

# **LINUX PROGRAMMING**

## **ASSIGNMENT-01**

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**CLASS- CYBER SECURITY**

**SECTION- A**

**1.What is Linux Operating System(OS)? List three pros and cons of it.(CO1)**

**Answer-**Linux is a powerful open-source operating system kernel and the foundation for many different OS distributions, known for its stability, security, and cost-effectiveness.

<b>pros</b>	<b>cons</b>
Open source - you can see, modify and share the code freely.	Beginners may find it hard to learn commands, kernel programming and system structure.
Stability and Security - linux is very stable and less prone to viruses, making it good for programming and servers.	popular games or software may not run easily on linux.
It provides better tools for meeting the conditions.	certain hardware may not have good linux drivers, causing issues with programming or testing.

**2.Differentiate between Linux, Mac, Android and Windows OS with at least six unique features.(CO1)**

**Answer-**

**LINUX**

- open-source

- free to use
- very secure
- used mainly in servers and coding.
- need some technical knowledge to use fully.

#### **MAC**

- works only on apple devices.
- very smooth and stable performances.
- strong interaction with iPhone, iPad, Apple watch.
- built-in apps like Safari, iMovie.
- good design and high cost.

#### **ANDROID**

- works mainly for mobile phones and tablets
- owned by google.
- highly customisable.
- affordable devices to very expensive ones.

#### **WINDOWS**

- Most used OS for PC and laptops.
- supports the largest number of software and games.
- updates are available from microsoft.
- less expensive than mac.

### **3. Why is linux preferred for mainframe servers for legacy application? give three out-of-box technical reasons.(CO1)**

**Answer-**

- Linux is very stable and does not crash easily which is important for servers.
- it is secure and less affected by viruses so that data remains safe.
- it is open-source and flexible so that the companies can modify it as per their needs.

**4.Explain the structure of the Linux File System with proper diagram. Note you can use tree command to find it out.**

**Answer-**

The linux file system follows a tree structure at the top, there is a root directory “ / ”.

Inside it we have important folders like :-

- /bin
- contains basic commands.
- /etc
- system configuration files.
- /home
- personal files of users.
- /var
- log files and variable data.
- /dev
- device files
- /tmp
- a directory for temporary files that can be deleted.
- The tree command provides a visual representation of this hierarchy.
- Everything in linux is part of this single tree.

**5.If linux OS is open-source how do companies like red hat still making money from it? Do a market study and answer properly.**

**Answer-**

- They do not sell linux itself but sell support services.
- They provide enterprise solutions with extra features for companies.
- They give paid training, certifications, memberships and security updates.
- This is how Red Hat and others earn and make money while linux is free.
- They offer cloud services and partnerships with data centers, which brings extra revenue.

- They sign long term contracts with big companies to provide guaranteed support and system update.

**6. Write a command to display today's date and time(I.e., current system time).(CO1)**

**Answer-**

The command is - date

The command date if used in kali linux will result as:-

**Sun Sep 21 13:57:45 IST 2025**

**7. Which command is used to check how long the system has been running?(CO-1)**

**Answer-**

The command is - uptime

The command uptime if used in kali linux will result as:-

**13:59:33 up 1 hour, 23 minutes, 2 users,**

**load average: 0.45, 0.30, 0.20**

**8. Write the difference between shutdown -h now and halt?**

**Answer-**

**shutdown -h**

- Safely shuts down the system and powers off.

**halt**

- Stops the system immediately may not power it off properly.

**9. Compare init 0 and shutdown -h. Which is safer? Why?**

**Answer-**

<b>init 0</b>	<b>shutdown -h</b>
Directly changes the system runlevel to shutdown.	Gracefully stops all processes and then powers off.
Not always safe.	shutdown -h is safer because it closes program properly and prevents data loss.

**10.A system administrator accidentally powers off a server machine without shutting it down properly. What problems can occur to the said server?**

**Answer-**

- Data loss if files were being written.
- Corrupted file system which may need repair.
- Hardware stress due to sudden power cut.
- Services crash affecting users connected to the server.
- Running services stop suddenly which can disconnect clients or users.
- Pending updates leaves security risks.
- Hard disk wear and tear increases due to sudden stop.

## **BRAINSTORMING**

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

**Answer-**Yes, you can create your own operating system using the Linux Kernel. The kernel is the core part that controls the hardware and basic functions of a computer. Since Linux is open source you can modify it, add your own software, tools, and designs, and remove parts that you don't need to make a completely custom OS. Many popular linux systems like UBUNTU are made, firstly they all use linux kernel but have their own features and look. This flexibility is what makes Linux a good choice for anyone wanting to build their own operating system.

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

**Answer-**

If you try to build your own OS using the Linux Kernel then you require:-

- **Technical knowledge** - you need to understand how operating systems work, including kernel functions, drivers and system calls.
- **Programming skills** - strong knowledge of C and scripting for other parts is required.
- **Hardware compatibility** - making sure your OS works with different hardware and can be tricky.
- **Time and effort** - building a stable and usable OS takes a lot of time, it's not a small project.
- **Debugging and errors** - bugs can crash the system and fixing them is challenging.
- **Security** - make sure your OS is secure against viruses.

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

**Answer-**

Yes, several engineers in India are working on this field some of them are:-

- Bhumika Goyal
- Shush Khan
- Suparna Bhattacharya
- Navtej Singh

**THANK YOU**