CE503-COMPUTER NETWORKS LABORATORY MANUAL

BASICS OF NETWORK COMMANDS

LIST OF COMMANDS STUDIED UNDER LESSON:

- Ping
- Ipconfig
- Netstat
- Tracert
- Nslookup
- Finger
- Fping and
- Arp

1. PING

Ping is used to send message to another machine with the help of Internet Control Message Protocol, it sends out ICMP Echo Request message to the host then it waits for a response from destination computer. It is usually used to verify that our computer can communicate with other devices over network.

```
C:\Users\Lenovo>ping www.google.com

Pinging www.google.com [216.58.197.36] with 32 bytes of data:
Reply from 216.58.197.36: bytes=32 time=63ms TTL=53
Reply from 216.58.197.36: bytes=32 time=80ms TTL=53
Reply from 216.58.197.36: bytes=32 time=83ms TTL=53
Reply from 216.58.197.36: bytes=32 time=75ms TTL=53

Ping statistics for 216.58.197.36:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 63ms, Maximum = 83ms, Average = 75ms
```

To run ping command, we must have to provide IP address of the destination machine or URL of host to which we want to communicate. In above example, we have tried to send a request message to google.com for 4 times and all of them were received by confirmation.

Time shown in each message is the time taken for a message to travel from our machine to destination machine and again back to our machine (ms means milli-seconds).

It also shows minimum, maximum and average time required for this whole process in the last line.

2. **Ipconfig**

   As the name suggests, ipconfig command shows configuration of our device in terms of IPv4, IPv6, mask and gateway for all the adapters. It also refreshes Dynamic Host Configuration Protocol(DHCP) and Domain Name System(DNS) settings.

```
C:\Users\Lenovo>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

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

Wireless LAN adapter Local Area Connection* 2:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::5cff:591f:7d5:cecd%14
   IPv4 Address. . . . . . . . . . . : 192.168.137.1
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . :

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::81d3:25a6:753d:f2f5%7
   IPv4 Address. . . . . . . . . . . : 192.168.43.197
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.43.1
```

   As shown above, it gives information about IPv4, IPv6 and Subnet mask and Default Gateway for Wi-Fi, wireless LAN and Ethernet as well.

3. **Netstat**

   Netstat is a network utility tool that is used to see incoming and outgoing network connections for TCP. It is also used to check routing tables, and a number of network interface.
   As you can see in the image below, it displays TCP protocol connections between two computers, it displays local as well foreign IP address and state of network connection between them i.e. established connection. To stop receiving the whole list of network connection we have to press ctrl+c.

```
C:\Users\Lenovo>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.43.197:49307   13.107.21.200:https    ESTABLISHED
  TCP    192.168.43.197:49441   131.253.33.254:https   ESTABLISHED
  TCP    192.168.43.197:49442   204.79.197.222:https   ESTABLISHED
  TCP    192.168.43.197:51324   52.139.250.253:https   ESTABLISHED
  TCP    192.168.43.197:51389   172.217.194.188:5228   ESTABLISHED
  TCP    192.168.43.197:51391   185.199.111.153:https  ESTABLISHED
^C
C:\Users\Lenovo>
```

4. **Tracert**

Traceroute (or tracert for windows**)** shows you the path a packet takes, from your computer to each hop or say router through which it passes and reaches to destination machine which you have specified. Even it shows the failed or discarded connection to a router or machine in the path. It also shows the time taken from one router to another.

```
C:\Users\Lenovo>tracert www.google.com

Tracing route to www.google.com [216.58.197.36]
over a maximum of 30 hops:

  1      6 ms      5 ms      5 ms  192.168.43.1
  2      *         *         *     Request timed out.
  3     57 ms     30 ms     38 ms  10.169.21.226
  4      *         *         *     Request timed out.
  5     53 ms     30 ms     39 ms  100.64.0.125
  6      *         *         *     Request timed out.
  7     45 ms     44 ms     44 ms  103.29.44.7
  8      *         *         *     Request timed out.
  9     70 ms     70 ms     45 ms  72.14.211.218
 10     62 ms     61 ms     50 ms  108.170.248.202
 11     82 ms     71 ms     77 ms  108.170.226.237
 12     68 ms     78 ms     79 ms  108.170.253.113
 13     76 ms     57 ms     58 ms  108.170.234.107
 14     61 ms     57 ms     58 ms  maa03s20-in-f36.1e100.net [216.58.197.36]

Trace complete.
```

As you can see, you can either provide IP address of destination machine to which the path is to be extracted or you can type URL of host as well.

5. **Nslookup**

   It lets you obtain Domain name or IP address mapping, or other DNS records about the host which you have specified.

```
C:\Users\Lenovo>nslookup
Default Server:  UnKnown
Address:  192.168.43.1

> www.google.com
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
Name:    www.google.com
Addresses:  2404:6800:4007:807::2004
          216.58.197.36

> www.GeeksforGeeks.org
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
Name:    a1991.b.akamai.net
Addresses:  64:ff9b::2a6a:a270
          64:ff9b::2a6a:a216
          42.106.162.22
          42.106.162.112
Aliases:  www.GeeksforGeeks.org
          www.geeksforgeeks.org.edgesuite.net

> www.twitter.com
Server:  UnKnown
Address:  192.168.43.1

Non-authoritative answer:
Name:    twitter.com
Addresses:  64:ff9b::68f4:2a01
          64:ff9b::68f4:2a81
          104.244.42.1
          104.244.42.129
Aliases:  www.twitter.com
```

   Here as you can see, it shows the server name, IP addresses and aliases of the host provided by us. To exit from command, we have to type ctrl+c in cmd.

6. Arp

   Arp displays entries of the ARP-Address Resolution Protocol cache. ARP is used when a particular machines IP address is known to us but the Physical/MAC address of that machine is not known to us. This cache stores a table having entries of IP addresses and their resolved Ethernet or Token Ring physical addresses.

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

Interface: 192.168.43.197 --- 0x7
  Internet Address      Physical Address      Type
  192.168.43.1          3c-fa-43-f1-c6-33     dynamic
  192.168.43.255        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

Interface: 192.168.137.1 --- 0xe
  Internet Address      Physical Address      Type
  192.168.137.255       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
```