

Linux History and philosophy

Linux began in 1991 with Linus Torvalds creating a free kernel, combining it with GNU tools for a full OS, driven by the philosophy of free and open-source software (FOSS), emphasizing collaboration, transparency, user freedom (to use, study, modify, share), and a decentralized approach, growing from a hobby into powering servers, Android, supercomputers, and more, contrasting proprietary models.

History of Linux

- 1991: Finnish student Linus Torvalds started developing a Unix-like kernel as a personal project, inspired by the MINIX OS, aiming for a free alternative to proprietary systems.
- Early Development: Torvalds released his kernel's source code, and it quickly grew through global developer contributions, combining with the GNU Project's free tools to form complete operating systems (distributions like Debian, Red Hat).
- Licensing Shift: Initially restricted, the kernel adopted the GNU General Public License (GPL) in 1992.
- Growth & Adoption: Linux gained traction in servers, embedded systems and became a stable, secure alternative to Windows/macOS.

Linux Philosophy

- Free & Open Source (FOSS)
- User Freedom
- Collaboration & Transparency
- Decentralization
- Customization & Control

Task-1

- 1) write a brief history of linux

```
student@student-virtual-machine:~$ nano LinuxHistory.txt
```

- Creating a LinuxHistory.txt file and editing it in nano.

```
student@student-virtual-machine: ~
GNU nano 6.2 LinuxHistory.txt
Origin and Principles of Linux System

The GNU/Linux system is a powerful, free and open-source operating system that combines the Linux Kernel with software from the GNU project.

GNU/Linux System is result of two independent projects.

The GNU project (1984): Richard Stallman launched the GNU project in 1984 with goal of creating a complete, free, Unix-like operating system.

By the early 1990's the project had produced most necessary user space softwares, including GNU Compiler collection like (gcc), GNU C Library (glibc), the bash shell.

The linux kernel was developed by Linus Torvalds in 1991, who was a computer science student, began a hobby project to create his own operating system kernel as free alternative to MINIX.

Later he released it Sep 17, 1991 which was further licensed by GPL (General Public License) in 1992.

Principles of GNU/Linux operating system
1) open source and free software
2) modularity and simplicity
```

Task-2

2) File Navigation and Directory Structure

```
student@student-virtual-machine: ~$ ls -la
```

- `ls` – cmd used to display the files in a directory
- `-l` – flag used to list in vertical format
- `-a` – used to display the hidden files.

```
student@student-virtual-machine: ~$ pwd
/home/student
```

- `pwd` – cmd used to print the current working directory.
- `realpath` – cmd also used to view the absolute path of a file/folder.

```
student@student-virtual-machine: ~$ mkdir Practise
student@student-virtual-machine: ~$ cd Practise
student@student-virtual-machine: ~/Practise$
```

- `mkdir` – command used to create a new directory
- `-p` – flag used to create a non-parent directory

Task-3

3) File management commands to organize files and directories

```
student@student-virtual-machine:~$ touch Practise/sample.txt
```

touch – cmd used to create any file in a directory or folder.

```
student@student-virtual-machine:~$ cp Practise/sample.txt Practise/duplicate.txt
```

cp- cmd used to copy the file from one directory/folder to another directory or folder or within same directory or folder.

```
student@student-virtual-machine:~/Practise$ ls -lh
total 0
-rw-rw-r-- 1 student student 0 Dec 17 15:04 duplicate.txt
-rw-rw-r-- 1 student student 0 Dec 17 15:02 sample.txt
```

rm – command used to delete a file,folder,directory.

```
student@student-virtual-machine:~/Practise$ rm duplicate.txt
```

Task-4

Use grep cmd to find all the instance of “Linux” in LinuxHistory.txt

and redirect output to LinuxInstances.txt.

#creating file LinuxHistory.txt.

```
student@student-virtual-machine:~$ touch LinuxHistory.txt
student@student-virtual-machine:~$ cat >> LinuxHistory.txt
Linux kernel developed by linux torvald
Linux is distributed under GNU license
Linux comes with different versions popularly known as Distribution("Distros") like fedora,ubuntu,arch-linux,kali-linux
Linux is renowned for being robust and secure
Linux dominates cloud computing.student@student-virtual-machine:~$
```

Use grep to filter all line that contain instance of Linux.

```
Linux dominates cloud computing.student@student-virtual-machine:~$ grep -o "Linux" LinuxHistory.txt > LinuxInstances.txt
student@student-virtual-machine:~$ cat LinuxInstances.txt
Linux
Linux
Linux
Linux
Linux
Linux
Linux
Linux
Linux
Linux
Linux
Linux
```

Task-5

Permissions and Ownership

#View current permissions for sample.txt

```
student@student-virtual-machine:~$ touch sample.txt
student@student-virtual-machine:~$ ls -hil sample.txt
9439973 -rw-rw-r-- 1 student student 0 Dec 20 16:21 sample.txt
```

#change the permission of sample.txt to read only for the owner and no permission for others.

```
student@student-virtual-machine:~$ chmod 400 sample.txt
student@student-virtual-machine:~$ ls -hil sample.txt
9439973 -r----- 1 student student 0 Dec 20 16:21 sample.txt
```

#change the ownership of LinuxHistory.txt to another user.

```
student@student-virtual-machine:~$ sudo chown student1 LinuxHistory.txt
[sudo] password for student:
student@student-virtual-machine:~$ ls -lih LinuxHistory.txt
9439978 -rw-rw-r-- 1 student1 student 0 Dec 20 16:28 LinuxHistory.txt
```

Task -6

Remote System Access

```
#use ssh to connect to remote system
```

```
student@student-virtual-machine:~$ ssh -i "sarabesh-test-server.pem" ec2-user@35.154.250.9  
The authenticity of host '35.154.250.9 (35.154.250.9)' can't be established.  
ED25519 key fingerprint is SHA256:umyjrxDxmQG5L0STJg/QqWSMwnnqqkzxPsnupuBJkj4.  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '35.154.250.9' (ED25519) to the list of known hosts.
```

```
, #_
~\ _####      Amazon Linux 2023
~~ \#####\
~~   \|###|
~~    \|#/     https://aws.amazon.com/linux/amazon-linux-2023
~~      V~'|_>
~~~~
~~~~ ._. / 
~~~~_/m/'/_
```

```
[ec2-user@ip-192-168-0-147 ~]$ sudo apt upgrade
```

#once connected use scp to copy LinuxHistory.txt from local machine to remote system.

```
student@student-virtual-machine:~$ scp -i "sarabesh-test-server.pem" LinuxHistory.txt ec2-user@35.154.250.9:/home/ec2-user/
LinuxHistory.txt                                100% 0 0.0KB/s 00:00

student@student-virtual-machine:~$ ssh -i "sarabesh-test-server.pem" ec2-user@35.154.250.9

#_
~\##### Amazon Linux 2023
~\#####
~\###|
~\#/_
~V~'~'~>
~\
~\
~/m/'

Last login: Sat Dec 20 19:14:13 2025 from 103.195.247.230
[ec2-user@ip-192-168-0-147 ~]$ ls -lhi
total 0
8567532 -rw-rw-r--. 1 ec2-user ec2-user 0 Dec 20 19:36 LinuxHistory.txt
[ec2-user@ip-192-168-0-147 ~]$ rm LinuxHistory.txt
[ec2-user@ip-192-168-0-147 ~]$ Connection to 35.154.250.9 closed by remote host.
Connection to 35.154.250.9 closed.
```