

# LINUX PROGRAMMING ASSIGNMENT-1

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CLASS : CYBER SECURITY ( C )

- 1) what is Linux operating system (OS)? List three pros and cons of it .

Ans :

Linux is an operating system. It is an open source by Linus Torvalds. It powers desktop, server, mobile devices and embedded systems.

## Pros:

- Open source and free to use
- highly secure with strong user permission and community driven patches
- stable and reliable making it ideal for servers

## Cons:

- Steeper learning curve for beginners compared to Windows
- Limited support for some proprietary software and games
- hardware driven compatibility issues in some cases

## 2) Differentiate between Linux, Mac, Android and Windows OS (6 features)

Ans:

- | Feature        | Linux       |
|----------------|-------------|
| • Source model | open source |

- |                    |                     |
|--------------------|---------------------|
| • Cost             | free                |
| • Security         | very secure         |
| • Customisation    | highly customizable |
| • Target users     | developers, servers |
| • Hardware support | wide range          |

## MAC(macos )

- paid
- secure with apple updates
- Limited customisation
- designers professionals
- only Apple hardware

## ANDROID

- Open source
- free secure but Malware possible
- moderate customisations
- mobile users smartphone tablets

## WINDOWS

- Proprietary
- licenced more vulnerable
- Limited customisation
- general PC user
- PCs and laptops

## 3) why is Linux preferred for mainframe server for Legacy applications (three reasons)

Ans :

- Stability and reliability over long up times
- strong security with multi user control

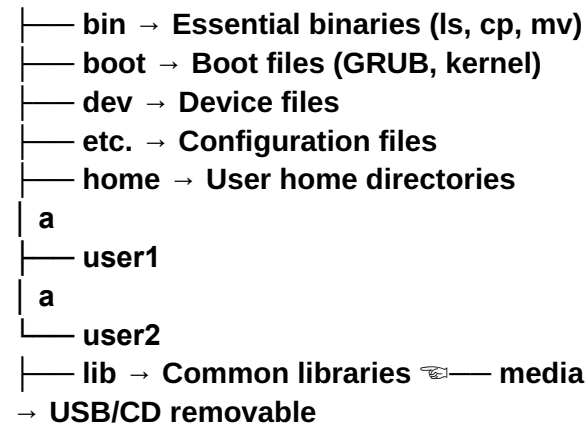
- scalability to handle of processes concurrently

#### 4) explain the structure of the Linux file system with the diagram

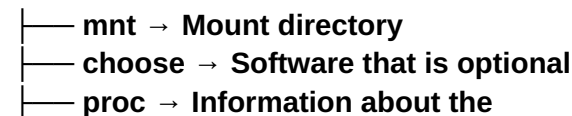
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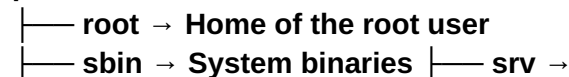
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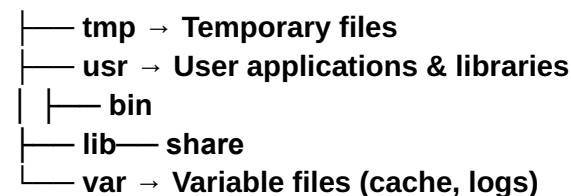
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process



Service information



#### 5) If Linux is open source, how do companies like Red Hat make money?

Ans :

Companies like Red Hat earn Revenue through

- subscription services
- enterprise solution
- training and certificate programs for professional

#### 6) command to display today's date and time

Ans:

Command :

Date

Return:

Sun Sep 21 19:05:45 IST 2025

#### 7) which command is used to check how long the system has been running

Ans:

Command : Uptime: 13:59:33 up 1hour, 23 minutes , 2 users , load average : 0.45,0.30,0.20

#### 8) difference between shutdown -h now and halt

Ans:

- **Shutdown-h now** : gracefully stops all processes and then halts the system
- **halt** : immediately halts the system without properly shutting down services

#### 9) compare init 0 and shutdown -h which is safer ? why?

Ans:

- **Init 0**: changes system and Run level to zero
- **shutdown -h** : safely shutdown processes and halts the Machines

- **Safer:** is shutdown because it ensures all process and file systems are properly stopped

**10) server powered off accidentally without shutdown what are the problems**

**Ans:**

- File system corruption
- Data loss due to unsaved buffers
- hardware stress
- services may fail to restart properly

**Brainstorming**

**a) As Linux Kernel is open-source, can we build our own operating system?**

- Yes, it is possible to create your own operating system using the Linux Kernel. The kernel is the main component that manages the hardware and software functions of a computer. Since Linux is open source, users have the freedom to modify it by adding their own software, tools, and designs, and removing parts they don't need to make a fully customized OS. Many popular Linux distributions, like Ubuntu, are created this way; they usually rely on Linux but have their own features. This flexibility allows us to make Linux an excellent choice for anyone wanting to build their own operating system.

**b) In order to do that, what are the stoppers, hurdles, and challenges?**

**Technical background:** understanding of operating system ,

kernel functions, drivers, and system calls are essential.

**Programming knowledge:** Advanced knowledge of C, along with scripting skills are required to develop components.

**Hardware compatibility:** Ensuring that the OS functions reliably across various hardware platforms can be complicated and might need a few experts to solve it.

**Time and effort:** Developing a stable, user-friendly system is time-demanding and lots of consistent effort.

**Debugging:** Errors and bugs can make the system troublesome, and resolving them often is challenging

**Security:** The OS must be safeguarded against malware and other threats

**C) Is anyone in India working in this field? Find at least three to four engineers.**

Several Indian engineers have made contributions to Linux:

Ashish Gulhati – Open-source advocate and entrepreneur

Atul Chitnis – Organizer of FOSS.IN

Suparna Bhattacharya – Distinguished Technologist at Hewlett Packard Labs

**Thank you**