# Introduction to Linux Operating System

1. Introduction to Linux Operating System
    a. Understanding the Linux kernel architecture.
    b. Kernel space vs. User space.
    c. Overview of various Linux distributions (Ubuntu, CentOS, Debian, etc.).
    d. Selection criteria for different use cases.
2. Comparison of Linux/Unix/Windows Operating Systems:
    a. Technical differentiators between Linux, Unix, and Windows
    b. Kernel, file system, and security model comparisons.
3. Operating System Concepts:
    a. Process management, scheduling, and synchronization.
    b. Memory management and virtual memory.
    c. Input/output operations and their handling in Linux
    d. Device drivers and I/O subsystem.
    e. File system types (ext4, XFS, Btrfs) and their features.
    f. Inode structure and file attributes.
    g. User account management.
    h. Group administration and permissions.
    i. Understanding file permissions and access control.
    j. Ownership concepts and implications.
    k. RAM management and monitoring.
    l. Storage technologies and management (LVM, RAID).
    m. Process creation, termination, and monitoring.
    n. Process priorities and resource management.
    o. Managing system services (systemd).
    p. Customizing system startup processes.
    q.
4. Network Firewall Configuration:
    a. Networking fundamentals in Linux.
    b. Configuring network interfaces and routing
    c. iptables and firewalld usage.
    d. Configuring and managing firewall rules.
5. POSIX Standard:
    a. Compliance with POSIX standards in Linux.
    b. POSIX threads and synchronization.
6. Linux Terminal:
    a. Terminal emulators and characteristics.
    b. Terminal control sequences and ANSI escape codes.
    c. Shell as a command-line interpreter.
    d. Types of shells in Linux.
    e. Features and functionalities of SH and Bash shells.

f. Shell scripting capabilities.
g. Writing and executing shell scripts.
h. Variables, loops, and conditional statements.
i. Automating tasks with cron.
j. Scheduling recurring jobs.
k. Essential command-line utilities and their usage.
l. Command syntax and options.
m. Text Editor – VI / VIM / NANO:
n. Advanced text editing with Vim.
o. Nano as a simple text editor.
p. Environment variables and their significance.
q. Setting and managing environment variables.
r. System monitoring tools (top, htop).
s. Log files and system event tracking.
t. Package management with apt (Debian/Ubuntu) and yum (CentOS/RHEL).
u. Dependency resolution and package installation.
v. Understand the software dependencies
w. Library management and linking.
x. Debian and RPM package formats.
y. Package structure and metadata.
z. Apt package manager usage and commands.
aa. Repository configuration and package installation.
bb. Yum package manager usage and commands.
cc. Repository configuration and package installation.
dd. Creating daemon processes.
ee. Running processes in the background.
ff. Creating and extracting archives (tar, zip).
gg. Compression techniques and tools.
hh. Efficient shell navigation and workflow.
ii. Command-line shortcuts and tricks.

7. MANPAGES:
    a. Utilizing manual pages for command reference.
    b. Understanding manpage sections.
8. Terminal Multiplexing – Screen and Tmux:
    a. Multiplexing terminal sessions.
    b. Session management and control.
9. Remote Access:
    a. Secure Shell (SSH) configuration and usage.
    b. Remote file transfer (SCP, SFTP).

This technical breakdown provides a comprehensive understanding of Linux fundamentals and their relevance to Electronic Health Records (EHR) systems.