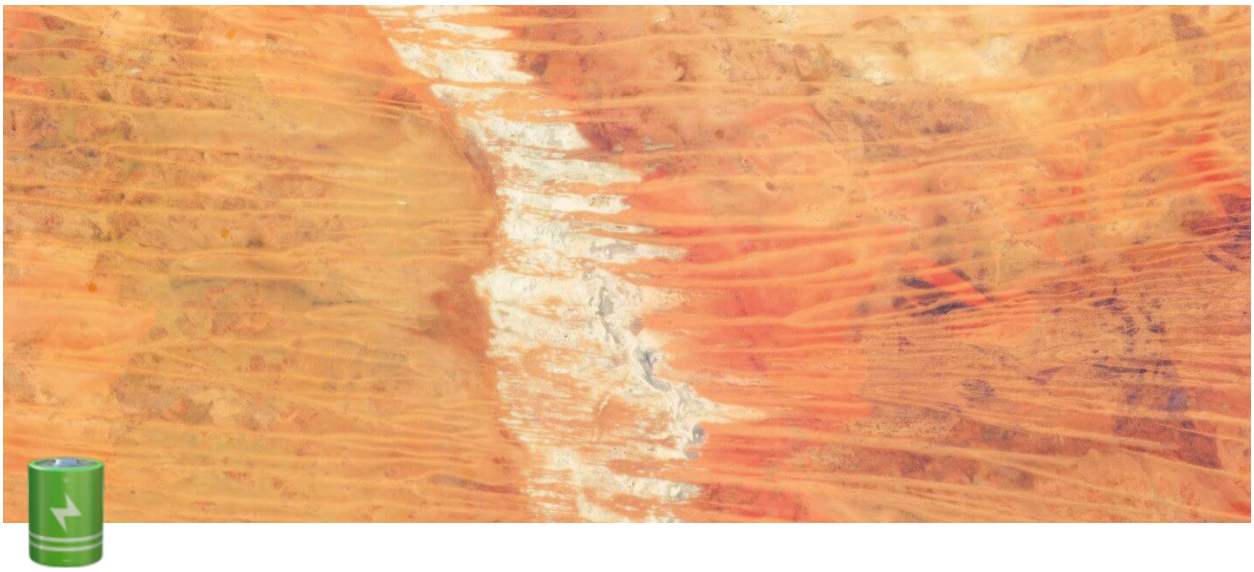


Linux

Linux is a **free and open-source operating system** designed for **security, stability, and performance**.

It supports **multiple users** and **multiple processes** running at the same time, making it suitable for servers, cloud systems, and development environments.

Operating System (OS)

An **Operating System** is system software that acts as an **interface between computer hardware and the user**.

It:

- Manages hardware resources (CPU, memory, storage, I/O)
- Provides an environment for applications to run
- Allows users to interact with the system without understanding machine-level instructions

Without an OS, applications like browsers or editors cannot function.

Kernel

The **kernel** is the **core of the operating system** and operates at the lowest level.

It is responsible for:

- CPU process scheduling
- Memory management
- Device and hardware communication
- Handling system calls

All software ultimately interacts with hardware through the kernel.

Daemons

Daemons are **background processes** that provide essential system services.

Key points:

- Run without direct user interaction
- Start at boot or system login
- Handle tasks like printing, scheduling, networking, and logging

Examples include services for SSH, cron jobs, and system monitoring.

Shell

The **shell** is a program that allows users to **interact with the operating system**.

It:

- Accepts commands from the user
- Executes programs and scripts
- Displays output

Shells can be **command-line based** or **graphical**, but command-line shells are preferred for automation and administration.

Command

A **command** is an instruction given to the shell to perform a specific task, such as file handling, process control, or system inspection.

Terminal

A **terminal** is a **text-based interface** used to access the shell.

It allows users to enter commands and view their output.

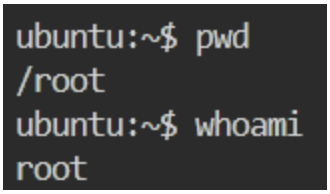
The terminal does not execute commands itself—it **passes them to the shell**.

Linux commands are instructions executed in the terminal (shell) to interact with the operating system.

2. Navigation Commands

`pwd`

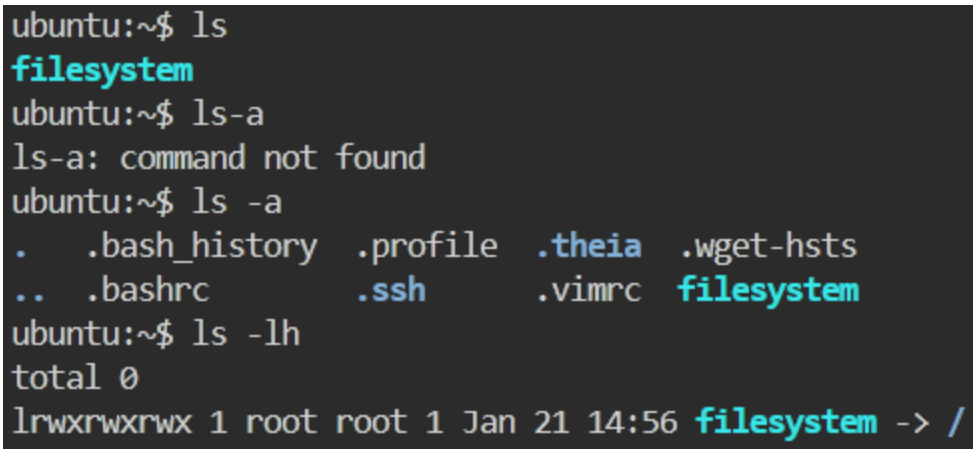
Prints the current working directory.




```
pwd
```

`ls`

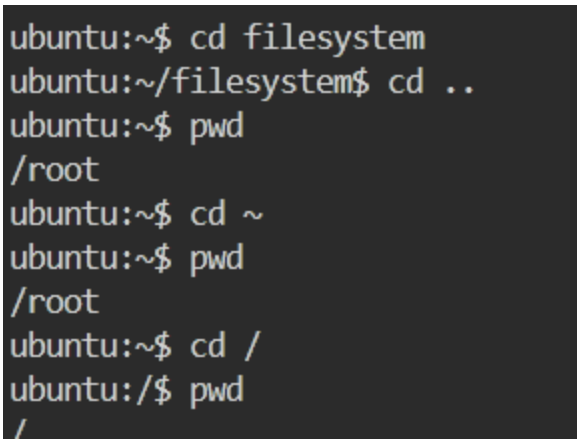
Lists files and directories.



ls
ls -l# long format
ls -a# show hidden files
ls -lh# human-readable files

cd

Changes directory.



cd folder_name
cd ..# move up one directory
cd ~# home directory
cd /# root directory

3. File Management

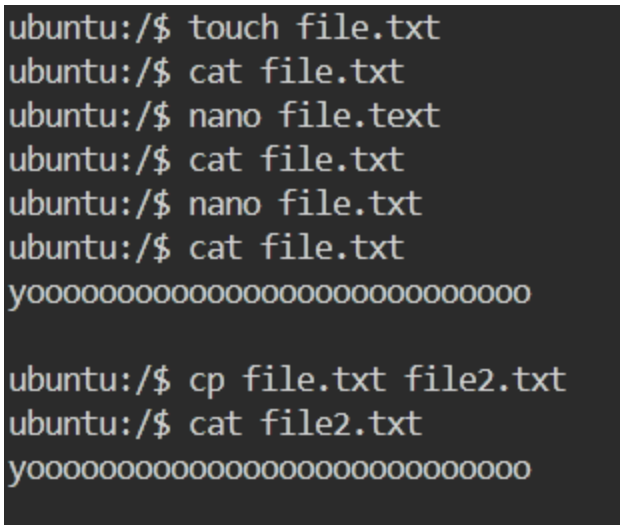
touch

Creates empty files.

```
touch file.txt
```

cat

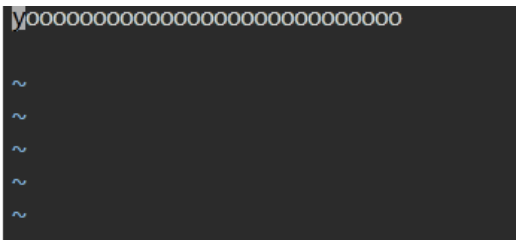
Displays file content.

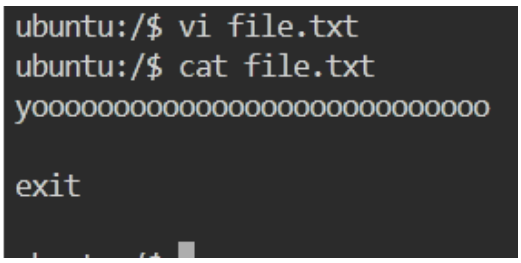



```
cat file.txt
```

vi / nano

Edits files.





```
vi file.txt
nano file.txt
```

cp

Copies files or directories.

```
cp source.txt destination.txt
cp -r dir1 dir2
```

mv

Moves or renames files.

```
mv old.txt new.txt
mv file.txt /path/to/location/
```

rm

Deletes files or directories.

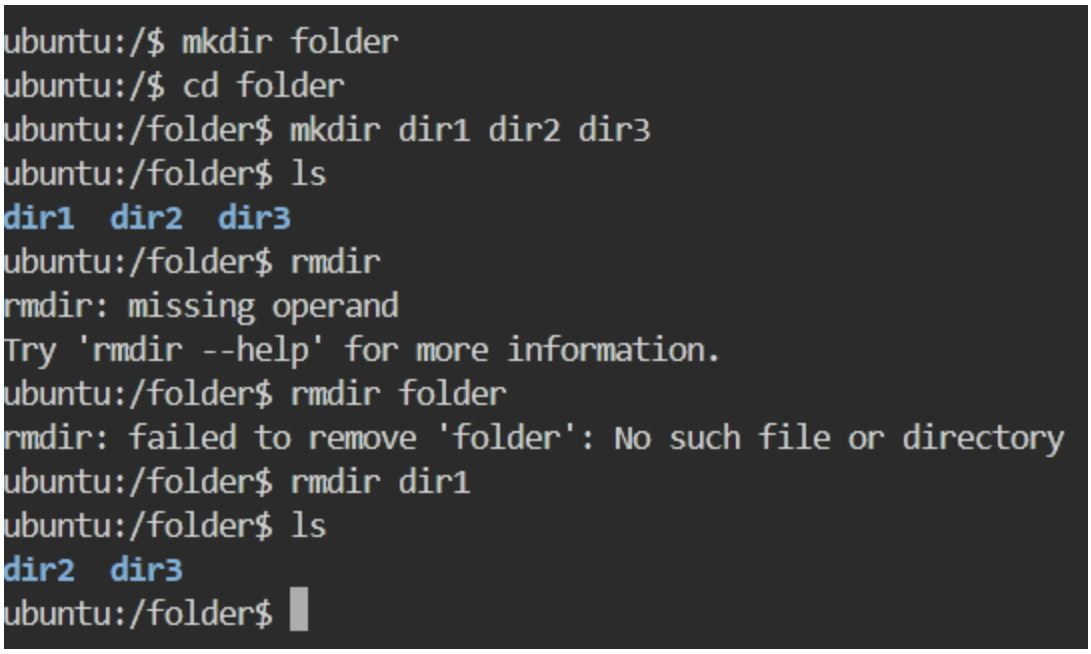
```
rm file.txt
rm -r directory/
rm -rf directory/# force delete
```

---

4. Directory Management

mkdir

Creates directories.




```
mkdir folder
mkdir dir1 dir2 dir3
```

`rmdir`

Deletes empty directories.

```
rmdir folder
```

---

5. Viewing & Searching

`less`

View large files page by page.

```
less file.txt
```

`head` / `tail`

View beginning or end of files.

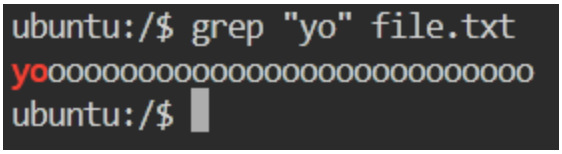
```
head file.txt
tail file.txt
tail -f log.txt# live updates
```

find

Search files.

```
find . -name file.txt
```

grep



Search text inside files.

```
grep"error" filecd.txt
```

---

6. Permissions & Ownership

chmod

Change file permissions.

```
chmod 755 script.sh
chmod +x script.sh
```

chown

Change file owner.

```
chown user:group file.txt
```

Permission Breakdown

```
r = read (4)
w = write (2)
x = execute (1)
```

---

7. System Information

whoami

Displays current user.

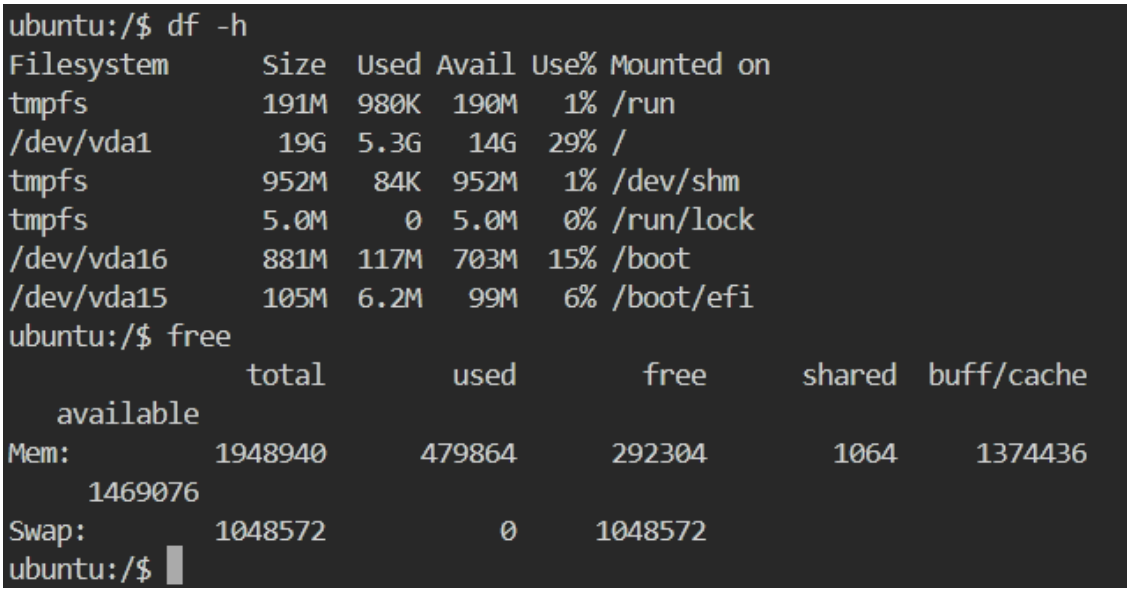
```
whoami
```

uname

System information.

```
uname -a
```

df



Disk usage.

```
df -h
```

free

Memory usage.

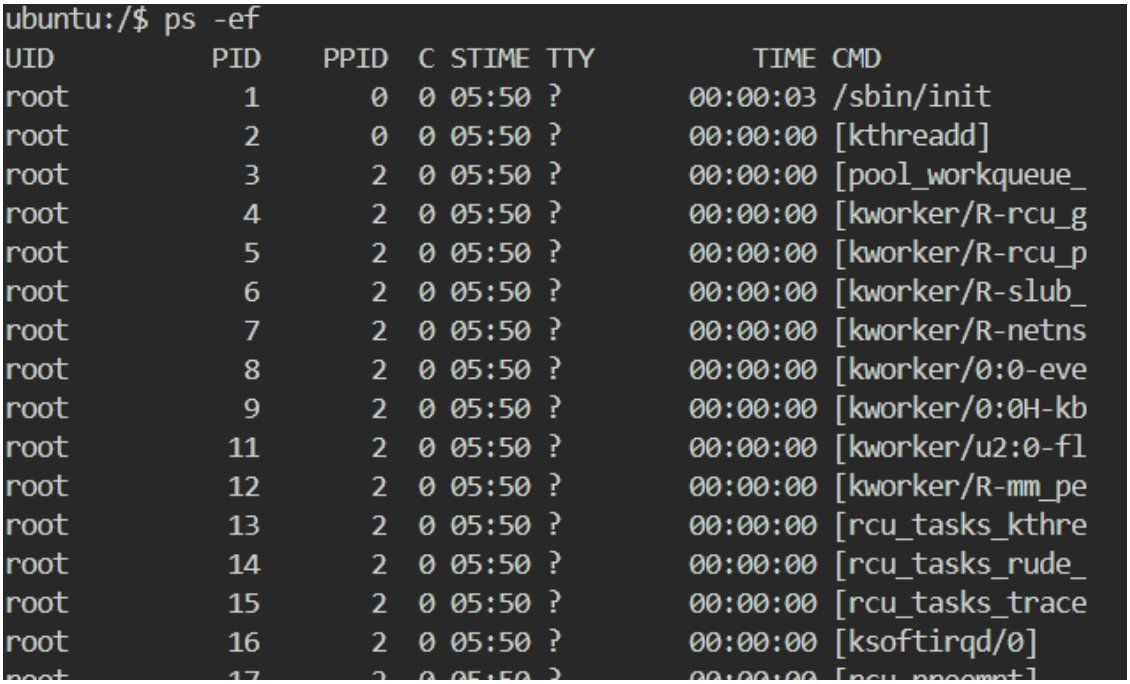
```
free -h
```

---

8. Process Management

ps

View running processes.



```
ubuntu:/$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1       0  0 05:50 ?        00:00:03 /sbin/init
root           2       0  0 05:50 ?        00:00:00 [kthreadd]
root           3       2  0 05:50 ?        00:00:00 [pool_workqueue_
root           4       2  0 05:50 ?        00:00:00 [kworker/R-rcu_g
root           5       2  0 05:50 ?        00:00:00 [kworker/R-rcu_p
root           6       2  0 05:50 ?        00:00:00 [kworker/R-slub_
root           7       2  0 05:50 ?        00:00:00 [kworker/R-netns
root           8       2  0 05:50 ?        00:00:00 [kworker/0:0-eve
root           9       2  0 05:50 ?        00:00:00 [kworker/0:0H-kb
root          11       2  0 05:50 ?        00:00:00 [kworker/u2:0-fl
root          12       2  0 05:50 ?        00:00:00 [kworker/R-mm_pe
root          13       2  0 05:50 ?        00:00:00 [rcu_tasks_kthre
root          14       2  0 05:50 ?        00:00:00 [rcu_tasks_rude_
root          15       2  0 05:50 ?        00:00:00 [rcu_tasks_trace
root          16       2  0 05:50 ?        00:00:00 [ksoftirqd/0]
```

```
ps -ef
```

top

Real-time process monitoring.

```
top
```

kill

Terminate processes.

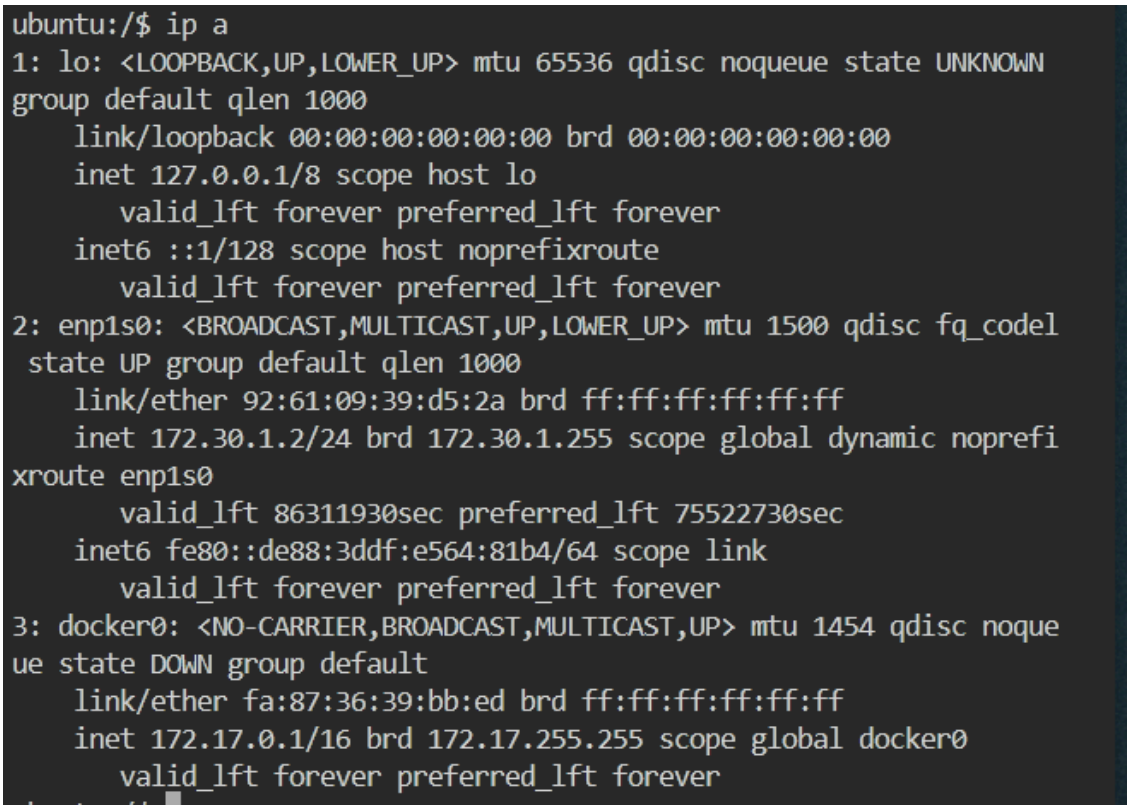
```
kill PID
kill -9 PID
```

---

9. Networking Basics

ip

Network configuration.



```
ip a
```

ping

```
ubuntu:/$ ping reachthefinals.com
PING reachthefinals.com (198.185.159.144) 56(84) bytes of data.
64 bytes from 198.185.159.144: icmp_seq=1 ttl=53 time=11.0 ms
64 bytes from 198.185.159.144: icmp_seq=2 ttl=53 time=10.6 ms
64 bytes from 198.185.159.144: icmp_seq=3 ttl=53 time=11.0 ms
64 bytes from 198.185.159.144: icmp_seq=4 ttl=53 time=10.6 ms
```

Check connectivity.

```
ping google.com
```

curl / wget

Download data.

```
curl url
wget url
```

---

10. Command History

history

```
   13  pwd
   14  cd /
   15  pwd
   16  touch file.txt
   17  cat file.txt
   18  nano file.text
   19  cat file.txt
   20  nano file.txt
   21  cat file.txt
   22  cp file.txt file2.txt
   23  cat file2.txt
   24  ls
   25  cp -r filesystem media
   26  pwd
   27  cp -r / media
   28  vi file.txt
   29  cat file.txt
   30  mkdir folder
   31  cd folder
   32  mkdir dir1 dir2 dir3
   33  ls
   34  rmdir
   35  rmdir folder
   36  rmdir dir1
   37  ls
   38  cd ..
   39  ls
   40  grep"yo" file.txt
   41  grep "yo" file.txt
   42  df =h
   43  df -h
   44  free
   45  ps -ef
   46  top
   47  ip
   48  ifconfig
   49  ping reachthefinals.com
   50  ip a
   51  curl reachthefinals.com
   52  ls
   53  wget reachthefinals.com
   54  cat index.html
   55  history
ubuntu:/$
```

Shows previously executed commands.

```
history
```