Date: 12/06/2024

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: The ipconfig command is used to display information about your network configuration and refresh DHCP and DNS Settings.

--------- **Details About Command ------**

No.	Option	Description
1	ipconfig /renew	That command orders your DHCP client to renegotiate an IP address (IPv4) lease with the DHCP server on your router.
2	ipconfig /renew6	That command orders your DHCP client to renegotiate an IP address (IPv6) lease with the DHCP server on your router.
3	ipconfig /allcompartments	Show information about all compartments.
4	ipconfig /displaydns	Display the contents of the DNS Resolver Cache.
5	ipconfig /flushdns	Purges the DNS Resolver cache.

Date: **12/06/2024**

Implementation:

ipconfig /renew

ipconfig /renew6

ipconfig /allcompartments

ipconfig /displaydns

```
C:\Users\raman>ipconfig /displaydns

Windows IP Configuration
```

ipconfig /flushdns

```
C:\Users\raman>ipconfig /flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.
```

2. ping

Description: The ping command sends a request over the network to a specific device.

--------- Details About Command ------

No.	Option	Description
1	ping -t [DOMAIN_NAME/IP]	That is sends continues request (while key-board interrupt not occur) over the network to a specific device.
2	ping -n [number] [DOMAIN_NAME/IP]	Number of echo requests to send.
3	ping -4 [DOMAIN_NAME/IP]	Force using IPv4
4	ping -6 [DOMAIN_NAME/IP]	Force using IPv6
5	ping -i [number] [DOMAIN_NAME/IP]	Time To Live

Implementation:

```
Command Prompt          ×    +   ˅

C:\Users\raman>ping darshan.ac.in

Pinging darshan.ac.in [103.13.112.180] with 32 bytes of data:
Reply from 103.13.112.180: bytes=32 time=64ms TTL=121
Reply from 103.13.112.180: bytes=32 time=24ms TTL=121
Reply from 103.13.112.180: bytes=32 time=64ms TTL=121
Reply from 103.13.112.180: bytes=32 time=22ms TTL=121

Ping statistics for 103.13.112.180:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 64ms, Average = 43ms
```

Date: 12/06/2024

ping -t 103.13.112.180

```
C:\Users\raman>ping -t 103.13.112.180

Pinging 103.13.112.180 with 32 bytes of data:
Reply from 103.13.112.180: bytes=32 time=33ms TTL=121
Reply from 103.13.112.180: bytes=32 time=25ms TTL=121
Reply from 103.13.112.180: bytes=32 time=33ms TTL=121
Reply from 103.13.112.180: bytes=32 time=61ms TTL=121
Reply from 103.13.112.180: bytes=32 time=36ms TTL=121
Reply from 103.13.112.180: bytes=32 time=131ms TTL=121
Reply from 103.13.112.180: bytes=32 time=28ms TTL=121
Reply from 103.13.112.180: bytes=32 time=22ms TTL=121
Reply from 103.13.112.180: bytes=32 time=28ms TTL=121
Reply from 103.13.112.180: bytes=32 time=37ms TTL=121

Ping statistics for 103.13.112.180:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 131ms, Average = 43ms
Control-C
^C
```

ping -n 10 103.13.112.180

```
C:\Users\raman>ping -n 10 103.13.112.180

Pinging 103.13.112.180 with 32 bytes of data:
Reply from 103.13.112.180: bytes=32 time=321ms TTL=121
Reply from 103.13.112.180: bytes=32 time=31ms TTL=121
Reply from 103.13.112.180: bytes=32 time=247ms TTL=121
Reply from 103.13.112.180: bytes=32 time=79ms TTL=121
Reply from 103.13.112.180: bytes=32 time=513ms TTL=121
Reply from 103.13.112.180: bytes=32 time=124ms TTL=121
Reply from 103.13.112.180: bytes=32 time=52ms TTL=121
Reply from 103.13.112.180: bytes=32 time=54ms TTL=121
Reply from 103.13.112.180: bytes=32 time=79ms TTL=121
Reply from 103.13.112.180: bytes=32 time=186ms TTL=121

Ping statistics for 103.13.112.180:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 31ms, Maximum = 513ms, Average = 168ms
```

ping -4 darshan.ac.in

```
C:\Users\raman>ping -4 darshan.ac.in

Pinging darshan.ac.in [103.13.112.180] with 32 bytes of data:
Reply from 103.13.112.180: bytes=32 time=162ms TTL=116
Reply from 103.13.112.180: bytes=32 time=95ms TTL=116
Reply from 103.13.112.180: bytes=32 time=78ms TTL=116
Reply from 103.13.112.180: bytes=32 time=34ms TTL=116

Ping statistics for 103.13.112.180:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 34ms, Maximum = 162ms, Average = 92ms
```

ping -6 darshan.ac.in

```
C:\Users\raman>ping -6 darshan.ac.in

Pinging darshan.ac.in [64:ff9b::670d:70b4] with 32 bytes of data:
Reply from 64:ff9b::670d:70b4: time=87ms
Reply from 64:ff9b::670d:70b4: time=41ms
Reply from 64:ff9b::670d:70b4: time=61ms
Reply from 64:ff9b::670d:70b4: time=46ms

Ping statistics for 64:ff9b::670d:70b4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 41ms, Maximum = 87ms, Average = 58ms
```

ping -i 2 103.13.112.180

```
C:\Users\raman>ping -i 2 103.13.112.180

Pinging 103.13.112.180 with 32 bytes of data:
Reply from 192.0.0.1: TTL expired in transit.
Reply from 192.0.0.1: TTL expired in transit.
Reply from 192.0.0.1: TTL expired in transit.
Reply from 192.0.0.1: TTL expired in transit.

Ping statistics for 103.13.112.180:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

3. getmac

Description: getmac is used to display the Media Access Control (MAC) address and list of network adapters in the system.

--------- Details About Command ------

No.	Option	Description
1	getmac /FO [FORMAT]	Specifies the format in which the output is to be displayed. Valid formats: "TABLE", "LIST", "CSV".
2	getmac /S [SYSTEM_NAME]	Specifies the remote system to connect to.
3	getmac /V	Specifies that verbose output is displayed.
4	getmac /NH	Specifies that the "Column Header" should not be displayed in the output. Valid only for TABLE and CSV formats.
5	getmac /?	Displays this help message.

Implementation:

```
C:\Users\raman>getmac

Physical Address    Transport Name
==================  =====================================================
B0-3C-DC-E3-E9-8C   \Device\Tcpip_{B539784A-FCA6-467F-8B2F-B40446FD5F9D}
C0-18-50-AB-4C-48   Media disconnected
00-FF-96-1A-75-E4   Media disconnected
```

getmac /FO list

```
C:\Users\raman>getmac /FO list

Physical Address: B0-3C-DC-E3-E9-8C
Transport Name:   \Device\Tcpip_{B539784A-FCA6-467F-8B2F-B40446FD5F9D}

Physical Address: C0-18-50-AB-4C-48
Transport Name:   Media disconnected

Physical Address: 00-FF-96-1A-75-E4
Transport Name:   Media disconnected
```

getmac /S JAY_PATEL

```
C:\Users\raman>getmac /S JAY_PATEL

Physical Address    Transport Name
=================== ========================================================
B0-3C-DC-E3-E9-8C   \Device\Tcpip_{B539784A-FCA6-467F-8B2F-B40446FD5F9D}
C0-18-50-AB-4C-48   Media disconnected
00-FF-96-1A-75-E4   Media disconnected
```

getmac /V

```
C:\Users\raman>getmac /V

Connection Name Network Adapter Physical Address    Transport Name
=============== =============== =================== =========================================================
Wi-Fi           Intel(R) Wi-Fi  B0-3C-DC-E3-E9-8C   \Device\Tcpip_{B539784A-FCA6-467F-8B2F-B40446FD5F9D}
Ethernet        Realtek PCIe Gb C0-18-50-AB-4C-48   Media disconnected
Local Area Conn TAP-Windows Ada 00-FF-96-1A-75-E4   Media disconnected
```

getmac /NH

```
C:\Users\raman>getmac /NH

B0-3C-DC-E3-E9-8C   \Device\Tcpip_{B539784A-FCA6-467F-8B2F-B40446FD5F9D}
C0-18-50-AB-4C-48   Media disconnected
00-FF-96-1A-75-E4   Media disconnected
```

getmac /?

```
Command Prompt        ×    +   ∨

C:\Users\raman>getmac /?

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

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

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

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

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

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

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

    /V                      Specifies that verbose output is displayed.

    /?                      Displays this help message.

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

Date: 12/06/2024

4. systeminfo

Description: Displays detailed configuration information about a computer and its operating system.

---------- **Details About Command** ------

No.	Option	Description
1	systeminfo /FO [FORMAT]	Specifies the format in which the output is to be displayed. Valid formats: "TABLE", "LIST", "CSV".
2	systeminfo /S [SYSTEM_NAME]	Specifies the remote system to connect to.
3	systeminfo /U	Specifies the user context under which the command should execute.
4	systeminfo /NH	Specifies that the "Column Header" should not be displayed in the output. Valid only for TABLE and CSV formats.
5	systeminfo /?	Displays this help message.

Implementation:


```
C:\Users\raman>systeminfo

Host Name:                 JAY_PATEL
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:          ramanijay2004@outlook.com
Registered Organization:   N/A
Product ID:                00356-24600-24039-AAOEM
Original Install Date:     16-10-2022, 21:42:16
System Boot Time:          15-06-2024, 09:08:45
System Manufacturer:       Acer
System Model:              Aspire A715-51G
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 154 Stepping 3 GenuineIntel ~1700 Mhz
BIOS Version:              INSYDE Corp. V1.08, 04-02-2023
Windows Directory:        C:\WINDOWS
System Directory:         C:\WINDOWS\system32
Boot Device:              \Device\HarddiskVolume1
System Locale:            en-us;English (United States)
Input Locale:             00004009
Time Zone:                (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:    7,896 MB
Available Physical Memory: 1,051 MB
Virtual Memory: Max Size: 15,832 MB
Virtual Memory: Available: 6,399 MB
Virtual Memory: In Use:    9,433 MB
Page File Location(s):    D:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\JAY_PATEL
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
                           [05]: KB5037663
                           [06]: KB5037959
Network Card(s):           3 NIC(s) Installed.
```

systeminfo /FO csv

```
C:\Users\raman>systeminfo /FO csv
"Host Name","OS Name","OS Version","OS Manufacturer","OS Configuration","OS Build Type","Registered Owner","Registered O
rganization","Product ID","Original Install Date","System Boot Time","System Manufacturer","System Model","System Type",
"Processor(s)","BIOS Version","Windows Directory","System Directory","Boot Device","System Locale","Input Locale","Time
Zone","Total Physical Memory","Available Physical Memory","Virtual Memory: Max Size","Virtual Memory: Available","Virtua
l Memory: In Use","Page File Location(s)","Domain","Logon Server","Hotfix(s)","Network Card(s)","Hyper-V Requirements"
"JAY_PATEL","Microsoft Windows 11 Home Single Language","10.0.22631 N/A Build 22631","Microsoft Corporation","Standalone
 Workstation","Multiprocessor Free","ramanijay2004@outlook.com","N/A","00356-24600-24039-AAOEM","16-10-2022, 21:42:16","
15-06-2024, 09:08:45","Acer","Aspire A715-51G","x64-based PC","1 Processor(s) Installed.,[01]: Intel64 Family 6 Model 15
4 Stepping 3 GenuineIntel ~1700 Mhz","INSYDE Corp. V1.08, 04-02-2023","C:\WINDOWS","C:\WINDOWS\system32","\Device\Harddi
skVolume1","en-us;English (United States)","00004009","(UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi","7,896 MB","1,49
9 MB","15,832 MB","6,520 MB","9,312 MB","D:\pagefile.sys","WORKGROUP","\\JAY_PATEL","6 Hotfix(s) Installed.,[01]: KB5037
591,[02]: KB5012170,[03]: KB5027397,[04]: KB5039212,[05]: KB5037663,[06]: KB5037959","3 NIC(s) Installed.,[01]: Intel(R)
 Wi-Fi 6E AX211 160MHz,      Connection Name: Wi-Fi,      DHCP Enabled:    Yes,    DHCP Server:      192.168.51.208,
    IP address(es),      [01]: 192.168.51.32,      [02]: fe80::37cc:e18a:cebc:732c,      [03]: 2409:40c1:2021:24e1:50ff:3
8fb:dcf0:f39,      [04]: 2409:40c1:2021:24e1:6727:351:e8cd:aee4,[02]: Realtek PCIe GbE Family Controller,      Connectio
n Name: Ethernet,      Status:          Media disconnected,[03]: TAP-Windows Adapter V9,      Connection Name: Local Are
a Connection,      Status:          Media disconnected","VM Monitor Mode Extensions: Yes,Virtualization Enabled In Firmw
are: Yes,Second Level Address Translation: Yes,Data Execution Prevention Available: Yes"
```

systeminfo /S JAY_PATEL

```
 Command Prompt          ×   +  ∨                                                                              –   □   ×
C:\Users\raman>systeminfo /S JAY_PATEL

Host Name:                 JAY_PATEL
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:          ramanijay2004@outlook.com
Registered Organization:   N/A
Product ID:                00356-24600-24039-AAOEM
Original Install Date:     16-10-2022, 21:42:16
System Boot Time:          15-06-2024, 09:08:45
System Manufacturer:       Acer
System Model:              Aspire A715-51G
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 154 Stepping 3 GenuineIntel ~1700 Mhz
BIOS Version:              INSYDE Corp. V1.08, 04-02-2023
Windows Directory:         C:\WINDOWS
System Directory:          C:\WINDOWS\system32
Boot Device:               \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:              00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     7,896 MB
Available Physical Memory: 1,577 MB
Virtual Memory: Max Size:  15,832 MB
Virtual Memory: Available: 6,605 MB
Virtual Memory: In Use:    9,227 MB
Page File Location(s):     D:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\JAY_PATEL
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
                           [05]: KB5037663
                           [06]: KB5037959
Network Card(s):           3 NIC(s) Installed.
```

Date: 12/06/2024

systeminfo /S JAY_PATEL /U WORK_GROUP

```
C:\Users\raman>systeminfo /S JAY_PATEL /U WORK_GROUP
WARNING: User credentials cannot be used for local connections

Host Name:                 JAY_PATEL
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:          ramanijay2004@outlook.com
Registered Organization:   N/A
Product ID:                00356-24600-24039-AAOEM
Original Install Date:     16-10-2022, 21:42:16
System Boot Time:          15-06-2024, 09:08:45
System Manufacturer:       Acer
System Model:              Aspire A715-51G
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
                           [01]: Intel64 Family 6 Model 154 Stepping 3 GenuineIntel ~1700 Mhz
BIOS Version:              INSYDE Corp. V1.08, 04-02-2023
Windows Directory:         C:\WINDOWS
System Directory:          C:\WINDOWS\system32
Boot Device:               \Device\HarddiskVolume1
System Locale:             en-us;English (United States)
Input Locale:              00004009
Time Zone:                 (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory:     7,896 MB
Available Physical Memory: 1,635 MB
Virtual Memory: Max Size:  15,832 MB
Virtual Memory: Available: 6,617 MB
Virtual Memory: In Use:    9,215 MB
Page File Location(s):     D:\pagefile.sys
Domain:                    WORKGROUP
Logon Server:              \\JAY_PATEL
Hotfix(s):                 6 Hotfix(s) Installed.
                           [01]: KB5037591
                           [02]: KB5012170
                           [03]: KB5027397
                           [04]: KB5039212
```

systeminfo /FO table /NH

```
C:\Users\raman>systeminfo /FO table /NH

JAY_PATEL             Microsoft Windows 11 Home Sing 10.0.22631 N/A Build 22631    Microsoft Corporation           Standalone Workstation
           Multiprocessor Free  ramanijay2004@outlook.com              N/A                                          00356-24600-24
039-AAOEM       16-10-2022, 21:42:16     15-06-2024, 09:08:45       Acer                   Aspire A715-51G    x64-based PC          1 Pr
ocessor(s) Installed., [01]: Intel64 Fami INSYDE Corp. V1.08, 04-02-2023 C:\WINDOWS      C:\WINDOWS\system32  \Device\HarddiskVolume1      en-us
;English (United States)     00004009                      (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi   7,896 MB          1,668 MB
       15,832 MB              6,690 MB             9,142 MB          D:\pagefile.sys            WORKGROUP           \\JAY_PATEL
       6 Hotfix(s) Install, 3 NIC(s) Installed., [01]: Intel(R) Wi-Fi 6E AX211 160MHz,        Connection Name: Wi-Fi,     DHCP  VM Monitor Mode Extension
s: Yes, Virtualization Enabled In Firmware: Yes, Second Level Address Trans

C:\Users\raman>
```

systeminfo /?

```
C:\Users\raman>systeminfo /?

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

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

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

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

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

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

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

    /?                      Displays this help message.

Examples:
    SYSTEMINFO
    SYSTEMINFO /?
    SYSTEMINFO /S system
    SYSTEMINFO /S system /U user
    SYSTEMINFO /S system /U domain\user /P password /FO TABLE
    SYSTEMINFO /S system /FO LIST
    SYSTEMINFO /S system /FO CSV /NH
```

5. traceroute / tracert

Description: The Traceroute command (tracert) is a utility designed for displaying the time it takes for a packet of information to travel between a local computer and a destination IP address or domain.

--------- **Details About Command ------**

No.	Option	Description
1	tracert -d [DOMAIN_NAME/IP]	Do not resolve addresses to hostnames.
2	tracert -h [NUMBER] [DOMAIN_NAME/IP]	Maximum number of hops to search for target.
3	tracert -j [DOMAIN_NAME/IP]	Loose source route along host-list (IPv4-only).
4	tracert -4 [DOMAIN_NAME/IP]	Force using IPv4.
5	tracert -6 [DOMAIN_NAME/IP]	Force using IPv6.

Implementation:

```
C:\Users\raman>tracert darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 30 hops:

  1    40 ms     3 ms     4 ms  2409:40c1:2021:24e1::2
  2    63 ms    39 ms    41 ms  2405:200:5210:4:3924:110:3:207
  3    99 ms    38 ms    36 ms  2405:200:5210:4:3925::1
  4   193 ms    29 ms    37 ms  2405:200:824:3632:62::7
  5   100 ms    40 ms    36 ms  64:ff9b::c0a8:e3c2
  6    57 ms    37 ms    32 ms  64:ff9b::c0a8:a870
  7     *         *         *    Request timed out.
  8     *         *         *    Request timed out.
  9     *         *         *    Request timed out.
 10     *         *         *    Request timed out.
 11     *         *         *    Request timed out.
 12   104 ms    77 ms    85 ms  64:ff9b::73f5:7652
 13    57 ms    78 ms    38 ms  64:ff9b::67d8:5f09
 14    76 ms    38 ms    39 ms  64:ff9b::67d8:5f22
 15    73 ms    78 ms    89 ms  64:ff9b::cb70:8412
 16    85 ms    78 ms    77 ms  64:ff9b::670d:70b4

Trace complete.
```

tracert -d darshan.ac.in

```
C:\Users\raman>tracert -d darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 30 hops:

  1     3 ms     5 ms     2 ms  2409:40c1:2021:24e1::2
  2    51 ms    52 ms    36 ms  2405:200:5210:4:3924:110:3:207
  3    28 ms    39 ms    42 ms  2405:200:5210:4:3925::1
  4   100 ms    37 ms    39 ms  2405:200:824:3632:62::7
  5    71 ms    36 ms    37 ms  64:ff9b::c0a8:e3c2
  6    24 ms    24 ms    40 ms  64:ff9b::c0a8:a872
  7     *         *         *    Request timed out.
  8     *         *         *    Request timed out.
  9     *         *         *    Request timed out.
 10     *         *         *    Request timed out.
 11     *         *         *    Request timed out.
 12    81 ms    38 ms    39 ms  64:ff9b::73f5:7652
 13    74 ms    39 ms    78 ms  64:ff9b::67d8:5f09
 14   247 ms    89 ms    38 ms  64:ff9b::67d8:5f22
 15    66 ms    42 ms    74 ms  64:ff9b::cb70:8412
 16    67 ms    74 ms    34 ms  64:ff9b::670d:70b4

Trace complete.
```

Date: 12/06/2024

tracert -h 5 darshan.ac.in

```
C:\Users\raman>tracert -h 5 darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 5 hops:

  1    64 ms     3 ms     4 ms  2409:40c1:2021:24e1::2
  2   187 ms    45 ms    35 ms  2405:200:5210:4:3924:110:3:207
  3    92 ms    37 ms    37 ms  2405:200:5210:4:3925::1
  4   102 ms    37 ms    38 ms  2405:200:824:3632:62::7
  5    81 ms    23 ms    31 ms  64:ff9b::c0a8:e3c3

Trace complete.
```

tracert –j darshan.ac.in

```
C:\Users\raman>tracert -j darshan.ac.in

Tracing route to darshan.ac.in [103.13.112.180]
over a maximum of 30 hops:

  1     *        *        *     Request timed out.
  2     *        *        *     Request timed out.
  3     *        *        *     Request timed out.
  4     *        *        *     Request timed out.
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7     *        *        *     Request timed out.
  8     *        *        *     Request timed out.
  9     *        *        *     Request timed out.
 10     *        *        *     Request timed out.
 11     *        *        *     Request timed out.
 12     *        *        *     Request timed out.
 13     *        *        *     Request timed out.
 14   ^C
```

tracert -4 darshan.ac.in

```
C:\Users\raman>tracert -4 darshan.ac.in

Tracing route to darshan.ac.in [103.13.112.180]
over a maximum of 30 hops:

  1     6 ms     4 ms     3 ms  192.168.51.208
  2    11 ms    12 ms     4 ms  192.0.0.1
  3     *        *        *     Request timed out.
  4     *        *        *     Request timed out.
  5     *        *        *     Request timed out.
  6     *        *        *     Request timed out.
  7     *        *        *     Request timed out.
  8     *        *        *     Request timed out.
  9     *        *        *     Request timed out.
 10     *        *        *     Request timed out.
 11     *        *        *     Request timed out.
 12     *        *        *     Request timed out.
 13     *        *        *     Request timed out.
 14     *        *        *     Request timed out.
 15     *        *        *     Request timed out.
 16     *        *        *     Request timed out.
 17   235 ms    89 ms    78 ms  103.13.112.180

Trace complete.
```

tracert -6 darshan.ac.in

```
C:\Users\raman>tracert -6 darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 30 hops:

  1     4 ms     4 ms     2 ms  2409:40c1:2021:24e1::2
  2    96 ms    37 ms    40 ms  2405:200:5210:4:3924:110:3:207
  3    53 ms    38 ms    37 ms  2405:200:5210:4:3925::1
  4    51 ms    37 ms    38 ms  2405:200:824:3632:62::7
  5    89 ms    38 ms    33 ms  64:ff9b::c0a8:e3c3
  6    87 ms    33 ms    39 ms  64:ff9b::c0a8:a870
  7     *        *        *     Request timed out.
  8     *        *        *     Request timed out.
  9     *        *        *     Request timed out.
 10     *        *        *     Request timed out.
 11     *        *        *     Request timed out.
 12    87 ms    74 ms    38 ms  64:ff9b::73f5:7652
 13    67 ms    77 ms    76 ms  64:ff9b::67d8:5f09
 14   154 ms    40 ms    38 ms  64:ff9b::67d8:5f22
 15   111 ms    50 ms    64 ms  64:ff9b::cb70:8412
 16    47 ms    77 ms    40 ms  64:ff9b::670d:70b4

Trace complete.
```

6. netstat

Description: The network statistics (netstat) command is a networking tool used for troubleshooting and configuration, that can also serve as a monitoring tool for connections over the network.

--------- **Details About Command** ------

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

Implementation:

```
C:\Users\raman>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49678        Jay_Patel:49679        ESTABLISHED
  TCP    127.0.0.1:49679        Jay_Patel:49678        ESTABLISHED
  TCP    127.0.0.1:49680        Jay_Patel:49681        ESTABLISHED
  TCP    127.0.0.1:49681        Jay_Patel:49680        ESTABLISHED
  TCP    127.0.0.1:49691        Jay_Patel:49692        ESTABLISHED
  TCP    127.0.0.1:49692        Jay_Patel:49691        ESTABLISHED
  TCP    127.0.0.1:49695        Jay_Patel:49696        ESTABLISHED
  TCP    127.0.0.1:49696        Jay_Patel:49695        ESTABLISHED
  TCP    127.0.0.1:49697        Jay_Patel:49698        ESTABLISHED
  TCP    127.0.0.1:49698        Jay_Patel:49697        ESTABLISHED
  TCP    127.0.0.1:50665        Jay_Patel:50666        ESTABLISHED
  TCP    127.0.0.1:50666        Jay_Patel:50665        ESTABLISHED
  TCP    192.168.51.32:50791    52.163.231.110:https   ESTABLISHED
  TCP    192.168.51.32:51464    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51465    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51466    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51467    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51468    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51469    192.168.51.208:domain  TIME_WAIT
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:49410  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:49411  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50749  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50784  [2606:4700:8d78:d438:28d7:cbb:2417:4495]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50913  [2603:1046:1400:1::1]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50922  [2603:1063:2202:14::3]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50934  [64:ff9b::14d4:5875]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50973  se-in-f188:5228        ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50986  [2606:4700:8d78:d438:28d7:cb9:2417:4495]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51449  1drv:https             TIME_WAIT
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51450  1drv:https             ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51451  [2603:1046:1400:1::d]:https  TIME_WAIT
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51454  [64:ff9b::14bd:ad0c]:https  TIME_WAIT
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51455  [64:ff9b::14bd:ad0b]:https  TIME_WAIT
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51457  whatsapp-chatd-edge6-shv-01-bom1:5222  ESTABLISHED
```

Date: 12/06/2024

netstat -e

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

                           Received            Sent

Bytes                    1173590424       224894748
Unicast packets             613002          420114
Non-unicast packets             72            4986
Discards                         0               0
Errors                           0               0
Unknown protocols                0
```

netstat -f

```
Command Prompt                                                                                                                    –  □  ×

C:\Users\raman>netstat -f

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49678        Jay_Patel:49679        ESTABLISHED
  TCP    127.0.0.1:49679        Jay_Patel:49678        ESTABLISHED
  TCP    127.0.0.1:49680        Jay_Patel:49681        ESTABLISHED
  TCP    127.0.0.1:49681        Jay_Patel:49680        ESTABLISHED
  TCP    127.0.0.1:49691        Jay_Patel:49692        ESTABLISHED
  TCP    127.0.0.1:49692        Jay_Patel:49691        ESTABLISHED
  TCP    127.0.0.1:49695        Jay_Patel:49696        ESTABLISHED
  TCP    127.0.0.1:49696        Jay_Patel:49695        ESTABLISHED
  TCP    127.0.0.1:49697        Jay_Patel:49698        ESTABLISHED
  TCP    127.0.0.1:49698        Jay_Patel:49697        ESTABLISHED
  TCP    127.0.0.1:50665        Jay_Patel:50666        ESTABLISHED
  TCP    127.0.0.1:50666        Jay_Patel:50665        ESTABLISHED
  TCP    192.168.51.32:50791    52.163.231.110:https   ESTABLISHED
  TCP    192.168.51.32:51480    13.69.239.72:https     ESTABLISHED
  TCP    192.168.51.32:51481    13.69.239.72:https     ESTABLISHED
  TCP    192.168.51.32:51492    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51493    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51494    192.168.51.208:domain  TIME_WAIT
  TCP    192.168.51.32:51502    192.168.51.208:domain  FIN_WAIT_2
  TCP    192.168.51.32:51503    192.168.51.208:domain  FIN_WAIT_2
  TCP    192.168.51.32:51504    192.168.51.208:domain  FIN_WAIT_2
  TCP    192.168.51.32:51505    192.168.51.208:domain  FIN_WAIT_2
  TCP    192.168.51.32:51506    192.168.51.208:domain  FIN_WAIT_2
  TCP    192.168.51.32:51507    192.168.51.208:domain  FIN_WAIT_2
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:49410  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:49411  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50749  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50784  [2606:4700:8d78:d438:28d7:cbb:2417:4495]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50913  [2603:1046:1400:1::1]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50922  [2603:1063:2202:14::3]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50934  [64:ff9b::14d4:5875]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50973  se-in-f188.1e100.net:5228  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:50986  [2606:4700:8d78:d438:28d7:cb9:2417:4495]:https  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51457  whatsapp-chatd-edge6-shv-01-bom1.facebook.com:5222  ESTABLISHED
  TCP    [2409:40c1:2021:24e1:50ff:38fb:dcf0:f39]:51470  del11s04-in-x03.1e100.net:https  TIME_WAIT
```

netstat -i

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

Active Connections

  Proto  Local Address          Foreign Address        State          Time in State (ms)
  TCP    127.0.0.1:49678        Jay_Patel:49679        ESTABLISHED    5061251
  TCP    127.0.0.1:49679        Jay_Patel:49678        ESTABLISHED    5061251
  TCP    127.0.0.1:49680        Jay_Patel:49681        ESTABLISHED    5061251
  TCP    127.0.0.1:49681        Jay_Patel:49680        ESTABLISHED    5061251
  TCP    127.0.0.1:49691        Jay_Patel:49692        ESTABLISHED    5057312
  TCP    127.0.0.1:49692        Jay_Patel:49691        ESTABLISHED    5057312
  TCP    127.0.0.1:49695        Jay_Patel:49696        ESTABLISHED    5056530
  TCP    127.0.0.1:49696        Jay_Patel:49695        ESTABLISHED    5056530
  TCP    127.0.0.1:49697        Jay_Patel:49698        ESTABLISHED    5052807
  TCP    127.0.0.1:49698        Jay_Patel:49697        ESTABLISHED    5052807
  TCP    127.0.0.1:50665        Jay_Patel:50666        ESTABLISHED    3301290
  TCP    127.0.0.1:50666        Jay_Patel:50665        ESTABLISHED    3301290
  TCP    192.168.51.32:50791    52.163.231.110:https   ESTABLISHED    2891418
```

netstat -n

netstat -o

Date: **12/06/2024**

7. nslookup

Description: The nslookup command queries internet domain name servers in two modes.

--------- **Details About Command** ------

No.	Option	Description
1	set debug	You can get additional information about a domain name by using this DNS command.
2	set q=soa	Another useful CMD DNS command is the SOA record command. Getting the SOA record of a domain is fairly simple and similar to the last DNS command. The only difference is that you set the query type to "*soa*" instead of "*ns*".

Implementation:

```
C:\Users\raman>nslookup
Default Server:  UnKnown
Address:  192.168.51.208

>
```

> set debug
> darshan.ac.in

```
> set debug
> darshan.ac.in
Server:  UnKnown
Address:  192.168.51.208

------------
Got answer:
    HEADER:
        opcode = QUERY, id = 2, rcode = NOERROR
        header flags:  response, want recursion, recursion avail.
        questions = 1,  answers = 1,  authority records = 0,  additional = 0

    QUESTIONS:
        darshan.ac.in, type = A, class = IN
    ANSWERS:
    ->  darshan.ac.in
        internet address = 103.13.112.180
        ttl = 50002 (13 hours 53 mins 22 secs)

------------
Non-authoritative answer:
------------
Got answer:
    HEADER:
        opcode = QUERY, id = 3, rcode = NOERROR
        header flags:  response, want recursion, recursion avail.
        questions = 1,  answers = 1,  authority records = 0,  additional = 0

    QUESTIONS:
        darshan.ac.in, type = AAAA, class = IN
    ANSWERS:
    ->  darshan.ac.in
        AAAA IPv6 address = 64:ff9b::670d:70b4
        ttl = 50002 (13 hours 53 mins 22 secs)

------------
Name:    darshan.ac.in
Addresses:  64:ff9b::670d:70b4
        103.13.112.180
```

> set q=soa
> darshan.ac.in

```
> set q=soa
> darshan.ac.in
Server:  UnKnown
Address:  192.168.51.208

-------------
Got answer:
    HEADER:
        opcode = QUERY, id = 4, rcode = NOERROR
        header flags:  response, want recursion, recursion avail.
        questions = 1,  answers = 1,  authority records = 0,  additional = 0

    QUESTIONS:
        darshan.ac.in, type = SOA, class = IN
    ANSWERS:
    ->  darshan.ac.in
        ttl = 86400 (1 day)
        primary name server = ns1.darshan.interactivedns.com
        responsible mail addr = developer.darshan.ac.in
        serial  = 2024052001
        refresh = 10800 (3 hours)
        retry   = 3600 (1 hour)
        expire  = 604800 (7 days)
        default TTL = 10800 (3 hours)

------------
Non-authoritative answer:
darshan.ac.in
        ttl = 86400 (1 day)
        primary name server = ns1.darshan.interactivedns.com
        responsible mail addr = developer.darshan.ac.in
        serial  = 2024052001
        refresh = 10800 (3 hours)
        retry   = 3600 (1 hour)
        expire  = 604800 (7 days)
        default TTL = 10800 (3 hours)
> |
```

8. hostname

Description: Hostname command in Linux is used to obtain the DNS (Domain Name System) name and set the system's hostname or NIS (Network Information System) domain name.

Implementation:

```
C:\Users\raman>hostname
Jay_Patel
```

9. pathping

Description: The PathPing command is a command-line network utility included in Windows NT operating systems since Windows 2000 that combines the functionality of ping with that of tracert.
---------- Details About Command ------

No.	Option	Description
1	pathping -g darshan.ac.in	Loose source route along host-list.
2	pathping -h 2 darshan.ac.in	Maximum number of hops to search for target.
3	pathping -p 2 darshan.ac.in	Wait period milliseconds between pings.
4	pathping -4 darshan.ac.in	Force using IPv4.
5	pathping -6 darshan.ac.in	Force using IPv6.

Date: 12/06/2024

Implementation:

```
C:\Users\raman>pathping darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 30 hops:
  0  Jay_Patel [2409:40c1:4027:fde2:f860:5aac:bd12:521]
  1  2409:40c1:4027:fde2::9c
  2  2405:200:5210:3:3924:110:3:211
  3  2405:200:5210:3:3925::1
  4  2405:200:898:3632:62::6
  5  64:ff9b::c0a8:e3c2
  6  64:ff9b::c0a8:f48a
  7     *        *        *
Computing statistics for 150 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            Jay_Patel [2409:40c1:4027:fde2:f860:5aac:bd12:521]
                                0/ 100 =  0%   |
  1    5ms      0/ 100 =  0%   0/ 100 =  0%  2409:40c1:4027:fde2::9c
                                0/ 100 =  0%   |
  2   54ms      0/ 100 =  0%   0/ 100 =  0%  2405:200:5210:3:3924:110:3:211
                              100/ 100 =100%   |
  3   ---     100/ 100 =100%   0/ 100 =  0%  2405:200:5210:3:3925::1
                                0/ 100 =  0%   |
  4   ---     100/ 100 =100%   0/ 100 =  0%  2405:200:898:3632:62::6
                                0/ 100 =  0%   |
  5   ---     100/ 100 =100%   0/ 100 =  0%  64:ff9b::c0a8:e3c2
                                0/ 100 =  0%   |
  6   ---     100/ 100 =100%   0/ 100 =  0%  64:ff9b::c0a8:f48a

Trace complete.
```

pathping -g darshan.ac.in

```
C:\Users\raman>pathping -g darshan.ac.in

Tracing route to darshan.ac.in [103.13.112.180]
over a maximum of 30 hops:
  0  Jay_Patel [192.168.51.32]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            Jay_Patel [192.168.51.32]

Trace complete.
```

pathping -h 2 darshan.ac.in

```
C:\Users\raman>pathping -h 2 darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 2 hops:
  0  Jay_Patel [2409:40c1:4027:fde2:f860:5aac:bd12:521]
  1  2409:40c1:4027:fde2::9c
  2  2405:200:5210:3:3924:110:3:211

Computing statistics for 50 seconds...
```

pathping -p 2 darshan.ac.in

```
C:\Users\raman>pathping -p 2 darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 30 hops:
  0  Jay_Patel [2409:40c1:4027:fde2:f860:5aac:bd12:521]
  1  2409:40c1:4027:fde2::9c
  2  2405:200:5210:3:3924:110:3:211
  3  2405:200:5210:3:3925::1
  4  2405:200:898:3632:62::6
  5  64:ff9b::c0a8:e3c3
  6  64:ff9b::c0a8:f48c
  7     *        *        *
Computing statistics for 1 seconds...
```

pathping -4 darshan.ac.in

```
C:\Users\raman>pathping -4 darshan.ac.in

Tracing route to darshan.ac.in [103.13.112.180]
over a maximum of 30 hops:
  0  Jay_Patel [192.168.51.32]
  1  192.168.51.208
  2  192.0.0.1
  3      *        *        *
Computing statistics for 50 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                            Jay_Patel [192.168.51.32]
                                0/ 100 =  0%   |
  1    4ms     0/ 100 =  0%    0/ 100 =  0%  192.168.51.208
                              100/ 100 =100%   |
  2   ---    100/ 100 =100%    0/ 100 =  0%  192.0.0.1

Trace complete.
```

pathping -6 darshan.ac.in

```
C:\Users\raman>pathping -6 darshan.ac.in

Tracing route to darshan.ac.in [64:ff9b::670d:70b4]
over a maximum of 30 hops:
  0  Jay_Patel [2409:40c1:4027:fde2:f860:5aac:bd12:521]
  1  2409:40c1:4027:fde2::9c
  2  2405:200:5210:3:3924:110:3:211
  3  2405:200:5210:3:3925::1
  4  2405:200:898:3632:62::6
  5  64:ff9b::c0a8:e3c3
  6  64:ff9b::c0a8:f48a
  7      *        *        *
Computing statistics for 150 seconds...
```

Date: **12/06/2024**

10. arp

Description: Arp command manipulates the System's ARP cache.

--------- **Details About Command** ------

No.	Option	Description
1	arp /a	Displays current ARP entries by interrogating the current protocol data.

Implementation:

```
C:\Users\raman>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.
```

arp /a

```
C:\Users\raman>arp /a

Interface: 192.168.51.32 --- 0xe
  Internet Address      Physical Address      Type
  192.168.51.208        ca-6f-b0-61-a9-03     dynamic
  192.168.51.255        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
```