Experiment #	<TO BE FILLED BY STUDENT>	**Student ID**	<TO BE FILLED BY STUDENT>
Date	<TO BE FILLED BY STUDENT>	**Student Name**	@KLWKS_BOT THANOS

Lab 2: Execute the following networking commands like ipconfig, tracert, telnet, netsh, ping, nslookup and netstat in the command prompt prompt with simple topology.

Date of the Session:___/___/_____ **Session Time:_____to_____**

Learning outcome:

- Understand the purpose of ipconfig and use ipconfig to display network configuration information for a Windows computer.
- Learn how to use ping to test network connectivity to a remote host.
- Learn how to use tracert and netstat to trace the route taken by network packets to a destination.
- Understand the purpose of nslookup (Name Server Lookup) and use nslookup to query DNS servers for information about domain names and IP addresses.

Pre-Lab Task:

1. Ensure you have access to a Windows computer or virtual machine where you can practice the various DOS commands.

- Make sure the computer/VM is set up and operational.
- Confirm that the command prompt (CMD) or PowerShell is available for practicing **DOS commands.**

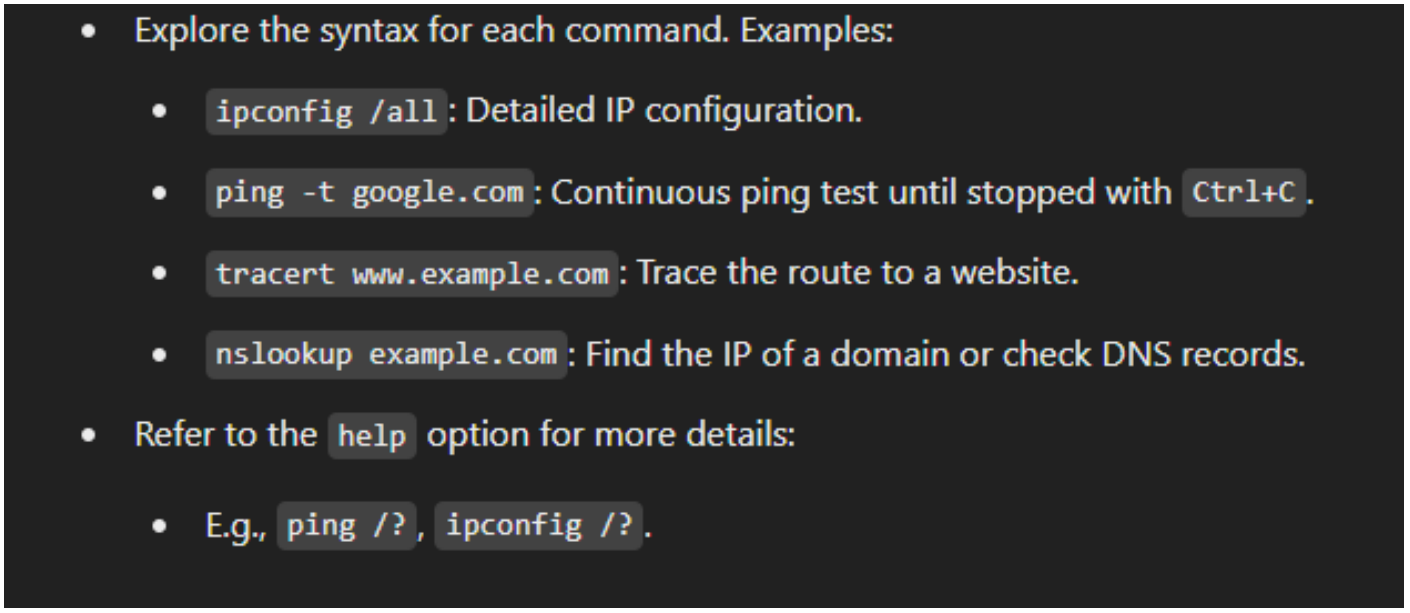
2. Review fundamental networking concepts like IP addresses, DNS, and routing. Understand what these commands are used for and why.

- **IP Addresses**: Understand IPv4 and IPv6 addressing (e.g., `192.168.1.1` for IPv4).
- **DNS (Domain Name System)**: Converts human-readable domain names (e.g., `google.com`) into IP addresses.
- **Routing**: Know how data packets travel from source to destination across a network.
- Purpose of Networking Commands:
  - **IPConfig**: Check your device's IP configuration.
  - **Ping**: Test connectivity with another network device.
  - **Tracert**: Trace the route packets take to a destination.
  - **NSLookup**: Look up DNS records.
  - **Netstat**: View network statistics and active connections.

3. Before starting the lab, use ping to verify that your Windows machine has network connectivity. This will also help you practice the ping command.

- Open Command Prompt:
  1. Type `ping google.com` to test connectivity to Google.
  2. Alternatively, try `ping 8.8.8.8` (Google's public DNS server).
- Check for replies:
  - **Successful**: "Reply from..." indicates network connectivity.
  - **Unsuccessful**: "Request timed out" or "Destination host unreachable" might require troubleshooting.

4. Familiarize yourself with the syntax and basic usage of each command. You don't need to memorize them, but knowing the basics helps.



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In Lab Task:

Lab 2: Executing the commands ipconfig, tracert, telnet, netsh, ping, nslookup and netstat in the command prompt

Writing space for the Problem: (For Student's use only)

1. **ipconfig command**

```
C:\Users\thanos>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:
   IPv4 Address. . . . . . . . . . . : 192.168.1.100
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

2. **ping command**

```
C:\Users\thanos>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

3. **tracert command**

```
C:\Users\thanos>tracert 8.8.8.8

Tracing route to 8.8.8.8 over a maximum of 30 hops:

  1     <1 ms    <1 ms    <1 ms  192.168.1.1
  2     10 ms    11 ms    12 ms  10.0.0.1
  3     20 ms    21 ms    19 ms  172.217.0.14
  4     22 ms    21 ms    22 ms  8.8.8.8

Trace complete.
```

4. **telnet command**

```
C:\Users\thanos>telnet 192.168.1.1
Connecting To 192.168.1.1...
```

5. **netsh command**

```
C:\Users\thanos>netsh
netsh>interface ipv4 show config

Configuration for interface "Ethernet"
    DHCP enabled: Yes
    IP Address: 192.168.1.100
    Subnet Prefix: 192.168.1.0/24 (mask 255.255.255.0)
    Default Gateway: 192.168.1.1
    DNS Servers: 8.8.8.8
```

6. **nslookup command**

```
C:\Users\thanos>nslookup google.com
Server:  UnKnown
Address:  192.168.1.1

Non-authoritative answer:
Name:    google.com
Addresses:  142.250.190.14
          2607:f8b0:4005:805::200e
```

7. netstat command

```
C:\Users\thanos>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.1.100:5060     192.168.1.1:80         ESTABLISHED
  TCP    192.168.1.100:5182     104.16.89.62:443       TIME_WAIT
  UDP    192.168.1.100:137      *:*                    LISTENING
  TCP    [::]:445               [::]:0                 LISTENING
```

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VIVA-VOCE Questions (In-Lab):

1. What is the primary purpose of the ipconfig command?

`ipconfig` : Displays and manages a computer's IP configuration, including IP addresses, subnet mask, and DNS info.

2. How does tracert determine the route a packet takes to reach a destination host?

`tracert` : Tracks the route packets take by sending requests with incrementally increasing TTL values.

3. What is netsh, and how is it used for configuring network settings?

`netsh` : Configures and monitors network settings via the command line, such as IPs and firewalls.

4. Describe the primary function of the nslookup command.

`nslookup` : Queries DNS to resolve domain names to IP addresses and troubleshoot DNS issues.

5. What is the role of the netstat command in a network environment?

`netstat` : Shows active connections, open ports, and network statistics for troubleshooting.

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Post Lab Task:

1. Describe a situation where you might use the tracert command in a real-world networking problem.

The `tracert` command can be used to diagnose connectivity issues between a client and a remote server. For example, if users cannot access a company's website, `tracert` can identify where the connection fails by showing the hops (routers) and detecting delays or unreachable nodes along the path.

2. Provide an example of a specific network configuration task that you performed using the netsh command during the lab. What were the steps involved in accomplishing this task?

Task: Configuring a static IP address for a network adapter.

Steps:

1. Opened Command Prompt with administrative privileges.
2. Ran the command:
   netsh interface ipv4 set address name="Ethernet" static 192.168.1.100 255.255.255.0 192.168.1.1
3. Verified the configuration by running:
   ipconfig
4. Successfully set the static IP, subnet mask, and gateway for the "Ethernet"

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3. Describe the types of information you obtained from the netstat command during the lab.

The `netstat` command provided:

- Active TCP and UDP connections, including their local and remote IP addresses and port numbers.
- The state of each connection (e.g., Established, Listening, or Time-Wait).
- Process IDs (using `netstat -ano`) to link connections to specific applications.
- Network interface statistics such as packet counts.

Evaluator Remark (if Any):	**Marks Secured_____out of 50**
	Signature of the Evaluator with Date