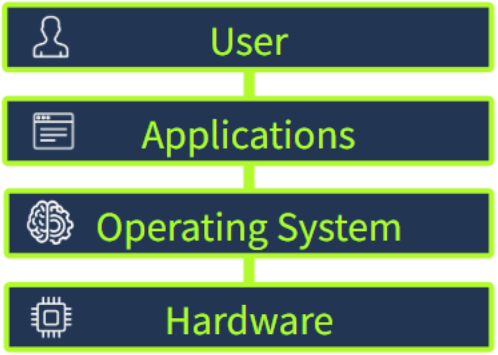
Operating System

1. What is an Operating System (OS)?



- Core software that manages hardware + software
- Acts between user/apps ↔ hardware
- Examples: Windows, Linux, macOS
- Without OS → apps would fight for CPU, RAM, storage

Layer structure:

User → Applications → Operating System → Hardware

2. Why OS is Needed

OS acts as a central manager:

- Controls CPU, RAM, storage, devices
- Prevents app conflicts
- Handles security & permissions
- Makes system stable and usable

3. System Privilege Layers

Kernel Space (High privilege)

- Core of OS
- Direct access to hardware (CPU, RAM, disk)
- Fully trusted
- Manages system resources

User Space (Low privilege)

- Where apps run
- Cannot directly access hardware
- Must request kernel using system calls

4. OS Main Duties

Process Management

- Creates and manages programs (processes)
- Decides CPU time allocation
- Multitasking without freezing system

Memory Management

- Allocates RAM to apps
- Protects memory between apps
- Uses virtual memory when RAM low

File System Management

- Organizes files & folders
- Handles permissions
- Maintains metadata (name, size, time)

User Management

- Multiple user accounts
- Authentication (password, biometrics)
- Access control

Device Management

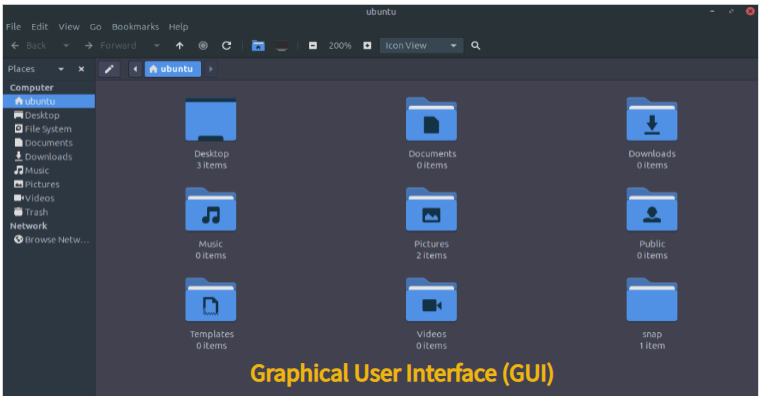
- Controls hardware via drivers
- Provides common interface for apps
- Example: printer, mouse, USB

OS Interfaces

Graphical User Interface (GUI)

A visual interface where you interact using:

- Icons
- Windows
- Buttons
- Menus
- Mouse clicks



Characteristics:

- User-friendly
- Easy for beginners
- Slower for repetitive tasks
- Good for browsing and general usage

Command Line Interface (CLI)

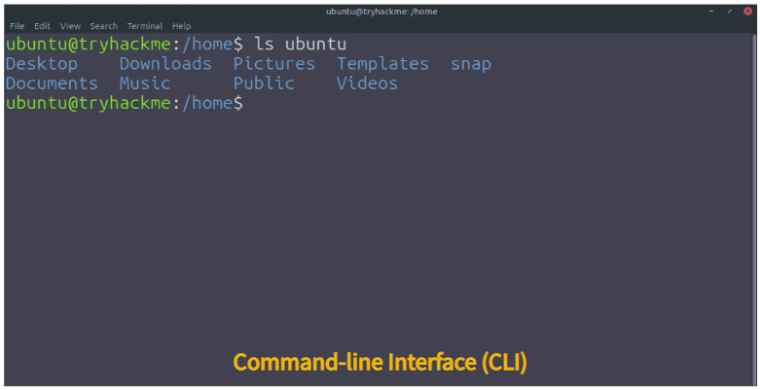
Text-based interface where you type commands.

Example:

```
ls /home/ubuntu
```

Characteristics:

- Precise
- Fast
- Scriptable
- Powerful
- Requires command knowledge



Windows Basics

Evolution of Microsoft Windows Operating System

1. Early Computer Operating Systems

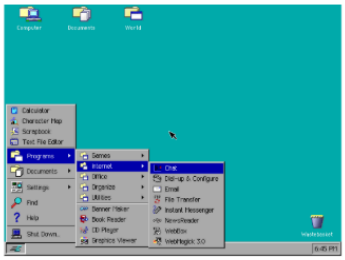
- Early computers used MS-DOS (Microsoft Disk Operating System).
- Interface characteristics:
  - Black screen environment
  - Command-Line Interface (CLI)
- Users had to type commands manually.
- No graphical elements like icons or windows.

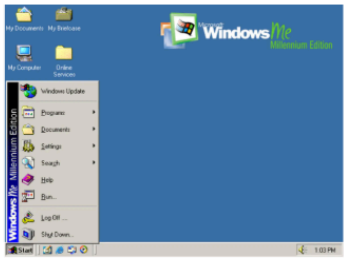
2. Introduction of Windows 1.0 (1985)

- Microsoft released Windows 1.0 in 1985.
- It was not a full operating system initially.
- Worked as a Graphical User Interface (GUI) layer on top of MS-DOS.

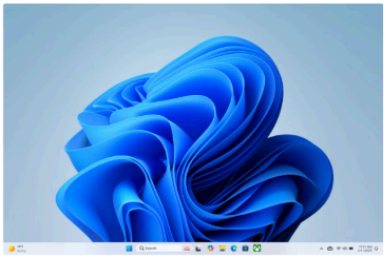
New features introduced:

- Windows (multiple application screens)
- Menus
- Mouse support
- Easier user interaction compared to typing commands


Windows 1.0 (1985)



Windows ME (2000)


Windows 11 (2021)

Interacting with linux terminal

1. "Where Am I?"

```
ubuntu@tryhackme:~$ pwd
/home/ubuntu
```

Command: pwd

Function: prints working directory.

2. "What's Around Me?"

```
ubuntu@tryhackme:~$ ls
Desktop    Downloads  Pictures  Templates  logs
Documents  Music      Public    Videos     projects
```

Command: ls

Function: lists contents of the current directory

Flags:

ls -l (it will list more content in more details)
ls -al (it will list contents including the hidden ones)

3. Let's Move Around

```
ubuntu@tryhackme:~$ cd Documents/
ubuntu@tryhackme:~/Documents$ pwd
/home/ubuntu/Documents
```

Command: cd directory_name
Function: move from one directory to another

Command: cd ..
Function: move backward

4. Let's find something

find Command

```
ubuntu@tryhackme:~$ find ~ -name mission_brief.txt
/<REDACTED-PATH>/mission_brief.txt
```

Command: find <path> <option> filename
Function: find the given file in the path provided

5. Read a file

```
ubuntu@tryhackme:~/<REDACTED-PATH>$ cat mission_brief.txt
Great job finding your way around the terminal.

Your next assignment is to collect a small system report:
- Who you're logged in as
- The kernel version
- Total disk space
- The name of this Linux distribution

Once you gather those details, you'll be ready for the next step.

FLAG:<REDACTED>
```

Command: cat filename.txt
Function: print the contents of file in terminal

6. "Who Are You Logged in As?"

```
ubuntu@tryhackme:~$ whoami
ubuntu
```

Command: whoami
Function: prints the current username in terminal

7. "What System Are You On?"

```
ubuntu@tryhackme:~$ uname -a
Linux tryhackme 6.14.0-1018-aws #18~24.04.1-Ubuntu SMP Mon
Nov 24 19:46:27 UTC 2025 x86_64 x86_64 x86_64 GNU/Linux
```

Command: uname -a
Function: print the system information

Breakdown of the Information

1. Linux: The system is running the Linux kernel.
2. tryhackme: The hostname (the computer's name).
3. <REDACTED>-aws: The kernel version installed on the machine.
4. x86_64: The hardware platform (also 64-bit).
5. GNU/Linux: The operating system type (Linux kernel + GNU tools).

8. Check Disk and Storage Info

```
ubuntu@tryhackme:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        68G   11G   58G  16% /
tmpfs           969M     0  969M   0% /dev/shm
tmpfs           388M  1.2M  387M   1% /run
tmpfs           5.0M     0  5.0M   0% /run/lock
tmpfs           194M  184K  194M   1% /run/user/1000
tmpfs           194M  172K  194M   1% /run/user/114
ubuntu@tryhackme:~$
```

Command: df -h (-h for human readable format)
Function: prints disk usage and space available

Breakdown of the Information

1. /dev/root is the main disk of the system with 68G total, 11G used, <REDACTED>G free, and is 16% full.
2. tmpfs entries are temporary filesystems stored in RAM, not on the physical disk.
3. /dev/shm is a shared memory area with 0.9G available and 0 used.
4. /run/user/114 is similar temporary storage for another system user, also 194M total and mostly empty.

9. Read a System File

head into /etc by running cd /etc and then list what's inside using ls command. You'll most likely see a file named "os-release". Read is using cat command.

```
ubuntu@tryhackme:/etc$ cat os-release
PRETTY_NAME="Ubuntu 24.04.1 LTS"
NAME="Ubuntu"
VERSION_ID="24.04"
VERSION="24.04.1 LTS (Noble Numbat)"
VERSION_CODENAME=noble
ID=ubuntu
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-
policies/privacy-policy"
UBUNTU_CODENAME=noble
LOGO=ubuntu-logo
ubuntu@tryhackme:/etc$
```

Windows terminal basics

1. Where Am I?

```
C:\Users\Administrator>cd
C:\Users\Administrator

C:\Users\Administrator>
```

Command: cd
Function: print the working directory

2. What's Around Me?

```
C:\Users\Administrator>dir
 Volume in drive C has no label.
 Volume Serial Number is A8A4-C362

 Directory of C:\Users\Administrator

01/04/2026  10:14 PM    <DIR>          .
01/04/2026  10:14 PM    <DIR>          ..
03/04/2024  10:17 AM    <DIR>          .ms-ad
01/04/2026  10:14 PM    <DIR>          .research
10/14/2022  10:06 AM    <DIR>          3D Objects
10/14/2022  10:06 AM    <DIR>          Contacts
01/04/2026  10:23 PM    <DIR>          Desktop
01/04/2026  10:14 PM    <DIR>          Documents
01/04/2026  10:14 PM    <DIR>          Downloads
10/14/2022  10:06 AM    <DIR>          Favorites
10/14/2022  10:06 AM    <DIR>          Links
10/14/2022  10:06 AM    <DIR>          Music
10/14/2022  10:06 AM    <DIR>          Pictures
10/14/2022  10:06 AM    <DIR>          Saved Games
02/26/2024  01:49 AM    <DIR>          Searches
10/14/2022  10:06 AM    <DIR>          Videos
               0 File(s)              0 bytes
              16 Dir(s)   3,163,987,968 bytes free
```

Command: dir
Function: list all the contents in the current directory

Flags:

dir /a (it will list all the hidden file)

3. Moving Around the Filesystem

Command: cd foldername
Command: cd .. (for going backward)
Function: navigating the filesystem

4. Finding a File on the Disk

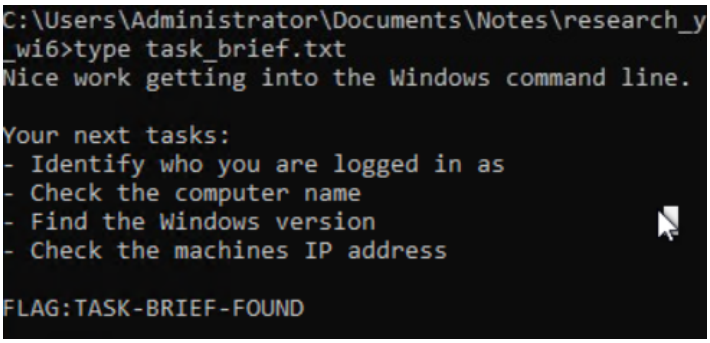
Command: dir /s filename
Function: find the files location

/s flag tells Windows to search all subfolders starting from your current directory

```
C:\Users\Administrator>dir /s task_brief.txt
 Volume in drive C has no label.
 Volume Serial Number is A8A4-C362

 Directory of C:\Users\Administrator\Documents\Notes\research_yn6\exports_imv\scr
eenshots\notes_wi6

01/04/2026  10:14 PM               220 task_brief.txt
               1 File(s)            220 bytes

     Total Files Listed:
               1 File(s)            220 bytes
               0 Dir(s)   3,257,225,216 bytes free

C:\Users\Administrator>
```

5. Read the File

Command: type filename.txt
Function: print the contents of a file



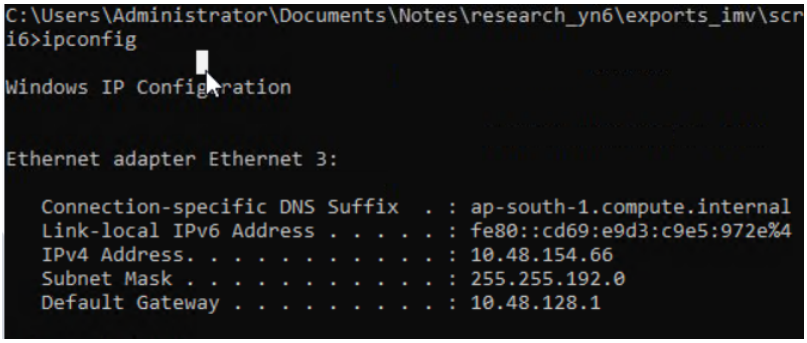
6. Who Am I Logged In As?

Check username: whoami
Check hostname: hostname

7. Checking OS information

Command: systeminfo
Function: print system information

8. Network information



Command: ipconfig
Function: shows machine’s network configuration