**Lab 2: Introduction to Basic Networking Tools and Commands**

Objective: To familiarize students with essential networking tools and commands used for troubleshooting, diagnosing, and managing network configurations.

**Basic Networking Tools**

## 1. `ipconfig` / `ifconfig`

## Purpose: View IP address and network info

- `ipconfig` – for **Windows**
- `ifconfig` – for **Linux / macOS**

## Example:

```
ipconfig
```

## What it shows:

- Your **IP address**
- Subnet mask
- Default gateway (router address)

Use it to find your computer's network info.

## 2. `ping`

## Purpose: Test if another device is reachable

## Example:

```
ping google.com
```

## What it does:

- Sends tiny packets to another computer
- If it replies, it's reachable
- Shows time taken and packet loss

Good for checking if the internet or a server is working.

## 3. `tracert` / `traceroute`

### Purpose: See the path data takes through the network

- `tracert` – **Windows**
- `traceroute` – **Linux/macOS**

### Example:

```
tracert google.com
```

### What it shows:

- Every "hop" (router) your data goes through
- Useful to check **where connection slows or fails**

## 4. `netstat`

### Purpose: View network connections and ports

### Example:

```
netstat -an
```

### What it shows:

- Active network connections
- Ports being used
- Listening ports (useful for server-side checks)

Helps in finding **open or used ports**.

## 5. `nslookup`

### Purpose: Check DNS (Domain Name System)

### Example:

```
nslookup google.com
```

### What it shows:

- Converts a **domain name** into an **IP address**

Helps if you think **DNS is not working**.

## 6. `arp`

### Purpose: Shows IP to MAC address mappings

### Example:

```
arp -a
```

### What it shows:

- IP addresses and their linked **MAC addresses**
- Devices in your **local network**

Great for viewing nearby connected devices.

## 7. `hostname`

### Purpose: Shows the computer's name on the network

### Example:

```
hostname
```

Useful in identifying your system on a network.

## 8. `telnet`

### Purpose: Check if a specific port is open on a host

### Example:

```
telnet google.com 80
```

Used to check **remote server ports**, though often disabled by default now.

[Attach all necessary screenshots of each command to provide the evidence of your lab]. Ensure that your CMD prompt interface has your name.