

### Q 3. Explain Linux file structure.

The **Linux file structure** follows a hierarchical organization known as the **Filesystem Hierarchy Standard (FHS)**. At the root of this structure is the **root directory (/)**, which contains all other directories and files. Here's an explanation of its key components:

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#### 1. Root Directory (/)

- The top-level directory in the Linux filesystem hierarchy.
  - All other directories, files, and drives are mounted under /.
  - Provides access to the entire filesystem.
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#### 2. Key Directories in the Linux File Structure

##### a. /bin (Binaries)

- Contains essential **binary executable files** for system use, such as basic commands.
- Examples: ls, cat, cp, mv.

##### b. /boot

- Stores **boot-related files** required to boot the system.
- Examples: Bootloader files like grub, kernel files (vmlinuz).

##### c. /dev (Devices)

- Contains **device files** for hardware and virtual devices.
- Examples: sda (hard drive), tty (terminals), null, zero.

##### d. /etc (Configuration Files)

- Holds **system-wide configuration files**.
- Examples: hosts (hostname settings), passwd (user accounts), ssh/ (SSH configs).

##### e. /home

- Contains **user-specific directories** and files.
- Example: /home/username stores personal files, settings, and downloads for a user.

##### f. /lib and /lib64 (Libraries)

- Stores **shared libraries** (similar to DLL files in Windows) used by binaries in /bin and /sbin.
- Examples: libc.so, libm.so.

##### g. /media

- A mount point for **removable media** such as USB drives, CDs, and DVDs.

#### h. /mnt

- A temporary mount point for **manually mounted filesystems** (e.g., external drives).

#### i. /opt

- Used for installing **optional or third-party software** packages.

#### j. /proc

- A virtual filesystem that contains **system and process information**.
- Examples: /proc/cpuinfo (CPU details), /proc/meminfo (memory usage).

#### k. /root

- The **home directory for the root user** (superuser).

#### l. /run

- Stores **runtime information** since the last boot (e.g., PID files, sockets).

#### m. /sbin (System Binaries)

- Contains **system administration binaries** that are typically used by the root user.
- Examples: ifconfig, fdisk, reboot.

#### n. /srv

- Contains **data for specific services** provided by the system (e.g., web servers, FTP servers).

#### o. /sys

- A virtual filesystem providing **information about hardware devices** and system components.
- Examples: /sys/class/ for device classes, /sys/block/ for block devices.

#### p. /tmp

- A directory for **temporary files** created by applications and processes.
- Automatically cleared at boot or after a set time.

#### q. /usr (User System Resources)

- Contains **user-related programs and files** that are not critical for system boot.
- Subdirectories:
  - /usr/bin: Non-essential binaries.
  - /usr/lib: Libraries for programs in /usr/bin.
  - /usr/local: Locally installed software.

#### r. /var (Variable Files)

- Contains **variable data** that changes frequently, such as logs and spool files.
- Examples:

- /var/log: System logs.
- /var/spool: Email and print queues.