Date: 13/06/2024

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:

It is a command-line utility available in MS Windows operating systems that displays all current network configurations.

No.	Option	Description
1	/all	Display full configuration information.
2	/release	Release the IPv4 address for the specified adapter.
3	/renew	Renew the IPv4 address for the specified adapter.
4	/setclassid	Modifies the DHCP class ID.
5	/setclassid6	Modifies the IPv6 DHCP class ID.

Implementation:

```
C:\Users\Jay Ashapura Maa>ipconfig/all

Windows IP Configuration

   Host Name . . . . . . . . . . . . : MOHIT-PRASHANT
   Primary Dns Suffix  . . . . . . . :
   Node Type . . . . . . . . . . . . : Hybrid
   IP Routing Enabled. . . . . . . . : No
   WINS Proxy Enabled. . . . . . . . : No
   DNS Suffix Search List. . . . . . : bbrouter
```

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```
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  . : bbrouter
   IPv6 Address. . . . . . . . . . . : 2402:a00:184:745b:d3d6:7151:4624:9f24
   Temporary IPv6 Address. . . . . . : 2402:a00:184:745b:25b3:cd11:e2e0:9afd
   Link-local IPv6 Address . . . . . : fe80::e9e6:b80c:d955:ab48%10
   IPv4 Address. . . . . . . . . . . : 192.168.1.6
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::a63:32ff:fe66:3fb7%10
                                       192.168.1.1
```

```
C:\Users\Jay Ashapura Maa>ipconfig/flushdns

Windows IP Configuration

Successfully flushed the DNS Resolver Cache.
```

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2. ping

Description:

It is a network utility used to test the reachability of a host on an IP Network.

No.	Option	Description
1	-t	Ping the specified host until stopped.
2	-a	Resolve addresses to hostnames.
3	-n count	Number of echo requests to send.
4	-f	Don't fragment flag in packet.
5	-i TTL	Time to Live.

Implementation:

```
C:\Users\Jay Ashapura Maa>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
```

```
C:\Users\Jay Ashapura Maa>ping -t www.google.com

Pinging www.google.com [2404:6800:4009:830::2004] with 32 bytes of data:
Reply from 2404:6800:4009:830::2004: time=23ms
Reply from 2404:6800:4009:830::2004: time=22ms
Reply from 2404:6800:4009:830::2004: time=22ms
Reply from 2404:6800:4009:830::2004: time=23ms
Reply from 2404:6800:4009:830::2004: time=24ms
Reply from 2404:6800:4009:830::2004: time=24ms
Reply from 2404:6800:4009:830::2004: time=23ms
```

```
C:\Users\Jay Ashapura Maa>ping -a www.google.com

Pinging www.google.com [2404:6800:4009:830::2004] with 32 bytes of data:
Reply from 2404:6800:4009:830::2004: time=23ms
Reply from 2404:6800:4009:830::2004: time=23ms
Reply from 2404:6800:4009:830::2004: time=23ms
Reply from 2404:6800:4009:830::2004: time=23ms

Ping statistics for 2404:6800:4009:830::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 23ms, Maximum = 23ms, Average = 23ms
```

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```
C:\Users\Jay Ashapura Maa>ping -f www.google.com

Pinging www.google.com [142.251.42.36] with 32 bytes of data:
Reply from 142.251.42.36: bytes=32 time=26ms TTL=60
Reply from 142.251.42.36: bytes=32 time=26ms TTL=60
Reply from 142.251.42.36: bytes=32 time=26ms TTL=60
Reply from 142.251.42.36: bytes=32 time=26ms TTL=60

Ping statistics for 142.251.42.36:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 26ms, Maximum = 26ms, Average = 26ms
```

```
C:\Users\Jay Ashapura Maa>ping -i 1 www.google.com

Pinging www.google.com [2404:6800:4009:830::2004] with 32 bytes of data:
Reply from 2404:6800:4009:830::2004: TTL expired in transit.
Reply from 2404:6800:4009:830::2004: TTL expired in transit.
Reply from 2404:6800:4009:830::2004: TTL expired in transit.
Reply from 2404:6800:4009:830::2004: TTL expired in transit.

Ping statistics for 2404:6800:4009:830::2004:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

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3. getmac

Description:

The 'getmac' command is used to display the Media Access Control (MAC) addresses for network interfaces on a computer.

No.	Option	Description
1	/s	Specifies the remote system to connect.
2	/u	Specifies the user context under command.
3	/p	Specifies the password for user context.
4	/fo	Specifies the format of the output.
5	/nh	Omits the header row from output.

Implementation:

```
Parameter List:
    /S      system          Specifies the remote system to connect to.

    /U      [domain\]user   Specifies the user context under
                            which the command should execute.

    /P      [password]      Specifies the password for the given
                            user context. Prompts for input if omitted.

    /FO     format          Specifies the format in which the output
                            is to be displayed.
                            Valid values: "TABLE", "LIST", "CSV".

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

    /V                      Specifies that verbose output is displayed.

    /?                      Displays this help message.
```

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4. systeminfo

Description:

The command is used in Windows to display detailed configuration information about a computer and its operating system, including hardware and software details.

No.	Option	Description
1	/s	Specifies the remote system to connect to.
2	/u	Specifies the user context under which the command should execute.
3	/p	Specifies the password for the given user context.
4	/fo	Specifies the format in which the output is to be displayed.
5	/nh	Specifies the Column Header, valid for Table and CSV Formats

Implementation:

```
C:\Users\Jay Ashapura Maa>systeminfo/?

SYSTEMINFO [/S system [/U username [/P [password]]]] [/FO format] [/NH]

Description:
    This tool displays operating system configuration information for
    a local or remote machine, including service pack levels.

Parameter List:
    /S      system          Specifies the remote system to connect to.

    /U      [domain\]user   Specifies the user context under which
                            the command should execute.

    /P      [password]      Specifies the password for the given
                            user context. Prompts for input if omitted.

    /FO     format          Specifies the format in which the output
                            is to be displayed.
                            Valid values: "TABLE", "LIST", "CSV".

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

    /?                      Displays this help message.
```

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5. tracert

Description:

The command in Windows is used to determine the route taken by packets across an IP network.

No.	Option	Description
1	-d	Do not resolve addresses to hostnames.
2	-h	Maximum number of hops to search for target.
3	-j host-list	Loose source route along host-list.
4	-w timeout	Wait timeout milliseconds for each reply.
5	-r	Trace round trip path.

Implementation:

```
C:\Users\Jay Ashapura Maa>tracert www.google.com

Tracing route to www.google.com [2404:6800:4009:830::2004]
over a maximum of 30 hops:

  1     3 ms     2 ms     2 ms  undefined.hostname.localhost
  2    45 ms    12 ms     4 ms  undefined.hostname.localhost
  3    24 ms    21 ms    21 ms  undefined.hostname.localhost
  4    26 ms    25 ms    24 ms  2001:4860:1:1::19c0
  5    25 ms    23 ms    23 ms  2404:6800:80b3::1
  6    25 ms    22 ms    22 ms  2001:4860:0:1::17d0
  7    24 ms    22 ms    23 ms  2001:4860:0:1::2039
  8    24 ms    21 ms    21 ms  bom12s20-in-x04.1e100.net [24

Trace complete.
```

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```
C:\Users\Jay Ashapura Maa>tracert -d www.google.com

Tracing route to www.google.com [2404:6800:4009:830::2004]
over a maximum of 30 hops:

  1     5 ms     3 ms     3 ms  2402:a00:184:745b:a63:32ff:fe66:3fb7
  2     4 ms     4 ms     4 ms  2402:a00:184:1::1111
  3    24 ms    22 ms    22 ms  2402:a00:84::6
  4    26 ms    24 ms    24 ms  2001:4860:1:1::19c0
  5    26 ms    24 ms    22 ms  2404:6800:80b3::1
  6    23 ms    22 ms    21 ms  2001:4860:0:1::17d0
  7    24 ms    23 ms    22 ms  2001:4860:0:1::2039
  8    26 ms    23 ms    22 ms  2404:6800:4009:830::2004

Trace complete.
```

```
C:\Users\Jay Ashapura Maa>tracert -h 15 www.google.com

Tracing route to www.google.com [2404:6800:4002:82e::2004]
over a maximum of 15 hops:

  1     6 ms     3 ms     3 ms  undefined.hostname.localhost
  2    10 ms     4 ms     6 ms  undefined.hostname.localhost
  3    58 ms    22 ms    24 ms  undefined.hostname.localhost
  4    26 ms    25 ms    25 ms  2001:4860:1:1::19c0
  5    50 ms    24 ms    54 ms  2404:6800:80eb::1
  6    34 ms    46 ms     *     2001:4860:0:1::49e6
  7    65 ms    24 ms    23 ms  2001:4860:0:1::870a
  8    45 ms    42 ms    43 ms  2001:4860::9:4001:7733
  9    25 ms    23 ms    26 ms  2001:4860::9:4002:d931
 10    41 ms    40 ms    39 ms  2001:4860::9:4001:ddce
 11    44 ms    43 ms    42 ms  2001:4860:0:1::78c1
 12    41 ms    40 ms    39 ms  2001:4860:0:1::5e43
 13    42 ms    40 ms    42 ms  del12s10-in-x04.1e100.net [24

Trace complete.
```

```
C:\Users\Jay Ashapura Maa>tracert -w 100 www.google.com

Tracing route to www.google.com [2404:6800:4002:82e::2004]
over a maximum of 30 hops:

  1     5 ms     3 ms     2 ms  undefined.hostname.localhost
  2    10 ms     4 ms     5 ms  undefined.hostname.localhost
  3    23 ms    20 ms    20 ms  undefined.hostname.localhost
```

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```
C:\Users\Jay Ashapura Maa>tracert -4 www.google.com

Tracing route to www.google.com [142.251.42.36]
over a maximum of 30 hops:

  1     3 ms     3 ms     4 ms  RTK_GW.bbrouter [192.168.1.1]
  2     6 ms     4 ms     5 ms  10.216.0.1
  3    23 ms    22 ms    21 ms  103.241.47.65
  4    24 ms    25 ms    22 ms  142.250.47.236
  5    23 ms    22 ms    24 ms  74.125.37.7
  6    23 ms    27 ms    21 ms  142.251.69.43
  7    20 ms    20 ms    20 ms  bom12s20-in-f4.1e100.net [142.251.42.36]

Trace complete.
```

```
C:\Users\Jay Ashapura Maa>tracert -6 www.google.com

Tracing route to www.google.com [2404:6800:4009:830::2004]
over a maximum of 30 hops:

  1     3 ms     3 ms     3 ms  undefined.hostname.localhost [2402:a00:184:745b:a63:32ff:fe66:3fb7]
  2     6 ms     4 ms     4 ms  undefined.hostname.localhost [2402:a00:184:1::1111]
  3    23 ms    19 ms    20 ms  undefined.hostname.localhost [2402:a00:84::6]
  4    24 ms    22 ms    22 ms  2001:4860:1:1::19c0
  5    24 ms    31 ms    20 ms  2404:6800:80b3::1
  6    25 ms    21 ms    20 ms  2001:4860:0:1::17d0
  7    23 ms    20 ms    21 ms  2001:4860:0:1::2039
  8    23 ms    23 ms    20 ms  bom12s20-in-x04.1e100.net [2404:6800:4009:830::2004]

Trace complete.
```

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6. netstat

Description:

The netstat command is a powerful network utility in Windows used to display network connections (both incoming and outgoing), routing tables, interface statistics, masquerade connections, and multicast memberships.

No.	Option	Description
1	-a	Displays all connections and listening ports.
2	-e	Displays Ethernet stats, such as number of bytes and packets transferred.
3	-n	Displays active TCP connections, port numbers.
4	-o	Displays active TCP connections and includes the process ID.
5	-r	Displays the routing table.

Implementation:

```
C:\Users\Jay Ashapura Maa>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49688        MOHIT-PRASHANT:49689   ESTABLISHED
  TCP    127.0.0.1:49689        MOHIT-PRASHANT:49688   ESTABLISHED
  TCP    127.0.0.1:55876        MOHIT-PRASHANT:55877   ESTABLISHED
  TCP    127.0.0.1:55877        MOHIT-PRASHANT:55876   ESTABLISHED
  TCP    192.168.1.8:56228      20.212.88.117:https    ESTABLISHED
  TCP    192.168.1.8:56403      ec2-3-6-211-252:https  ESTABLISHED
  TCP    192.168.1.8:56467      52.230.60.54:https     TIME_WAIT
```

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```
C:\Users\Jay Ashapura Maa>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:445            MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:5040           MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:7680           MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:8090           MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:49664          MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:49665          MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:49666          MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:49667          MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:49668          MOHIT-PRASHANT:0       LISTENING
  TCP    0.0.0.0:49670          MOHIT-PRASHANT:0       LISTENING
  TCP    127.0.0.1:49688        MOHIT-PRASHANT:49689   ESTABLISHED
  TCP    127.0.0.1:49689        MOHIT-PRASHANT:49688   ESTABLISHED
  TCP    127.0.0.1:55876        MOHIT-PRASHANT:55877   ESTABLISHED
  TCP    127.0.0.1:55877        MOHIT-PRASHANT:55876   ESTABLISHED
  TCP    192.168.1.8:139        MOHIT-PRASHANT:0       LISTENING
```

```
C:\Users\Jay Ashapura Maa>netstat -e
Interface Statistics

                           Received            Sent

Bytes                    1273911835       211978074
Unicast packets             1344539          757127
Non-unicast packets           37100            6769
Discards                          0               0
Errors                            0               0
Unknown protocols                 0
```

```
C:\Users\Jay Ashapura Maa>netstat -n

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    127.0.0.1:49688        127.0.0.1:49689        ESTABLISHED
  TCP    127.0.0.1:49689        127.0.0.1:49688        ESTABLISHED
  TCP    127.0.0.1:55876        127.0.0.1:55877        ESTABLISHED
  TCP    127.0.0.1:55877        127.0.0.1:55876        ESTABLISHED
  TCP    192.168.1.8:56228      20.212.88.117:443      ESTABLISHED
  TCP    192.168.1.8:56403      3.6.211.252:443        ESTABLISHED
  TCP    192.168.1.8:56481      13.71.55.58:443        TIME_WAIT
  TCP    192.168.1.8:56482      13.71.55.58:443        TIME_WAIT
```

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```
C:\Users\Jay Ashapura Maa>netstat -o

Active Connections

  Proto  Local Address          Foreign Address        State           PID
  TCP    127.0.0.1:49688        MOHIT-PRASHANT:49689   ESTABLISHED     1276
  TCP    127.0.0.1:49689        MOHIT-PRASHANT:49688   ESTABLISHED     1276
  TCP    127.0.0.1:55876        MOHIT-PRASHANT:55877   ESTABLISHED     18244
  TCP    127.0.0.1:55877        MOHIT-PRASHANT:55876   ESTABLISHED     18244
  TCP    192.168.1.8:56228      20.212.88.117:https    ESTABLISHED     7040
  TCP    192.168.1.8:56403      ec2-3-6-211-252:https  ESTABLISHED     4928
  TCP    [2402:a00:184:745b:d053:3491:7c9d:3dc6]:49410  [2603:1040:a06:6::]:https  ESTABLISHED     5072
  TCP    [2402:a00:184:745b:d053:3491:7c9d:3dc6]:55988  whatsapp-cdn6-shv-02-bom1:https  ESTABLISHED     2860
  TCP    [2402:a00:184:745b:d053:3491:7c9d:3dc6]:56027  [2603:1040:a06:6::]:https  ESTABLISHED     13256
```

```
C:\Users\Jay Ashapura Maa>netstat -r
===========================================================================
Interface List
 16...6c f6 da 47 7a 80 ......Microsoft Wi-Fi Direct Virtual Adapter
  4...6e f6 da 47 7a 7f ......Microsoft Wi-Fi Direct Virtual Adapter #2
 10...6c f6 da 47 7a 7f ......Intel(R) Wi-Fi 6E AX211 160MHz
 18...2c 58 b9 47 b8 b1 ......Realtek Gaming GbE Family Controller
  1...........................Software Loopback Interface 1
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.1.1      192.168.1.8     40
        127.0.0.0        255.0.0.0         On-link         127.0.0.1    331
        127.0.0.1  255.255.255.255         On-link         127.0.0.1    331
  127.255.255.255  255.255.255.255         On-link         127.0.0.1    331
      192.168.1.0    255.255.255.0         On-link      192.168.1.8    296
      192.168.1.8  255.255.255.255         On-link      192.168.1.8    296
    192.168.1.255  255.255.255.255         On-link      192.168.1.8    296
        224.0.0.0        240.0.0.0         On-link         127.0.0.1    331
        224.0.0.0        240.0.0.0         On-link      192.168.1.8    296
  255.255.255.255  255.255.255.255         On-link         127.0.0.1    331
  255.255.255.255  255.255.255.255         On-link      192.168.1.8    296
===========================================================================
```

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7. nslookup

Description:

The command in Windows is a network administration command-line tool used for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or other specific DNS records. It's useful for diagnosing DNS problems.

No.	Option	Description
1	-type=A	Displays the Address record.
2	-type=AAAA	Displays the IPv6 address record.
3	-type=MX	Displays the mail exchange record.
4	-type=NS	Displays Name server record.
5	-type=PTR	Displays Pointer Record used for DNS lookups

Implementation:

```
C:\Users\Jay Ashapura Maa>nslookup -type=A google.com
Server:  UnKnown
Address:  fe80::a63:32ff:fe66:3fb7

Non-authoritative answer:
Name:    google.com
Address:  142.250.71.110
```

```
C:\Users\Jay Ashapura Maa>nslookup -type=AAAA google.com
Server:  UnKnown
Address:  fe80::a63:32ff:fe66:3fb7

Non-authoritative answer:
Name:    google.com
Address:  2404:6800:4009:806::200e
```

```
C:\Users\Jay Ashapura Maa>nslookup -type=MX google.com
Server:  UnKnown
Address:  fe80::a63:32ff:fe66:3fb7

Non-authoritative answer:
google.com      MX preference = 10, mail exchanger = smtp.google.com
```

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```
C:\Users\Jay Ashapura Maa>nslookup -type=NS google.com
Server:  UnKnown
Address:  fe80::a63:32ff:fe66:3fb7

Non-authoritative answer:
google.com      nameserver = ns2.google.com
google.com      nameserver = ns1.google.com
google.com      nameserver = ns3.google.com
google.com      nameserver = ns4.google.com
```

```
C:\Users\Jay Ashapura Maa>nslookup -type=PTR 93.184.216.34
Server:  UnKnown
Address:  fe80::a63:32ff:fe66:3fb7

*** UnKnown can't find 34.216.184.93.in-addr.arpa.: Non-existent domain
```

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8. hostname

Description:

The command is a simple utility used to display the name of the current computer (the hostname). This command is available on both Windows and Unix-based systems (including Linux and macOS), though the usage and options might slightly vary.

No.	Options	Description
1	/?	Displays the name of current host.
2	-f	Displays the host name with fully qualified domain name.
3	-a	Displays the alias names.
4	-i	Displays the network address.
5	-A	Displays all the information.

Implementation:

```
C:\Users\Jay Ashapura Maa>hostname
MOHIT-PRASHANT
```

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9. pathping

Description:

pathping is a network utility in Windows that combines the features of ping and tracert. It provides a detailed analysis of the route taken by packets across an IP network and calculates packet loss at each router or link in the path.

No.	Option	Description
1	-n	Do not resolve addresses o hostnames.
2	-i address	Use the specified source address.
3	-h	Specifies the maximum number of hops to search for target.
4	-p	Specifies the period, in milliseconds, between pings.
5	-q	Specifies the number of queries per hop.

Implementation:

```
C:\Users\Jay Ashapura Maa>pathping -h 30 www.google.com

Tracing route to www.google.com [2404:6800:4009:830::2004]
over a maximum of 30 hops:
  0  MOHIT-PRASHANT.bbrouter [2402:a00:184:745b:1d14:6a21:1a7c:2f1e]
  1  undefined.hostname.localhost [2402:a00:184:745b:a63:32ff:fe66:3fb7]
  2  undefined.hostname.localhost [2402:a00:184:1::1111]
  3  undefined.hostname.localhost [2402:a00:84::6]
  4  2001:4860:1:1::19c0
  5  2404:6800:8115::1
  6  2001:4860:0:1::542c
  7  2001:4860:0:1::f7c
  8  2001:4860:0:1::8769
  9  2001:4860:0:1::2039
 10  bom12s20-in-x04.1e100.net [2404:6800:4009:830::2004]
```

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```
C:\Users\Jay Ashapura Maa>pathping -g 192.168.1.1 10.0.0.1 www.google.com

Tracing route to www.google.com [142.251.42.36]
over a maximum of 30 hops:
  0  MOHIT-PRASHANT.bbrouter [192.168.1.8]
  1     *        *        *
Computing statistics for 0 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                          MOHIT-PRASHANT.bbrouter [192.168.1.8]

Trace complete.
```

```
C:\Users\Jay Ashapura Maa>pathping -q 5 www.google.com

Tracing route to www.google.com [2404:6800:4002:82e::2004]
over a maximum of 30 hops:
  0  MOHIT-PRASHANT.bbrouter [2402:a00:184:745b:1d14:6a21:1a7c:2f1e]
  1  undefined.hostname.localhost [2402:a00:184:745b:a63:32ff:fe66:3fb7]
  2  undefined.hostname.localhost [2402:a00:184:1::1111]
  3  undefined.hostname.localhost [2402:a00:84::6]
  4  2001:4860:1:1::19c0
  5  2404:6800:8100::1
  6  2001:4860:0:1::4b56
  7  2001:4860:0:1::7974
  8  2001:4860::9:4001:7734
  9  2001:4860::9:4001:67bd
 10  2001:4860:0:1::77d5
 11  2001:4860:0:1::5e45
 12  del12s10-in-x04.1e100.net [2404:6800:4002:82e::2004]
```

```
C:\Users\Jay Ashapura Maa>pathping -p 250 www.google.com

Tracing route to www.google.com [2404:6800:4009:830::2004]
over a maximum of 30 hops:
  0  MOHIT-PRASHANT.bbrouter [2402:a00:184:745b:1d14:6a21:1a7c:2f1e]
  1  undefined.hostname.localhost [2402:a00:184:745b:a63:32ff:fe66:3fb7]
  2  undefined.hostname.localhost [2402:a00:184:1::1111]
  3  undefined.hostname.localhost [2402:a00:84::6]
  4  2001:4860:1:1::19c0
  5  2404:6800:8115::1
  6  2001:4860:0:1::542c
  7  2001:4860:0:1::f7c
  8  2001:4860:0:1::8769
  9  2001:4860:0:1::2039
 10  bom12s20-in-x04.1e100.net [2404:6800:4009:830::2004]
```

Date: 13/06/2024

```
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                           MOHIT-PRASHANT.bbrouter [2402:a00:184:745b:1d14:6a21:1a7c:2f1e]
                                 0/   5 =  0%   |
  1    1ms     0/   5 =  0%     0/   5 =  0%  undefined.hostname.localhost [2402:a00:184:745b:a63:32ff:fe66:3fb7]
                                 0/   5 =  0%   |
  2    3ms     0/   5 =  0%     0/   5 =  0%  undefined.hostname.localhost [2402:a00:184:1::1111]
                                 0/   5 =  0%   |
  3   21ms     0/   5 =  0%     0/   5 =  0%  undefined.hostname.localhost [2402:a00:84::6]
                                 0/   5 =  0%   |
  4   23ms     0/   5 =  0%     0/   5 =  0%  2001:4860:1:1::19c0
                                 0/   5 =  0%   |
  5  ---      5/   5 =100%     5/   5 =100%  2404:6800:8100::1
                                 0/   5 =  0%   |
  6   22ms     0/   5 =  0%     0/   5 =  0%  2001:4860:0:1::4b56
                                 0/   5 =  0%   |
  7   26ms     0/   5 =  0%     0/   5 =  0%  2001:4860:0:1::7974
                                 0/   5 =  0%   |
  8   21ms     0/   5 =  0%     0/   5 =  0%  2001:4860::9:4001:7734
                                 0/   5 =  0%   |
  9   60ms     0/   5 =  0%     0/   5 =  0%  2001:4860::9:4001:67bd
                                 0/   5 =  0%   |
 10   59ms     0/   5 =  0%     0/   5 =  0%  2001:4860:0:1::77d5
                                 0/   5 =  0%   |
 11   43ms     0/   5 =  0%     0/   5 =  0%  2001:4860:0:1::5e45
                                 0/   5 =  0%   |
 12   48ms     0/   5 =  0%     0/   5 =  0%  del12s10-in-x04.1e100.net [2404:6800:4002:82e::2004]

Trace complete.
```

Date: 13/06/2024

10.arp

Description:

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

No.	Option	Description
1	-a	Displays current ARP entries by interrogating the current protocol data.
2	-g	Similar to -a.
3	-v	Displays current ARP entries in Verbose mode.
4	-d	Deletes the host specified by inet_addr.
5	-s	Adds the host and associates the Internet Address with Physical Address.

Implementation:

```
C:\Users\Jay Ashapura Maa>arp

Displays and modifies the IP-to-Physical address translation tables used by
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] [-v]
```

```
C:\Users\Jay Ashapura Maa>arp -a

Interface: 192.168.1.8 --- 0xa
  Internet Address      Physical Address      Type
  192.168.1.1           08-63-32-66-3f-b7     dynamic
  192.168.1.255         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
```

Date: 13/06/2024

```
C:\Users\Jay Ashapura Maa>arp -a

Interface: 192.168.1.8 --- 0xa
  Internet Address      Physical Address      Type
  192.168.1.1           08-63-32-66-3f-b7     dynamic
  192.168.1.255         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
```

```
C:\Users\Jay Ashapura Maa>arp -s 157.55.85.212

Displays and modifies the IP-to-Physical address translation tables used by
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] [-v]

  -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 ARP
                table are displayed.
  -g            Same as -a.
  -v            Displays current ARP entries in verbose mode.  All invalid
                entries and entries on the loop-back interface will be shown.
  inet_addr     Specifies an internet address.
  -N if_addr    Displays the ARP entries for 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.
  eth_addr      Specifies a physical address.
  if_addr       If present, this specifies the Internet address of the
                interface whose address translation table should be modified.
                If not present, the first applicable interface will be used.
```