Lab 2:

Networking command:

1. Ipconfig:

Ipconfig (standing for "Internet Protocol configuration") is a console application program which is used to displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings. It also allows for releasing and renewing IP addresses.

```
C:\Users\LENOVO>ipconfig

Windows IP Configuration


Wireless LAN adapter Local Area Connection* 1:

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

Wireless LAN adapter Local Area Connection* 2:

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

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : Home
   Link-local IPv6 Address . . . . . : fe80::3d85:d631:2525:7453%16
   IPv4 Address. . . . . . . . . . . : 192.168.1.18
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

2. Ipconfig/all:

It is used to display detailed information about all adapters on the system, including the IP address, subnet mask, default gateway, DHCP server, and DNS servers and many more.

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

Windows IP Configuration

   Host Name . . . . . . . . . . . . : LENOVO-IDEALPAD
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Mixed
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : Home

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
   Physical Address. . . . . . . . . : 76-4C-A1-C8-66-31
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
   Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
   Physical Address. . . . . . . . . : 86-4C-A1-C8-66-31
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : Home
   Description . . . . . . . . . . . : Qualcomm Atheros QCA61x4A Wireless Network Adapter
   Physical Address. . . . . . . . . : 74-4C-A1-C8-66-31
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::3d85:d631:2525:7453%16(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.1.18(Preferred)
```

```
Wireless LAN adapter Wi-Fi:

   Connection-specific DNS Suffix  . : Home
   Description . . . . . . . . . . . : Qualcomm Atheros QCA61x4A Wireless Network Adapter
   Physical Address. . . . . . . . . : 74-4C-A1-C8-66-31
   DHCP Enabled. . . . . . . . . . . : Yes
   Autoconfiguration Enabled . . . . : Yes
   Link-local IPv6 Address . . . . . : fe80::3d85:d631:2525:7453%16(Preferred)
   IPv4 Address. . . . . . . . . . . : 192.168.1.18(Preferred)
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Lease Obtained. . . . . . . . . . : Saturday, January 27, 2024 5:29:44 PM
   Lease Expires . . . . . . . . . . : Sunday, January 28, 2024 6:34:36 PM
   Default Gateway . . . . . . . . . : 192.168.1.1
   DHCP Server . . . . . . . . . . . : 192.168.1.1
   DHCPv6 IAID . . . . . . . . . . . : 158616737
   DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2A-C4-A6-8F-74-4C-A1-C8-66-31
   DNS Servers . . . . . . . . . . . : 192.168.1.1
   NetBIOS over Tcpip. . . . . . . . : Enabled
```

3. nslookup:

Name server lookup is a network administration command-line tool for querying the Domain Name System (DNS) to obtain the mapping between domain name and IP address, or other DNS records.

```
C:\Users\LENOVO>nslookup
Default Server:  Broadcom.Home
Address:  192.168.1.1

> www.youtube.com
Server:  Broadcom.Home
Address:  192.168.1.1

Non-authoritative answer:
Name:     youtube-ui.l.google.com
Addresses:  2404:6800:4002:821::200e
            2404:6800:4002:822::200e
            2404:6800:4002:823::200e
            2404:6800:4002:824::200e
            142.250.194.110
            142.250.194.142
            142.250.194.174
            142.250.194.206
            142.250.194.238
            142.250.195.14
            142.250.207.206
            142.250.207.238
            172.217.160.238
            172.217.161.14
            172.217.166.206
            172.217.166.238
            172.217.167.14
            172.217.167.46
            172.217.166.14
            172.217.27.174
Aliases:  www.youtube.com
```

4. getmac:

The 'getmac' command retrieves the Media Access Control (MAC) addresses of network adapters on a Windows system. It can be used to diagnose network issues or simply to verify MAC addresses.

```
C:\Users\LENOVO>getmac

Physical Address    Transport Name
=================== ===========================================================
74-4C-A1-C8-66-31   \Device\Tcpip_{E4724E63-C286-4956-9E52-B59A37539A01}
```

5. ping:

   Ping is a command-line program designed to allow network admins to track the availability status of different devices in a network. It sends ICMP echo requests to the target host and measures the round-trip time for packets to reach the destination and return.

```
C:\Users\LENOVO>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=76ms TTL=64
Reply from 192.168.1.1: bytes=32 time=31ms TTL=64
Reply from 192.168.1.1: bytes=32 time=14ms TTL=64
Reply from 192.168.1.1: bytes=32 time=4ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 76ms, Average = 31ms
```

6. tracert:

   It identifies the route that a packet takes between your computer and the destination computer. It shows each hop along the path, along with response times, helping in diagnosing network latency or routing issues.

```
C:\Users\LENOVO>tracert 192.168.1.1

Tracing route to Broadcom.Home [192.168.1.1]
over a maximum of 30 hops:

  1     2 ms     2 ms     2 ms  Broadcom.Home [192.168.1.1]

Trace complete.
```

7. netstat:

   It is a networking tool used for troubleshooting and configuration, that can also serve as a monitoring tool for connections over the network.
   Both incoming and outgoing connections, routing tables, port listening, and usage statistics are common uses for this command.

```
C:\Users\LENOVO>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.18:57256     20.198.118.190:https   ESTABLISHED
  TCP    192.168.1.18:57257     a104-86-188-200:https  CLOSE_WAIT
  TCP    192.168.1.18:57397     52.98.123.210:https    ESTABLISHED
  TCP    192.168.1.18:57398     52.98.123.210:https    ESTABLISHED
  TCP    192.168.1.18:57401     149.154.170.100:https  ESTABLISHED
  TCP    192.168.1.18:57403     149.154.167.99:https   TIME_WAIT
  TCP    192.168.1.18:57404     52.111.240.8:https     TIME_WAIT
  TCP    192.168.1.18:57405     52.111.240.8:https     ESTABLISHED
  TCP    192.168.1.18:57406     52.111.240.8:https     ESTABLISHED
  TCP    192.168.1.18:57408     52.109.44.102:https    ESTABLISHED
  TCP    192.168.1.18:57410     20.212.88.117:https    ESTABLISHED
  TCP    192.168.1.18:57411     204.79.197.239:https   TIME_WAIT
  TCP    192.168.1.18:57412     52.111.252.17:https    ESTABLISHED
  TCP    [fe80::3d85:d631:2525:7453%16]:1521   LENOVO-IDEALPAD:49686   ESTABLISHED
  TCP    [fe80::3d85:d631:2525:7453%16]:49686  LENOVO-IDEALPAD:1521    ESTABLISHED
```

8. arp-a:

The Address Resolution Protocol (ARP) cache on a system maps IP addresses to MAC addresses. Using 'arp -a' displays the ARP cache entries, showing which IP addresses are associated with which MAC addresses.

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

Interface: 192.168.1.18 --- 0x10
  Internet Address      Physical Address      Type
  192.168.1.1           b4-cf-e0-09-81-f7     dynamic
  192.168.1.13          28-e3-47-be-59-f8     dynamic
  192.168.1.255         ff-ff-ff-ff-ff-ff     static
  224.0.0.2             01-00-5e-00-00-02     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
```

9. route:

This command displays and modifies the local IP routing table. It shows how packets will be routed through the network based on destination IP addresses and subnet masks.

```
C:\Users\LENOVO>route

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
                [MASK netmask]  [gateway] [METRIC metric]  [IF interface]

  -f          Clears the routing tables of all gateway entries.  If this is
              used in conjunction with one of the commands, the tables are
              cleared prior to running the command.

  -p          When used with the ADD command, makes a route persistent across
              boots of the system. By default, routes are not preserved
              when the system is restarted. Ignored for all other commands,
              which always affect the appropriate persistent routes.

  -4          Force using IPv4.

  -6          Force using IPv6.
```

10. hostname:

The hostname command displays the name of the current host system. Only users with root user authority can set the host name.

```
C:\Users\LENOVO>hostname
LENOVO-IDEALPAD
```

11. Nbtstat:

NetBIOS over TCP/IP (NBT) statistics can be viewed using this command. It shows NetBIOS name tables for local and remote computers, aiding in troubleshooting NetBIOS-related issues.

```
C:\Users\LENOVO>nbtstat

Displays protocol statistics and current TCP/IP connections using NBT
(NetBIOS over TCP/IP).

NBTSTAT [ [-a RemoteName] [-A IP address] [-c] [-n]
        [-r] [-R] [-RR] [-s] [-S] [interval] ]

  -a   (adapter status) Lists the remote machine's name table given its name
  -A   (Adapter status) Lists the remote machine's name table given its
                        IP address.
  -c   (cache)          Lists NBT's cache of remote [machine] names and their IP addresses
  -n   (names)          Lists local NetBIOS names.
  -r   (resolved)       Lists names resolved by broadcast and via WINS
  -R   (Reload)         Purges and reloads the remote cache name table
  -S   (Sessions)       Lists sessions table with the destination IP addresses
  -s   (sessions)       Lists sessions table converting destination IP
                        addresses to computer NETBIOS names.
  -RR  (ReleaseRefresh) Sends Name Release packets to WINS and then, starts Refresh

  RemoteName   Remote host machine name.
  IP address   Dotted decimal representation of the IP address.
  interval     Redisplays selected statistics, pausing interval seconds
               between each display. Press Ctrl+C to stop redisplaying
               statistics.
```

12. Tasklist:

It is used to display a list of currently running processes on the local computer or on a remote computer. It can be filtered by various parameters, such as process name, session, CPU usage, and so forth.

```
C:\Users\LENOVO>tasklist

Image Name                     PID Session Name        Session#    Mem Usage
========================= ======== ================ =========== ============
System Idle Process              0 Services                   0          8 K
System                           4 Services                   0      6,512 K
Secure System                  140 Services                   0     30,828 K
Registry                       172 Services                   0     33,464 K
smss.exe                       636 Services                   0      1,048 K
csrss.exe                     1032 Services                   0      5,484 K
wininit.exe                   1180 Services                   0      6,448 K
services.exe                  1284 Services                   0     10,584 K
LsaIso.exe                    1340 Services                   0      3,248 K
lsass.exe                     1360 Services                   0     26,876 K
```

13. Systeminfo:

The systeminfo command is a built-in tool of the Windows operating system that displays detailed information about the computer's hardware and software configuration.

```
C:\Users\LENOVO>systeminfo

Host Name:                 LENOVO-IDEALPAD
OS Name:                   Microsoft Windows 11 Home
OS Version:                10.0.22631 N/A Build 22631
OS Manufacturer:           Microsoft Corporation
OS Configuration:          Standalone Workstation
OS Build Type:             Multiprocessor Free
Registered Owner:          LENOVO
Registered Organization:   N/A
Product ID:                00325-82194-32747-AAOEM
Original Install Date:     10/14/2022, 6:55:05 PM
System Boot Time:          1/21/2024, 5:56:47 PM
System Manufacturer:       LENOVO
System Model:              82KU
System Type:               x64-based PC
Processor(s):              1 Processor(s) Installed.
```

14. Wmic:

It offers a command-line interface for Windows Management Instrumentation (WMI), providing extensive capabilities to interact with the operating system and installed applications.

```
C:\Users\LENOVO>wmic bios get Manufacturer,SerialNumber,ReleaseDate
Manufacturer   ReleaseDate                  SerialNumber
LENOVO         20220512000000.000000+000    PF31L56Z
```