INSTITUTE OF COMPUTER STUDIES

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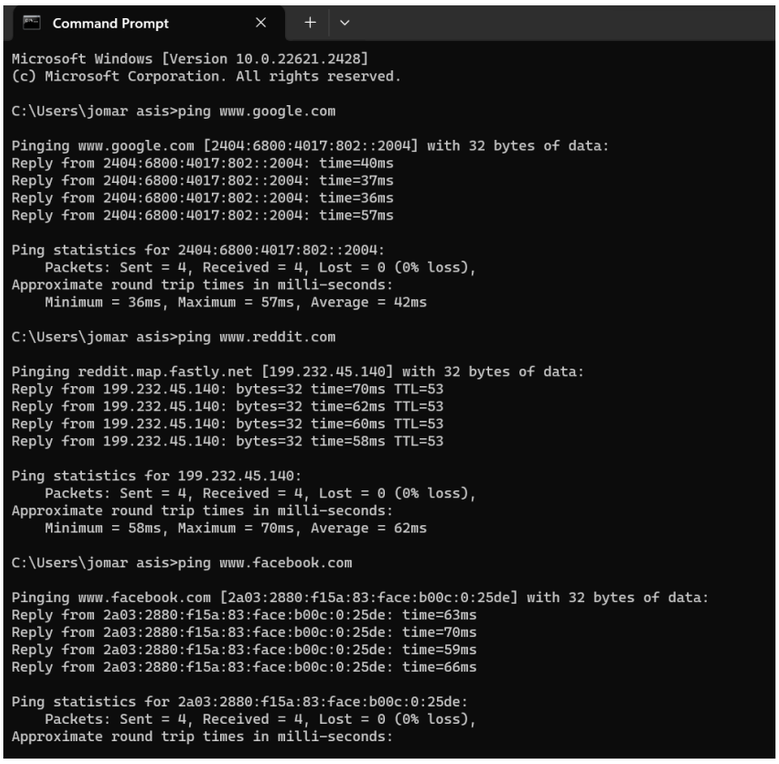
Ping and Traceroute

Ping Exercise Part 1 (30 points)

- Pick the address of a site you visit. You are going to use it to test some network diagnostics. What happened when you ping your site?
- Try it with a few more examples. What is happening?



When I pinged "www.google.com" using its IPv6 address, I received successful replies with round-trip times ranging from 36ms to 57ms, indicating that my computer can effectively communicate with Google's server, and the network latency is relatively low. Similarly, I tested the connectivity to "www.reddit.com" via its IPv4 address and "www.facebook.com" using its IPv6 address. In both cases, I received successful replies with round-trip times ranging from 58ms to 70ms for Reddit and 59ms to 70ms for Facebook, demonstrating that my computer can reach these servers, and the network latency is well within an acceptable range for these websites.

- How can ping be useful?

Ping serves various crucial purposes in network diagnostics. It aids in Checking Network Connectivity by verifying if your computer can establish successful connections with remote servers or websites, with received replies signifying functional network connectivity. Furthermore, Ping is instrumental in Measuring Latency, offering insights into the round-trip time for data transmission, facilitating the assessment of network performance and responsiveness, with lower times being preferable. The tool also helps in Identifying Packet Loss, as unacknowledged lost packets suggest network issues that could impact connection quality or server reliability. Additionally, Ping is an invaluable resource for Diagnosing Network Problems; when encountering slow internet or connectivity issues, it can pinpoint potential trouble spots, such as high latency or packet loss. System administrators utilize Ping for Testing Host Reachability, confirming server operational status; unresponsive servers may be

offline or experiencing problems. Moreover, Ping aids in Troubleshooting Connectivity Issues, offering a powerful tool for diagnosing and resolving network connectivity problems, both within local networks and the broader internet.

Type ping /? To find the various options there are:

```
C:\Users\jomar asis>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.
    -v TOS         Type Of Service (IPv4-only. This setting has been deprecated
                   and has no effect on the type of service field in the IP
                   Header).
    -r count       Record route for count hops (IPv4-only).
    -s count       Timestamp for count hops (IPv4-only).
    -j host-list   Loose source route along host-list (IPv4-only).
    -k host-list   Strict source route along host-list (IPv4-only).
    -w timeout     Timeout in milliseconds to wait for each reply.
    -R             Use routing header to test reverse route also (IPv6-only).
                   Per RFC 5095 the use of this routing header has been
                   deprecated. Some systems may drop echo requests if
                   this header is used.
    -S srcaddr     Source address to use.
    -c compartment Routing compartment identifier.
    -p             Ping a Hyper-V Network Virtualization provider address.
    -4             Force using IPv4.
    -6             Force using IPv6.
```

Using the count request option to send 5 instead of 4

```
C:\Users\jomar asis>ping -n 5 www.google.com

Pinging www.google.com [2404:6800:4017:805::2004] with 32 bytes of data:
Reply from 2404:6800:4017:805::2004: time=57ms
Reply from 2404:6800:4017:805::2004: time=29ms
Reply from 2404:6800:4017:805::2004: time=29ms
Reply from 2404:6800:4017:805::2004: time=36ms
Reply from 2404:6800:4017:805::2004: time=30ms

Ping statistics for 2404:6800:4017:805::2004:
    Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 29ms, Maximum = 57ms, Average = 36ms
```

Tracert Exercise Part 2 (40 points)

- Using the command prompt and tracert command, find the route to
- www.whatis.com

```
C:\Users\jomar asis>tracert www.whatis.com

Tracing route to dsites.techtarget.com [34.120.117.196]
over a maximum of 30 hops:

  1     3 ms     3 ms     2 ms  192.168.34.242
  2     *        *        *     Request timed out.
  3    39 ms    42 ms    28 ms  10.2.198.65
  4    61 ms    31 ms    34 ms  10.66.132.94
  5    59 ms    36 ms    72 ms  10.66.132.97
  6    72 ms    33 ms    34 ms  10.66.132.49
  7    55 ms    39 ms    47 ms  131.226.79.102
  8    38 ms    39 ms    38 ms  131.226.78.21
  9    61 ms    30 ms    38 ms  74.125.32.64
 10    71 ms    33 ms    37 ms  66.249.94.213
 11    62 ms    32 ms    35 ms  142.251.244.149
 12    71 ms    36 ms    39 ms  196.117.120.34.bc.googleusercontent.com [34.120.117.196]

Trace complete.
```

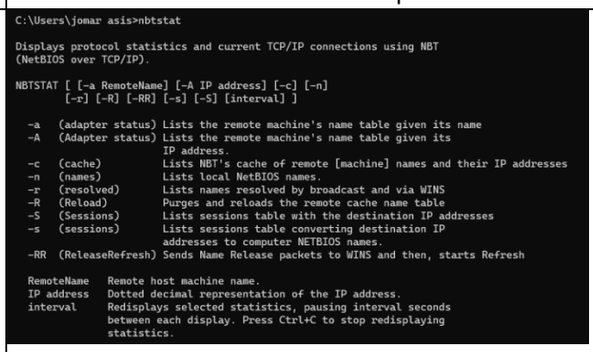
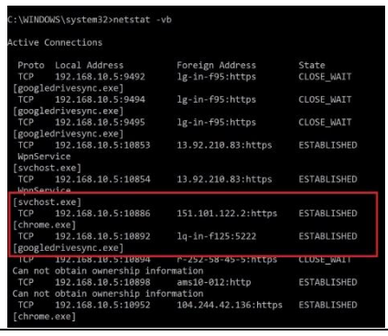
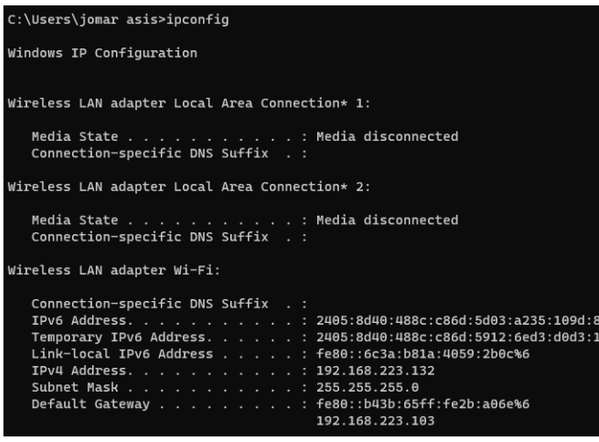
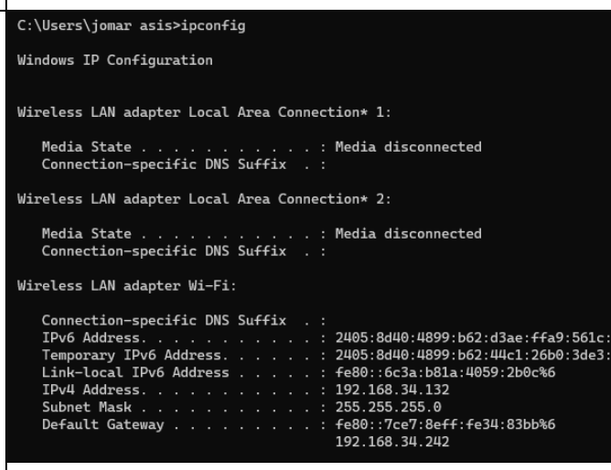
- 139.84.19.200

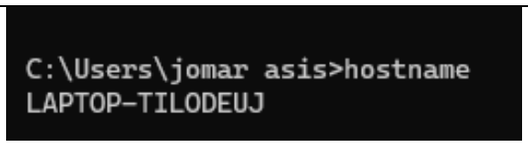
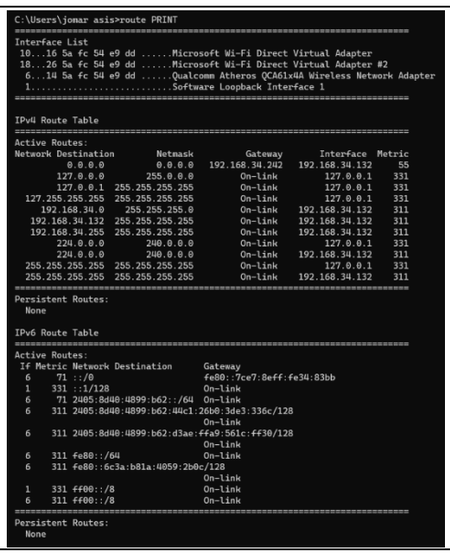
```
C:\Users\jomar asis>tracert 139.84.19.200

Tracing route to 139.84.19.200 over a maximum of 30 hops

  1     6 ms     3 ms     2 ms  192.168.223.103
  2     *        *        *     Request timed out.
  3    71 ms    29 ms    28 ms  10.2.197.66
  4    62 ms    37 ms    27 ms  10.66.132.102
  5    58 ms    38 ms    40 ms  10.66.132.105
  6    41 ms    27 ms    30 ms  10.66.132.77
  7    59 ms    35 ms    29 ms  131.226.78.190
  8    75 ms    31 ms    34 ms  131.226.78.130
  9    89 ms    56 ms    61 ms  131.226.79.130
 10    74 ms    56 ms    60 ms  te0-8-0-4-3.ccr31.sin01.atlas.cogentco.com [154.18.16.201]
 11   263 ms  1036 ms  1014 ms  be2913.ccr41.lax04.atlas.cogentco.com [154.54.27.54]
 12   287 ms   318 ms   224 ms  be3360.ccr42.lax01.atlas.cogentco.com [154.54.25.149]
 13   281 ms   235 ms   234 ms  be2932.ccr32.phx01.atlas.cogentco.com [154.54.45.161]
 14   261 ms   244 ms   262 ms  be3872.ccr22.elp02.atlas.cogentco.com [154.54.26.54]
 15   276 ms   252 ms   253 ms  be3851.ccr42.iah01.atlas.cogentco.com [154.54.2.5]
 16   311 ms   274 ms   285 ms  be2690.ccr42.atl01.atlas.cogentco.com [154.54.28.129]
 17   333 ms   294 ms   299 ms  be2113.ccr42.dca01.atlas.cogentco.com [154.54.24.221]
 18   331 ms   292 ms   290 ms  be2752.rcr71.bwi01.atlas.cogentco.com [154.54.90.217]
 19   333 ms   291 ms   293 ms  be2751.rcr21.phl01.atlas.cogentco.com [154.54.90.214]
 20   332 ms   274 ms   275 ms  38.32.43.42
 21     *        *        *     Request timed out.
 22     *        *        *     Request timed out.
 23     *        *        *     Request timed out.
 24     *        *        *     Request timed out.
 25     *        *        *     Request timed out.
 26     *        *        *     Request timed out.
 27     *        *        *     Request timed out.
 28     *        *        *     Request timed out.
 29     *        *        *     Request timed out.
 30     *        *        *     Request timed out.

Trace complete.
```

- Ask your classmate for their ip address—trace the route to them.

```
C:\Users\jomar asis>tracert 192.168.1.9

Tracing route to 192.168.1.9 over a maximum of 30 hops

  1     6 ms     2 ms     2 ms  192.168.223.103
  2     *        *        *     Request timed out.
  3    32 ms    33 ms    29 ms  10.2.197.66
  4    43 ms    28 ms    39 ms  10.66.132.102
  5    44 ms    39 ms    37 ms  10.66.132.105
  6    74 ms    28 ms    33 ms  10.66.132.77
  7    57 ms    40 ms    37 ms  131.226.78.190
  8    77 ms    29 ms    50 ms  131.226.78.130
  9    62 ms    56 ms    48 ms  131.226.78.139
 10     *        *        *     Request timed out.
 11     *        *        *     Request timed out.
 12     *        *        *     Request timed out.
 13     *        *        *     Request timed out.
 14     *        *        *     Request timed out.
 15     *        *        *     Request timed out.
 16     *        *        *     Request timed out.
 17     *        *        *     Request timed out.
 18     *        *        *     Request timed out.
 19     *        *        *     Request timed out.
 20     *        *        *     Request timed out.
 21     *        *        *     Request timed out.
 22     *        *        *     Request timed out.
 23     *        *        *     Request timed out.
 24     *        *        *     Request timed out.
 25     *        *        *     Request timed out.
 26     *        *        *     Request timed out.
 27     *        *        *     Request timed out.
 28     *        *        *     Request timed out.
 29     *        *        *     Request timed out.
 30     *        *        *     Request timed out.

Trace complete.
```

Other TCP/IP diagnostic commands

Command	Meaning	Function	Sample
Nbtstat	NetBIOS over TCPIP Statistics	Nbtstat is a TCP/IP utility that displays current TCP/IP connections and statistics using NetBIOS over TCP/IP (NetBT). Nbtstat is installed on a computer running Microsoft Windows when the TCP/IP protocol stack is installed	
Netstat	Network Statistics	It shows the established network TCP/IP connections of the local computer with remote hosts, open ports on the machine, the process ID (PID) of each connection etc.	
Ipconfig	Internet Protocol Configuration	The ipconfig command is used to display detailed IP information for each network adapter utilizing TCP/IP. The ipconfig command can also be used to release and renew IP addresses on systems configured to receive them via a DHCP server. The ipconfig command is available in all versions of Windows.	
Arp	Address Resolution Protocol	ARP stands for “Address Resolution Protocol” and is one of the core networking protocols that work in Layer 2 level and facilitate communication in a LAN. The job of ARP is to find the physical address (MAC address) of the target and map it with its corresponding Layer 3 IP address when	

		communicating in a LAN. The ARP cache table stores mappings of IP addresses with their corresponding MAC address.	
Hostname	Hostname	The hostname command displays the name of the current host. The hostname command is available in Windows 11, Windows 10, Windows 8, Windows 7, Windows Vista, and Windows XP.	
Route	Route	The “route” command is used to manipulate the local routing table of the computer. You can print the current routing table, add new static routes, delete entries etc.	

- https://www.networkstraining.com/windows-ip-commands/
- https://networkencyclopedia.com/nbtstat/#:~:text=You%20can%20run%20nbtstat%20from%20the%20command%20prompt,name%20and%20NetBIOS%20scope%20ID%20of%20a%20machine
- https://www.lifewire.com/list-of-command-prompt-commands-4092302

Another Exercise part 3 (30 points)

- Find the ipconfig for your machine.
- Open the command window
- Use the NBTSTAT command.
- Run the NBTSTAT command using your ip address for your machine. Use the –A option. What did you find out?

```
C:\Users\jomar asis>ipconfig

Windows IP Configuration


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  . :
   IPv6 Address. . . . . . . . . . . : 2405:8d40:488c:c86d:5d03:a235:109d:80a2
   Temporary IPv6 Address. . . . . . : 2405:8d40:488c:c86d:5912:6ed3:d0d3:1f83
   Link-local IPv6 Address . . . . . : fe80::6c3a:b81a:4059:2b0c%6
   IPv4 Address. . . . . . . . . . . : 192.168.223.132
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::b43b:65ff:fe2b:a06e%6
                                       192.168.223.103

C:\Users\jomar asis>nbtstat -A 192.168.223.132

Wi-Fi:
Node IpAddress: [192.168.223.132] Scope Id: []

    Host not found.

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

    Host not found.

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

    Host not found.
```

The output indicates that my computer lacks a NetBIOS name in the local network's database. This might be due to the machine not having a NetBIOS name configured or NetBIOS not being used for identification. Additionally, two other network interfaces, Local Area Connection 1 and Local Area Connection 2, do not have valid IP addresses assigned, resulting in "Host not found" messages since there are no NetBIOS names to resolve for those interfaces.