# Application

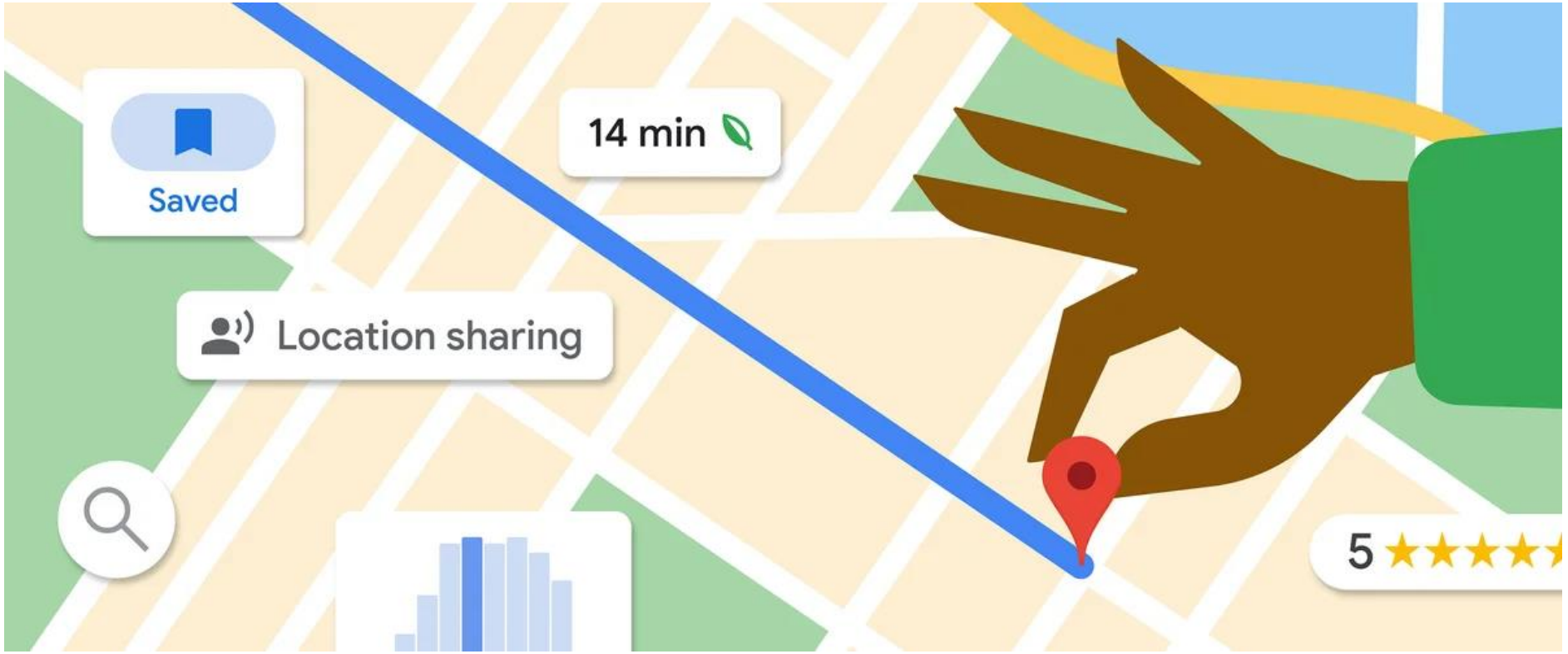
Peace of code that is written for specific purpose

# E-learning portal

An eLearning portal is **a website that offers learners interaction and collaboration on eLearning content like courses, presentations, podcasts and tests as well as content management for eLearning providers**.

# Google Map

It’s designed to find the route between source and destination.



# Software

A set of instructions that directs a computer’s hardware to perform a task is called a program, or software program.

# Software

# Hardware

Computer hardware refers to a system's physical components, including the processor, memory, storage, input/output, and other peripherals. The purpose of computer hardware is to provide a platform for running software applications that allow users to perform various tasks efficiently.

Key: Touch and feel

# Hardware

# CPU

The CPU **interprets, processes and executes instructions**, most often from the hardware and software programs running on the device. The CPU performs arithmetic, logic, and other operations to transform data input into more usable information output.

It perform Input, Output, Arithmetic and logical operation

# How to check CPU details for server > lscpu

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                8
On-line CPU(s) list:   0-7
Thread(s) per core:    2
Core(s) per socket:    4
Socket(s):             1
NUMA node(s):          1
Vendor ID:             AuthenticAMD
CPU family:            21
Model:                 2
Model name:            AMD FX(tm)-8350 Eight-Core Processor
Stepping:              0
CPU MHz:               1400.000
CPU max MHz:           4000.0000
CPU min MHz:           1400.0000
BogoMIPS:              8000.05
Virtualization:        AMD-V
L1d cache:             16K
L1i cache:             64K
L2 cache:              2048K
L3 cache:              8192K
NUMA node0 CPU(s):     0-7
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb r
dtscp lm constant_tsc rep_good nopl nonstop_tsc extd_apicid aperfmperf pni pclmu
lqdq monitor ssse3 fma cx16 sse4_1 sse4_2 popcnt aes xsave avx f16c lahf_lm cmp_
legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs xop s
kinit wdt lwp fma4 tce nodeid_msr tbm topoext perfctr_core perfctr_nb cpb hw_pst
ate ssbd vmmcall bmi1 arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flus
hbyasid decodeassists pausefilter pfthreshold
```

# What happen when my application need more CPU?

Assign more then 1 CPU.

Note: A single core can be executing **one instruction for one thread at a time**.

```
1000m (milicores) = 1 core = 1 vCPU = 1 AWS vCPU = 1 GCP Core.
100m (milicores) = 0.1 core = 0.1 vCPU = 0.1 AWS vCPU = 0.1 GCP Core.
```

# ROM

ROM is a non-volatile form of memory that **stores data permanently and cannot be written over or erased**

**Why we need ROM?**

**System uses ROM to store fixed information**

**Example: TV remote memory or washing machine memory**

# ROM Usage

It’s very powerful in terms of calculation, and it will not forget when power goes down. It always start from where if left.

Example: Washing machine Timer

# RAM

RAM is a temporary memory bank where your computer stores data it needs to retrieve quickly. RAM keeps data easily accessible so your processor can quickly find it without having to go into long-term storage to complete immediate processing tasks

More the RAM means more the system speed.

# RAM

**Random access memory**, or **RAM** for short, is active during the processing function. RAM is often referred to as "temporary memory."

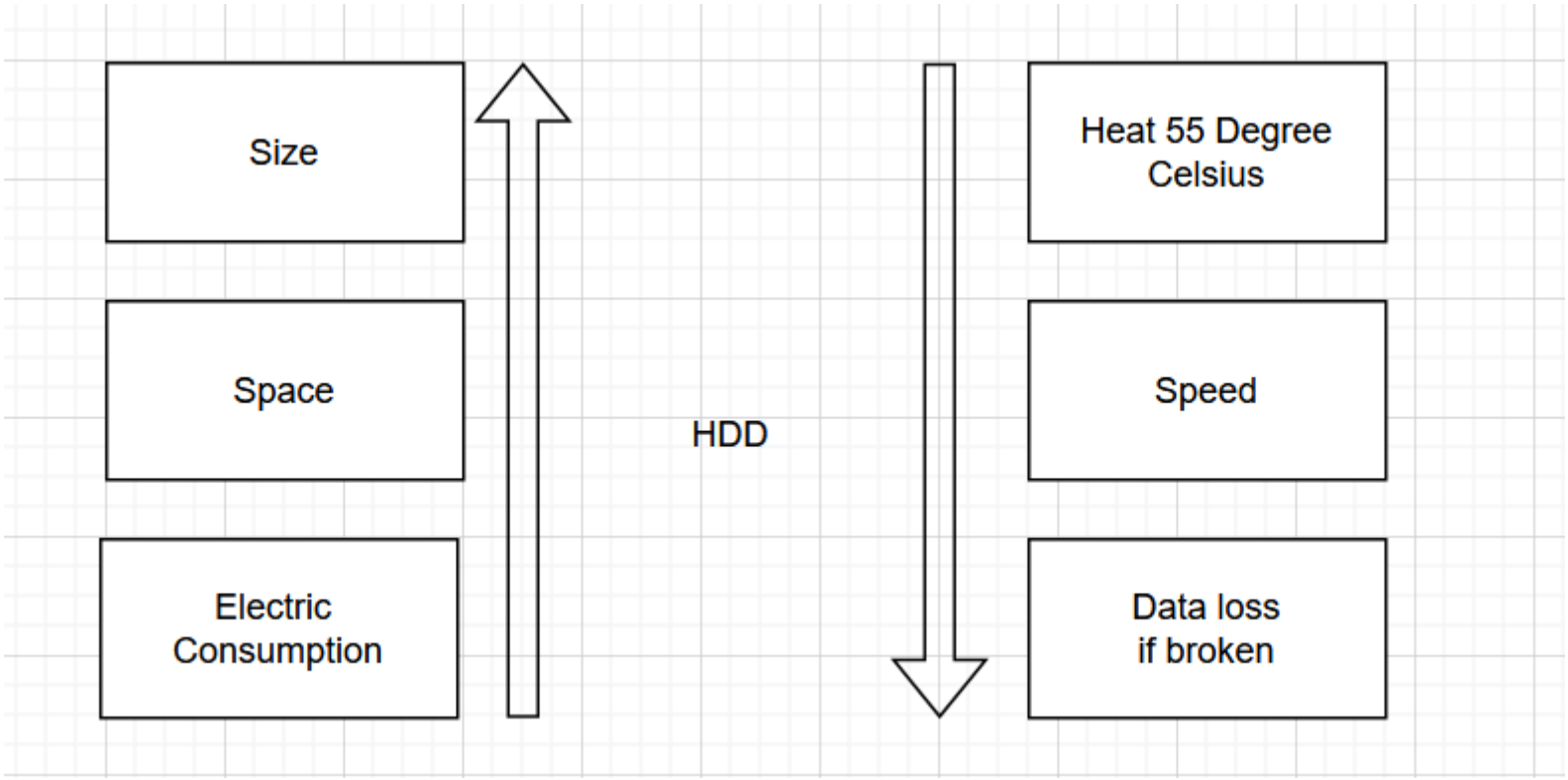
RAM consists of electronic circuits on the motherboard that temporarily hold programs and data while the computer is on. Each circuit has an address that is used by the microprocessor to transmit and store data. When the computer is off, RAM is empty.

# Storage

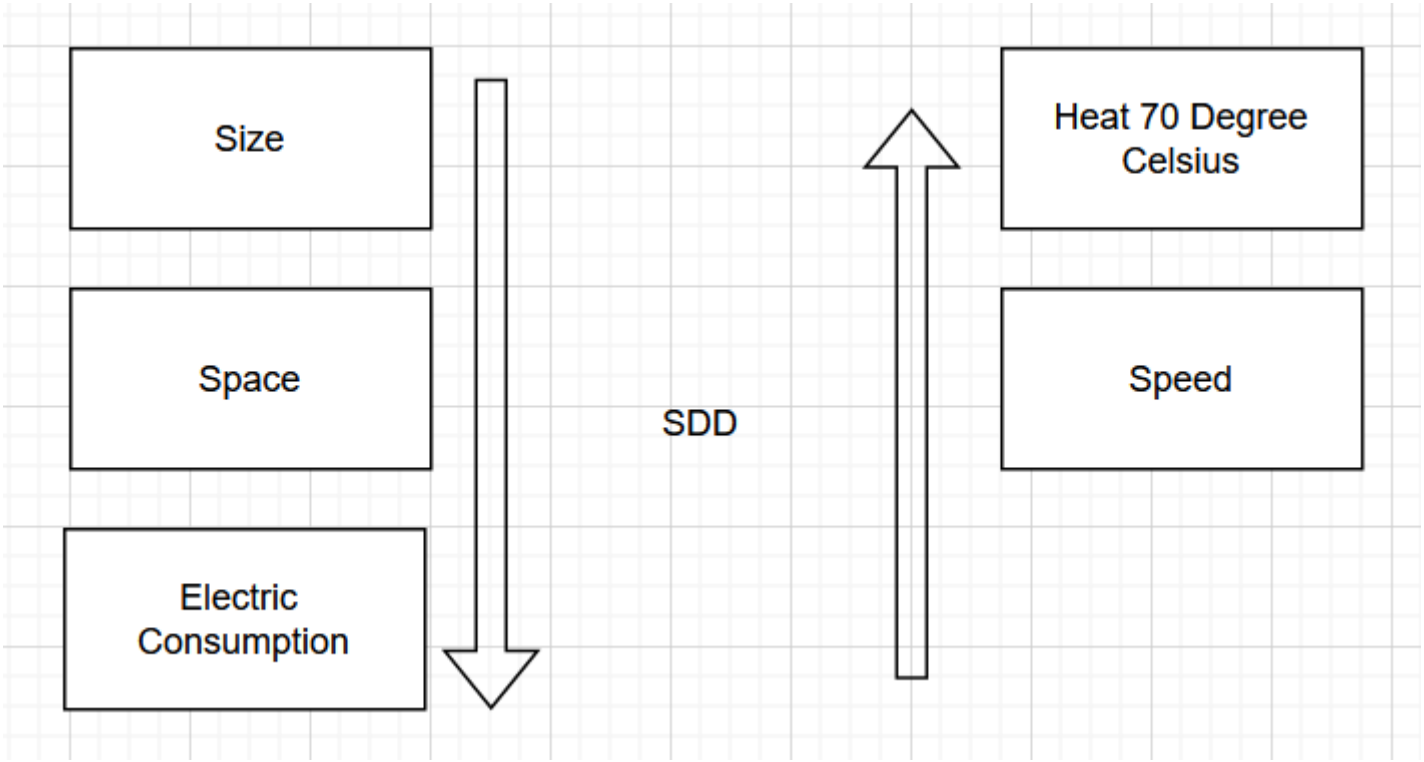
The storage unit is a part of the computer system which is employed to store the information and instructions to be processed. A storage device is an integral part of the computer hardware which stores information/data to process the result of any computational work. Without a storage device, a computer would not be able to run or even boot up. Or in other words, we can say that a storage device is hardware that is used for storing, porting, or extracting data files. It can also store information/data both temporarily and permanently.

# HDD: Hard Disk Drive

# HDD properties



# SDD- Solid State Drive



# lsblk: listing the hard disk used

```
ubuntu $ lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
loop0     7:0    0 63.2M  1 loop /snap/core20/1634
loop2     7:2    0 67.8M  1 loop /snap/lxd/22753
loop3     7:3    0 38.8M  1 loop /snap/snapd/21759
loop4     7:4    0   64M  1 loop /snap/core20/2318
loop5     7:5    0 91.9M  1 loop /snap/lxd/24061
vda     252:0    0   20G  0 disk
|-vda1  252:1    0 19.9G  0 part /
|-vda14 252:14   0    4M  0 part
`-vda15 252:15   0  106M  0 part /boot/efi
```

# What is Linux?

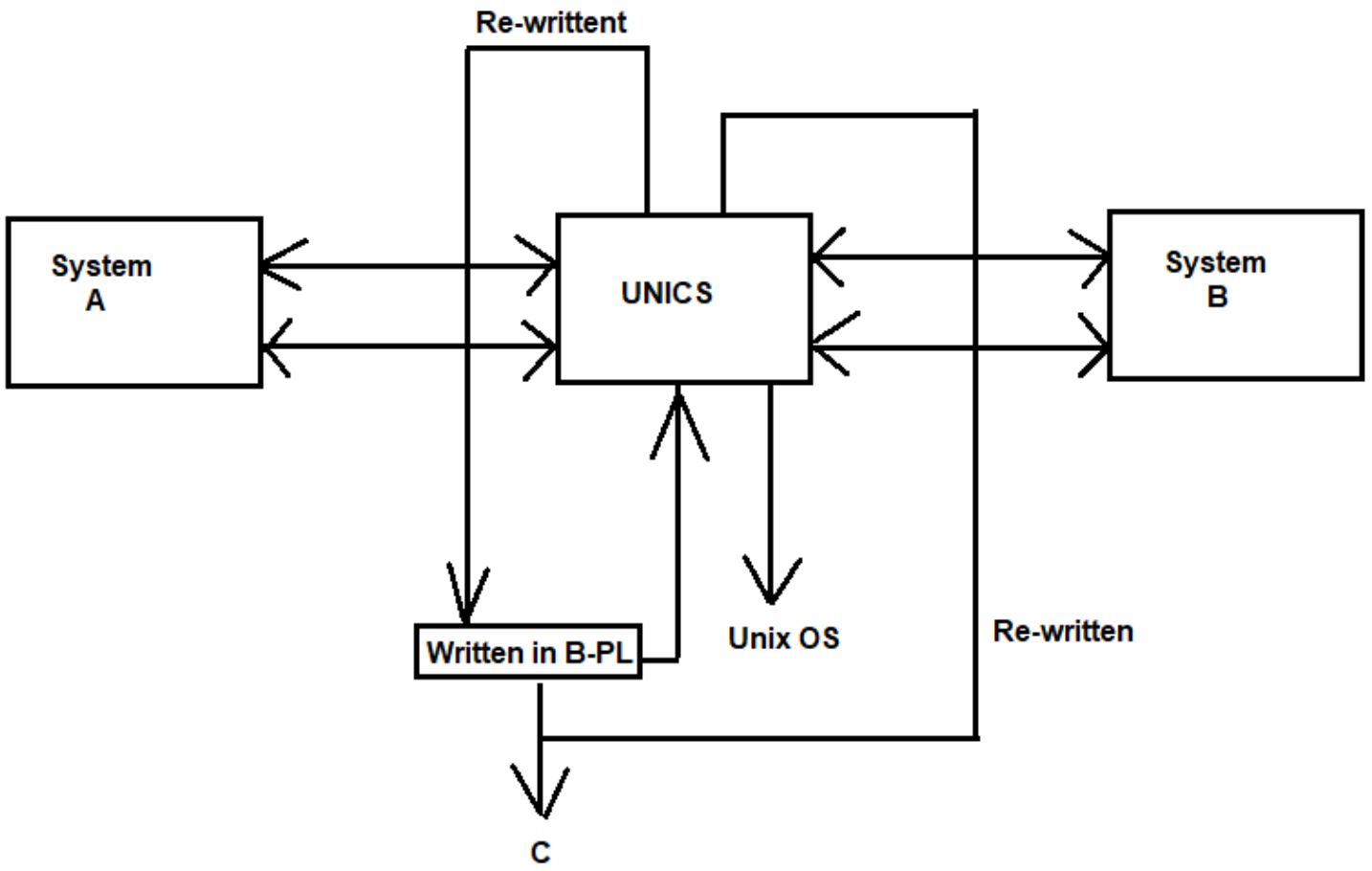
Linux is an Operating system which allow us to manage of hardware and software[Application] in effective way.

# Linux vs Unix

In around 1950 communication system was unidirectional, to convert that unidirectional communication to bi-directional control system unics is written.

Unics was initially written in B-PL/assembly

# Linux vs Unix



# free command

```
ubuntu $ free
               total        used        free      shared  buff/cache   available
Mem:         2030940      224580      576296        1016     1230064     1636500
Swap:        1048572           0     1048572
ubuntu $ free -m
               total        used        free      shared  buff/cache   available
Mem:            1983         236         430           0        1315        1553
Swap:           1023           0        1023
ubuntu $ free -g
               total        used        free      shared  buff/cache   available
Mem:               1           0           0           0           1           1
Swap:              0           0           0
```

# grep command

The grep command in Unix/Linux is used to search for text patterns within files. It's a powerful tool for filtering text data based on regular expressions

# lscpu

```
ubuntu $ lscpu
Architecture:                    x86_64
CPU op-mode(s):                  32-bit, 64-bit
Byte Order:                      Little Endian
Address sizes:                   39 bits physical, 48 bits virtual
CPU(s):                          1
On-line CPU(s) list:             0
Thread(s) per core:              1
Core(s) per socket:              1
Socket(s):                       1
NUMA node(s):                    1
Vendor ID:                       GenuineIntel
CPU family:                      6
Model:                           42
Model name:                      Intel Xeon E312xx (Sandy Bridge, IBRS update)
Stepping:                        1
CPU MHz:                         3504.000
BogoMIPS:                        7008.00
Hypervisor vendor:               KVM
```

```
ubuntu $ lscpu | grep CPU
CPU op-mode(s):                  32-bit, 64-bit
CPU(s):                          1
On-line CPU(s) list:             0
CPU family:                      6
CPU MHz:                         3504.000
NUMA node0 CPU(s):               0
Vulnerability Mds:               Mitigation; Clear CPU buffers; SMT Host state unknown
```

# top

```
top - 15:16:33 up 29 min,  0 users,  load average: 0.01, 0.03, 0.00
Tasks: 116 total,   1 running, 115 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,  0.3 sy,  3.3 ni, 96.3 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :   1983.3 total,    373.1 free,    244.8 used,   1365.4 buff/cache
MiB Swap:   1024.0 total,   1024.0 free,      0.0 used.   1546.0 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   1156 root      20   0   10832   2108   1112 S   0.3   0.1   0:00.04 kc-terminal
   2678 root      39  19  836068  48764  29416 S   0.3   2.4   0:01.75 node
      1 root      20   0  103944  13012   8384 S   0.0   0.6   0:02.40 systemd
      2 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kthreadd
      3 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_gp
      4 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 rcu_par_gp
      6 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 kworker/0:0H-e
      8 root       0 -20       0      0      0 I   0.0   0.0   0:00.00 mm_percpu_wq
      9 root      20   0       0      0      0 S   0.0   0.0   0:00.17 ksoftirqd/0
     10 root      20   0       0      0      0 I   0.0   0.0   0:00.23 rcu_sched
     11 root      rt   0       0      0      0 S   0.0   0.0   0:00.00 migration/0
     12 root     -51   0       0      0      0 S   0.0   0.0   0:00.00 idle_inject/0
     14 root      20   0       0      0      0 S   0.0   0.0   0:00.00 cpuhp/0
     15 root      20   0       0      0      0 S   0.0   0.0   0:00.00 kdevtmpfs
```

# df command

The df (disk free) command in Unix/Linux is used to display information about the file system's disk space usage. It provides a quick overview of how much space is available on each mounted filesystem.

```
ubuntu $ df
Filesystem     1K-blocks    Used Available Use% Mounted on
udev              997952       0    997952   0% /dev
tmpfs             203096    1012    202084   1% /run
/dev/vda1       20134592 4812344  15305864  24% /
tmpfs            1015468       0   1015468   0% /dev/shm
tmpfs               5120       0      5120   0% /run/lock
tmpfs            1015468       0   1015468   0% /sys/fs/cgroup
/dev/loop0         69504   69504         0 100% /snap/lxd/22753
/dev/loop1         64768   64768         0 100% /snap/core20/1634
/dev/vda15        106858    5313    101545   5% /boot/efi
/dev/loop3         39808   39808         0 100% /snap/snapd/21759
/dev/loop4         65536   65536         0 100% /snap/core20/2318
/dev/loop5         94208   94208         0 100% /snap/lxd/29619
tmpfs             203092       0    203092   0% /run/user/0
```