

Date:27.07.2024

Exp no : 1A BASIC NETWORKING COMMANDS IN WINDOWS OPERATING SYSTEM

Aim:-

To implement basic networking commands in the Windows operating system.

1. IPCONFIG

The IPCONFIG network command provides a comprehensive view of information regarding the IP address configuration of the device we are currently working on.

The IPConfig command also provides us with some variation in the primary command that targets specific system settings or data, which are:

- IPConfig/all - Provides primary output with additional information about network adapters.
- IPConfig/renew - Used to renew the system's IP address.
- IPConfig/release - Removes the system's current IP address.

Syntax: ipconfig

```
Command Prompt
Microsoft Windows [Version 10.0.22631.3880]
(c) Microsoft Corporation. All rights reserved.

C:\Users\pooja>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::7b85:248e:1b5e:22f%13
    IPv4 Address. . . . . : 192.168.56.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Wireless LAN adapter Local Area Connection* 10:

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

Wireless LAN adapter Local Area Connection* 11:

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

Wireless LAN adapter Wi-Fi 3:

    Connection-specific DNS Suffix  . : 
    IPv6 Address. . . . . : 2401:4900:633c:ca72:9492:645c:d98a:dad0
    Temporary IPv6 Address . . . . . : 2401:4900:633c:ca72:35af:c09:8bb:6500
    Link-local IPv6 Address . . . . . : fe80::89fc:749c:56fa:884a%11
    IPv4 Address. . . . . : 192.168.35.56
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : fe80::382a:aeff:fe0f:33d9%11
                                192.168.35.57

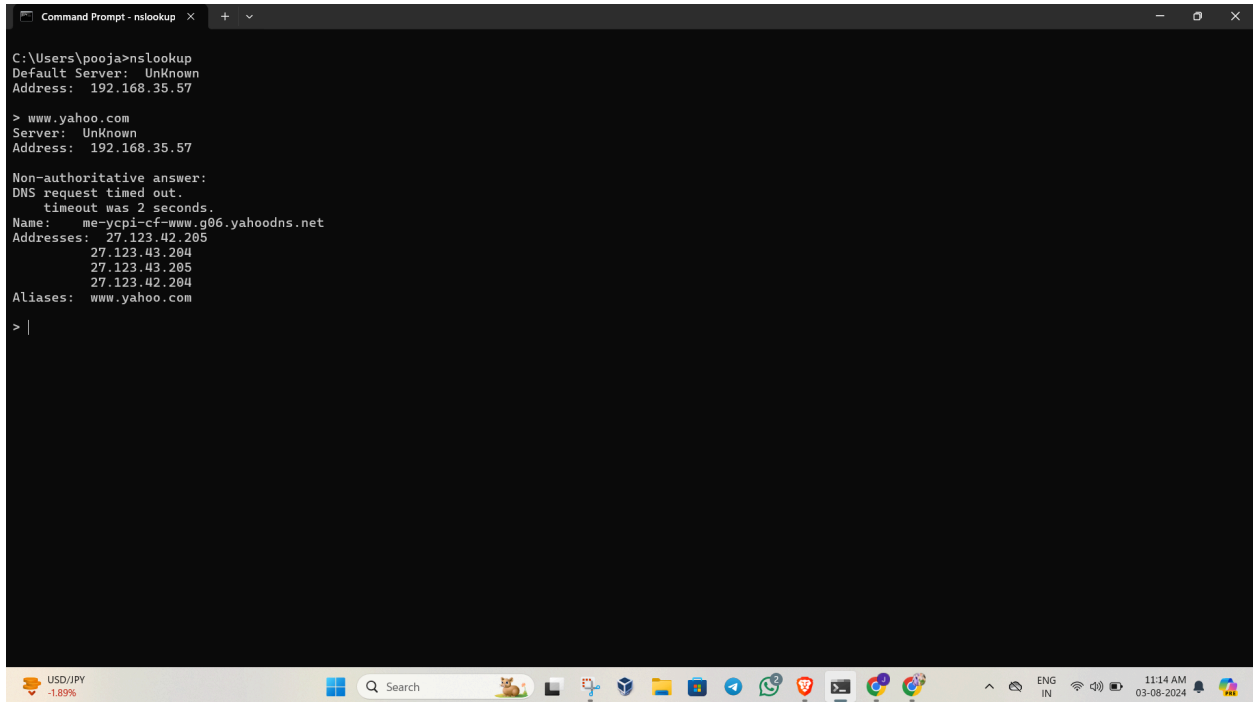
C:\Users\pooja>ipconfig/all

Windows IP Configuration
```

2. NSLOOKUP

The NSLOOKUP command is used to troubleshoot network connectivity issues in the system. Using the nslookup command, we can access the information related to our system's DNS server, i.e., domain name and IP address.

Syntax: nslookup



```
Command Prompt - nslookup
C:\Users\pooja>nslookup
Default Server:  Unknown
Address:  192.168.35.57

> www.yahoo.com
Server:  Unknown
Address:  192.168.35.57

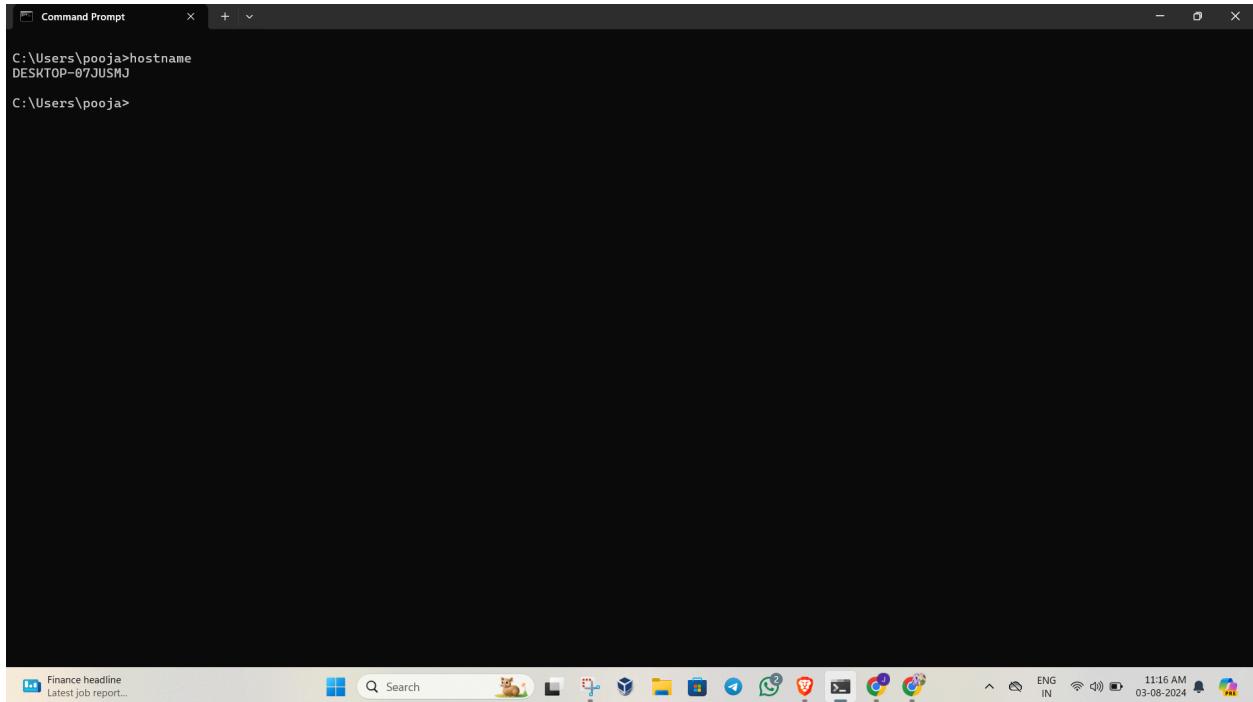
Non-authoritative answer:
DNS request timed out.
  timeout was 2 seconds.
Name:    me-ycpi-cf-www.g06.yahoodns.net
Addresses:  27.123.42.205
            27.123.43.204
            27.123.42.204
Aliases:  www.yahoo.com

> |
```

3. HOSTNAME

The HOSTNAME command displays the hostname of the system. The hostname command is much easier to use than going into the system settings to search for it.

Syntax:hostname



```
Command Prompt
C:\Users\pooja>hostname
DESKTOP-07JUSMJ
C:\Users\pooja>
```

4. PING

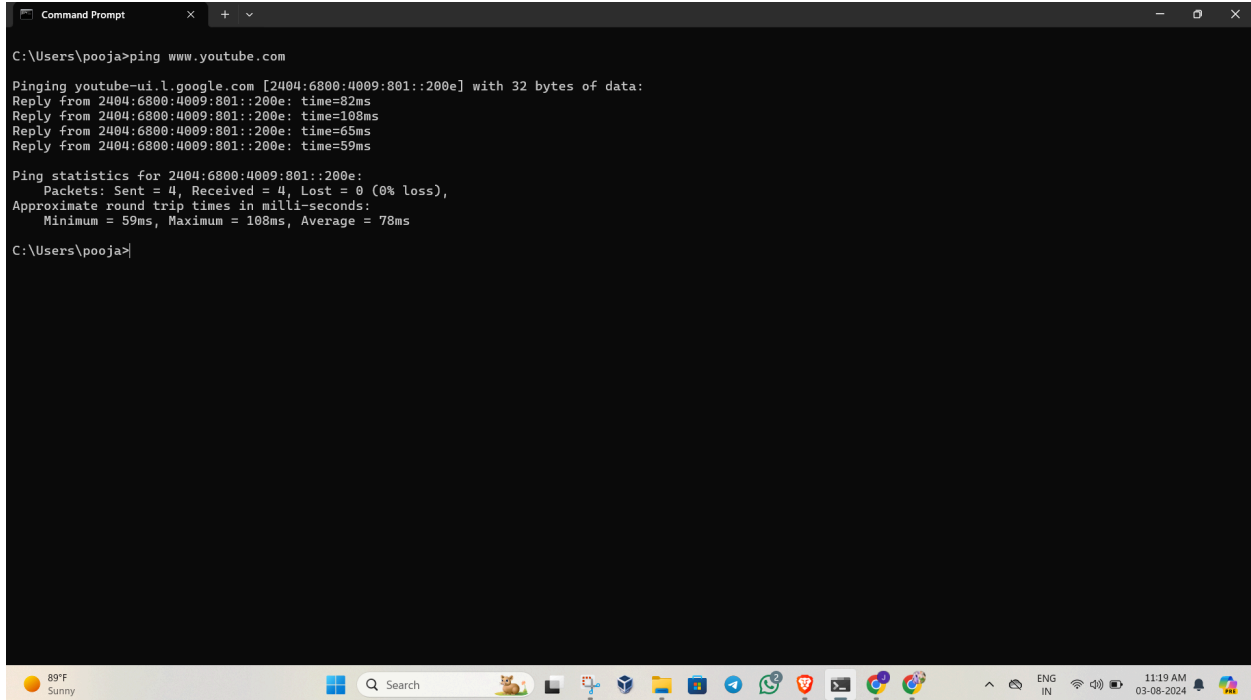
The Ping command is one of the most widely used commands in the prompt tool, as it allows the user to check the connectivity of our system to another host.

This command sends four experimental packets to the destination host to check whether it receives them successfully, if so, then, we can communicate with the destination host. But in case the packets have not been received, that means, no communication can be established with the destination host.

Syntax:

ping www.destination_host_name.com

Example: ping www.yahoo.com



```
Command Prompt
C:\Users\pooja>ping www.youtube.com

Pinging youtube-ui.l.google.com [2404:6800:4009:801::200e] with 32 bytes of data:
Reply from 2404:6800:4009:801::200e: time=82ms
Reply from 2404:6800:4009:801::200e: time=108ms
Reply from 2404:6800:4009:801::200e: time=65ms
Reply from 2404:6800:4009:801::200e: time=59ms

Ping statistics for 2404:6800:4009:801::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 59ms, Maximum = 108ms, Average = 78ms

C:\Users\pooja>
```

5. TRACERT

The TRACERT command is used to trace the route during the transmission of the data packet over to the destination host and also provides us with the “hop” count during transmission.

Using the number of hops and the hop IP address, we can troubleshoot network issues and identify the point of the problem during the transmission of the data packet.

Syntax: tracert IP-address OR tracert www.destination_host_name.com

Example: tracert www.youtube.com

```
Command Prompt
C:\Users\pooja>tracert www.youtube.com

Tracing route to youtube-ui.l.google.com [2404:6800:4007:818::200e]
over a maximum of 30 hops:
  1  14 ms  4 ms  4 ms  2401:4900:633c:ca72::cf
  2  *      *      *      Request timed out.
  3  168 ms  99 ms  99 ms  2401:4900:0:7e6::1
  4  111 ms  94 ms  101 ms  2401:4900:0:6ff::3
  5  235 ms  186 ms  96 ms  2401:4900:0:6f7::1
  6  *      *      *      Request timed out.
  7  117 ms  134 ms  22 ms  2404:a800:3a00:1::605
  8  128 ms  100 ms  99 ms  2404:a800::92
  9  111 ms  102 ms  100 ms  2001:4860:1:1::d2e
 10  109 ms  52 ms  140 ms  2404:6800:805a::1
 11  187 ms  40 ms  24 ms  2001:4860:0:1::1394
 12  128 ms  112 ms  23 ms  2001:4860:0:1::33cb
 13  29 ms  30 ms  31 ms  maa05s17-in-x0e.1e100.net [2404:6800:4007:818::200e]

Trace complete.
C:\Users\pooja>
```

6. NETSTAT

The Netstat command as the name suggests displays an overview of all the network connections in the device. The table shows detail about the connection protocol, address, and the current state of the network.

Syntax:netstat

```

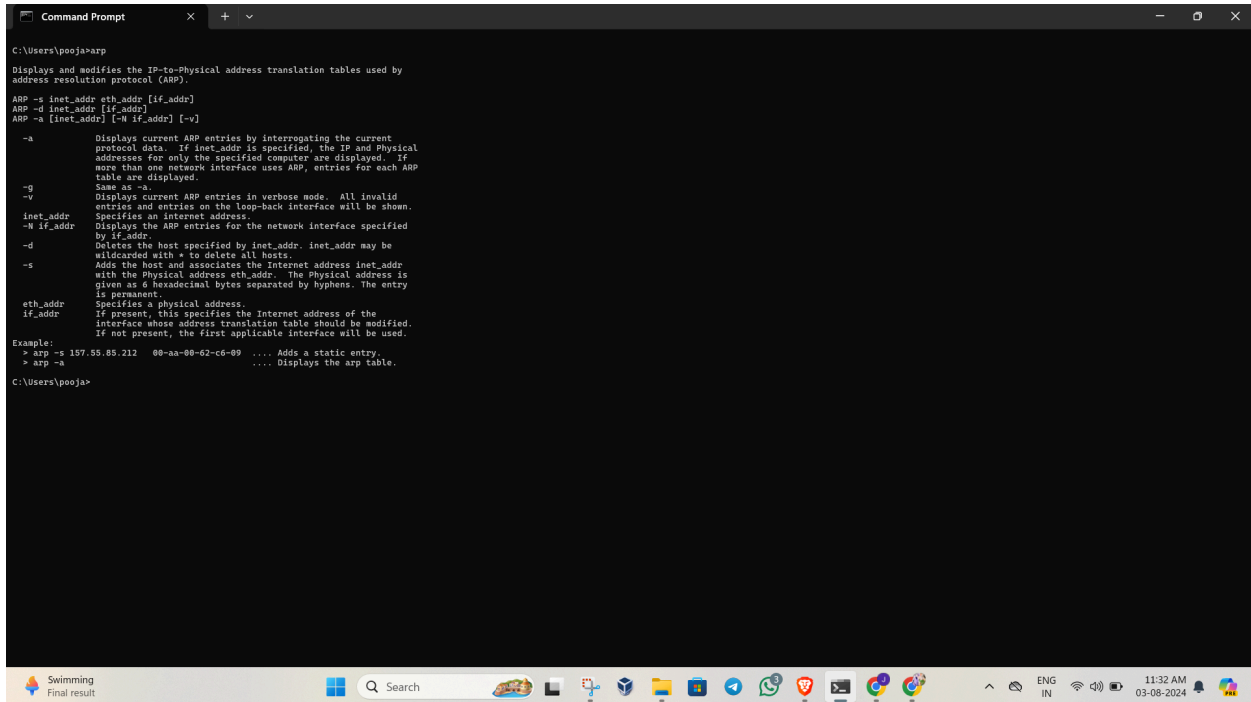
Command Prompt
C:\Users\pooja>netstat
Active Connections
Proto Local Address           Foreign Address         State
TCP    127.0.0.1:49782          DESKTOP-87JUSMJ:49783  ESTABLISHED
TCP    127.0.0.1:49783          DESKTOP-87JUSMJ:49782  ESTABLISHED
TCP    127.0.0.1:49784          DESKTOP-87JUSMJ:49785  ESTABLISHED
TCP    127.0.0.1:49785          DESKTOP-87JUSMJ:49784  ESTABLISHED
TCP    127.0.0.1:49787          DESKTOP-87JUSMJ:49788  ESTABLISHED
TCP    127.0.0.1:49788          DESKTOP-87JUSMJ:49787  ESTABLISHED
TCP    192.168.35.56:13910      Telnyx-cs333489.https  ESTABLISHED
TCP    192.168.35.56:13978      20.212.88.117:https    ESTABLISHED
TCP    192.168.35.56:14069      U-140-42-112-22-fad.https ESTABLISHED
TCP    192.168.35.56:14092      a184-77-173-121.https  ESTABLISHED
TCP    192.168.35.56:14093      a184-77-173-41.https   ESTABLISHED
TCP    192.168.35.56:14094      a184-77-173-41.https   ESTABLISHED
TCP    192.168.35.56:14095      a-0003:https           ESTABLISHED
TCP    192.168.35.56:14188      ec2-44-195-238-38.https ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:13904  sh-in-f108:9228       ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:13123  sh-in-f108:5228       ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:13192  maas5526-in-x0a:https ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14032  maas5517-in-x0a:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14039  maas3536-in-x0a:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14040  maas5517-in-x0a:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14041  maas5517-in-x0a:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14059  whatsapp-cdn-shv-02-t123.https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14056  [2404:a800:6:126:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14057  [2404:a800:6:101:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14058  whatsapp-cdn-shv-01-t123.https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14059  [2404:a800:6:126:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14060  whatsapp-cdn-shv-01-t123.https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14061  [2404:a800:6:8c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14062  [2404:a800:6:129:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14063  [2404:a800:6:101:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14064  [2404:a800:6:129:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14065  [2404:a800:6:8c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14066  whatsapp-cdn-shv-01-maa2.https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14067  [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14068  [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14069  [2404:a800:6:127:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14070  [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14071  [2404:a800:6:8c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14072  [2404:a800:6:15c:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14073  [2404:a800:6:128:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14074  [2404:a800:6:128:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14075  [2404:a800:6:129:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14076  [2404:a800:6:127:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14077  [2404:a800:6:127:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14078  [2404:a800:6:127:face:b00c:3333:7020]:https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14079  whatsapp-cdn-shv-02-maa2.https CLOSE_WAIT
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14081  bom07536-in-x0a:https ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14083  bom0755-in-x0a:https ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14089  maas5506-in-x0a:https ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14041  [2603:1804:a06:6:]:https ESTABLISHED
TCP    [2401:4900:633c:ca72:35af:c09:8bb:6500]:14042  [2603:1804:a06:6:]:https ESTABLISHED
TCP    [6800:7b85:248e:1b5e:224f13]:1521  DESKTOP-87JUSMJ:48654 ESTABLISHED
TCP    [6800:7b85:248e:1b5e:224f13]:48656  DESKTOP-87JUSMJ:1521  ESTABLISHED
C:\Users\pooja>

```

7. ARP(Address Resolution Protocol)

The ARP command is used to access the mapping structure of IP addresses to the MAC address. This provides us with a better understanding of the transmission of packets in the network channel.

Syntax: arp



```
C:\Users\pooja>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.
              Same as -a.
-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 08-aa-08-62-c6-09 .... Adds a static entry.
> arp -a                                           .... Displays the arp table.

C:\Users\pooja>
```

8. SYSTEMINFO

Using the SYSTEMINFO command, we can access the system's hardware and software details, such as processor data, booting data, Windows version, etc.

Syntax: systeminfo


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

Host Name: DESKTOP-07JUSMJ
OS Name: Microsoft Windows 11 Pro
OS Version: 10.0.22631 N/A Build 22631
OS Manufacturer: Microsoft Corporation
OS Configuration: Standalone Workstation
OS Build Type: Multiprocessor Free
Registered Owner: poojajunit2006@gmail.com
Registered Organization:
Product ID: 80338-80000-80000-AA778
Original Install Date: 01-01-2023, 04:45:21 PM
System Boot Time: 26-07-2024, 07:03:33 PM
System Manufacturer: HP
System Model: HP Pavilion Laptop
System Type: x64-based PC
Processor(s): 1 Processor(s) Installed.
[01]: Intel(R) Core(TM) i7-13700H Processor 2.40 GHz
BIOS Version: AMI P 08, 09-11-2023
Windows Directory: C:\Windows
System Directory: C:\Windows\System32
Root Device: \Device\HarddiskVolume1
System Locale: en-us;English (United States)
Input Locale: 00000409
Time Zone: (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory: 16,025 MB
Available Physical Memory: 8,182 MB
Virtual Memory: Max Size: 16,457 MB
Virtual Memory: Available: 8,696 MB
Virtual Memory: In Use: 9,761 MB
Page File Location(s): C:\pagefile.sys
Domain: WORKGROUP
Logon Server: \\DESKTOP-07JUSMJ
Hotfix(s): 5 Hotfix(s) Installed.
[01]: KB5033935
[02]: KB5027397
[03]: KB5033855
[04]: KB5040042
[05]: KB5039310
Network Card(s): 2 NIC(s) Installed.
[01]: Virtualbox Host-Only Ethernet Adapter
Connection Name: Ethernet
DHCP Enabled: No
IP address(es):
[01]: 192.168.56.1
[02]: fe80::7b85:248e:1b5e:22f
[02]: Realtek RTL8852BE WiFi 6 802.11ax PCIe Adapter
Connection Name: Wi-Fi 5
DHCP Enabled: Yes
DHCP Server: 192.168.35.57
IP address(es):
[01]: 192.168.35.56
[02]: fe80::89fc:70bc:56fa:88da
[03]: 2401:4900:633c:ca72:35af:c09:bbb:6500
[04]: 2401:4900:633c:ca72:35af:c09:bbb:6500
Hyper-V Requirements: A hypervisor has been detected. Features required for Hyper-V will not be displayed.

C:\Users\pooja>
```

9. ROUTE

Provides the data of routing data packets in the system over the communication channel.

Syntax: route print

```

C:\Users\pooja>route print

Interface List
13...{...} VirtualBox Host-Only Ethernet Adapter
14...{...} Microsoft Wi-Fi Direct Virtual Adapter #2
6...{...} Microsoft Wi-Fi Direct Virtual Adapter #1
11...{...} Realtek RTL8252UE PCI-E 6 Port 11x PCI-E Adapter
1...{...} Software Loopback Interface 1

IPv4 Route Table

Active Routes:
Network Destination        Netmask          Gateway           Interface Metric
0.0.0.0                    0.0.0.0          192.168.35.57     192.168.35.56   35
127.0.0.0                  255.0.0.0        On-link           127.0.0.1       331
127.0.0.1                  255.255.255.255 On-link           127.0.0.1       331
127.255.255.255            255.255.255.255 On-link           127.0.0.1       331
192.168.35.0                255.255.255.0    On-link           192.168.35.56   311
192.168.35.56               255.255.255.0    On-link           192.168.35.56   311
192.168.35.255              255.255.255.0    On-link           192.168.35.56   311
192.168.0.0                 255.255.255.0    On-link           192.168.56.1     281
192.168.56.1                255.255.255.0    On-link           192.168.56.1     281
192.168.56.255              255.255.255.0    On-link           192.168.56.1     281
224.0.0.0                  240.0.0.0        On-link           127.0.0.1       331
224.0.0.0                  240.0.0.0        On-link           192.168.56.1     281
240.0.0.0                  240.0.0.0        On-link           127.0.0.1       331
255.255.255.255            255.255.255.0    On-link           192.168.35.56   311
255.255.255.255            255.255.255.0    On-link           127.0.0.1       331
255.255.255.255            255.255.255.0    On-link           192.168.56.1     281
255.255.255.255            255.255.255.0    On-link           192.168.35.56   311

Persistent Routes:
None

IPv6 Route Table

Active Routes:
If Metric Network Destination      Gateway
11 1 1::/0 fe80::382a:aeff:fe0f:33d9
1 1 311::/128 On-link
11 1 71 2401:4908:633c:ca72::/64 On-link
11 1 311 2401:4908:633c:ca72:35af:c99:8bb:6500/128 On-link
11 1 311 2401:4908:633c:ca72:9492:648c:d99a:da00/128 On-link
13 281 fe80::/64 On-link
11 311 fe80::/64 On-link
13 281 fe80::70d5:748e:1b5e:22f7/128 On-link
11 311 fe80::89fc:749c:56fa:884a/128 On-link
1 1 311 ffd80::/8 On-link
11 281 ffd80::/8 On-link
11 11 ffd80::/8 On-link

Persistent Routes:
None

C:\Users\pooja>

```

CONCLUSION

Understood the need of using network commands and the way to implement them in the Windows command prompt and also learned about the different network commands to troubleshoot and configure the system's network settings.