com [142.250.71.110]
over a maximum of 30 hops:
  0  192.168.1.4
  1  192.168.1.1
  2  182.237.14.17
  3     *      10.244.21.1
  4  103.241.47.61
  5  142.250.47.236
  6  142.251.76.31
  7  192.178.86.247
  8  142.250.71.110

Computing statistics for 200 seconds...
```

```
C:\Users\Ritesh>pathping -g google.com

Tracing route to google.com [142.250.71.110]
over a maximum of 30 hops:
  0  DESKTOP-FKIOJGD [192.168.1.4]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            DESKTOP-FKIOJGD [192.168.1.4]

Trace complete.
```

```
C:\Users\Ritesh>pathping -w 100 google.com

Tracing route to google.com [2404:6800:4009:82c::200e]
over a maximum of 30 hops:
  0  DESKTOP-FKIOJGD [2402:a00:182:29f4:c876:229c:1dc6:b558]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            DESKTOP-FKIOJGD [2402:a00:182:29f4:c876:229c:1dc6:b558]

Trace complete.
```

10. arp
Description:

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

No.	Option	Description
1	-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.
2	-g	Same as -a
3	-v	Displays current ARP entries in verbose mode. All invalid entries and entries on the loop-back interface will be shown.
4	-d	Deletes the host specified by inet_addr. inet_addr may be wildcarded with * to delete all hosts.
5	-N	Displays the ARP entries for the network interface specified by if_addr.

Implementation:

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

Interface: 192.168.1.4 --- 0x14
  Internet Address      Physical Address      Type
  192.168.1.1           28-77-77-6b-1c-ee     dynamic
  192.168.1.255         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
  224.0.0.253           01-00-5e-00-00-fd     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

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

Interface: 192.168.1.4 --- 0x14
  Internet Address      Physical Address      Type
  192.168.1.1           28-77-77-6b-1c-ee     dynamic
  192.168.1.255         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
  224.0.0.253           01-00-5e-00-00-fd     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

```
C:\Users\Ritesh>arp -d 192.168.1.1
The ARP entry deletion failed: The requested operation requires elevation.
```