

# Lecture 14 — Kali Linux, VMware & Basic Linux Commands

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## 1. Kali Linux in VMware

### ◆ What is Kali Linux?

Kali Linux is a **Linux-based operating system** used mainly for:

- **Cybersecurity and Ethical Hacking**
- **Penetration testing**
- **Digital forensics**

It comes preloaded with tools like:

- Nmap, Wireshark, Burp Suite, Metasploit, Hydra, etc.

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### ◆ How to Download Kali Linux ISO:

1. Go to official site: <https://www.kali.org/downloads/>
2. Download the **Kali Linux ISO image** for VMware (64-bit preferred).
3. Once downloaded, **extract the zip file** if needed.

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### ◆ Create a Virtual Machine for Kali in VMware:

**Step 1:** Open **VMware Workstation**

**Step 2:** Click **Create a New Virtual Machine**

**Step 3:** Select **Typical (recommended)** → Next

**Step 4:** Choose **Installer disc image file (ISO)** → Browse and select Kali ISO file

**Step 5:** Enter OS Name (e.g., *Kali Linux*) and location path where VM will be saved

**Step 6:** Set:

- Processor cores (2 or more)
- RAM (at least 2 GB)

- Disk space (40 GB recommended)

**Step 7:** Click **Finish** → Start the virtual machine

**Step 8:** Install Kali Linux following on-screen setup.

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◆ **Default Login for Kali:**

- **Username:** kali
- **Password:** kali

These are default credentials to log in to the Kali machine for the first time.

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## 2. Basic Linux Commands (File & Directory Management)

Linux is a **command-line-based operating system**, meaning most tasks are done using **commands** typed in the terminal.

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### 1. ls — List of Files

**Purpose:**

Displays all files and directories in the current working directory.

**Syntax:**

ls

**Example:**

ls -l

-l flag shows files in detailed (long) format with permissions, owners, and sizes.

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### 2. cd — Change Directory

**Purpose:**

Used to move from one directory to another.

**Syntax:**

cd <directory\_name>

**Example:**

```
cd Documents
```

Moves into the *Documents* folder.

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 **3. cd .. — Go Back (to Parent Directory)**

**Purpose:**

Used to move one step back to the parent directory.

**Example:**

```
cd ..
```

If you are in /home/kali/Desktop, this command takes you to /home/kali.

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 **4. pwd — Print Working Directory**

**Purpose:**

Displays your **current directory path**.

**Syntax:**

```
pwd
```

**Example Output:**

```
/home/kali/Desktop
```

---

 **5. mkdir — Make Directory**

**Purpose:**

Creates a new folder (directory).

**Syntax:**

```
mkdir <folder_name>
```

**Example:**

```
mkdir batch3
```

Creates a new folder named *batch3*.



## 6. rmdir — Remove Directory

### Purpose:

Deletes an **empty directory**.

### Syntax:

```
rmdir <folder_name>
```

### Example:

```
rmdir batch3
```

If the folder is not empty, use:

```
rm -r batch3
```

---



## 7. touch — Create an Empty File

### Purpose:

Used to create new empty files.

### Syntax:

```
touch <file_name>
```

### Example:

```
touch student.txt
```

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## 8. nano — Edit a File

### Purpose:

Opens the file in **Nano text editor** to edit contents.

### Syntax:

```
nano <file_name>
```

### Example:

```
nano student.txt
```

Type your content, then:

- Press **Ctrl + O** → to save

- Press **Enter** → confirm
  - Press **Ctrl + X** → to exit
- 

## 9. cat — Display File Contents

### Purpose:

Displays contents of a file in the terminal.

### Syntax:

```
cat <file_name>
```

### Example:

```
cat student.txt
```

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## Case Study: Directory Navigation + File Creation

### Scenario:

You are currently in the Desktop directory.

You need to go back to the home directory, then go to *Documents*, create a folder *batch3*, make a file *student.txt*, and write *Kartik* inside that file.

### Step-by-Step Commands:

```
cd ..          # Step 1: Go back from Desktop to home  
cd Documents    # Step 2: Go to Documents folder  
mkdir batch3      # Step 3: Create folder named batch3  
cd batch3        # Step 4: Enter the folder  
touch student.txt  # Step 5: Create an empty file named student.txt  
nano student.txt   # Step 6: Open the file in nano editor  
# Type "Kartik"  
# Press Ctrl+O → Enter → Ctrl+X to save and exit  
cat student.txt    # Step 7: Display file content
```

## **Output:**

Kartik

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### **3. User and Permission Commands**



#### **sudo su — Switch User / Super User**

##### **Purpose:**

Used to switch to the **root (administrator)** account or execute commands with admin privileges.

##### **Syntax:**

`sudo su`

##### **Why it's used:**

Some operations (like installing packages, deleting system files) require **root access**.

Without sudo, the system will deny permission.

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### **cp — Copy Command**

##### **Purpose:**

Used to copy files or directories from one location to another.

##### **Syntax:**

`cp <source> <destination>`

##### **Examples:**

`cp student.txt /home/kali/Desktop`

`cp -r folder1 folder2`

-r means **recursive** (for copying directories).

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### **mv — Move or Rename Files**

##### **Purpose:**

Moves or renames files and folders.

**Syntax:**

```
mv <source> <destination>
```

**Examples:**

```
mv student.txt /home/kali/Documents
```

```
mv oldname.txt newname.txt
```

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**uname — System Information****Purpose:**

Displays system information like OS name, kernel version, etc.

**Syntax:**

```
uname -a
```

**Example Output:**

```
Linux kali 6.5.0-kali3-amd64 #1 SMP Debian 6.5 x86_64 GNU/Linux
```

---

**ifconfig — Network Configuration****Purpose:**

Displays network configuration details such as IP address, MAC address, and interface details.

**Syntax:**

```
ifconfig
```

**Example Output:**

```
eth0: inet 192.168.1.10 netmask 255.255.255.0
```

If command not found, install it using:

```
sudo apt install net-tools
```

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## 4. File Permissions and chmod Command

Every file in Linux has 3 types of access:

1. Owner (Admin/User)
2. Group
3. Public (Others)

Each can have three types of permissions:

### Permission Symbol Value

Read        r        4

Write      w        2

Execute    x        1

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#### ◆ Combining Permissions:

Type	Example Permission	Binary	Numeric
Full (rwx)	Read + Write + Execute	111	7
Read + Write	rwx-----	110	6
Read only	r----	100	4

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#### ◆ chmod — Change File Permissions

##### Purpose:

Modifies file or directory permissions for owner, group, and public.

##### Syntax:

chmod <permissions> <file\_name>

### **Example:**

chmod 766 test.txt

Here:

- 7 → Owner (read + write + execute)
  - 6 → Group (read + write)
  - 6 → Public (read + write)
- 

### **◆ Checking Permissions:**

Use:

ls -l test.txt

### **Example Output:**

-rwxrw-rw- 1 kali kali 0 Oct 20 10:32 test.txt

Breakdown:

#### **Part Meaning**

- File type (normal file)

rwx Owner has read, write, execute

rw- Group has read, write

rw- Public has read, write

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## 5. Summary Table

### Command Function

ls	List all files and directories
cd	Change directory
cd ..	Move one level up
pwd	Show current directory
mkdir	Create a new folder
rmdir	Delete an empty folder
touch	Create an empty file
nano	Edit file
cat	Display file content
sudo su	Switch to root user
cp	Copy file/folder
mv	Move or rename file/folder
uname -a	Show system details
ifconfig	Show network configuration
chmod	Change file permissions
ls -l	Show file permissions and details

## 1. SUMMARY (FULL CHAPTER SUMMARY)

### ◆ Kali Linux

Kali Linux is a security-focused Linux OS used by ethical hackers and penetration testers.

It comes with built-in cybersecurity tools (Nmap, Wireshark, Burp Suite, Metasploit, Hydra, etc.).

It is commonly installed and used on VMware for learning and ethical hacking labs.

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### ◆ VMware + Kali Setup

You download the Kali Linux ISO from [kali.org](http://kali.org) and create a virtual machine in VMware.

Assign proper resources (RAM, CPU, disk) → install OS → log in with default credentials (kali/kali).

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### ◆ Basic Linux Commands

Linux uses terminal commands for navigation and file management.

Important commands include:

- **ls** → list files
- **cd** → change directory
- **pwd** → show current directory
- **mkdir** → create folder
- **touch** → create file
- **nano** → edit file
- **cat** → show file content
- **cp / mv** → copy / move files
- **uname -a** → show system information
- **ifconfig** → network details

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## ◆ User Management & Permissions

Linux has 3 types of users:

- Owner
- Group
- Public

And 3 types of permissions:

- Read (4)
- Write (2)
- Execute (1)

Permissions are changed using:

chmod 766 file.txt

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## ◆ Networking in Linux

ifconfig shows:

- IP address
  - MAC address
  - Network interface info
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## ★ Full Chapter Summary in one line:

"This chapter explains how to run Kali Linux in VMware, navigate Linux using basic commands, manage files/users, and control permissions needed for cybersecurity operations."

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## 2. CONCLUSION (SHORT & PROFESSIONAL)

Kali Linux is essential for ethical hacking and cybersecurity testing, and VMware provides a safe environment for practice. Understanding basic Linux commands, user management, and file permissions is foundational for any Linux-based security role. This chapter prepares you for real-world penetration testing labs and interviews by teaching core Linux operational concepts.

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## 3. DETAILED MINDMAP (TEXT FORMAT FOR EASY VISUALIZATION)

### LECTURE 14 MINDMAP

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#### KALI LINUX

- Penetration Testing OS
- Ethical Hacking Tools:
  - Nmap
  - Wireshark
  - Metasploit
  - Hydra
- Default Login:
  - Username: kali
  - Password: kali



#### VMWARE

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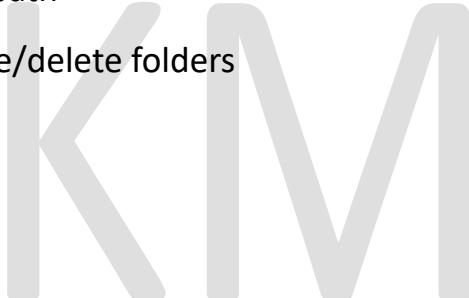
- Create Virtual Machine

- Load Kali Linux ISO
  - Assign CPU, RAM, Storage
  - Install OS → Login
  - Use for labs / safe hacking environment
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## BASIC LINUX COMMANDS

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- ls → list files
- cd / cd .. → navigate directories
- pwd → show current path
- mkdir / rmdir → create/delete folders
- touch → create file
- nano → edit file
- cat → display content
- cp / mv → copy & move files
- uname -a → system info
- ifconfig → network details



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## USER & PERMISSIONS

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- Users: Owner, Group, Public
- Permissions:
  - read (4)
  - write (2)

- execute (1)
  - chmod → change permissions
  - ls -l → view permissions
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## PRACTICAL WORKFLOW

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1. Navigate directories
  2. Create folders & files
  3. Modify content using nano
  4. View file using cat
  5. Change permissions using chmod
  6. View network using ifconfig
- 



## 4. INTERVIEW QUESTIONS WITH PERFECT ANSWERS

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### SECTION A — KALI LINUX INTERVIEW QUESTIONS

#### 1. What is Kali Linux?

Kali Linux is a Debian-based Linux operating system designed for cybersecurity, ethical hacking, and penetration testing. It includes tools like Nmap, Wireshark, Burp Suite, and Metasploit.

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#### 2. Why is Kali Linux used in cybersecurity?

Because it comes preinstalled with hundreds of security tools used for penetration testing, digital forensics, and vulnerability assessment.

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### **3. Why do we install Kali Linux on VMware?**

To safely perform hacking labs without affecting the real host system. VMware provides a safe, isolated, virtual environment.

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### **4. What are the default credentials of Kali?**

- Username: kali
  - Password: kali
- 



## **SECTION B — VMWARE INTERVIEW QUESTIONS**

### **5. What is VMware Workstation?**

It is virtualization software that allows you to run multiple operating systems (VMs) on a single physical machine.

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### **6. What resources do you assign while creating VM?**

- CPU cores
  - RAM
  - Disk space
  - Network mode
  - ISO file
- 

### **7. What is the difference between NAT and Bridged in VMware?**

Mode	Meaning	Use
NAT	VM shares host IP	Good for internet access safely
Bridged	VM gets real network IP	Good for penetration testing

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## 🔥 SECTION C — BASIC LINUX COMMANDS INTERVIEW QUESTIONS

### 8. What is the command to list files in Linux?

ls

For detailed view → ls -l

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### 9. How do you navigate directories?

- Move into folder → cd foldername
  - Go back → cd ..
  - Go to home → cd ~
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### 10. What does pwd do?

It displays the current working directory path.

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### 11. How do you create a folder in Linux?

mkdir foldername

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### 12. What is the difference between rm and rmdir?

- rmdir deletes empty folder
  - rm -r deletes folder with files
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### 13. How do you create a new file?

touch file.txt

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### 14. How do you open & edit a file in Linux?

Using Nano editor:

nano file.txt

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## **15. How do you display file contents?**

cat file.txt

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## **16. What is cp command?**

Used to copy files.

cp source destination

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## **17. How do you rename a file?**

Using mv:

mv old.txt new.txt

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## **18. What is uname -a used for?**

To show system information like kernel version, architecture, OS name.

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## **19. What is ifconfig used for?**

To show network information such as IP address, MAC address, subnet mask.

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## **SECTION D — USER & PERMISSION INTERVIEW QUESTIONS**

### **20. What is sudo su?**

Switches to superuser (root), allowing administrative privileges.

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### **21. What are the three types of Linux file permissions?**

- **Read (r)** – value 4
  - **Write (w)** – value 2
  - **Execute (x)** – value 1
-

## **22. What does chmod do?**

It changes file permissions.

Example:

```
chmod 755 file.txt
```

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## **23. How do you check permissions of a file?**

```
ls -l file.txt
```

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## **24. Explain permission 766.**

- Owner → 7 (read, write, execute)
  - Group → 6 (read, write)
  - Others → 6 (read, write)
- 

## **25. What does -rw-r--r-- mean?**

- Owner → read & write
  - Group → read
  - Others → read
- 

## **SECTION E — SCENARIO-BASED QUESTIONS**

### **26. You need to create a folder inside Documents and add text to a file. How will you do it?**

```
cd Documents
```

```
mkdir batch3
```

```
cd batch3
```

```
touch student.txt
```

```
nano student.txt # add content
```

```
cat student.txt
```

**27. A file is not opening due to permission denied. How will you fix it?**

Give execute/read/write permission using chmod:

chmod 755 file.txt

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**28. ifconfig not found. What will you do?**

Install net-tools:

sudo apt install net-tools

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**29. A file named data.txt needs to be copied to Desktop. Command?**

cp data.txt /home/kali/Desktop

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**30. Change filename from test.txt to output.txt.**

mv test.txt output.txt

