PART 1 — Operating System Basics

1. What is an Operating System (OS)?

An **Operating System** is the **boss program** of the computer.

It:

- Talks to hardware (CPU, RAM, Disk)
- Controls programs
- Manages files
- Manages users
- Keeps system secure

Example:

Without OS → Computer is **dead**
With OS → Computer becomes **usable**

Examples of OS:

- Windows
- Linux
- macOS
- Android

2. What is Linux?

Linux is:

- An **open-source operating system**
- Free
- Secure
- Used in:
    - Servers
    - Cloud
    - Supercomputers
    - Android
    - Cybersecurity
    - AI systems

Fun fact for students:
Google, Facebook, Netflix, WhatsApp → all run on Linux servers.

3. What is Ubuntu?

Ubuntu is:

- A **Linux distribution (distro)**
- Beginner-friendly
- Widely used in **education**
- Terminal-based → perfect for **OS subject**

Why Ubuntu for OS?

- Real OS concepts
- Real permissions
- Real process handling
- Same commands used in **industry servers**

PART 2 — Ubuntu Basics (Before Commands)

Ubuntu has 2 ways to work:

1. **GUI** (mouse, windows)
2. **CLI / Terminal** (commands) ← **OS syllabus focus**

Open Terminal:

```
Ctrl + Alt + T
```

PART 3 — First Commands (Confidence Boosters)

1. Who am I?

```
whoami
```

👉 Shows current logged-in user

2. Where am I?

```
pwd
```

👉 Present Working Directory

3. List files

```
ls
```

More details:

```
ls -l
```

Hidden files:

```
ls -a
```

4. Clear screen

```
clear
```

PART 4 — File & Directory Operations (Very Important)

1. Create directory

```
mkdir os_lab
```

2. Enter directory

```
cd os_lab
```

3. Create file

```
touch demo.txt
```

4. Write inside file

```
nano demo.txt
```

(Type something → `Ctrl+X` → `Y` → Enter)

5. Read file

```
cat demo.txt
```

PART 5 — Permissions (rwx) — CORE OS CONCEPT

What is rwx?

Symbol	Meaning
r	read
w	write
x	execute

Permissions apply to:

1. Owner
2. Group
3. Others

Check permissions

```
ls -l
```

Example:

```
-rw-r--r--
```

Break it:

- `rw-` → Owner
- `r--` → Group
- `r--` → Others

Numeric Permission System (Students LOVE this)

Permission	Value
r	4
w	2
x	1

Example:

```
777 = rwx rwx rwx
```

Change permission to 777

```
chmod 777 demo.txt
```

Check again:

```
ls -l
```

Make file executable

```
chmod +x demo.txt
```

PART 6 — User Management (Very Important for OS)

1. Switch user

```
su username
```

Example:

```
su student2
```

Exit user:

```
exit
```

2. Use superuser (admin power)

```
sudo command
```

Example:

```
sudo apt update
```

Explain: **sudo = temporary admin rights**

3. Create new user (demo)

```
sudo adduser testuser
```

Switch to it:

```
su testuser
```

PART 7 — Process & System Monitoring (OS Core)

Running processes

```
ps
```

Detailed:

```
ps -ef
```

Live system monitor:

```
top
```

(Exit with `q`)

Kill a process

```
kill PID
```

Example:

```
kill 1234
```

PART 8 — Disk & Memory Commands

Disk usage

```
df -h
```

Memory usage

```
free -h
```

PART 9 — Package Management

Update system

```
sudo apt update
```

Install software

```
sudo apt install tree
```

Use it:

```
tree
```

PART 10

Task 1

Create:

- Directory `os_practical`
- File `info.txt`
- Give permission `777`
- Write your name

Task 2

- Create new user
- Switch to that user
- Try accessing another user’s file
- Observe permission error

Task 3

- Run `top`
- Observe CPU usage
- Kill a process (demo only)