Assignment2

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Statement: Setting up small wireless computer network and hands-on networking command: Set up a small wired network of 2 to 4 computers using access point and ask students to access it on their wireless gadgets. Hands on for network commands - ping, pathping, ipconfig/ifconfig, arp, netstat, nbtstat, nslookup, route, traceroute/tracert, nmap.

tracert / traceroute
Tracks the path data packets take from your computer to a destination. Useful for identifying slow or failing network hops.

pathping
Combines ping and tracert to measure latency and packet loss along a route. Helpful for detailed connection diagnostics.

ipconfig
Displays your system's IP configuration including IP, subnet, and gateway. Also lets you refresh or release IP addresses.

arp
Shows the mapping of IP addresses to MAC addresses on the local network. Can add or delete ARP entries manually.

netstat
Displays active network connections, open ports, and routing tables. Useful for monitoring traffic and troubleshooting issues.

nbtstat
Shows NetBIOS names and their connection status. Helps diagnose issues in Windows file sharing or local name resolution.

nslookup
Queries DNS servers to find the IP address of a domain or vice versa. Useful for DNS troubleshooting.

route

Displays or modifies your system's routing table. Controls how data packets travel across networks.

nmap

Scans networks for devices, open ports, and running services. Widely used for security testing and network discovery.

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

Tracing route to google.com [142.250.192.78]
over a maximum of 30 hops:

  1     5 ms     2 ms     2 ms  192.168.0.1
  2     8 ms     8 ms     8 ms  b230.ucndns.in [103.252.169.230]
  3    34 ms    33 ms    32 ms  as15169.bom.extreme-ix.net [103.77.108.130]
  4    34 ms    41 ms    33 ms  192.178.110.125
  5    34 ms    34 ms    34 ms  142.250.61.203
  6    33 ms    34 ms    33 ms  bom12s16-in-f14.1e100.net [142.250.192.78]

Trace complete.
```

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

Tracing route to google.com [142.250.192.78]
over a maximum of 30 hops:
  0  PCsPC.domain.name [192.168.0.12]
  1  192.168.0.1
  2  b230.ucndns.in [103.252.169.230]
  3  as15169.bom.extreme-ix.net [103.77.108.130]
  4  192.178.110.125
  5  142.250.61.203
  6  bom12s16-in-f14.1e100.net [142.250.192.78]

Computing statistics for 150 seconds...
           Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                           PCsPC.domain.name [192.168.0.12]
                                 0/ 100 =  0%   |
  1   44ms     0/ 100 =  0%     0/ 100 =  0%  192.168.0.1
                                 0/ 100 =  0%   |
  2   72ms     1/ 100 =  1%     1/ 100 =  1%  b230.ucndns.in [103.252.169.230]
                                 0/ 100 =  0%   |
  3   88ms     0/ 100 =  0%     0/ 100 =  0%  as15169.bom.extreme-ix.net [103.77.108.130]
                                 0/ 100 =  0%   |
  4   81ms     0/ 100 =  0%     0/ 100 =  0%  192.178.110.125
                                 1/ 100 =  1%   |
  5   73ms     1/ 100 =  1%     0/ 100 =  0%  142.250.61.203
                                 0/ 100 =  0%   |
  6   82ms     1/ 100 =  1%     0/ 100 =  0%  bom12s16-in-f14.1e100.net [142.250.192.78]

Trace complete.
```

```
C:\Users\prath>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

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

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  . : domain.name
   Link-local IPv6 Address . . . . . : fe80::b256:9b84:34cb:1ac2%15
   IPv4 Address. . . . . . . . . . . : 192.168.0.12
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::a2ab:1bff:fed6:d767%15
                                       192.168.0.1

Ethernet adapter Bluetooth Network Connection:

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

Ethernet adapter vEthernet (WSL (Hyper-V firewall)):

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::4895:b8d4:98e4:26e2%44
   IPv4 Address. . . . . . . . . . . : 172.18.160.1
   Subnet Mask . . . . . . . . . . . : 255.255.240.0
   Default Gateway . . . . . . . . . :

C:\Users\prath>
```

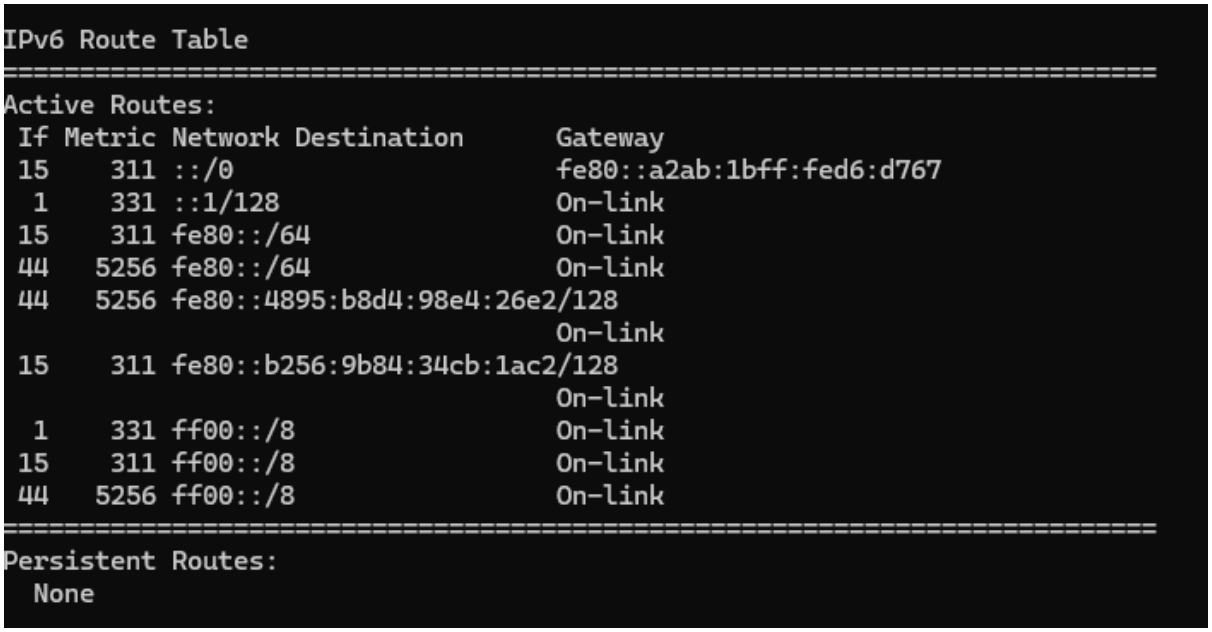
```
C:\Users\prath>arp -a

Interface: 192.168.0.12 --- 0xf
  Internet Address      Physical Address      Type
  192.168.0.1           a0-ab-1b-d6-d7-67     dynamic
  192.168.0.255         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
  239.255.255.250       01-00-5e-7f-ff-fa     static
  239.255.255.251       01-00-5e-7f-ff-fb     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

Interface: 172.18.160.1 --- 0x2c
  Internet Address      Physical Address      Type
  172.18.169.134        00-15-5d-16-d5-6b     dynamic
  172.18.175.255        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
  239.255.255.250       01-00-5e-7f-ff-fa     static
  239.255.255.251       01-00-5e-7f-ff-fb     static
```

```
C:\Users\prath>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            PCsPC:0                LISTENING
  TCP    0.0.0.0:445            PCsPC:0                LISTENING
  TCP    0.0.0.0:5040           PCsPC:0                LISTENING
  TCP    0.0.0.0:7680           PCsPC:0                LISTENING
  TCP    0.0.0.0:49664          PCsPC:0                LISTENING
  TCP    0.0.0.0:49665          PCsPC:0                LISTENING
  TCP    0.0.0.0:49666          PCsPC:0                LISTENING
  TCP    0.0.0.0:49667          PCsPC:0                LISTENING
  TCP    0.0.0.0:49668          PCsPC:0                LISTENING
  TCP    0.0.0.0:49670          PCsPC:0                LISTENING
  TCP    172.18.160.1:139       PCsPC:0                LISTENING
  TCP    192.168.0.12:139       PCsPC:0                LISTENING
  TCP    192.168.0.12:61330     4.213.25.240:https     ESTABLISHED
  TCP    192.168.0.12:61332     4.213.25.240:https     ESTABLISHED
  TCP    192.168.0.12:63981     se-in-f188:5228        ESTABLISHED
  TCP    192.168.0.12:64372     ec2-52-66-166-149:https  ESTABLISHED
  TCP    192.168.0.12:64426     151.101.193.229:https  ESTABLISHED
  TCP    192.168.0.12:64450     whatsapp-chatd-edge-shv-02-bom2:https  ESTABLISHED
  TCP    192.168.0.12:64469     hkg12s10-in-f36:https  CLOSE_WAIT
```

```
C:\Users\prath>nbtstat -n

Local Area Connection* 1:
Node IpAddress: [0.0.0.0] Scope Id: []

    No names in cache

Ethernet:
Node IpAddress: [0.0.0.0] Scope Id: []

    No names in cache

Bluetooth Network Connection:
Node IpAddress: [0.0.0.0] Scope Id: []

    No names in cache

Wi-Fi:
Node IpAddress: [192.168.0.12] Scope Id: []

                NetBIOS Local Name Table

       Name               Type         Status
    ---------------------------------------------
    PCSPC          <00>  UNIQUE      Registered
    WORKGROUP      <00>  GROUP       Registered
    PCSPC          <20>  UNIQUE      Registered

Local Area Connection* 2:
Node IpAddress: [0.0.0.0] Scope Id: []

    No names in cache

vEthernet (WSL (Hyper-V firewall)):
Node IpAddress: [172.18.160.1] Scope Id: []

                NetBIOS Local Name Table

       Name               Type         Status
    ---------------------------------------------
    PCSPC          <00>  UNIQUE      Registered
    WORKGROUP      <00>  GROUP       Registered
    PCSPC          <20>  UNIQUE      Registered
```

```
C:\Users\prath>nslookup gogle.com
Server:  dns.google
Address:  8.8.8.8

Non-authoritative answer:
Name:    gogle.com.domain.name
Address:  185.38.109.109
```

```
C:\Users\prath>route print
===========================================================================
Interface List
 20...d8 d0 90 52 f0 6a ......Realtek PCIe FE Family Controller
  3...b2 68 e6 2f 30 6d ......Microsoft Wi-Fi Direct Virtual Adapter
  6...c2 68 e6 2f 30 6d ......Microsoft Wi-Fi Direct Virtual Adapter #2
 15...b0 68 e6 2f 30 6d ......Qualcomm QCA9377 802.11ac Wireless Adapter
 17...b0 68 e6 2f 30 6e ......Bluetooth Device (Personal Area Network)
  1...........................Software Loopback Interface 1
 44...00 15 5d c0 04 a0 ......Hyper-V Virtual Ethernet Adapter
===========================================================================

IPv4 Route Table
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway       Interface  Metric
          0.0.0.0          0.0.0.0      192.168.0.1     192.168.0.12     55
        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
     172.18.160.0    255.255.240.0         On-link      172.18.160.1   5256
     172.18.160.1  255.255.255.255         On-link      172.18.160.1   5256
   172.18.175.255  255.255.255.255         On-link      172.18.160.1   5256
      192.168.0.0    255.255.255.0         On-link      192.168.0.12    311
     192.168.0.12  255.255.255.255         On-link      192.168.0.12    311
    192.168.0.255  255.255.255.255         On-link      192.168.0.12    311
        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      192.168.0.12    311
        224.0.0.0        240.0.0.0         On-link      172.18.160.1   5256
  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      192.168.0.12    311
  255.255.255.255  255.255.255.255         On-link      172.18.160.1   5256
===========================================================================
Persistent Routes:
  None
```



Networking Commands - Short Descriptions

Command	Description
tracert / traceroute	Shows the route packets take to reach a destination.
pathping	Combines ping and tracert to show latency and packet loss at each hop.
ipconfig / ifconfig	Displays network configuration details like IP, subnet mask, and gateway.
arp	Shows and manages IP-to-MAC address mappings.
netstat	Displays active connections, routing tables, and port usage.
nbtstat	Displays NetBIOS name and connection information.
nslookup	Queries DNS to get IP address or domain name information.
route	Displays or modifies the IP routing table.
nmap	Scans networks for devices, open ports, and services.