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WALCHAND LINUX USERS' GROUP



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SEATS

LINUXDIARY 5.0

EXPLORE THE LINUX REALM

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KICKOFF**

10
AUG

Session 02:
**ROUTE TO
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WARGAMES

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Basic and Advanced Linux Commands

Basic Commands

◆ **pwd**

Print Working Directory

```
● ○ ●  
$ pwd
```

◆ **ls**

List directory contents

-l: Long listing format

-a: Include hidden files

-h: Human-readable file sizes

```
● ○ ●  
$ ls  
$ ls -l  
$ ls -a  
$ ls -h
```

Basic Commands

cd

Change Directory



```
$ cd Desktop/
```

mkdir

Make Directory

-p: Create parent
directories as needed



```
$ mkdir Linux/
```

```
$ mkdir -p LinuxFamily/Arch
```

Basic Commands

◆ touch

Create an empty file

```
● ● ●  
$ touch file.txt  
  
$ touch file1.txt file2.txt
```

◆ mv

Move or Rename files or
directories

```
● ● ●  
$ mv oldName newName  
  
$ mv file destination/
```

Basic Commands

cp

Copy files or directories

-r: Copy directories recursively

```
$ cp file.txt Directory
$ cp -r Directory1 Directory2
```

cat

Concatenate and display file content

-n: Number all output lines

```
$ cat file.txt
$ cat -n file.txt
```

Basic Commands

◆ rm

Remove file or directory

-r: Remove directories and their contents recursively

```
$ rm file.txt
```

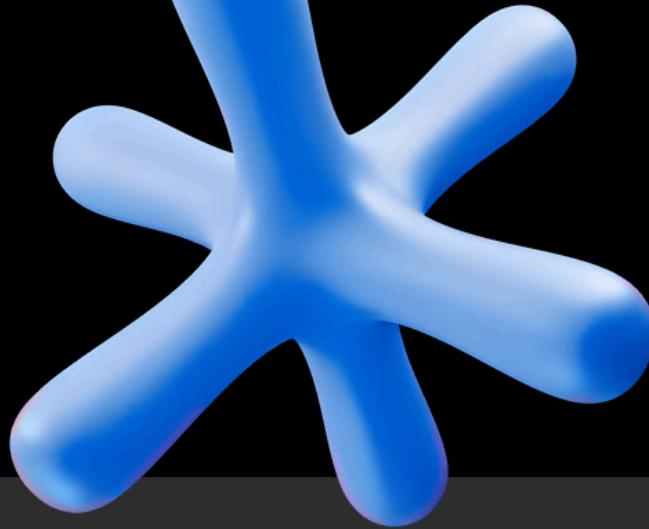
```
$ rm -r Document
```

◆ rmdir

Remove an empty directory

```
$ rmdir Directory_name
```

Basic Commands



◆ help

Provide information on built-in commands



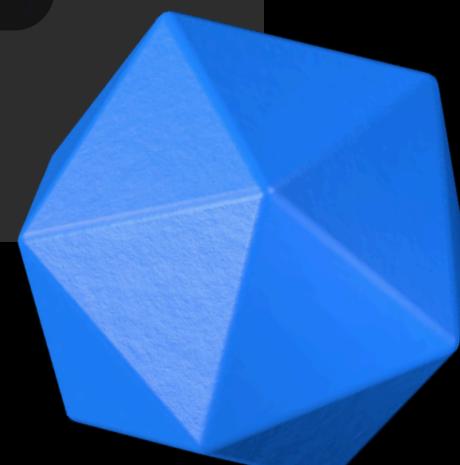
```
$ commandName --help
```

◆ man

Display the manual pages for other commands and utilities



```
$ man commandName
```



Advanced Commands

grep

Search text using patterns

- i: Ignore case distinctions
- n: Display line numbers

```
$ grep "LinuxDiary" file.txt  
  
$ grep -i "LinuxDiary" file.txt  
  
$ grep -n "LinuxDiary" file.txt
```

find

Search for files in a directory hierarchy

- name: Search by file name

```
$ find -name fileName.ext
```

Advanced Commands



♦ tar

Archive files

-c: Create a new archive

-x: Extract files from an archive

```
$ tar cvf name.tar file_path
```

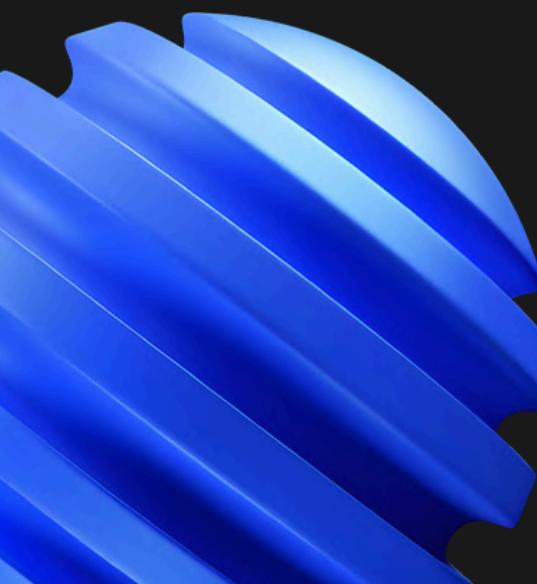
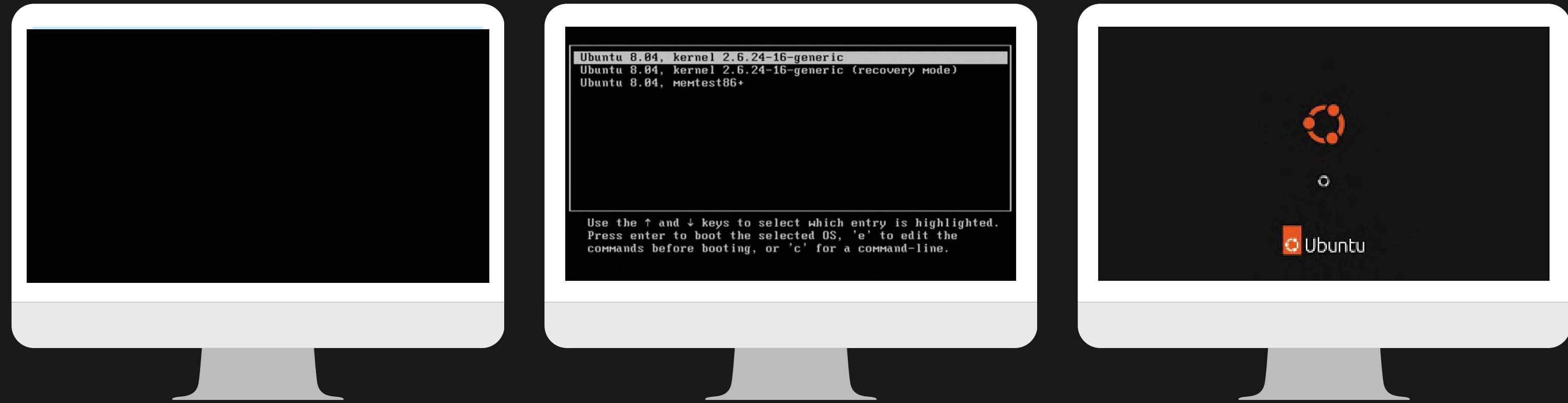
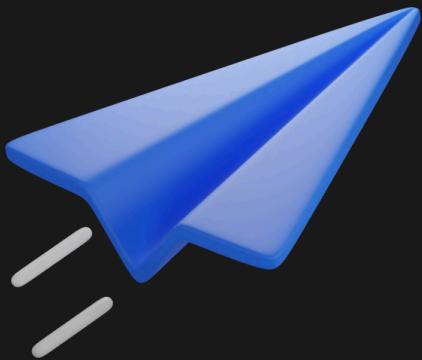
```
$ tar xvf name.tar file_path
```

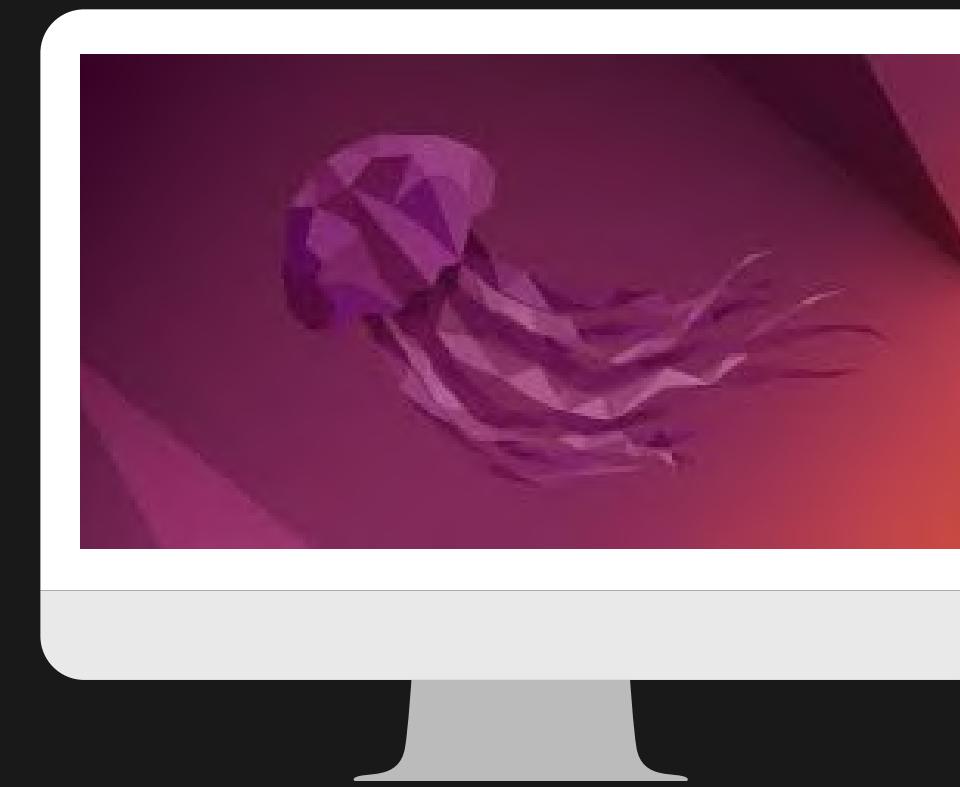
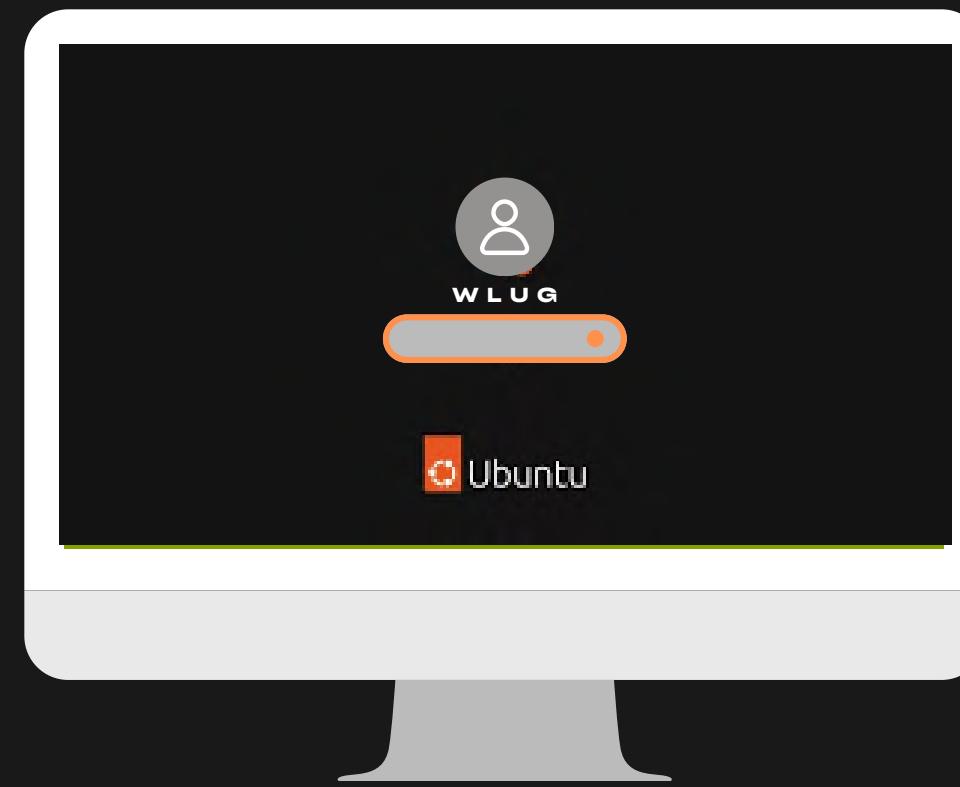
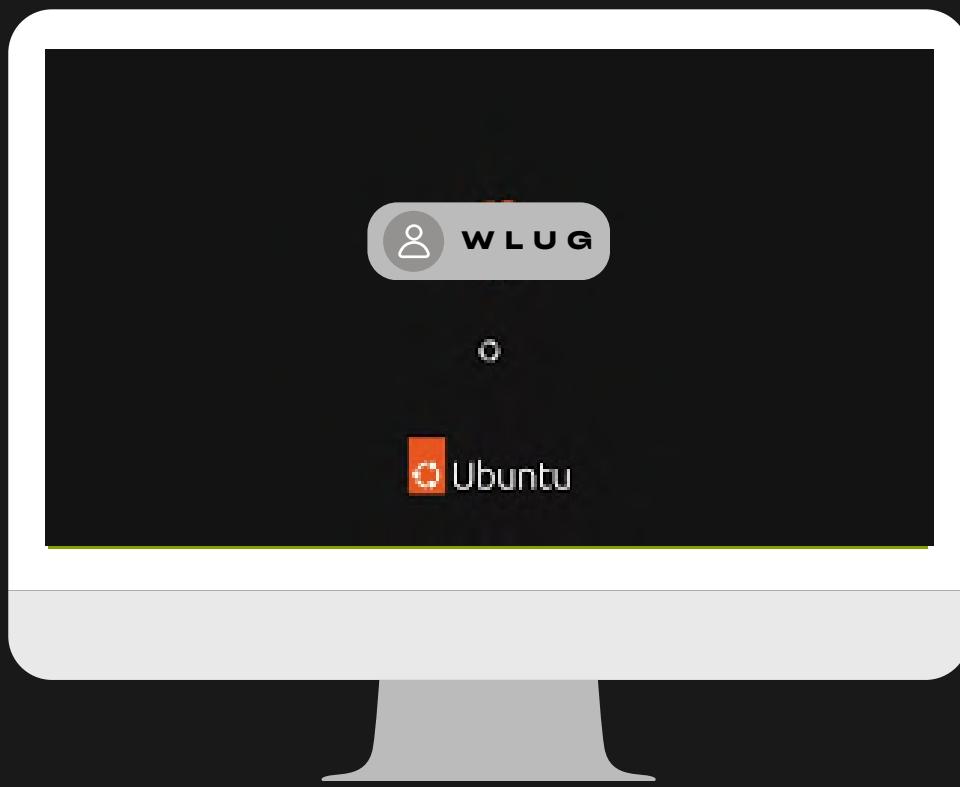
♦ zip and unzip

Compress or Expand a file or
a list of files in Linux

```
$ zip archive_name.zip file1 directory
```

What is
Bo^{power}ting?

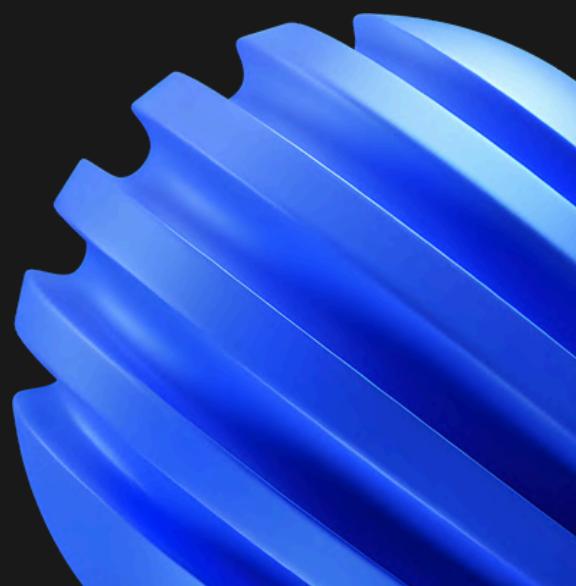




4

5

6



Booting Process

Process of switching on the computer and loading the operating system from a secondary memory to the main memory

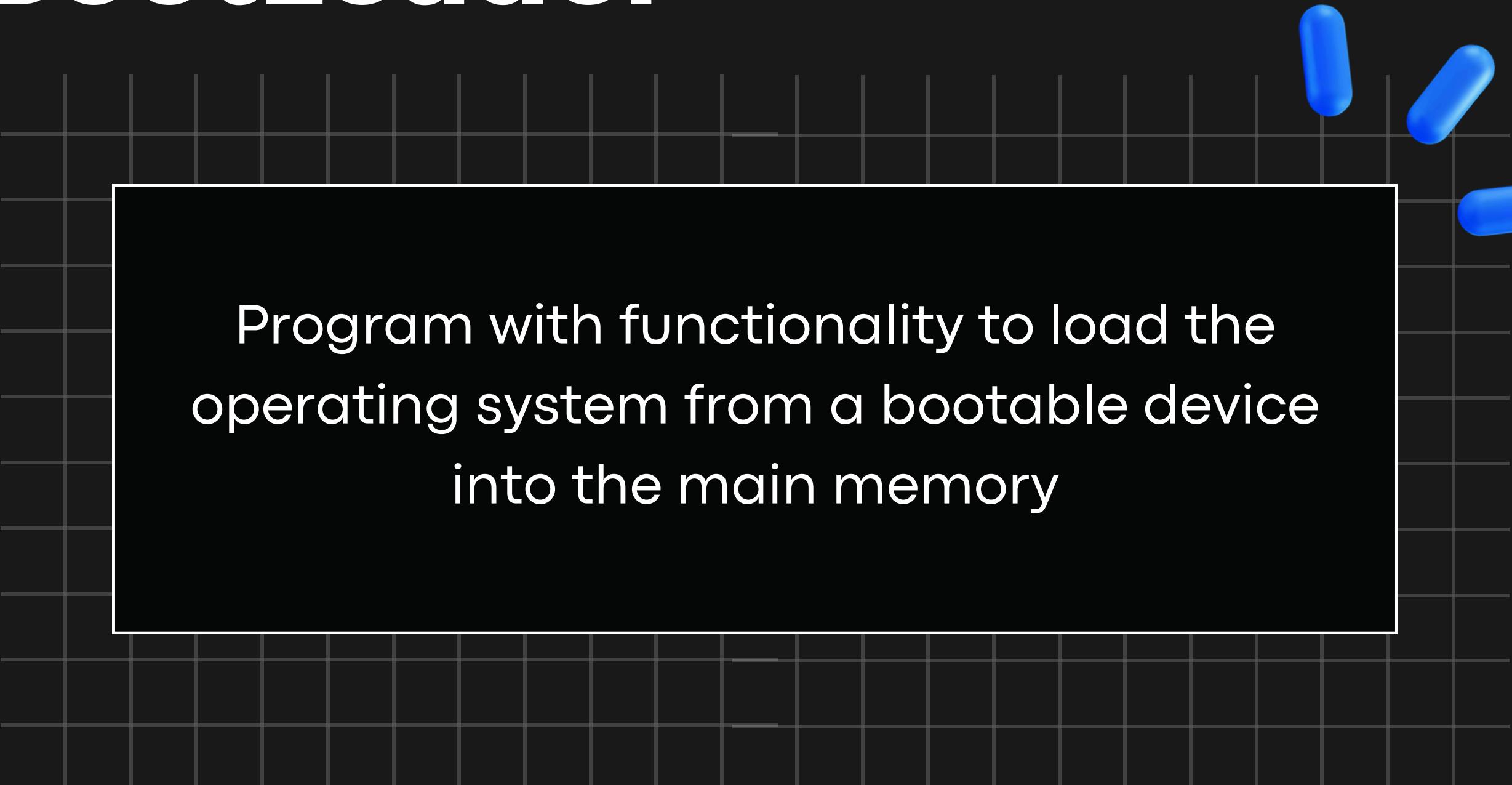
Boot Devices

Device from which operating system is loaded

Ex. Hard disk drive, optical disk, floppy disk

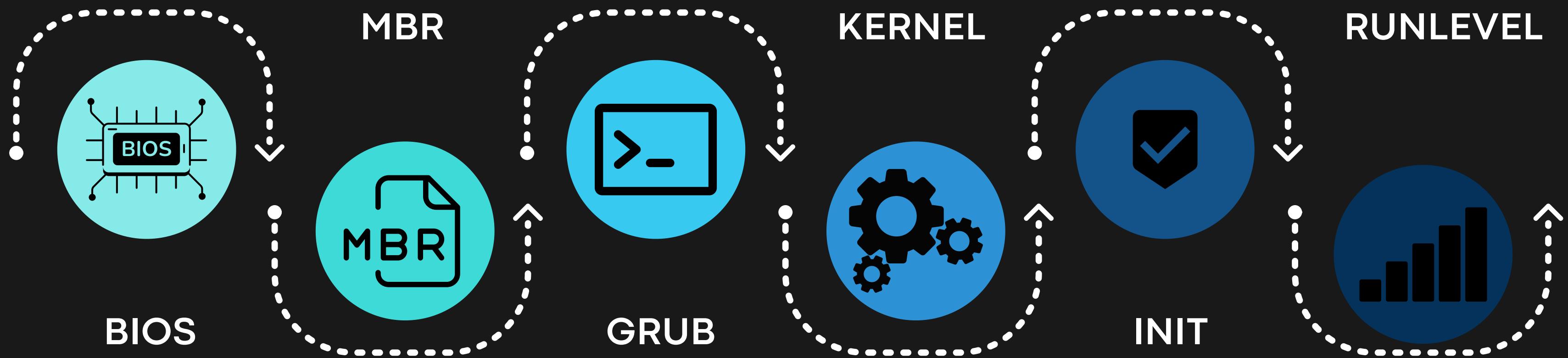


BootLoader



Program with functionality to load the operating system from a bootable device into the main memory

BOOTING SEQUENCE



+++

BIOS

- ◆ Basic Input Output System
- ◆ Performs the POST (Power-On-Self-Test)
- ◆ Checks for a bootable device
- ◆ Searches for the bootloader and passes control to it

PhoenixBIOS Setup Utility

Main Advanced Security **Boot** Exit

+ Hard Drive
+ Removable Devices
CD-ROM Drive
Network boot from AMD Am79C970A

Item Specific Help

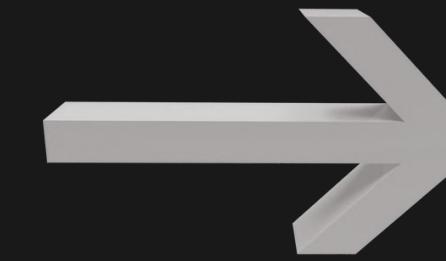
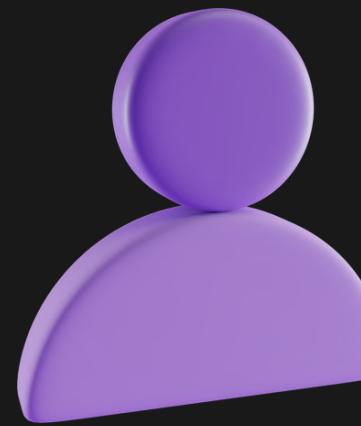
Keys used to view or configure devices:
<Enter> expands or collapses devices with a + or -
<Ctrl+Enter> expands all
<+> and <-> moves the device up or down.
<n> May move removable device between Hard Disk or Removable Disk
<d> Remove a device that is not installed.

F1 Help F2 Select Item F3 Change Values F9 Setup Defaults
Esc Exit F4 Select Menu Enter F5 Select Sub-Menu F10 Save and Exit

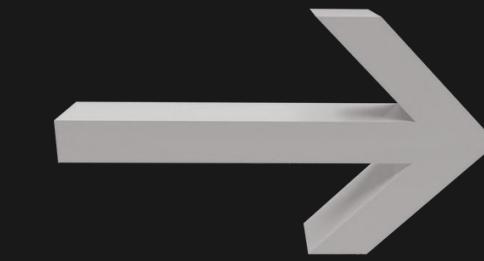
MBR

- ❖ Master Boot Record
- ❖ First sector of the bootable device with a size of 512 bytes
- ❖ Information for the bootloader to locate and load the OS
- ❖ It loads the bootloader into the memory and passes control to it

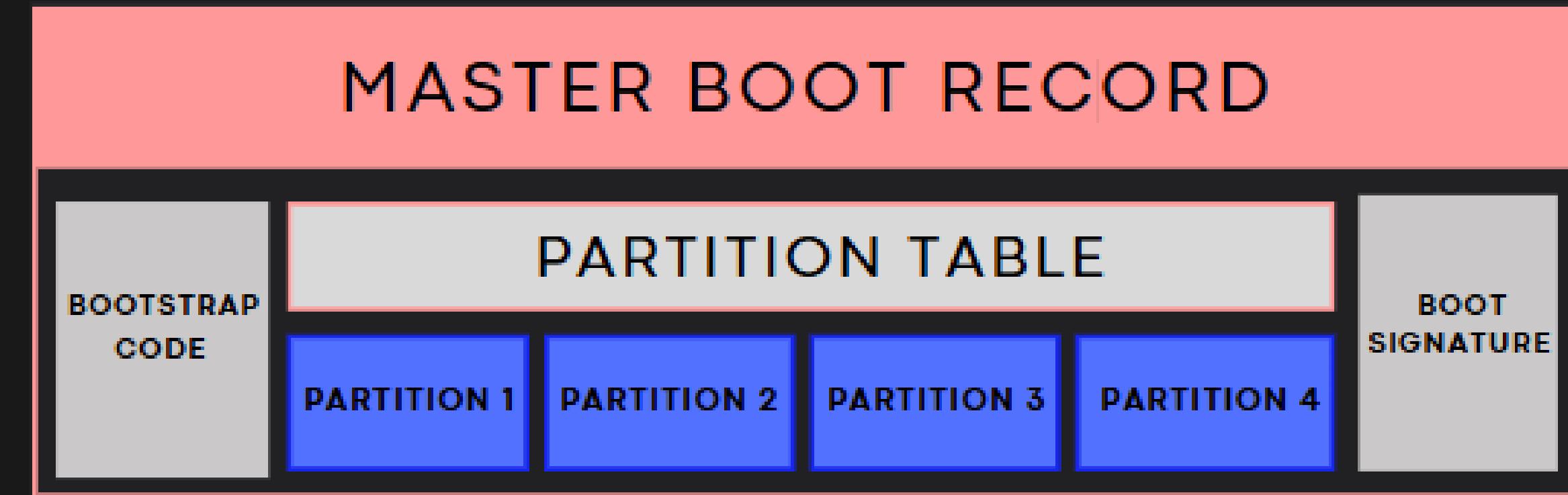
BIOS



MBR



BOOTLOADER



GRUB

- ◆ Grand Unified Bootloader
- ◆ Displays all available kernel images
- ◆ The grub configuration file is present at /boot/grub/grub.cfg
- ◆ Loads and executes the operating system's kernel and initrd / initramfs images

Ubuntu 8.04, kernel 2.6.24-16-generic
Ubuntu 8.04, kernel 2.6.24-16-generic (recovery mode)
Ubuntu 8.04, memtest86+
Other operating systems:
Windows Vista/Longhorn (loader)

Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the
commands before booting, or 'c' for a command-line.

The highlighted entry will be booted automatically in 4 seconds.

KERNEL

- ◆ Starts the process of initializing the system
- ◆ Loads temporary root file system using initrd / initramfs images
- ◆ Uses temporary file system to load the root file system
- ◆ Initialization of the first process called 'Init'

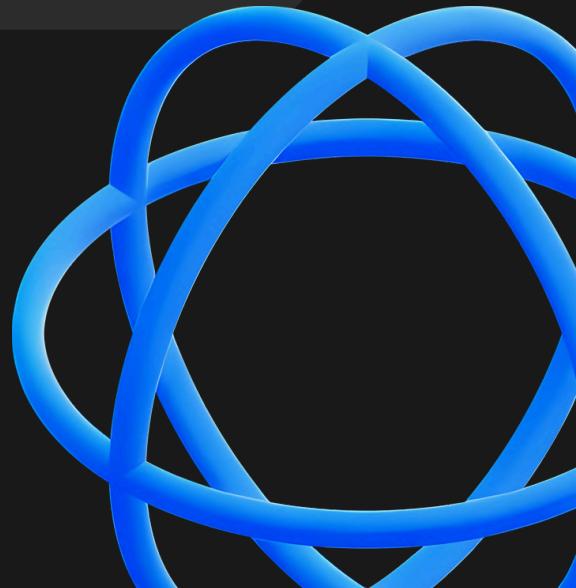


+++

INIT

- ◆ First process to start when the computer boots up
- ◆ Initializes all the system functions and processes
- ◆ The init configuration file is located at /etc/init

+++



RUNLEVEL

- ❖ Runlevel is a mode or state in which a Linux system operates
- ❖ Used to determine which system services and processes are started during booting
- ❖ Runlevels are numbered from 0 to 6

Types of Booting

Cold Booting

- ◆ Start
- ◆ Full system initialization
- ◆ Slow
- ◆ POST is performed

Warm Booting

- ◆ Restart
- ◆ Partial initialization
- ◆ Fast
- ◆ POST is not performed

BIOS

vs

UEFI

- ◆ Basic Input Output System
- ◆ Used in older systems
- ◆ Uses MBR
- ◆ Supports drives upto 2TB of size

- ◆ Unified Extensible Firmware Interface
- ◆ Used in modern systems
- ◆ Uses GPT
- ◆ Supports drives upto 9.4 ZB of size

+++

BIOS

VS

UEFI

PhoenixBIOS Setup Utility

Main Advanced Security Boot Exit

+Hard Drive
+Removable Devices
CD-ROM Drive
Network boot from AMD Am79C970A

Item Specific Help

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<Ctrl+Enter> expands all
<+> and <-> moves the device up or down.
<n> May move removable device between Hard Disk or Removable Disk
<d> Remove a device that is not installed.

F1 Help ↑ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

ASUS UEFI BIOS Utility - Advanced Mode

06/13/2016 13:51 | English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Quick Note(F9) Hot Keys

My Favorites Main Ai Tweaker Advanced Monitor Boot Tool Exit

Target CPU Turbo-Mode Frequency : 4200MHz
Target CPU @ AVX Frequency : 4200MHz
Target DRAM Frequency : 2800MHz
Target Cache Frequency : 2800MHz
Target DMI/PEG Frequency : 100MHz

Ai Overclock Tuner: Manual
CPU Strap: 100MHz
Source Clock Tuner: Auto
PLL Selection: Auto
Filter PLL: Auto
BCLK Frequency: 100.0
Initial BCLK Frequency: Auto
ASUS MultiCore Enhancement: Auto

Hardware Monitor

CPU

Frequency	Temperature
3000 MHz	31°C
BCLK	Core Voltage
100.0 MHz	1.250 V
Ratio	
30x	

Memory

Frequency	Vol_CHAB
2800 MHz	1.356 V
Capacity	Vol_CHCD
16384 MB	1.353 V

Voltage

+12V	+5V
12.096 V	4.960 V
+3.3V	
3.248 V	

[Manual]: When the manual mode is selected, the BCLK(base clock) frequency can be assigned manually.
[XMP]: When the XMP(extreme memory profile) mode is selected, the BCLK frequency and memory parameters will be optimized automatically.

Last Modified EzMode(F7) Search on FAQ
Version 2.17.1246. Copyright (C) 2016 American Megatrends, Inc.

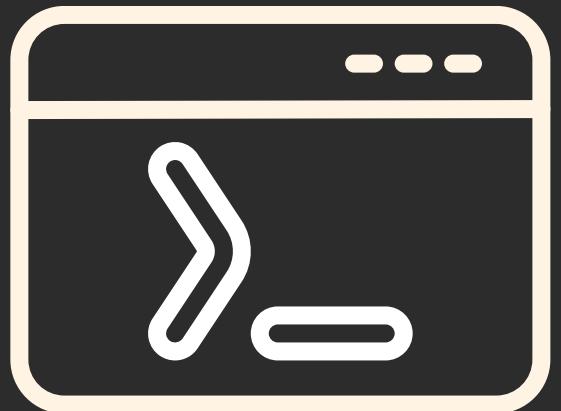
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Text Editors

- ❖ Software for editing plain text files
- ❖ Used for writing and editing code
- ❖ Creates and modifies configuration files
- ❖ Handles other text-based documents

Types of Text Editors



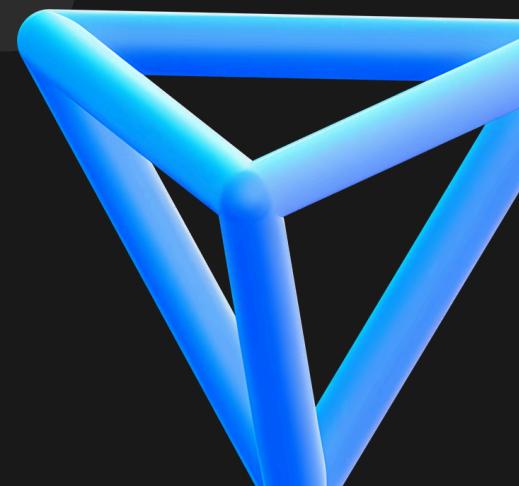
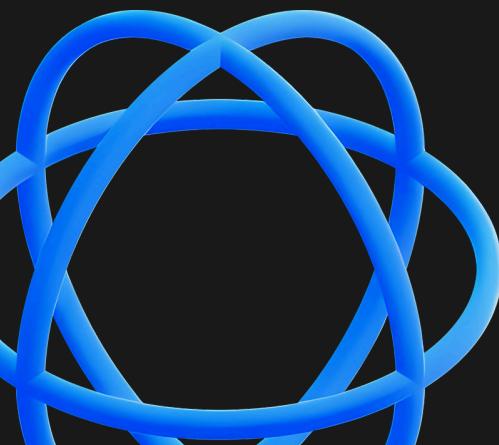
CLI

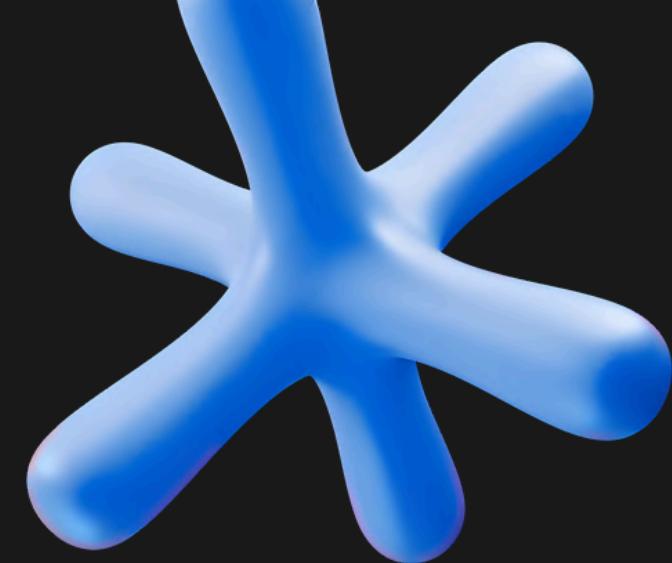
Vi/Vim, Nano, Pico,
Emac etc.



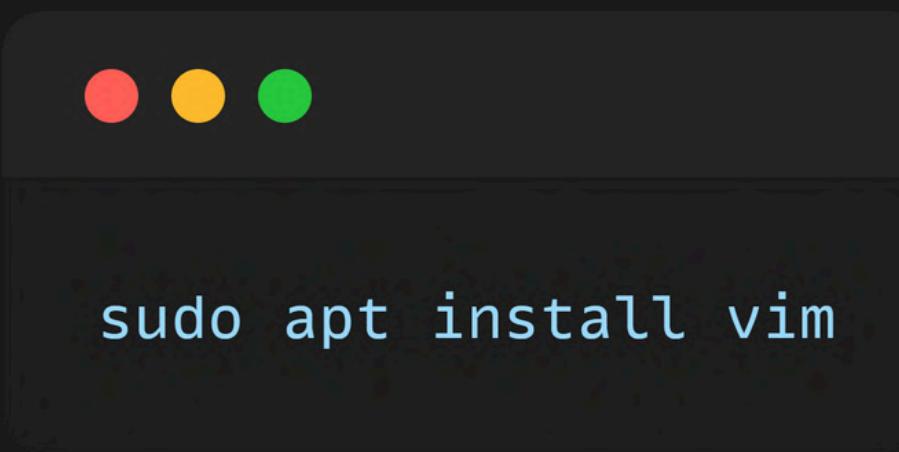
GUI

Gedit, Kate, Kwrite etc.





- ❖ Most powerful command line text editor
- ❖ Modes: COMMAND (default) INSERT ('i' key)



```
sudo apt install vim
```



```
:q // Exit
```

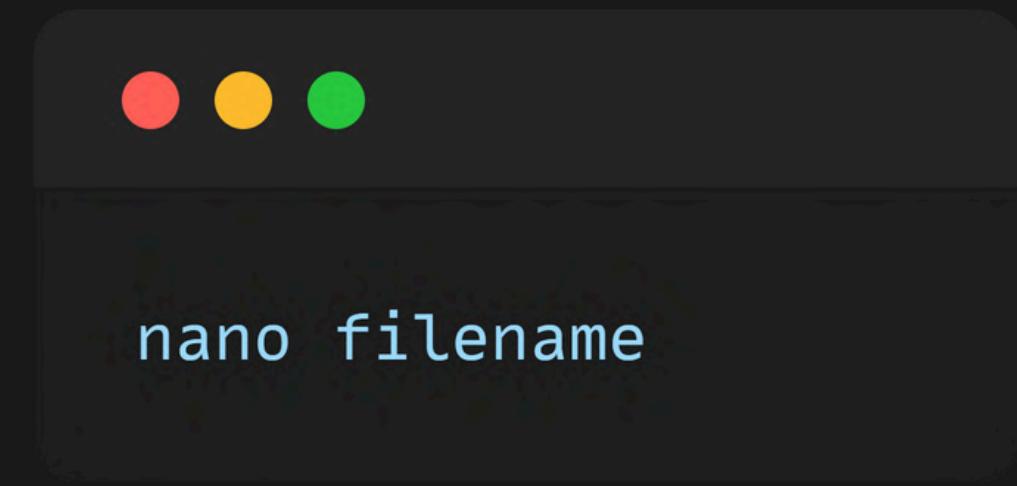
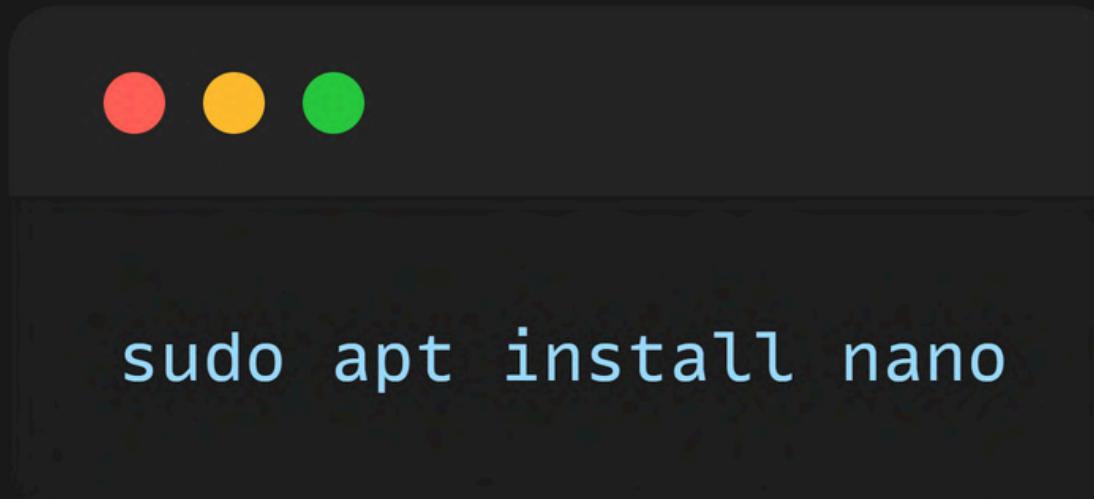


```
:wq // Save and Exit
```

```
:::  
iLE88Dj. :jD88888Dj:  
.LGitE888D.f8GjjjL8888E;  
iE :8888Et. .G8888.  
;i E888, ,8888,  
D888, :8888:  
D888, :8888:  
D888, :8888:  
D888, :8888:  
888W, :8888:  
W88W, :8888:  
W88W: :8888:  
DGGD: :8888:  
:8888:  
:W888:  
:8888:  
E888i  
tW88D
```

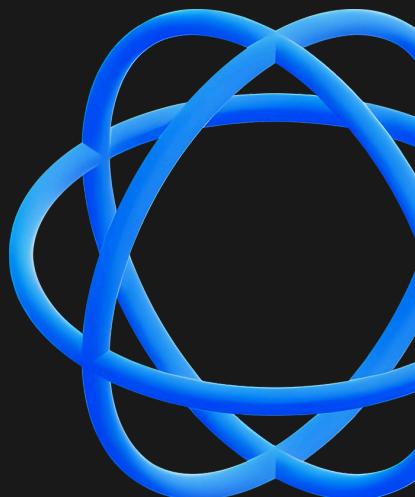
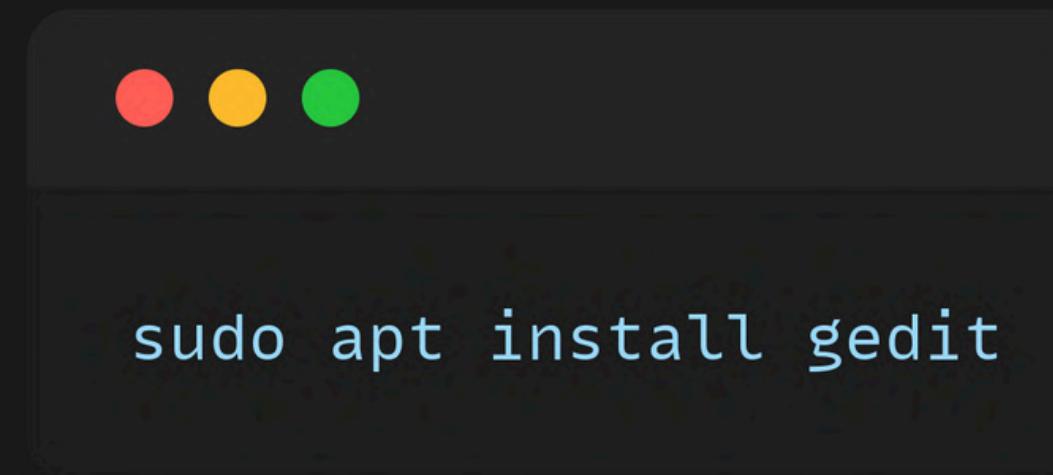
ano

- ❖ Command line text editor
- ❖ Popular for its simplicity and ease of use





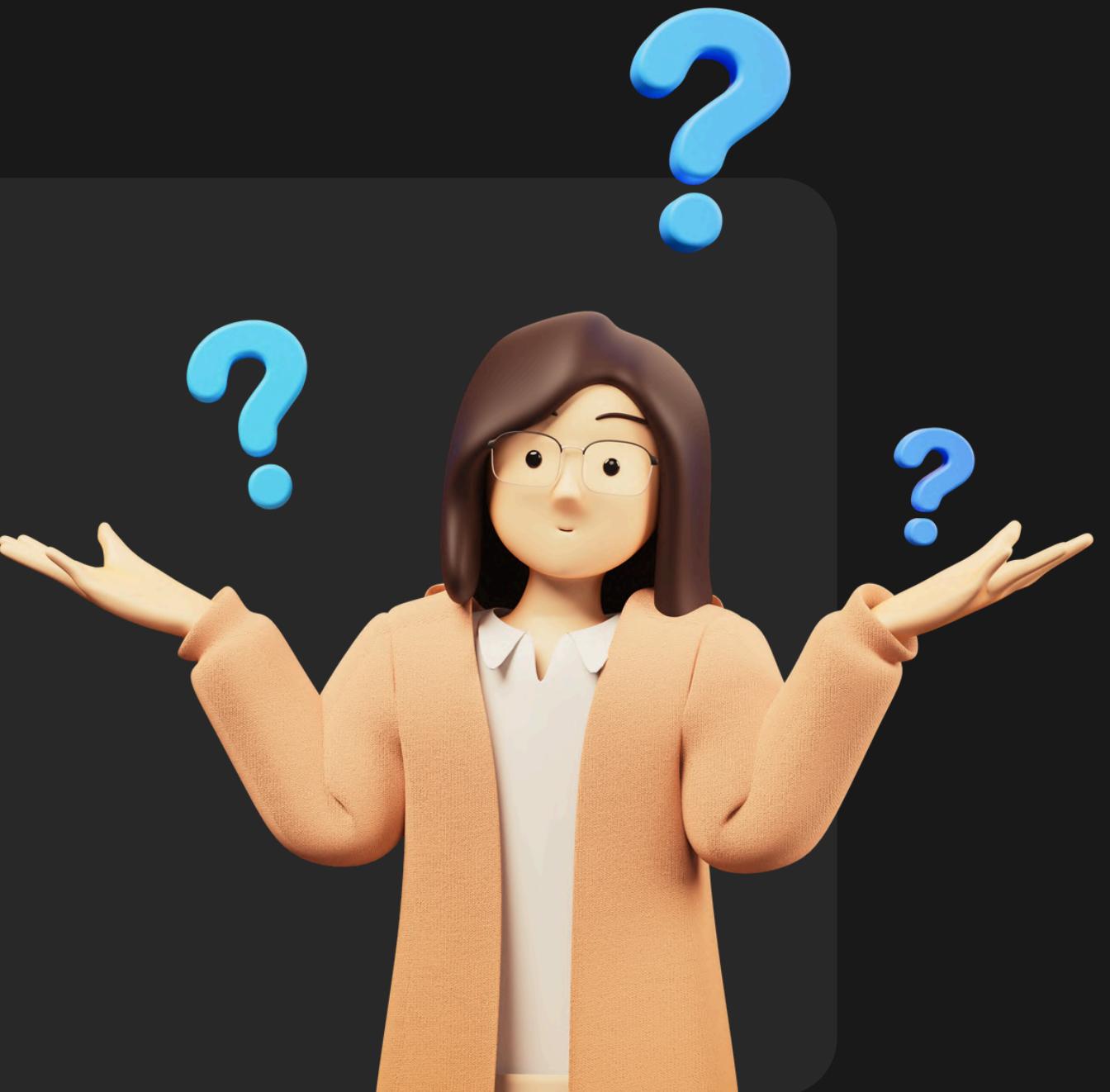
- ◆ Graphical text editor for GNOME desktop environment
- ◆ Clean and intuitive interface



Process Management

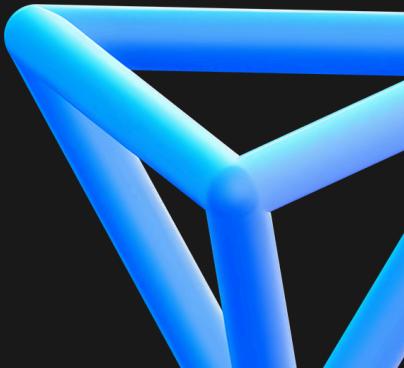
Contents

- ◆ What is a process?
- ◆ Process tree
- ◆ Forking and execute
- ◆ Types of processes
- ◆ Process management



What is a process?

- ❖ A running instance of a program
- ❖ Processes operates in isolation
- ❖ Processes start, run and stop
- ❖ The kernel manages a process



New



Stages of a process

Terminated



Ready



Waiting



Running





Roll no. 120

Process Identifiers

- ◆ A unique number
- ◆ Process - Process ID (PID)
- ◆ Parent process - Parent Process ID (PPID)
- ◆ Temporary in nature

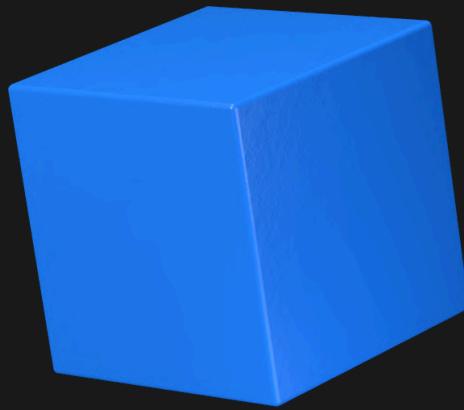
Present !



◆ What's my current process id?



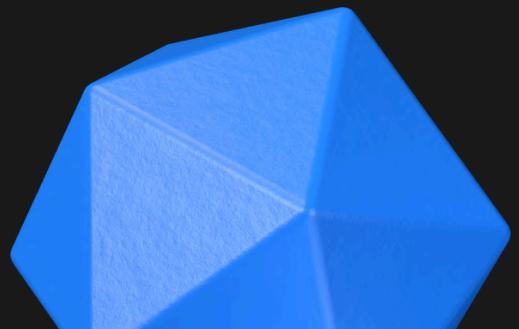
```
$ echo $$
```



◆ Who's my parent process?

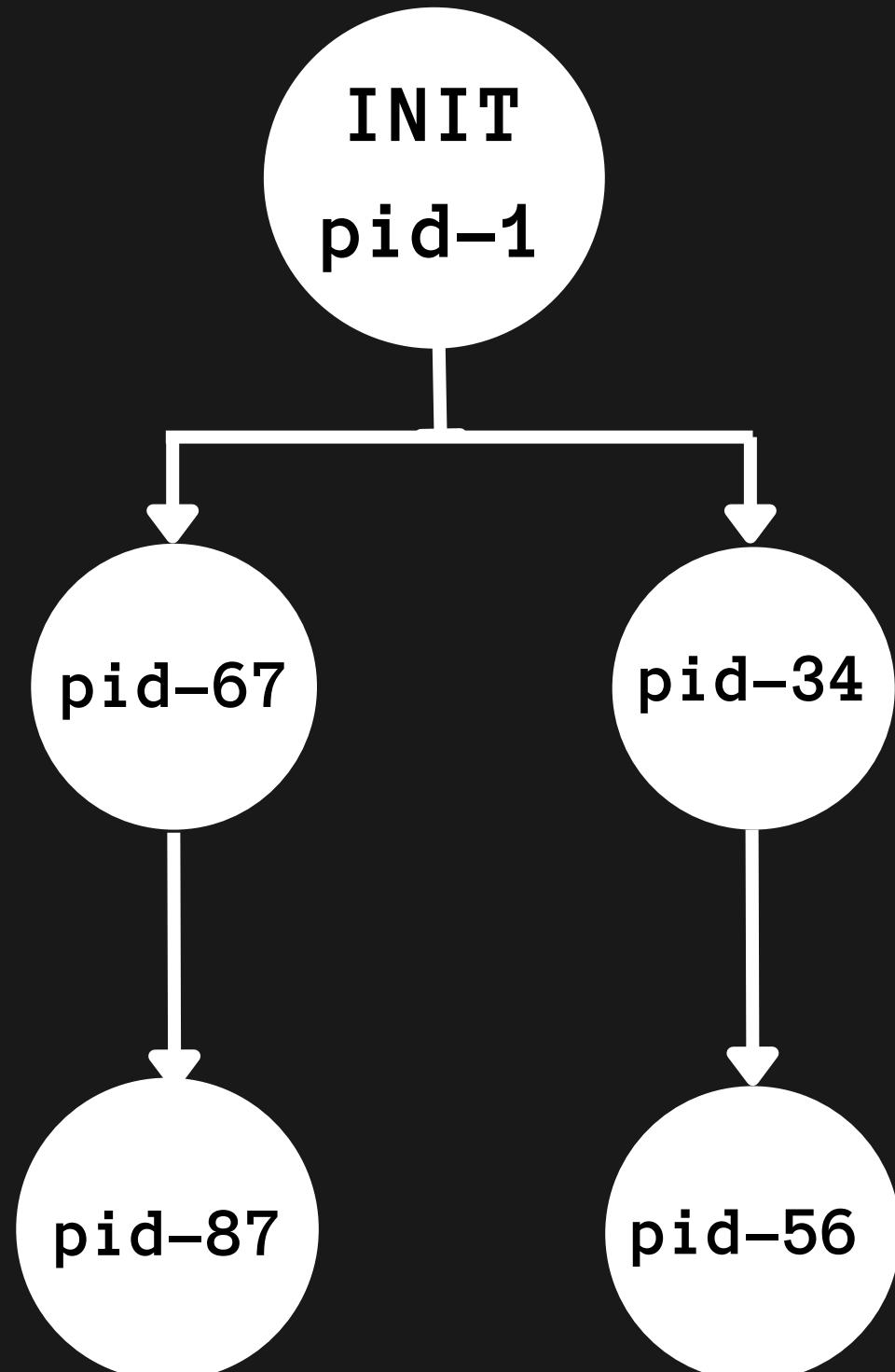


```
$ echo $PPID
```



Process Tree

- ◆ Displays process relationships
- ◆ Parent process creates child processes
- ◆ Init is the parent of all processes
- ◆ Use pstree command to view



◆ To display process tree



```
$ pstree
```

◆ To display PIDs



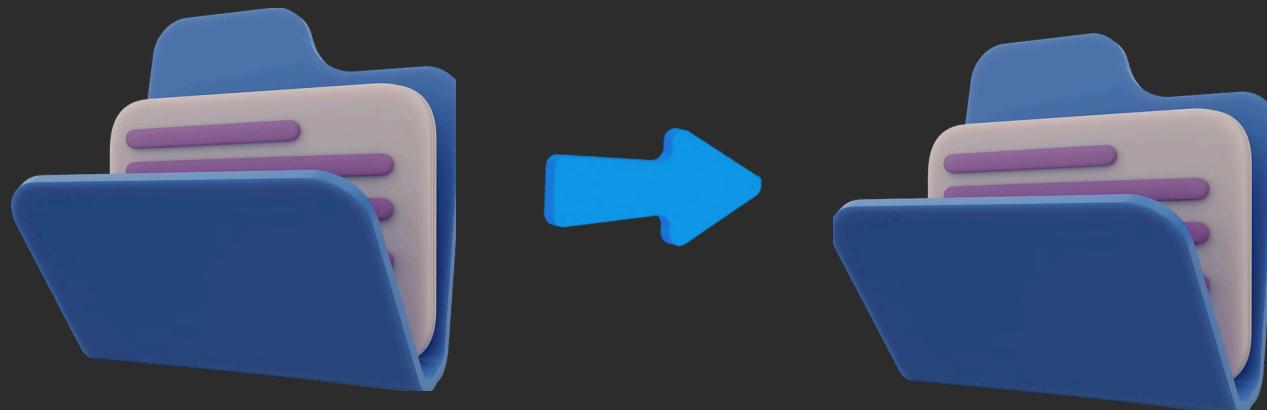
```
$ pstree -p
```

Zombie Process

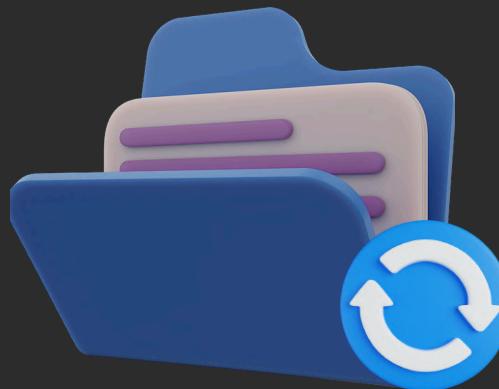
- ❖ Terminated child process
- ❖ Yet to be noticed by parent process
- ❖ Parent process collects it's exit status
- ❖ Done by invoking the wait() system call



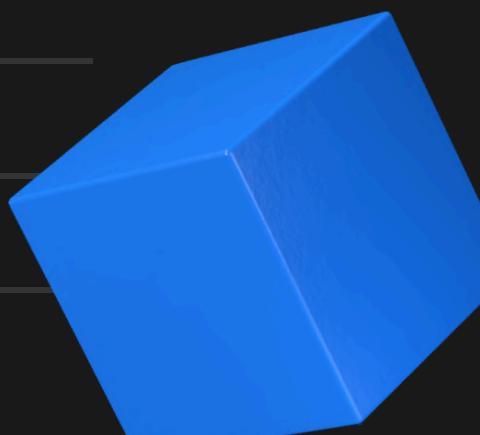
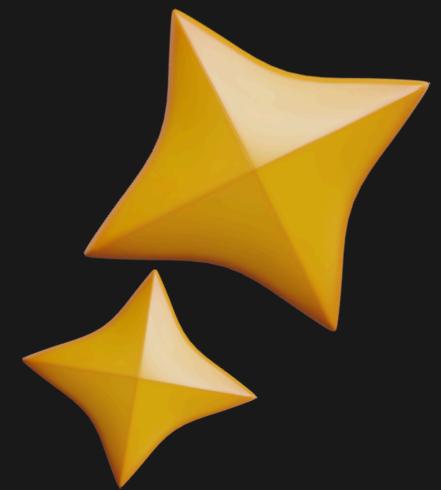
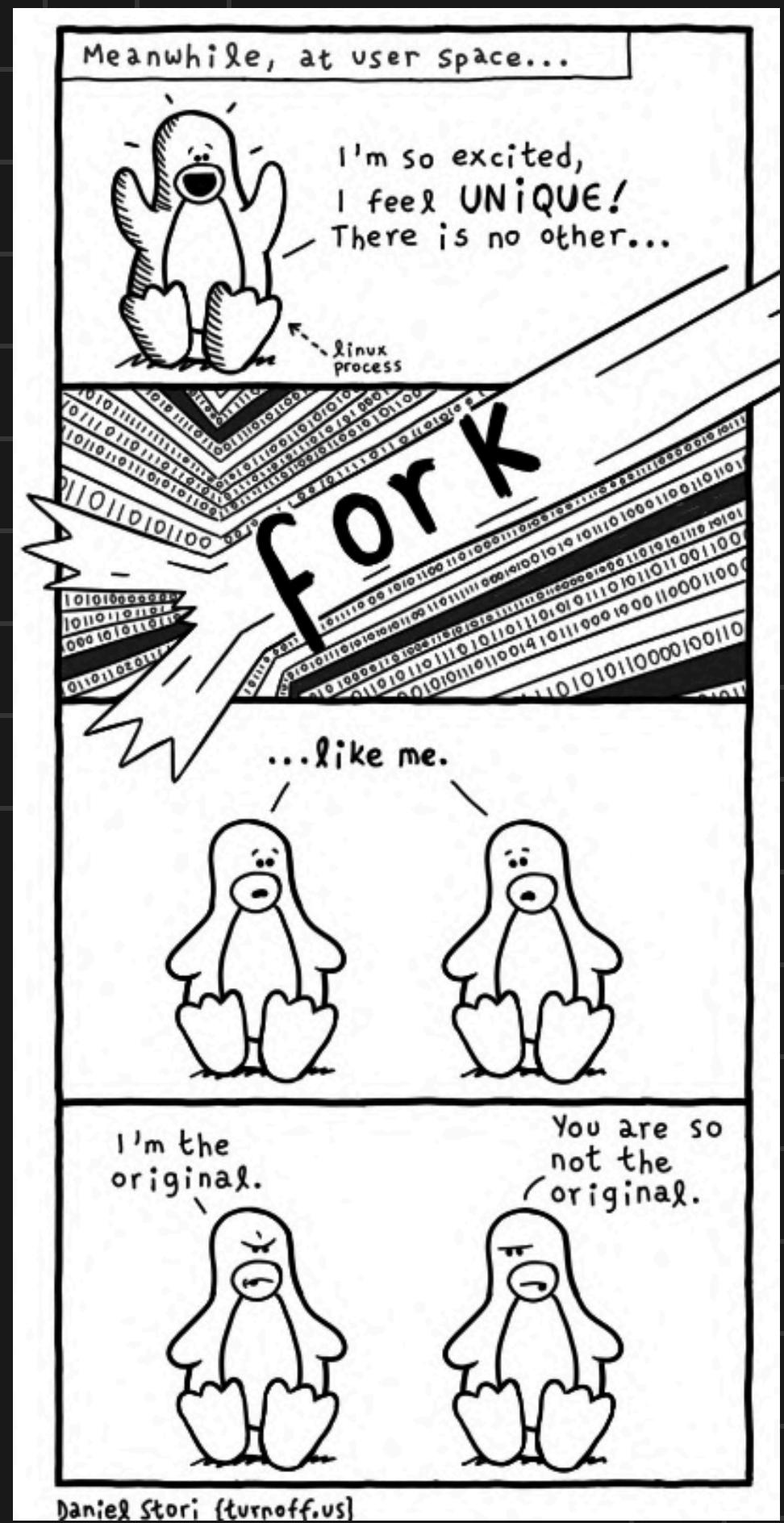
Forking & Execute



- ◆ Creates a copy of the current process
- ◆ System call - fork()



- ◆ Overwrites the existing copy of the process
- ◆ System call - exec()



Types of processes

Foreground process

- ◆ Requires user interaction
- ◆ Blocks other processes
- ◆ Commands run as foreground processes by default



Types of processes



Background process

- ❖ Independent of user interaction
- ❖ Starts in the background
- ❖ Add an (&) at the end to run the command in background

Process Management

- ◆ Organizing and prioritizing processes
- ◆ Improves efficiency
- ◆ Continuous cycle of improvement
- ◆ Enhances security



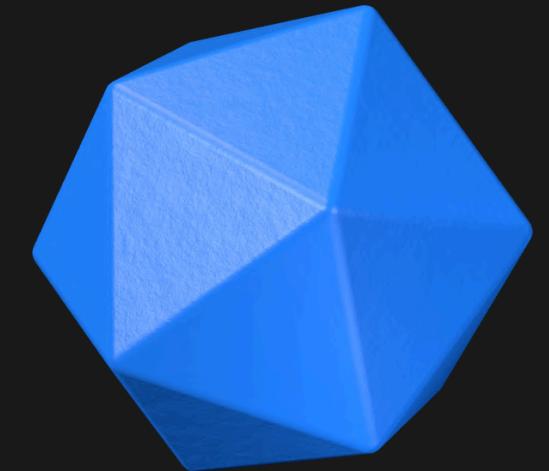
Command-Line Tools



- ◆ Displays a static snapshot of running processes when executed



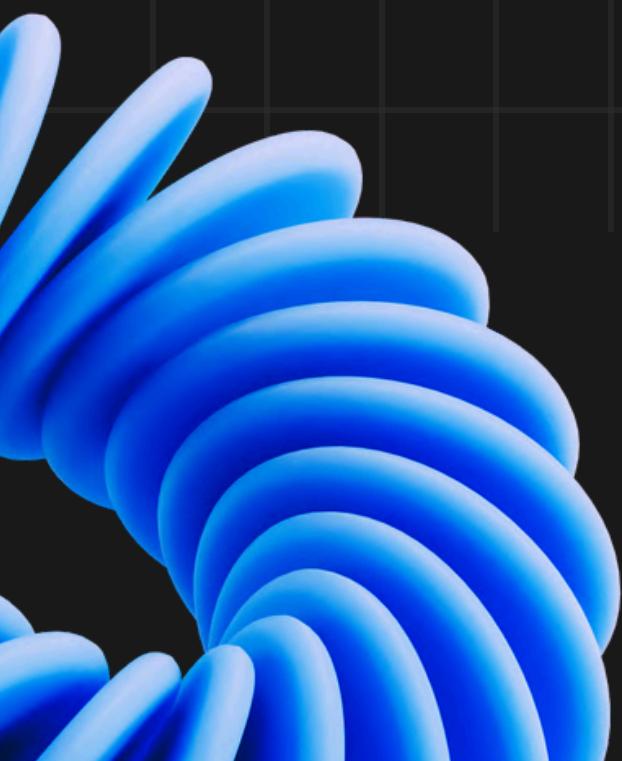
```
$ ps -ef
```

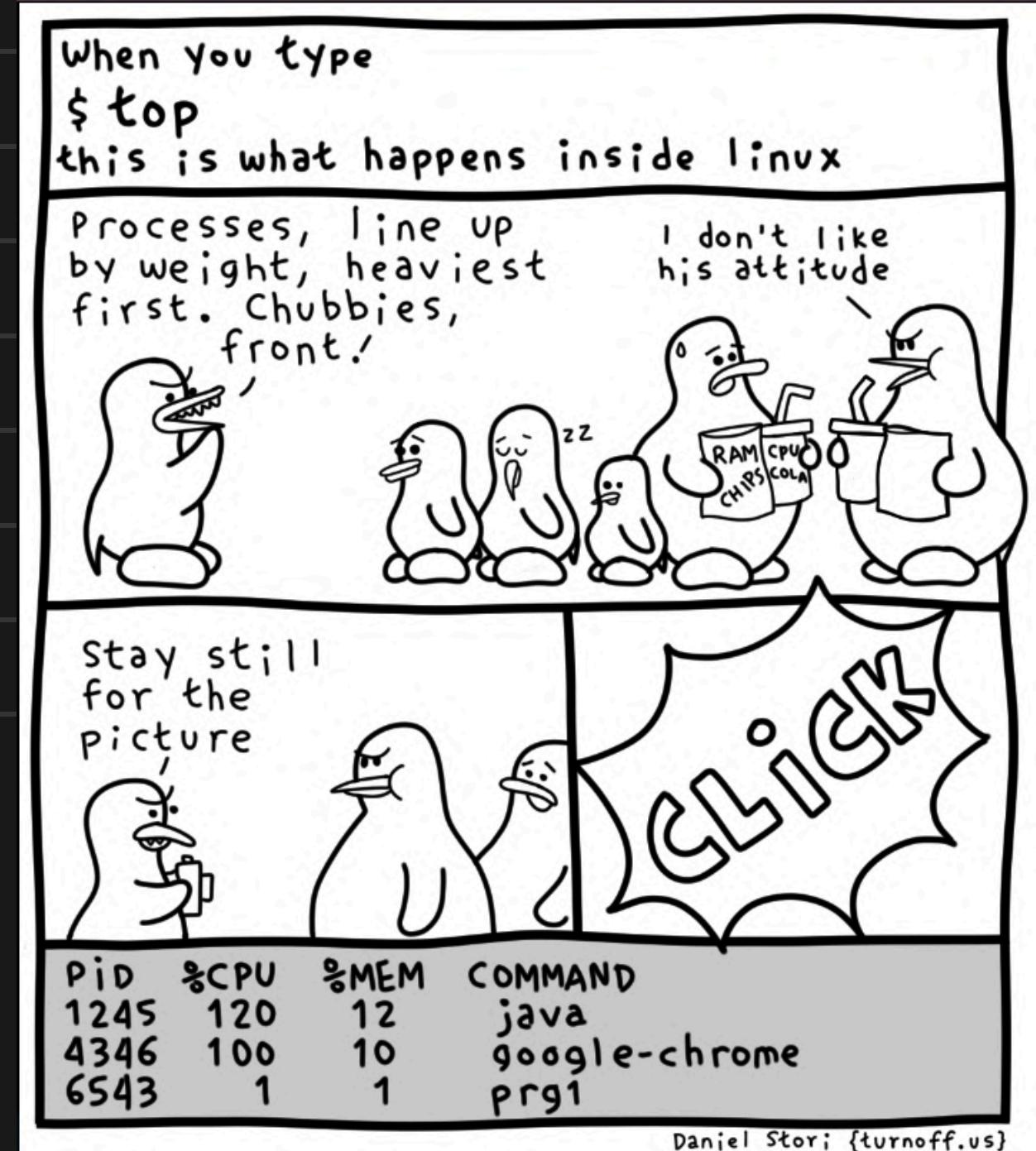


- ◆ Provides a real-time view of system processes



```
$ top
```





- ◆ Offers a user-friendly interface with color-coded and interactive elements



```
$ htop
```

- ◆ Lists background and suspended processes

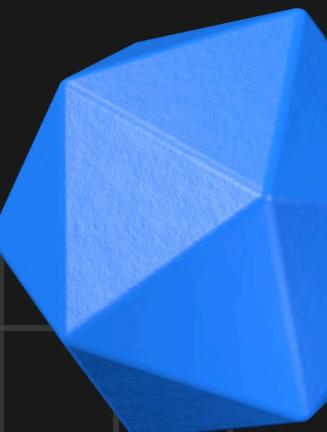


```
$ jobs
```

- ◆ Brings a background process to the foreground



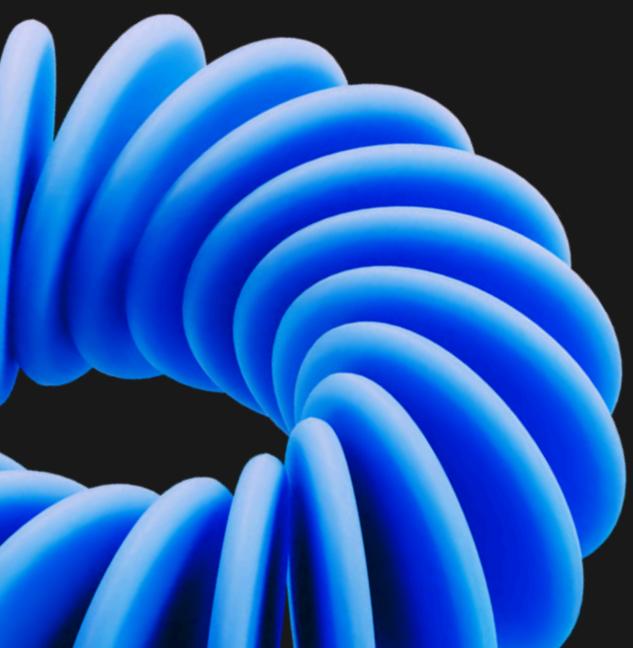
```
$ fg %[job_id]
```



- ◆ Sends a foreground process to the background



```
$ bg %[job_id]
```



- ◆ Finds the process ID (PID) of a running process based on its name



```
$ pidof [options] <program>
```

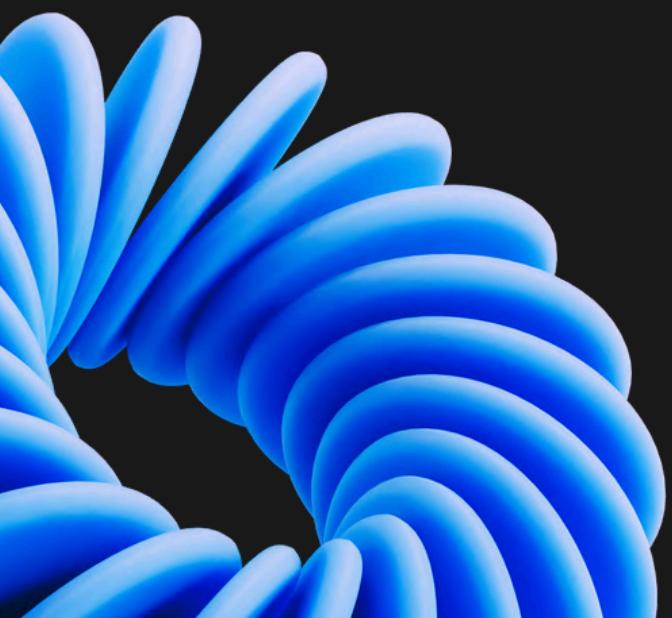
- ◆ Terminates a process by sending it a signal



```
$ kill [options] <pid> [....]
```

Fun Commands

- ❖ cowsay
- ❖ nyancat



Pipelining

Pipelining Mechanism

- Establishing data flow between processes
- This is done through pipe '|'
- Syntax

command_1 | command_2 | ... | command_N

Examples



```
$ ps -ef | grep bash
```



```
$ sl | lolcat
```

Thank You!