Module on DOS Network Tools and Commands

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To go to the DOS prompt, click Start-> Run-> Type cmd and Press enter. Type cd\ on the DOS window, it will take you to the root directory, commonly the C:\

To get and idea of the commands, we will now see the primary utilities of each them.

**Ping:** Used to check the availability of systems by using the ICMP Echo Request / Response messages.

```
[-r count] [-s count] [-j host-list] [-k host-list]
[-w timeout] target_name
```

**Tracert:** The traceroute command is used to find the sequence of hops (i.e., the name of the intermediate hops/routers) from the source to a remote destination host.

```
C:\>tracert
Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout] 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.
- `-k host-list` Strict source route along host-list.
- `-w timeout` Wait timeout milliseconds for each reply.
Route: The route command is used to display and modify the entries in the local routing table.

```
C:\>route
Manipulates network routing tables.
```

```
ROUTE [-f] [-p] [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. This option is not supported in Windows 95.

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.*.

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
> route ADD 157.0.0.0 MASK 255.0.0.0 157.55.80.1 METRIC 3 IF 2
```

Finger: The finger command is used to display information about users running in a specific host.
ARP: Thearp command is used to display and modify the address resolution cache, which stores the mapping between the IP address of systems and their resolved physical addresses.

C:\>arp
Displays and modifies the IP-to-Physical address translation tables used by the 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]

-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 are displayed.
-g Same as -a.
-n if_addr Specifies an internet address.
-N if_addr Specifies 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.

Example:
\> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
\> arp -a .... Displays the arp table.

IPconfig: The ipconfig command is used to display the current TCP/IP network configurations. Also, try ipconfig /all to display full configuration information

C:\>ipconfig
Windows IP Configuration

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix : utdallas.edu
IP Address . . . . . . . . . . . . . : 129.110.93.238
Subnet Mask . . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : 129.110.93.100
**Netstat:** When used without parameters, `netstat` displays active TCP connections. Use `netstat -e` option to learn about the statistics of the Ethernet.

- `netstat -a` to learn about the active TCP connections and also the ports on which the computer is waiting for incoming TCP/UDP messages.
- `netstat -n` to learn about the numerical values of the IP addresses and ports used for active TCP connections.
- `netstat -p <protocol>` to learn about the statistics for a specific protocol. The valid values for `<protocol>` include tcp, udp, ip, icmp.

**nslookup:** The `nslookup` command is used to study the DNS infrastructure.

```
C:\>nslookup
Default $server: home
Address: 192.168.1.254

> www.cnn.com
Server: home
Address: 192.168.1.254
Non-authoritative answer:
Name: www.cnn.com
157.166.255.18, 157.166.255.19

> www.jsums.edu
Server: home
Address: 192.168.1.254
Non-authoritative answer:
Name: web.jsums.edu
Address: 143.132.8.23
Aliases: www.jsums.edu

> compbio.jsums.edu
Server: home
Address: 192.168.1.254
Non-authoritative answer:
Name: compbio.jsums.edu
Address: 143.132.224.66
```

**Sample Questions**

1. Use an efficient algorithm and any one of the above command tools to find the maximum data size that can be handled by the physical network to which your computer is attached.

2. Use the ping command to determine how long it takes for a request packet with data size 50 bytes to reach a website operated from India: `www.sify.com`. Try sending another request packet of data size 1200 bytes to the same website and observe the delay it takes this time. Compare the delays you observed in the two cases. Are they significantly different? If so, why? If not, why there is no significant difference?
3. Find the number of hops and the corresponding delay it takes to reach www.abc.com and www.eduaustralia.co.kr. What is the percentage increase in the number of hops and delay to reach the site in Korea compared to reaching www.abc.com, a website in California? If you observe that the increase in the delay is not proportional to the increase in the number of hops, comment?

4. Find the domain name of the machine with IP address 74.125.45.99?

5. Find the number of unicast Ethernet frames sent and received by each of the network interfaces of your PC?

6. What is the physical address of the Ethernet adapter of the PC in which you are working?

7. Find whether port number 4123 is part of an active connection?

8. What is the IP address and physical address of the default router to which your machine forwards a packet for which it has no other next-hop forwarding router information in its local routing table?