

# [ 2CEIT503 COMPUTER NETWORKS ]

## Practical: 3

**AIM-** Studying Windows network commands.  
ping, pathping, ipconfig/ifconfig, arp, netstat, nbtstat,  
nslookup, route, traceroute/tracert, nmap



**Ganpat  
University**

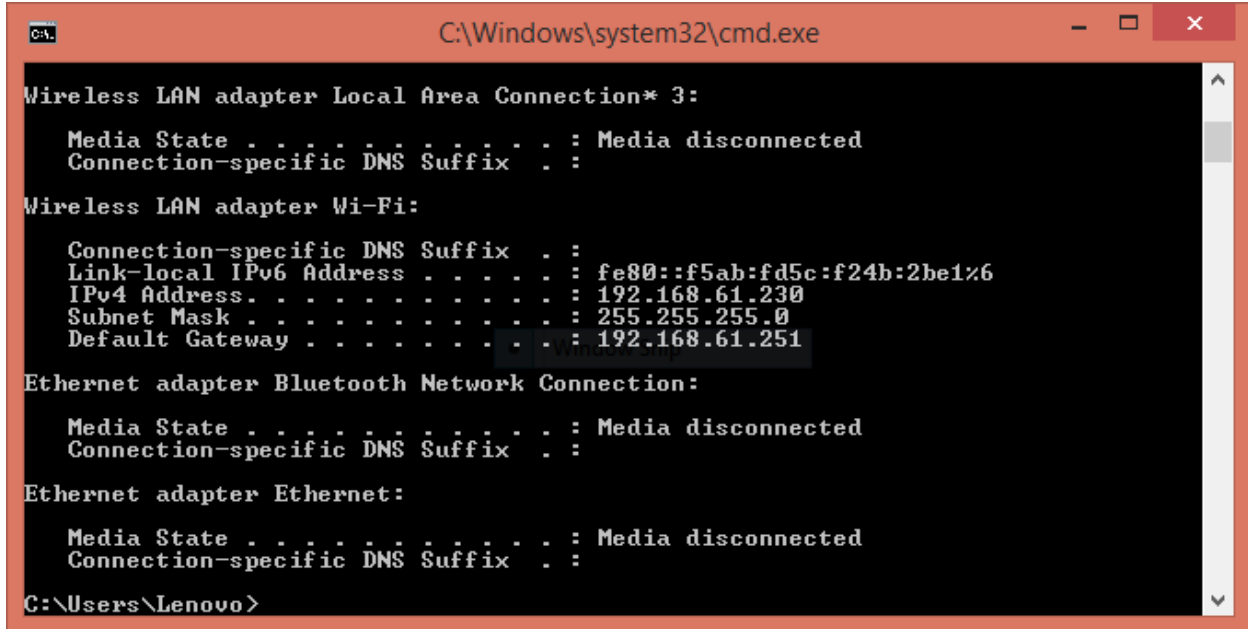
॥ विद्यया समाजोत्कर्षः ॥

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College of  
Engineering

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### Ipconfig :

The ipconfig command is a fast way of determining your computer's IP address and other information, such as the address of its default gateway — useful if you want to know the IP address of your router's web interface.



```
C:\Windows\system32\cmd.exe

Wireless LAN adapter Local Area Connection* 3:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::f5ab:fd5c:f24b:2be1%6
    IPv4 Address. . . . . : 192.168.61.230
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.61.251

Ethernet adapter Bluetooth Network Connection:

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

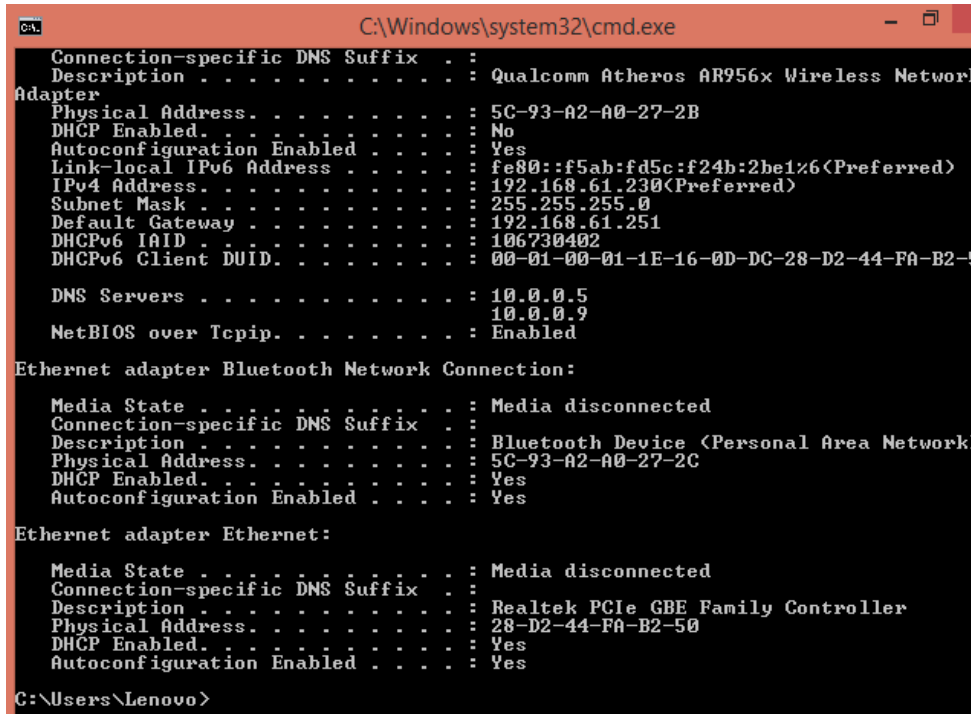
Ethernet adapter Ethernet:

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

C:\Users\Lenovo>
```

### Ipconfig/all :

all information about system.



```
C:\Windows\system32\cmd.exe

Connection-specific DNS Suffix  . :
Description . . . . . : Qualcomm Atheros AR956x Wireless Network
Adapter
Physical Address. . . . . : 5C-93-A2-A0-27-2B
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::f5ab:fd5c:f24b:2be1%6(Preferred)
IPv4 Address. . . . . : 192.168.61.230(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.61.251
DHCPv6 IAID . . . . . : 106730402
DHCPv6 Client DUID. . . . . : 00-01-00-01-1E-16-0D-DC-28-D2-44-FA-B2-50

DNS Servers . . . . . : 10.0.0.5
                       10.0.0.9
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
    Description . . . . . : Bluetooth Device (Personal Area Network)
    Physical Address. . . . . : 5C-93-A2-A0-27-2C
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
    Description . . . . . : Realtek PCIe GBE Family Controller
    Physical Address. . . . . : 28-D2-44-FA-B2-50
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

C:\Users\Lenovo>
```

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### Ping :

Ping is an old Unix tool that has been around for a long time but many PC users are unfamiliar with the Windows version. Ping sends out a packet to a designated internet host or network computer and measures its response time. Use ping whenever you need to verify that a host computer can connect to the TCP/IP network and network resources.

```
C:\Windows\system32\cmd.exe

Description . . . . . : Realtek PCIe GBE Family Controller
Physical Address. . . . . : 28-D2-44-FA-B2-50
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

C:\Users\Lenovo>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
          [-r count] [-s count] [[-j host-list] ; [-k host-list]]
          [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
          [-4] [-6] target_name

Options:
    -t          Ping the specified host until stopped.
                 To see statistics and continue - type Control-Break;
                 To stop - type Control-C.
    -a          Resolve addresses to hostnames.
    -n count    Number of echo requests to send.
    -l size     Send buffer size.
    -f         Set Don't Fragment flag in packet (IPv4-only).
    -i TTL     Time To Live.
    -v TOS     Type Of Service (IPv4-only. This setting has been deprecated
               and has no effect on the type of service field in the IP
               Header).
    -r count    Record route for count hops (IPv4-only).
    -s count    Timestamp for count hops (IPv4-only).
    -j host-list Loose source route along host-list (IPv4-only).
    -k host-list Strict source route along host-list (IPv4-only).
    -w timeout  Timeout in milliseconds to wait for each reply.
    -R         Use routing header to test reverse route also (IPv6-only).
               Per RFC 5095 the use of this routing header has been
               deprecated. Some systems may drop echo requests if
               this header is used.
    -S srcaddr  Source address to use.
    -c compartment Routing compartment identifier.
    -p         Ping a Hyper-V Network Virtualization provider address.
    -4         Force using IPv4.
    -6         Force using IPv6.

C:\Users\Lenovo>
```

```
C:\Windows\system32\cmd.exe

C:\Users\Lenovo>ping 192.161.41.151

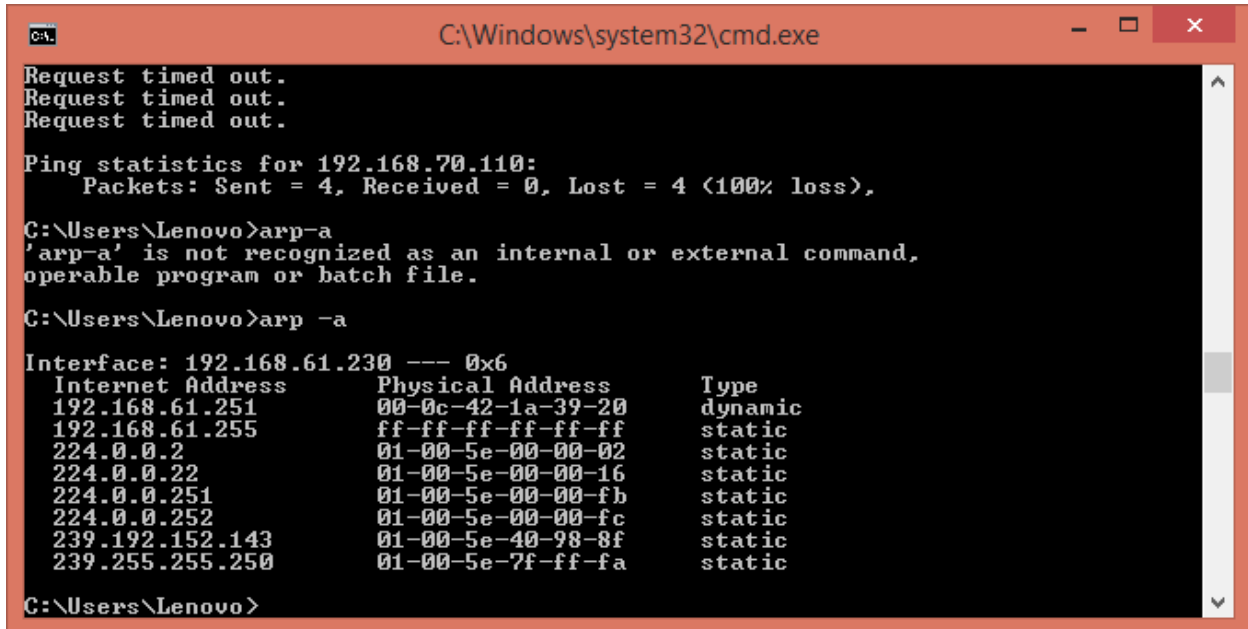
Pinging 192.161.41.151 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.161.41.151:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Lenovo>
```

## Practical: 3

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



```
C:\Windows\system32\cmd.exe

Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.70.110:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Lenovo>arp-a
'arp-a' is not recognized as an internal or external command,
operable program or batch file.

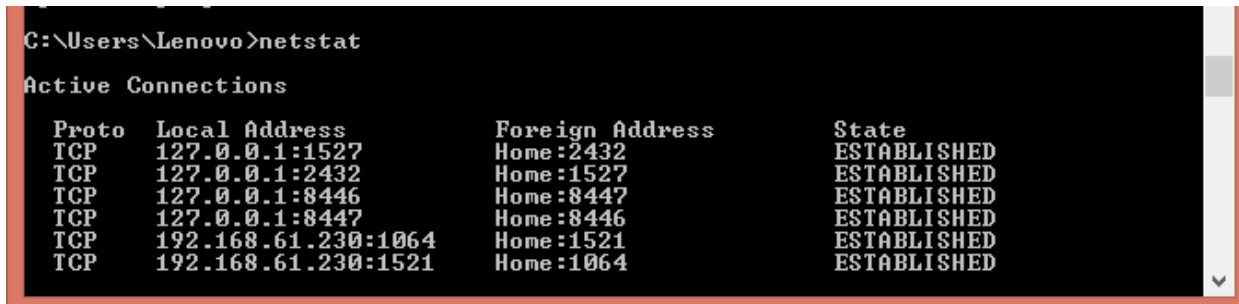
C:\Users\Lenovo>arp -a

Interface: 192.168.61.230 --- 0x6
    Internet Address      Physical Address        Type
    192.168.61.251        00-0c-42-1a-39-20      dynamic
    192.168.61.255        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
    239.192.152.143       01-00-5e-40-98-8f      static
    239.255.255.250       01-00-5e-7f-ff-fa      static

C:\Users\Lenovo>
```

### Netstat :

netstat stands for network statistics. This command displays incoming and outgoing network connections as well as other network information. The netstat utility can show you the open connections on your computer, which programs are making which connections, how much data is being transmitted, and other information. The netstat command is used to display very detailed information about how your computer is communicating with other computers or network devices.



```
C:\Users\Lenovo>netstat

Active Connections

Proto Local Address           Foreign Address         State
TCP   127.0.0.1:1527           Home:2432               ESTABLISHED
TCP   127.0.0.1:2432           Home:1527               ESTABLISHED
TCP   127.0.0.1:8446           Home:8447               ESTABLISHED
TCP   127.0.0.1:8447           Home:8446               ESTABLISHED
TCP   192.168.61.230:1064      Home:1521               ESTABLISHED
TCP   192.168.61.230:1521      Home:1064               ESTABLISHED
```

### Nslookup:

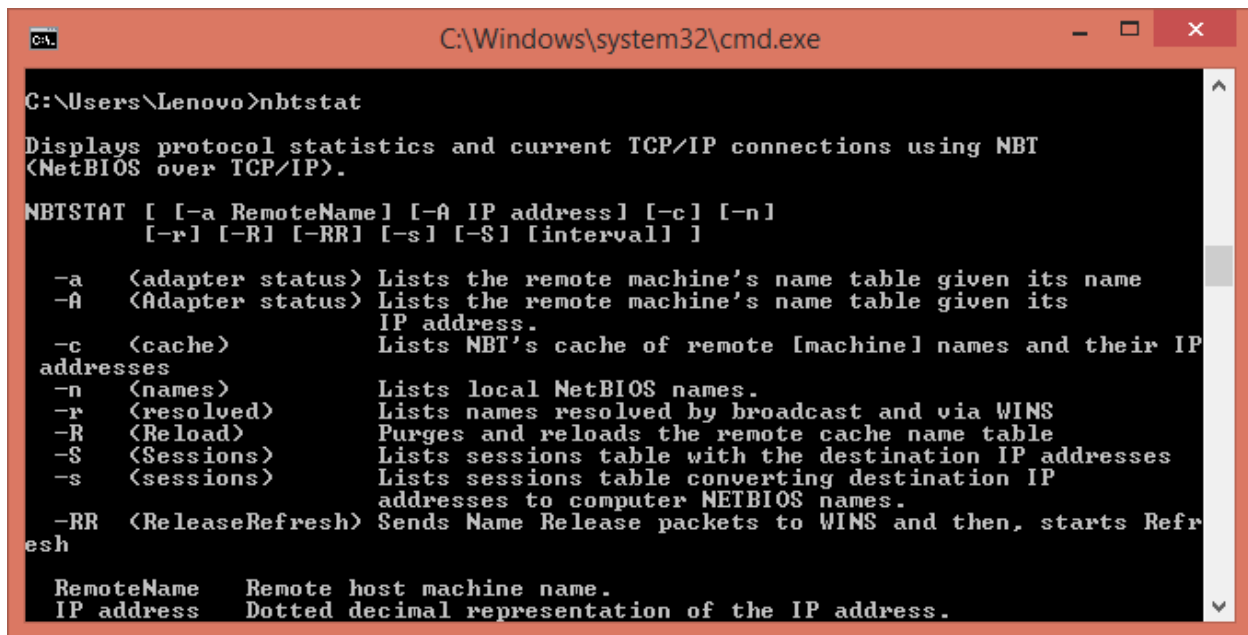
nslookup, which stands for "name server lookup", is a useful tool for finding out information about a domain named . This command helps diagnose the Domain Name System (DNS) infrastructure and comes with a number of sub-commands. These are mainly for systems administrators. The primary interest for average PC users is its use to find the computer name corresponding to a numeric IP.

## Practical: 3

```
C:\Users\Lenovo>nslookup
DNS request timed out.
    timeout was 2 seconds.
Default Server:  UnKnown
Address:  10.0.0.5
>
```

### Nbtstat :

Displays protocol statistics and current TCP/IP connections using NBT(NetBIOS over TCP/IP).Lists the remote machine's name table given its name.



```
C:\Windows\system32\cmd.exe

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 Refr
esh

RemoteName    Remote host machine name.
IP address     Dotted decimal representation of the IP address.
```

### Tracert :

A tracert is a tracking of a packet sent to a server. During its route this packet goes through several network devices (routers, firewall, etc.) and then goes finally at the server. With the tracert you can see the IP as well as the response time between each barrier.

```
C:\Users\Lenovo>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
              [-R] [-S srcaddr] [-4] [-6] target_name

Options:
-d          Do not resolve addresses to hostnames.
-h maximum_hops Maximum number of hops to search for target.
-j host-list Loose source route along host-list (IPv4-only).
-w timeout  Wait timeout milliseconds for each reply.
-R          Trace round-trip path (IPv6-only).
-S srcaddr  Source address to use (IPv6-only).
-4          Force using IPv4.
-6          Force using IPv6.
```

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### Route :

If this is used in conjunction with one of the commands (such as add, change, or delete), the table is cleared prior to running the command. -p : When used with the add command, the specified route is added to the registry and is used to initialize the IP routing table whenever the TCP/IP protocol is started.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

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.

command    One of these:
            PRINT      Prints a route
            ADD        Adds a route
            DELETE     Deletes a route
            CHANGE     Modifies an existing route

destination Specifies the host.
MASK         Specifies that the next parameter is the 'netmask' value.
netmask      Specifies a subnet mask value for this route entry.
            If not specified, it defaults to 255.255.255.255.
gateway     Specifies gateway.
interface   the interface number for the specified route.
METRIC      specifies the metric, ie. cost for the destination.

All symbolic names used for destination are looked up in the network database
file NETWORKS.  The symbolic names for gateway are looked up in the host name
database file HOSTS.

If the command is PRINT or DELETE.  Destination or gateway can be a wildcard,
(wildcard is specified as a star '*'), or the gateway argument may be omitted.

If Dest contains a * or ?, it is treated as a shell pattern, and only
matching destination routes are printed.  The '*' matches any string,
and '?' matches any one char.  Examples: 157.*.1, 157.*, 127.*, *224*.

Pattern match is only allowed in PRINT command.

Diagnostic Notes:
    Invalid MASK generates an error, that is when <DEST & MASK> != DEST.
    Example> route ADD 157.0.0.0 MASK 155.0.0.0 157.55.80.1 IF 1
    The route addition failed: The specified mask parameter is invalid.
    <Destination & Mask> != Destination.

Examples:

    > route PRINT
```

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### Ipconfig –flushdns :

To ensure Windows is getting addresses from the new DNS servers instead of using old, cached entries, run the ipconfig /flushdns command after changing your DNS server.



```
C:\Windows\system32\cmd.exe

C:\Users\Lenovo>ipconfig -flushdns
Error: unrecognized or incomplete command line.

USAGE:
    ipconfig [/allcompartments] [/? | /all |
        /renew [adapter] | /release [adapter] |
        /renew6 [adapter] | /release6 [adapter] |
        /flushdns | /displaydns | /registerdns |
        /showclassid adapter |
        /setclassid adapter [classid] |
        /showclassid6 adapter |
        /setclassid6 adapter [classid] ]

where
    adapter          Connection name
                     <wildcard characters * and ? allowed, see examples>

Options:
    /?              Display this help message
    /all            Display full configuration information.
    /release        Release the IPv4 address for the specified adapter.
    /release6       Release the IPv6 address for the specified adapter.
    /renew          Renew the IPv4 address for the specified adapter.
    /renew6         Renew the IPv6 address for the specified adapter.
    /flushdns       Purges the DNS Resolver cache.
    /registerdns     Refreshes all DHCP leases and re-registers DNS names
    /displaydns     Display the contents of the DNS Resolver Cache.
    /showclassid    Displays all the dhcp class IDs allowed for adapter.
    /setclassid     Modifies the dhcp class id.
    /showclassid6  Displays all the IPv6 DHCP class IDs allowed for adapter
    /setclassid6   Modifies the IPv6 DHCP class id.

The default is to display only the IP address, subnet mask and
default gateway for each adapter bound to TCP/IP.

For Release and Renew, if no adapter name is specified, then the IP address
leases for all adapters bound to TCP/IP will be released or renewed.

For Setclassid and Setclassid6, if no ClassId is specified, then the ClassId is
removed.

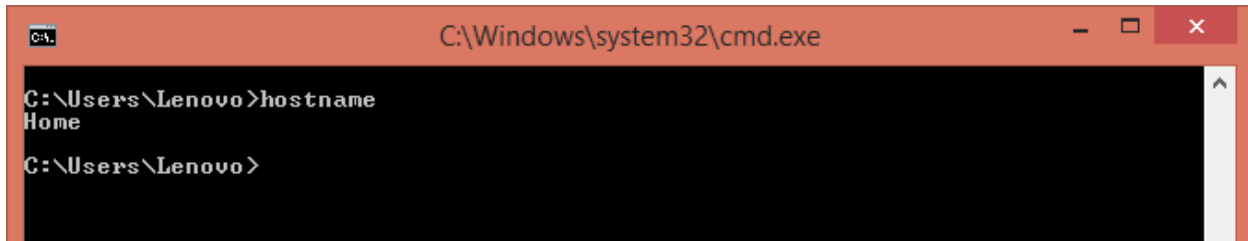
Examples:
> ipconfig          ... Show information
> ipconfig /all     ... Show detailed information
> ipconfig /renew    ... renew all adapters
> ipconfig /renew EL* ... renew any connection that has its
                        name starting with EL
> ipconfig /release *Con* ... release all matching connections,
                        eg. "Wired Ethernet Connection 1" or
                        "Wired Ethernet Connection 2"
> ipconfig /allcompartments ... Show information about all
                        compartments
> ipconfig /allcompartments /all ... Show detailed information about all
```

## Practical: 3

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### Hostname:

Useful to know machine name.



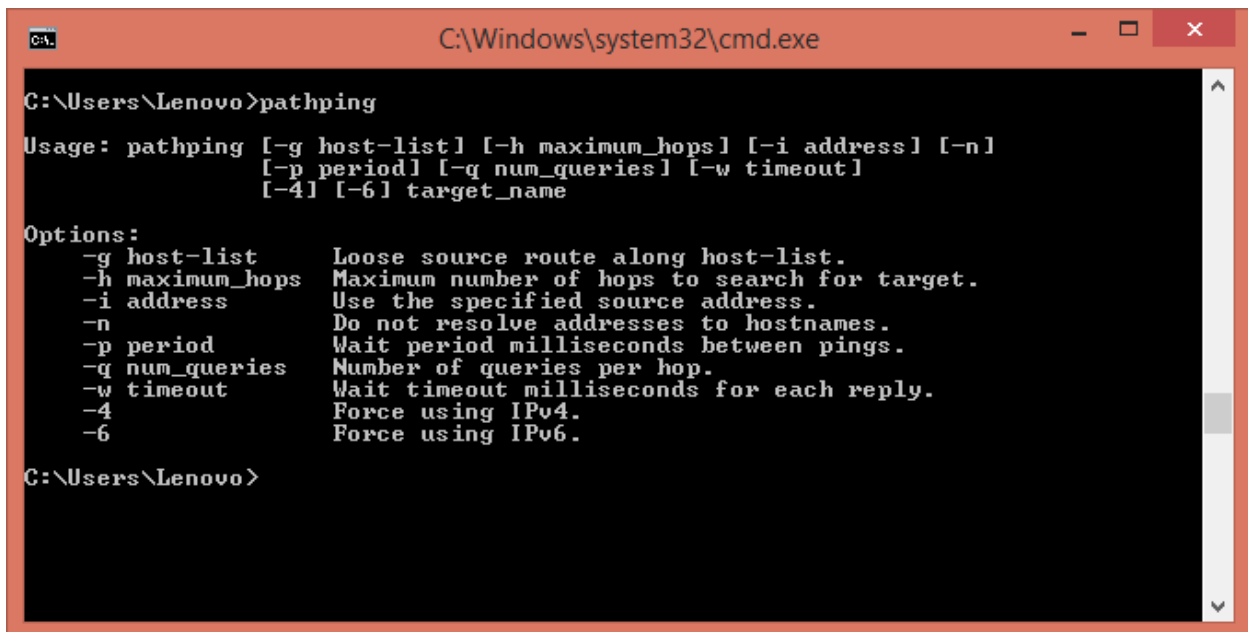
```
C:\Windows\system32\cmd.exe

C:\Users\Lenovo>hostname
Home

C:\Users\Lenovo>
```

### Pathping:

The **pathping** command is a route tracing tool that combines features of the **ping** and **tracert** commands with additional information that neither of those tools provides. The **pathping** command sends packets to each router on the way to a final destination over a period of time, and then computes results based on the packets returned from each hop. Since the command shows the degree of packet loss at any given router or link, it is easy to determine which routers or links might be causing network problems



```
C:\Windows\system32\cmd.exe

C:\Users\Lenovo>pathping

Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]
               [-p period] [-q num_queries] [-w timeout]
               [-4] [-6] target_name

Options:
  -g host-list      Loose source route along host-list.
  -h maximum_hops  Maximum number of hops to search for target.
  -i address        Use the specified source address.
  -n               Do not resolve addresses to hostnames.
  -p period         Wait period milliseconds between pings.
  -q num_queries    Number of queries per hop.
  -w timeout        Wait timeout milliseconds for each reply.
  -4               Force using IPv4.
  -6               Force using IPv6.

C:\Users\Lenovo>
```