Date: / /

Lab Practical #01:
Study of basic networking commands and IP configuration.

Practical Assignment #01:
1. Perform and explain various networking commands listed below:
     i.   ipconfig
     ii.   ping
     iii. getmac
     iv.   systeminfo
     v.   traceroute / tracert
     vi.   netstat
     vii. nslookup
     viii. hostname
     ix.   pathping
     x.   arp

1. ipconfig
Description:

--------- **Details About Command ------**

No.	Option	Description
1	/all	Displays full configuration information for all network adapters.
2	/renew	Renews the IP address for all adapters .
3	/flushdns	Clears the DNS resolver cache.
4	/displaydns	Displays the contents of the DNS resolver cache.
5	/release	Releases the current IP address for all adapters

Implementation: ----- Screenshot Only (Execute command on command prompt / terminal) -----

```
C:\Users\Dell>ipconfig /displaydns

Windows IP Configuration

    fe3cr.delivery.mp.microsoft.com
    ----------------------------------------
    Record Name . . . . . : fe3cr.delivery.mp.microsoft.com
    Record Type . . . . . : 5
    Time To Live  . . . . : 178
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    CNAME Record  . . . . : fe3.delivery.mp.microsoft.com


    Record Name . . . . . : fe3.delivery.mp.microsoft.com
    Record Type . . . . . : 5
    Time To Live  . . . . : 178
    Data Length . . . . . : 8
    Section . . . . . . . : Answer
    CNAME Record  . . . . : glb.cws.prod.dcat.dsp.trafficmanager.net


    Record Name . . . . . : glb.cws.prod.dcat.dsp.trafficmanager.net
    Record Type . . . . . : 28
    Time To Live  . . . . : 178
    Data Length . . . . . : 16
    Section . . . . . . . : Answer
    AAAA Record . . . . . : 2a01:111:f100:a000::4134:4847
```

Date: / /

```
C:\Users\Dell>ipconfig /?

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.
```

2. ping
Description:
--------- **Details About Command** ------

No.	Option	Description
1	-n <count>	Sends a specific number of echo requests
2	-t	Pings the target until manually stopped
3	-a	Resolves addresses to hostnames.
4	-l <size>	Sends packets of a specified size in bytes
5	-w <timeout>	Specifies a timeout in milliseconds to wait for each reply.

Date: / /

Implementation:

----- ScreenshotOnly (Execute command on command prompt / terminal) -----

```
C:\Windows\System32>ping -i 34 google.com

Pinging google.com [142.250.70.110] with 32 bytes of data:
Reply from 142.250.70.110: bytes=32 time=17ms TTL=117
Reply from 142.250.70.110: bytes=32 time=19ms TTL=117
Reply from 142.250.70.110: bytes=32 time=22ms TTL=117
Reply from 142.250.70.110: bytes=32 time=18ms TTL=117

Ping statistics for 142.250.70.110:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 17ms, Maximum = 22ms, Average = 19ms
```

Date: / /

```
C:\Windows\System32>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.
```

```
C:\Windows\System32>ping -l 50 google.com

Pinging google.com [142.251.221.238] with 50 bytes of data:
Reply from 142.251.221.238: bytes=50 time=15ms TTL=118
Reply from 142.251.221.238: bytes=50 time=16ms TTL=118
Reply from 142.251.221.238: bytes=50 time=20ms TTL=118
Reply from 142.251.221.238: bytes=50 time=17ms TTL=118

Ping statistics for 142.251.221.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 15ms, Maximum = 20ms, Average = 17ms
```

3. getmac

Description:

--------- **Details About Command** ------

No.	Option	Description
1	/S system	Specifies the remote system to connect to.
2	/U [domain\]user	Specifies the user context under which the command should execute.
3	/P [password]	Specifies the password for the given user context. Prompts for input if omitted.
4	/V	Specifies that verbose output is displayed.

Date: / /

5	/NH	Specifies that the "Column Header" should not be displayed in the output.Valid only for TABLE and CSV formats.

Implementation:

```
C:\Users\Dell>getmac

Physical Address    Transport Name
==================  =========================================================
34-7D-F6-CB-F5-E8   \Device\Tcpip_{10CED367-4760-460E-B18F-E1E9AA69E313}
34-7D-F6-CB-F5-EC   Media disconnected
```

4. tracert
Description:
--------- Details About Command ------

No.	Option	Description
1	-d	Do not resolve addresses to hostnames.
2	-R	Trace round-trip path (IPv6-only).
3	-h maximum_hops	Maximum number of hops to search for target.
4	-j host-list	Sends packets of a specified size in bytes
5	-w <timeout>	Wait timeout milliseconds for each reply.

Date: / /

Implementation:

```
C:\Users\Dell>tracert google.com

Tracing route to google.com [2404:6800:4009:82a::200e]
over a maximum of 30 hops:

  1     4 ms     4 ms     3 ms   2401:4900:7c0f:f6d0::a
  2     *        *        *      Request timed out.
  3     *        *        *      Request timed out.
  4    52 ms    39 ms    47 ms   2401:4900:0:afc::7
  5     *       35 ms     *      2401:4900:0:af5::1
  6    24 ms    32 ms    44 ms   2401:4900:4c:c409::25a2
  7    32 ms    18 ms    28 ms   2404:a800:2a00:20a::4a
  8   312 ms    31 ms    32 ms   2404:a800:2a00:20a::49
  9    98 ms    46 ms   269 ms   2404:a800::167
 10     *      204 ms    44 ms   2001:4860:1:1::3900
 11    83 ms    77 ms    77 ms   2001:4860:0:1::877b
 12    52 ms    41 ms    79 ms   2001:4860:0:1::161
 13    80 ms    43 ms    45 ms   bom12s17-in-x0e.1e100.net [2404:6800:4009:82a::200e]

Trace complete.
```

5. netstat

Implementation:

```
C:\Users\Dell>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    10.93.224.79:57281     20.44.8.230:8883       ESTABLISHED
  TCP    10.93.224.79:57941     a23-38-59-250:http     ESTABLISHED
  TCP    10.93.224.79:57965     20.190.145.142:https   TIME_WAIT
  TCP    10.93.224.79:57967     20.190.145.142:https   TIME_WAIT
  TCP    10.93.224.79:57968     20.190.145.142:https   ESTABLISHED
  TCP    10.93.224.79:57972     20.189.173.7:https     TIME_WAIT
  TCP    10.93.224.79:57975     20.42.65.94:https      TIME_WAIT
  TCP    10.93.224.79:57978     20.190.145.142:https   ESTABLISHED
  TCP    10.93.224.79:57982     204.79.197.222:https   ESTABLISHED
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:49447  [2603:1040:a06:6::]:https  ESTABLISHED
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57957  [2620:1ec:bdf::254]:https  CLOSE_WAIT
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57958  [2603:1061:11::254]:https  CLOSE_WAIT
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57970  [2620:1ec:46::254]:https  CLOSE_WAIT
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57977  g2600-1417-0075-0000-0000-0000-17d5-01c9:https  ESTABLISHED
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57979  [2620:1ec:bdf::72]:https  ESTABLISHED
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57980  [2620:1ec:44::254]:https  ESTABLISHED
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57981  [2620:1ec:29:1::254]:https  ESTABLISHED
  TCP    [2401:4900:7c0f:f6d0:6d1c:b233:9eef:76f0]:57983  whatsapp-chatd-edge6-shv-02-pnq1:5222  ESTABLISHED
```

6. nslookup

Implementation:

```
C:\Users\Dell>nslookup google.com
Server:   UnKnown
Address:  10.93.224.192

Non-authoritative answer:
Name:     google.com
Addresses:  2404:6800:4009:80d::200e
            142.251.221.238


C:\Users\Dell>nslookup google.com
Server:   UnKnown
Address:  10.93.224.192

Non-authoritative answer:
Name:     google.com
Addresses:  2404:6800:4009:80d::200e
            142.251.221.238
```

7. hostname

Implementation:

```
C:\Users\Dell>hostname
Rudra
```

8. pathping
Description:

--------- **Details About Command ------**

No.	Option	Description
1	-g host-list	Loose source route along host-list.
2	-h maximum_hops	Maximum number of hops to search for target.
3	-i address	Use the specified source address.
4	-n	Do not resolve addresses to hostnames.
5	-w <timeout>	Wait timeout milliseconds for each reply.

Implementation:

```
C:\Users\Dell>pathping google.com

Tracing route to google.com [2404:6800:4009:80d::200e]
over a maximum of 30 hops:
  0  Rudra [2401:4900:54c2:ff60:d00a:8f21:29c5:e7b2]
  1  2401:4900:54c2:ff60::31
  2    *         *         *
Computing statistics for 25 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                           Rudra [2401:4900:54c2:ff60:d00a:8f21:29c5:e7b2]
                              0/ 100 =  0%   |
  1   16ms     0/ 100 =  0%   0/ 100 =  0%  2401:4900:54c2:ff60::31

Trace complete.
```