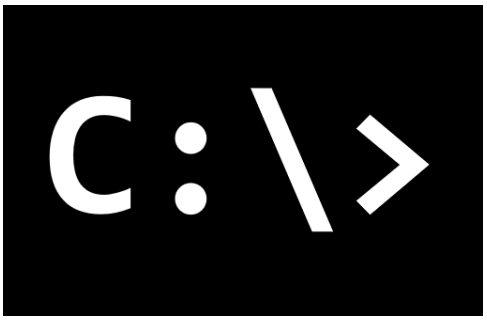
Project - 4

Command Line Mastery: A Comprehensive Internship Program on Windows Command Prompt



Submitted By:

Nishigandha Patil

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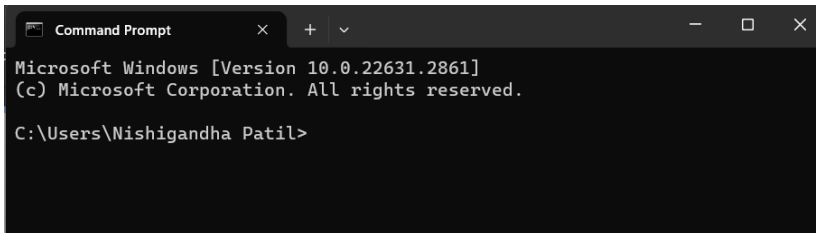
Introduction to Command Prompt

The Command Prompt in Windows is a powerful tool that allows you to interact with your computer using text-based commands.

Accessing the Command Prompt:

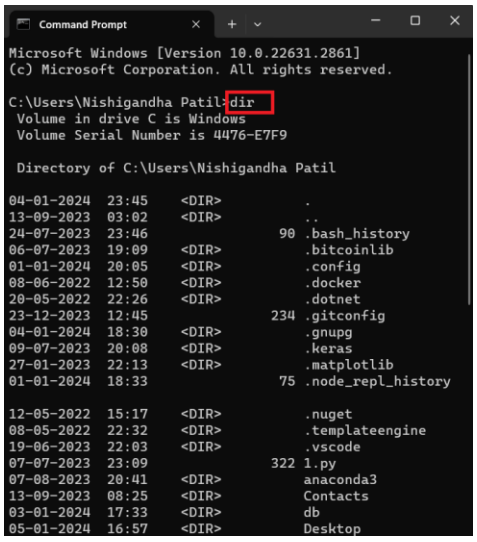
1. **Start Menu:** Search for "Command Prompt" or "cmd" and open it.
2. **Run Dialog Box:** Press Win + R, type "cmd," and hit Enter.
3. **File Explorer:** Navigate to a folder, hold Shift, right-click, and select "Open command window here" or "Open PowerShell window here" based on your Windows version.

➢ Command Prompt Window:



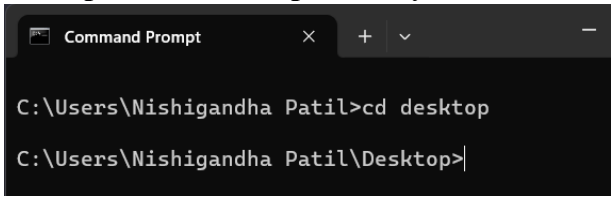
Basic Navigation Commands:

1. **dir:** Lists files and folders in the current directory.

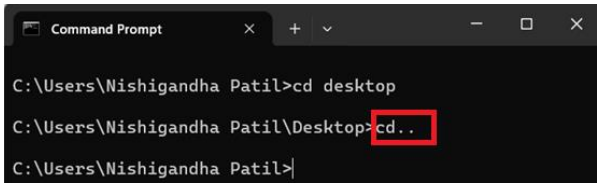


   - **dir /p:** Pauses after each screenful of information.
   - **dir /s:** Shows files in the current directory and all subdirectories.
   - **dir /w:** Displays the directory contents in wide format.

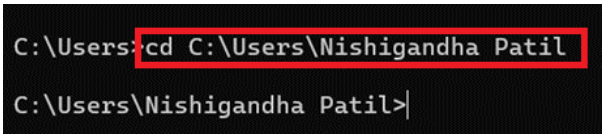
2. **cd (Change Directory):** Moves between directories.
   Example: >cd desktop Moves you to the Desktop directory



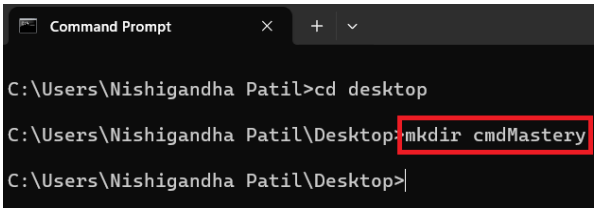
cd..: Moves up one level in the directory tree.



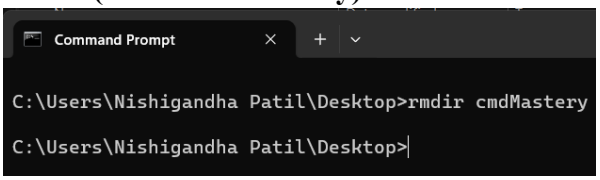
cd C:\Users\YourUsername: Navigates to a specific directory path.



3. **mkdir/md (Make Directory):** Creates a new directory. Syntax: mkdir folder_name.



4. **rmdir (Remove Directory):** Removes directories (folders)



'rmdir /s /q' (Force Delete): Deletes a directory and its contents without confirmation.

➢ Path Navigation:

Use backslashes '\' to separate folders in a path (C:\Users\YourUsername\Documents).
Typing just **'cd'** will take you back to your user directory.

➢ Understanding Paths:

'.' represents the current directory.
'..' represents the parent directory.

➢ Shortcuts and Tips:

1. **Tab Completion:** Press Tab to auto-complete commands, file names, or directories.
2. **Arrow Keys:** Navigate through previously entered commands using the up and down arrow keys.
3. Ctrl + C and Ctrl + V Doesn't work for copying and pasting within the Command Prompt. Use right-click instead.
4. Type **'cls'** to clear the Command Prompt screen.
5. **'Help'** or **'/?'**: Displays information about commands and their usage. Example, 'dir /?' will show options for the dir command.

File and Directory Management

Managing files and directories via the command line involves a set of commands that allow you to create, modify, move, copy, and delete files and folders.

➢ Working with Files:

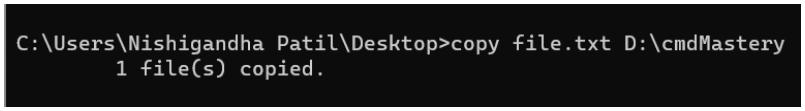
1. **echo:** Creates a new text file or overwrites existing content. (E.g.Creating a file: **file.txt)**

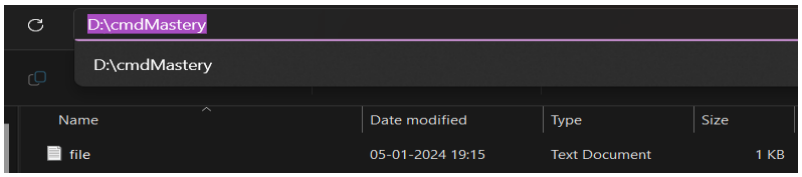
   Use echo with **'>'** to create new file or overwrite.

   use echo with **'>>'** to append text to an existing file.

2. **copy:** Copies files from one location to another.

   Syntax: copy sourceFile destination



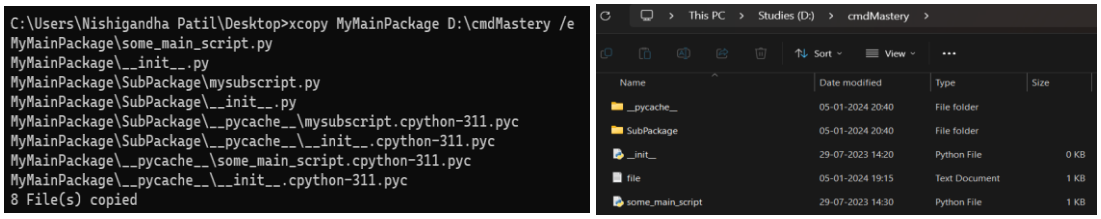


   Rename file using copy: You can also use copy to rename a file by specifying the same file as both the source and destination but with different names.(it will generate 2 files with same content but different names).

   Syntax: copy oldfile.txt newfile.txt

3. **xcopy:** Copies directories and their contents.

   Syntax: xcopy source destination /e



4. **move** (Move or Rename Files): Moves files from one location to another or renames files.

   Syntax: move sourceFile destination

```
C:\Users\Nishigandha Patil\Desktop>move nishu.txt D:\cmdMastery
        1 file(s) moved.
```

pycache	06-01-2024 11:44	File folder	
SubPackage	06-01-2024 11:44	File folder	
init	29-07-2023 14:20	Python File	0 KB
file	05-01-2024 19:15	Text Document	1 KB
nishu	05-01-2024 19:15	Text Document	1 KB
some_main_script	29-07-2023 14:30	Python File	1 KB

   Rename file using move:

   Syntax: move oldFileName newFileName (file.txt renamed to hello.txt on desktop)

```
C:\Users\Nishigandha Patil\Desktop>move file.txt hello.txt
        1 file(s) moved.
```

5. **ren:** used to rename files or directories

   Syntax: ren currentFileName newFileName (hello.txt renamed to world.txt on desktop)

```
C:\Users\Nishigandha Patil\Desktop>ren hello.txt world.txt
```

6. **type**: used to display the contents of a text file.

   Syntax: type filename.txt

```
C:\Users\Nishigandha Patil\Desktop>type world.txt
hello world
good morning
```

7. **del** (Delete): Deletes a file.

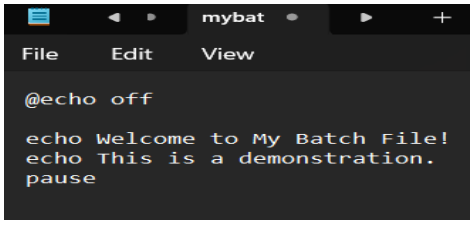
   Syntax: del filename.txt

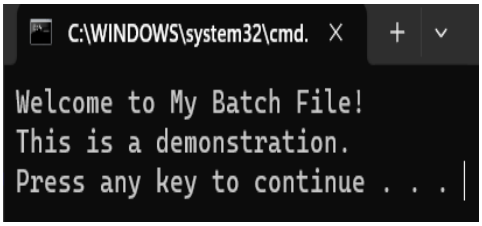
```
C:\Users\Nishigandha Patil\Desktop>del world.txt
```

Advanced File Operations

Batch file: A batch file is a script file containing a sequence of commands that are executed by the command-line interpreter in a computer's operating system. These files typically have the **.bat** extension on Windows

Open Notepad → Write batch script →Save as .bat extension → Save as type "All Files"→ Double clicks it to execute commands written in it.



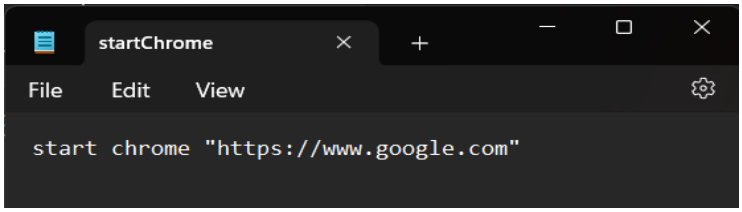


- **@echo off:** This command turns off the display of each command in the batch file as it runs. It's optional but commonly used to make the output cleaner.
- **echo:** Prints text to the console.

➢ Example: Batch Script to Open a URL in Chrome:

Step 1: Create a Batch Script:

1. **Write the batch file:** Open Notepad or any text editor→ write the batch script.

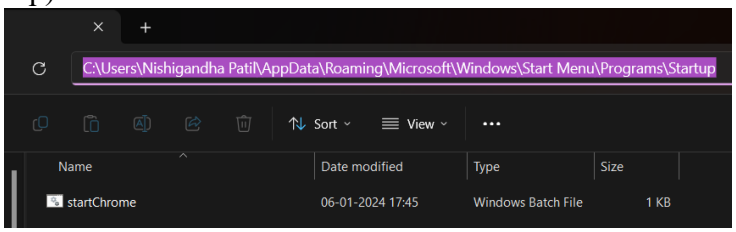


Use **'start'** command to open the chrome browser with the Google website.

2. **Save the File:** Go to File → Save As→Choose location→Choose file name, for example, startChrome.bat→Set the file type to All Files.

Step 2: Add Script to Startup

Place the batch file in the windows startup folder to execute tasks on system startup: (C:\Users\<Username>\AppData\Roaming\Microsoft\Windows\StartMenu\Programs\Startup)

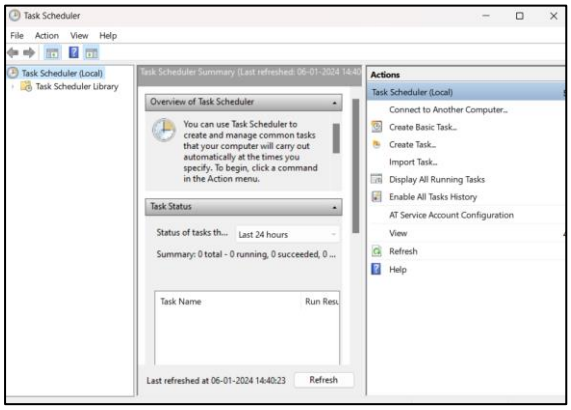


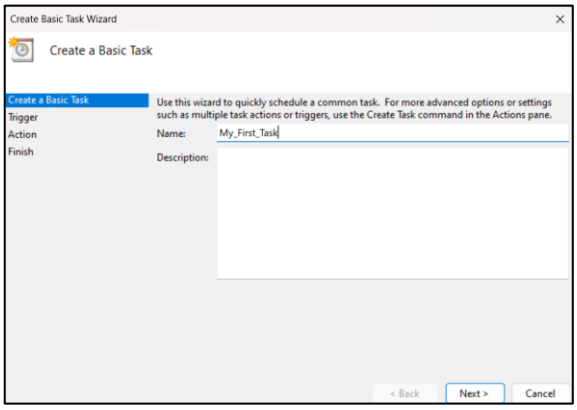
This will make the script run every time your computer starts.

➢ Automating tasks using batch scripts:

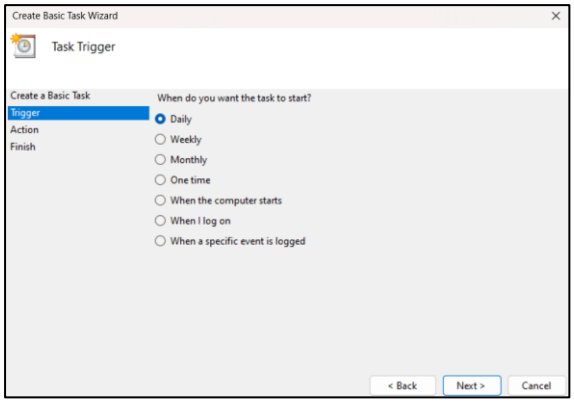
Create a batch file → Save it with .bat extension in Startup folder (C:).

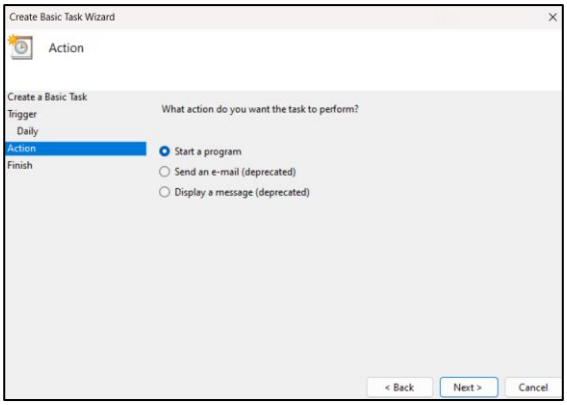
Open Task Scheduler (taskschd.msc) → Click Create Basic Task → Provide a name and description → Next.



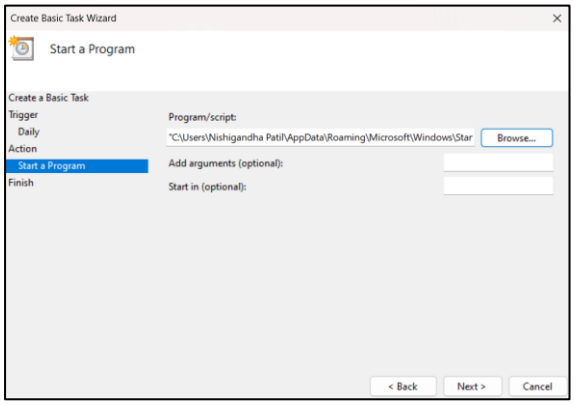


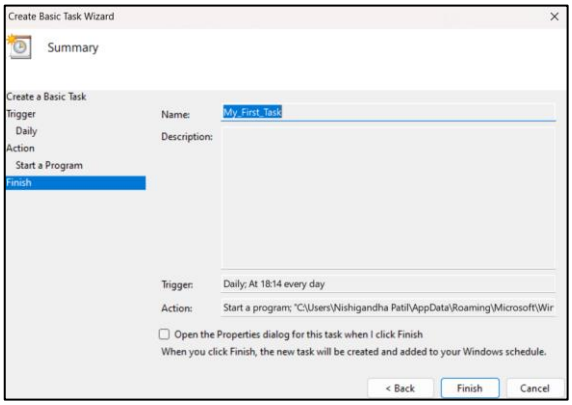
Select triggers (e.g., daily, weekly, etc.) → Choose the action Start a Program → Next.





Specify the batch file path → Set the schedule and additional settings → Finish.



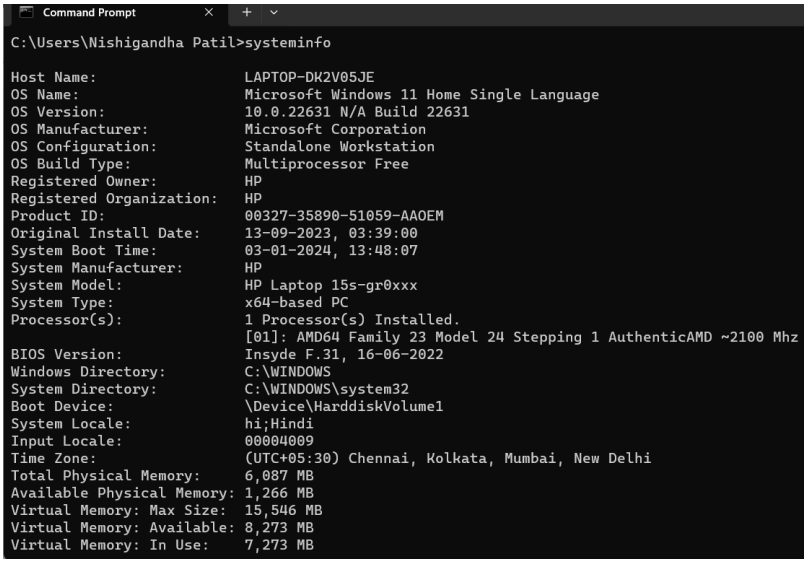


System Diagnostics and Management

System diagnostics and management involve monitoring, analyzing, and optimizing various aspects of a computer system to ensure its health, performance, and security.

➢ System Information Command:

1. **systeminfo**: Displays detailed system information, including OS version, installation date, hardware details, and more.



➢ Disk Management:

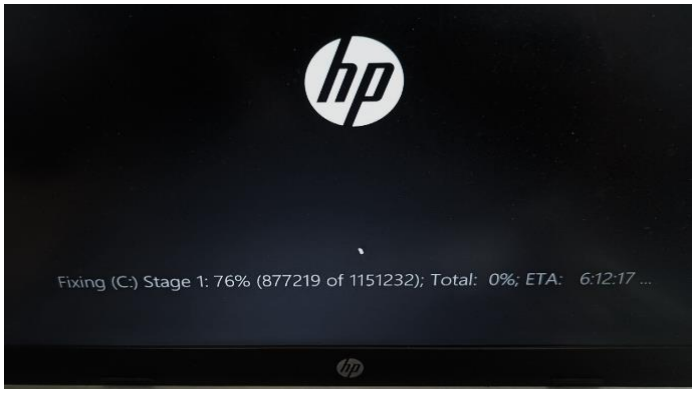
1. **chkdsk**: Checks the file system and fixes errors on a disk.

Cautions to consider before running chkdsk:

- **Back up important data:** before running 'chkdsk' backup your data as it involves making modifications to the disk structure, and in rare cases, data loss can occur.
- **Plan Sufficient Time:** chkdsk can take a considerable amount of time, especially on larger drives or if it's fixing severe errors.
- **Avoid interruptions:** Once chkdsk begins its operation, do not interrupt the process. Interrupting chkdsk can lead to incomplete repairs and potential data loss. Ensure your system won't shut down unexpectedly during the process.
- **Be Cautious with Parameters:** Use chkdsk parameters (/f, /r, etc.) cautiously. For example, /f fixes errors but can lead to data loss in severe cases. /r locates bad sectors and can take a longer time to complete.

/f: Fixes errors found on the disk.
/r: Locates bad sectors on the disk and recovers readable information.

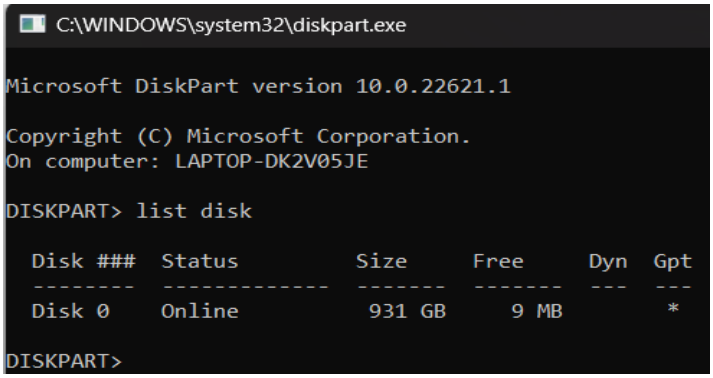
If you are running chkdsk on the system drive (C:) and it's in use, you will see a message asking if you want to schedule the disk check for the next system restart (yes/no).
Type “Y” and press Enter. Then restart your computer to let chkdsk run during the boot process.



Wait for chkdsk to Complete:
chkdsk might take a while depending on the size of the drive and the issues found. Let it complete without interruptions.

2. **diskpart**: Command-line disk partitioning tool for managing disks, volumes, and partitions.

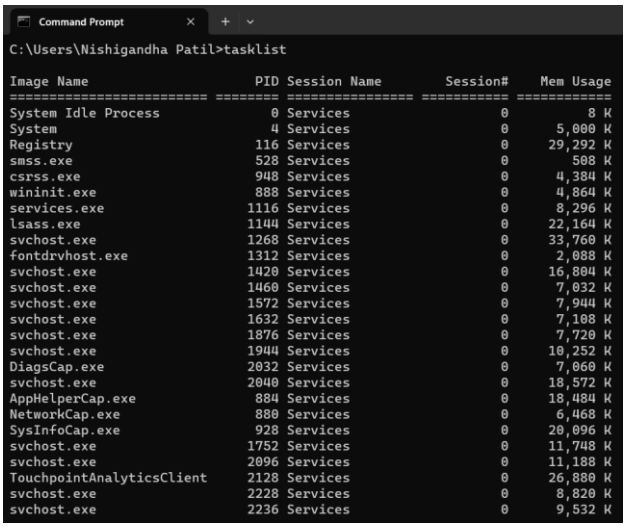
Type ‘diskpart’ command → diskpart command-line tool will open →list disk.



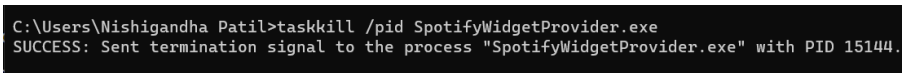
Creating disk partition:
Use “create partition primary size=X” to create a primary partition with a specific size (replace X with the size in MB).
Example: >create partition primary size=10240 (creates a primary partition of 10GB).
Type **exit** to exit the diskpart utility.

➢ System Monitoring:

1. **tasklist**: Lists all running processes.

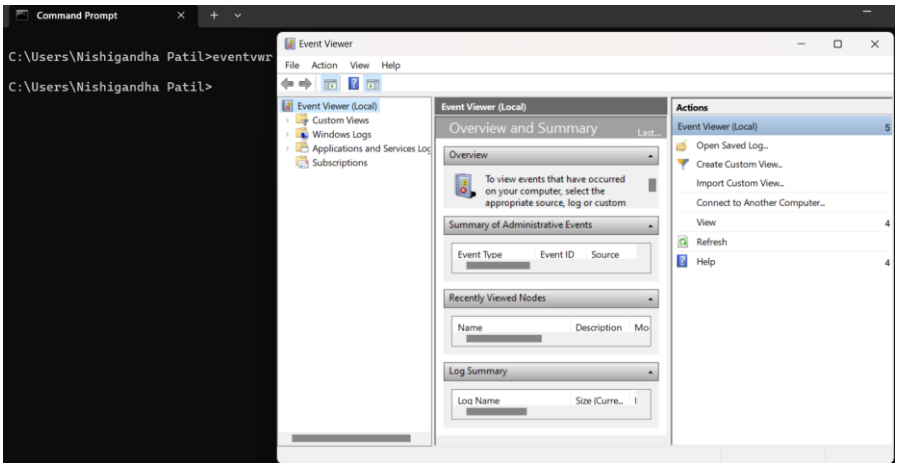


2. **taskkill**: Terminates a running process based on its process ID (PID).
   Syntax: taskkill /pid <PID>

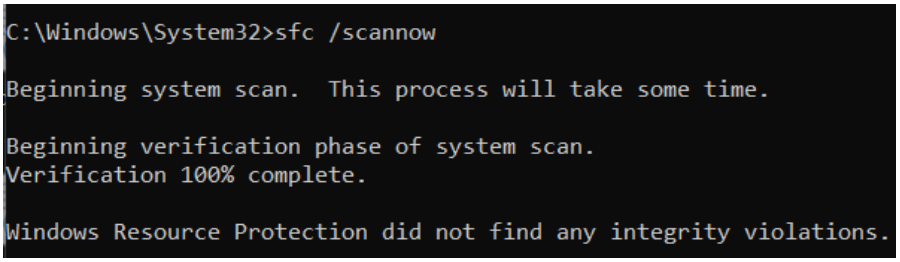


➢ Event Logs and System Health:

1. **eventvwr**: Opens the Event Viewer to view system logs and events.



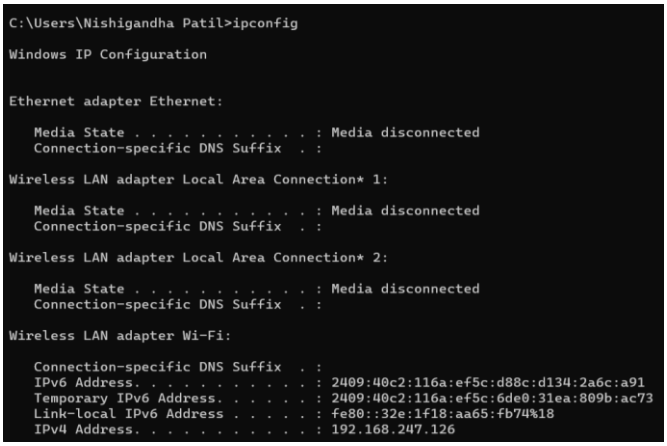
2. **sfc /scannow**: System File Checker checks and repairs system files. (Run as Administrator)



Networking and Internet Utilities

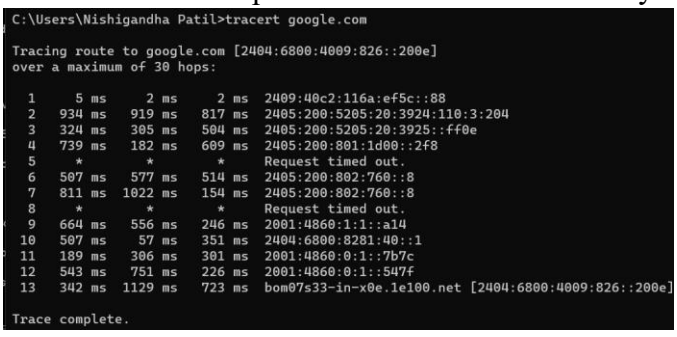
➢ Network Configuration and Information:

1. **ipconfig:** Displays network configuration information, including IP address, subnet mask, and default gateway.

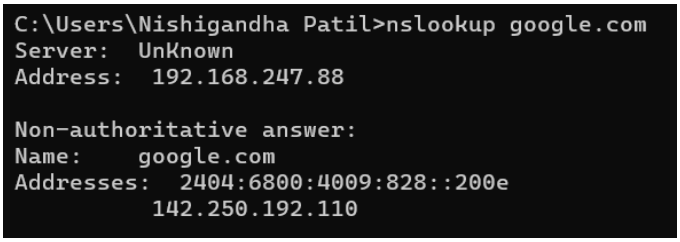


2. **ping:** Tests network connectivity by sending ICMP echo request packets to a destination.

3. **tracert**: Traces the path and measures transit delays of packets across a network.



4. **nslookup:** Performs DNS (Domain Name System) lookup to resolve domain names into IP addresses.



➢ Connectivity and Internet Information:

1. **netstat:** Displays active network connections, ports, and routing tables.

```
C:\Users\Nishigandha Patil>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:445            LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:3306           LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:5040           LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:33060          LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:49664          LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:49665          LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:49666          LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:49667          LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:49668          LAPTOP-DK2V05JE:0      LISTENING
  TCP    0.0.0.0:49677          LAPTOP-DK2V05JE:0      LISTENING
  TCP    127.0.0.1:27017        LAPTOP-DK2V05JE:0      LISTENING
  TCP    127.0.0.1:49678        LAPTOP-DK2V05JE:49679  ESTABLISHED
  TCP    127.0.0.1:49679        LAPTOP-DK2V05JE:49678  ESTABLISHED
  TCP    127.0.0.1:49680        LAPTOP-DK2V05JE:49681  ESTABLISHED
  TCP    127.0.0.1:49681        LAPTOP-DK2V05JE:49680  ESTABLISHED
  TCP    192.168.247.126:139    LAPTOP-DK2V05JE:0      LISTENING
  TCP    192.168.247.126:53908  20.44.248.159:https    ESTABLISHED
  TCP    [::]:135               LAPTOP-DK2V05JE:0      LISTENING
  TCP    [::]:445               LAPTOP-DK2V05JE:0      LISTENING
  TCP    [::]:3306              LAPTOP-DK2V05JE:0      LISTENING
  TCP    [::]:33060             LAPTOP-DK2V05JE:0      LISTENING
  TCP    [::]:49664             LAPTOP-DK2V05JE:0      LISTENING
  TCP    [::]:49665             LAPTOP-DK2V05JE:0      LISTENING
```

2. **arp:** Displays and modifies the ARP (Address Resolution Protocol) cache.
   arp -a: Displays the ARP table (ARP cache) with IP and MAC addresses.

```
C:\Users\Nishigandha Patil>arp -a

Interface: 192.168.247.126 --- 0x12
  Internet Address      Physical Address      Type
  192.168.247.88        22-72-ad-df-ac-54     dynamic
  192.168.247.255       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
```

   arp -d <IP_address>: Deletes an entry specified by the IP address.
   Example:

```
C:\Users\Nishigandha Patil>arp -d 192.168.1.100
```

   arp -s <IP_address> <MAC_address>: Adds a static ARP entry where IP is the IP address and MAC is the physical address.
   Example:

```
C:\Users\Nishigandha Patil>arp -s 192.168.1.100 00-11-22-33-44-55
```

   arp -? Displays help information about the arp command.

3. **telnet:** Establishes a connection to a remote computer or device over a network.
   Syntax: telnet [hostname or IP] [port]
   Note: Telnet is less secure due to its lack of encryption. SSH is often preferred for secure remote connections.
   Some modern systems may not have Telnet enabled or installed by default due to security concerns.

To enable telnet on windows:
Go to control panel →uninstall program → "Turn Windows features on or off"→ Find "Telnet Client" and tick it → Ok.

```
C:\Users\Nishigandha Patil>telnet 192.168.1.100 80
Connecting To 192.168.1.100...
```

4. **pathping:** Provides information about network latency and packet loss at intermediate hops between a source and destination.

```
PS C:\Users\Nishigandha Patil> pathping google.com

Tracing route to google.com [2404:6800:4009:81f::200e]
over a maximum of 30 hops:
  0  LAPTOP-DW2V05JE [2409:40c2:116a:ef5c:6de0:31ea:809b:ac73]
  1  2409:40c2:116a:ef5c::88
  2  2405:200:5205:20:3924:110:3:204
  3  2405:200:5205:20:3925::ff0a
  4  2405:200:801:1d00::2f8
  5     *        *        *
Computing statistics for 100 seconds...
            Source to Here   This Node/Link
Hop  RTT    Lost/Sent = Pct  Lost/Sent = Pct  Address
  0                                           LAPTOP-DW2V05JE [2409:40c2:116a:ef5c:6de0:31ea:809b:ac73]
                                     0/ 100 =  0%   |
  1    5ms     0/ 100 =  0%        0/ 100 =  0%  2409:40c2:116a:ef5c::88
                                     0/ 100 =  0%   |
  2  157ms     0/ 100 =  0%        0/ 100 =  0%  2405:200:5205:20:3924:110:3:204
                                   100/ 100 =100%   |
  3  ---     100/ 100 =100%        0/ 100 =  0%  2405:200:5205:20:3925::ff0a
                                     0/ 100 =  0%   |
  4  ---     100/ 100 =100%        0/ 100 =  0%  2405:200:801:1d00::2f8

Trace complete.
```

➢ Wireless Network Information (Wi-Fi):

1. **netsh wlan show profiles**: Lists all wireless network profiles stored on the system.

```
C:\Users\Nishigandha Patil>netsh wlan show profiles

Profiles on interface Wi-Fi:

Group policy profiles (read only)
---------------------------------
    <None>

User profiles
-------------
    All User Profile     : BIBS 2.0
    All User Profile     : ⚡
    All User Profile     : seminarroom
    All User Profile     : OnePlus Nord CE 2
    All User Profile     : Lab2
    All User Profile     : One Plus Nord2 5G
    All User Profile     : TP-Link_C8FC_EXT
    All User Profile     : TP-Link_C8FC
    All User Profile     : VIRUS 2.0
    All User Profile     : No Internet
    All User Profile     : Tenda_0AE478
    All User Profile     : Moto G Play 3038
    All User Profile     : OnePlus Nord2 5G
    All User Profile     : Galaxy M312A26
```

2. **netsh wlan show networks:** Displays available wireless networks.

```
C:\Users\Nishigandha Patil>netsh wlan show networks

Interface name : Wi-Fi
There are 1 networks currently visible.

SSID 1 : One Plus Nord2 5G
    Network type            : Infrastructure
    Authentication          : WPA2-Personal
    Encryption              : CCMP
```

Conclusion

Command Prompt (CMD) is a powerful command-line interface in Windows that allows users to interact with the operating system using text-based commands.

Key Points:

1. Functionality: CMD provides access to various system tools, utilities, and commands for system management, network configuration, file operations, and more.

2. Text-Based Interface: It operates through text commands, allowing users to perform tasks by typing commands rather than using a graphical interface.

3. Administrative Control: CMD can be run as an administrator, providing elevated privileges for performing system-level tasks and configurations.

4. File System Operations: It allows file and directory management using commands like 'dir', 'mkdir', 'rmdir', 'copy', 'move', etc.

5. Batch Scripting: Users can create batch scripts (`.bat` files) to automate sequences of commands for repetitive tasks or system configurations.

6. System Diagnostics: CMD provides tools like 'chkdsk', 'diskpart', 'systeminfo', and 'taskkill' for system diagnostics, disk management, and process control.

7. Networking Utilities: CMD includes tools like 'ipconfig', 'ping', 'netstat', 'nslookup', and 'telnet' for network diagnostics and management.

Considerations:

Caution: Some commands can affect system settings and data. Use commands carefully and avoid operations if you're unsure about their consequences.

Learning Curve: Learning CMD commands can take time. Regular use and practice can improve familiarity and proficiency.

Advanced Usage: Advanced users can leverage CMD's scripting capabilities for automation and system customization.

CMD remains a valuable tool for system administration, troubleshooting, and performing various tasks efficiently in Windows environments. While it's powerful, using it requires care and understanding of commands to avoid unintended consequences. As computing environments evolve, graphical user interfaces are more common, but the command line remains essential for certain tasks and specific configurations.