

WLUG PRESENTS

LinuxDiary 3.0



LinuxDiary 3.0

**Day 1
Session 1**

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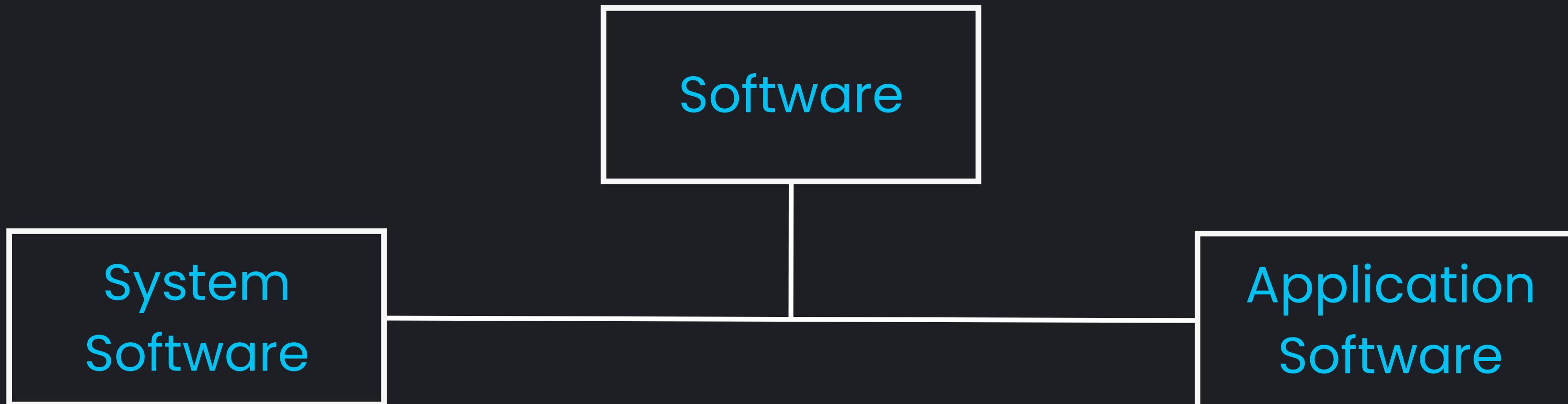


- ▶ Open Source Softwares
- ▶ Introduction to Linux world
- ▶ Understanding Kernel
- ▶ Applications
- ▶ Distributions



Softwares

Softwares are set of instructions that tell computer how to work



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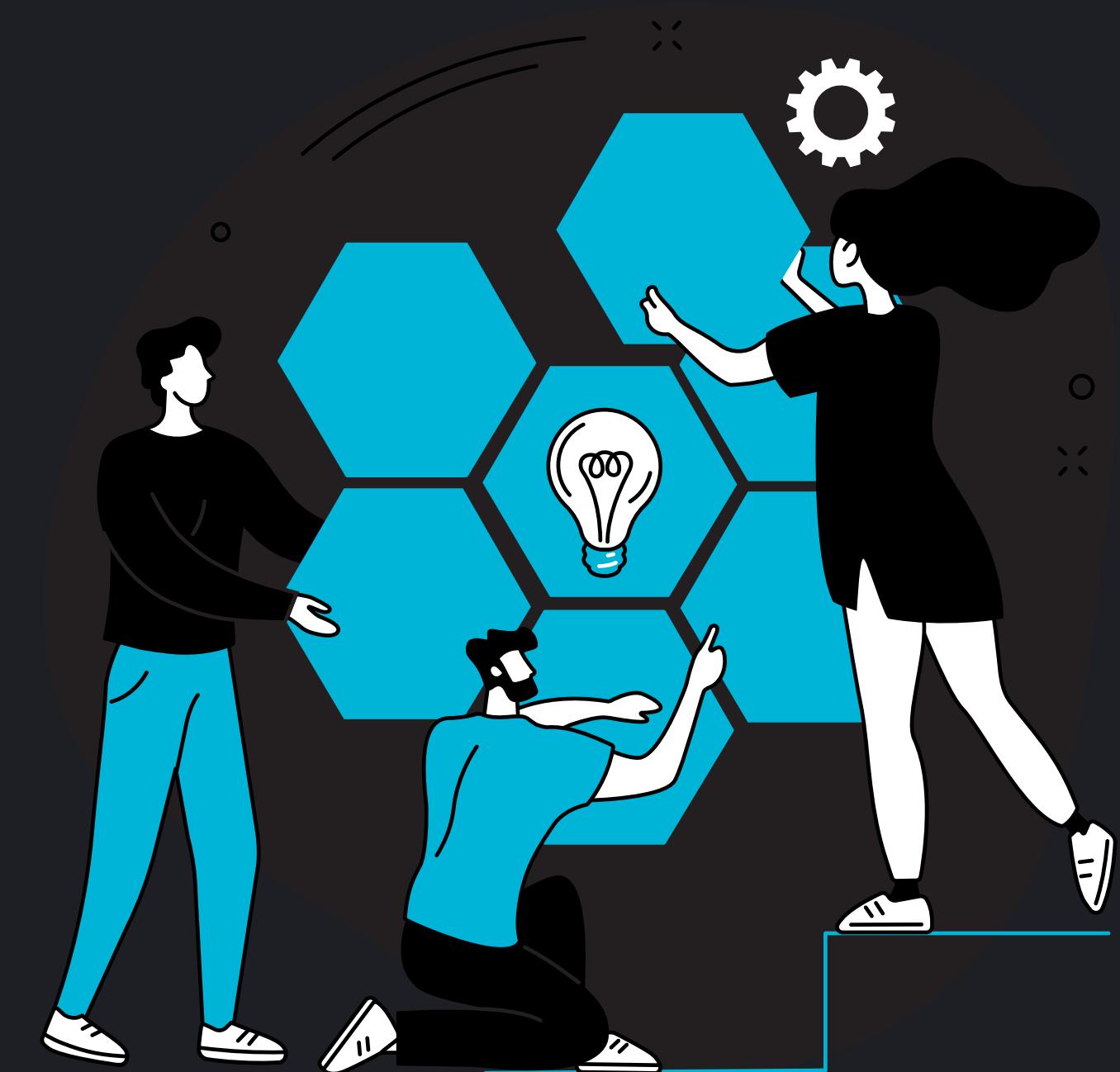
System software controls the internal functioning of computer

Example : OS , Drivers

Application software performs a specific task that is much more than basic operations of computer

Example : Browsers , messaging apps

How Softwares are built ?



Source
code



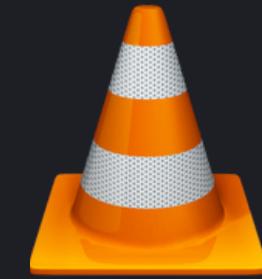
Executable
file

File **Extension** tell your computer what type of file it is and what application can open the file.



Open Source Softwares

Open source software is software **with source code** that anyone can inspect modify and enhance



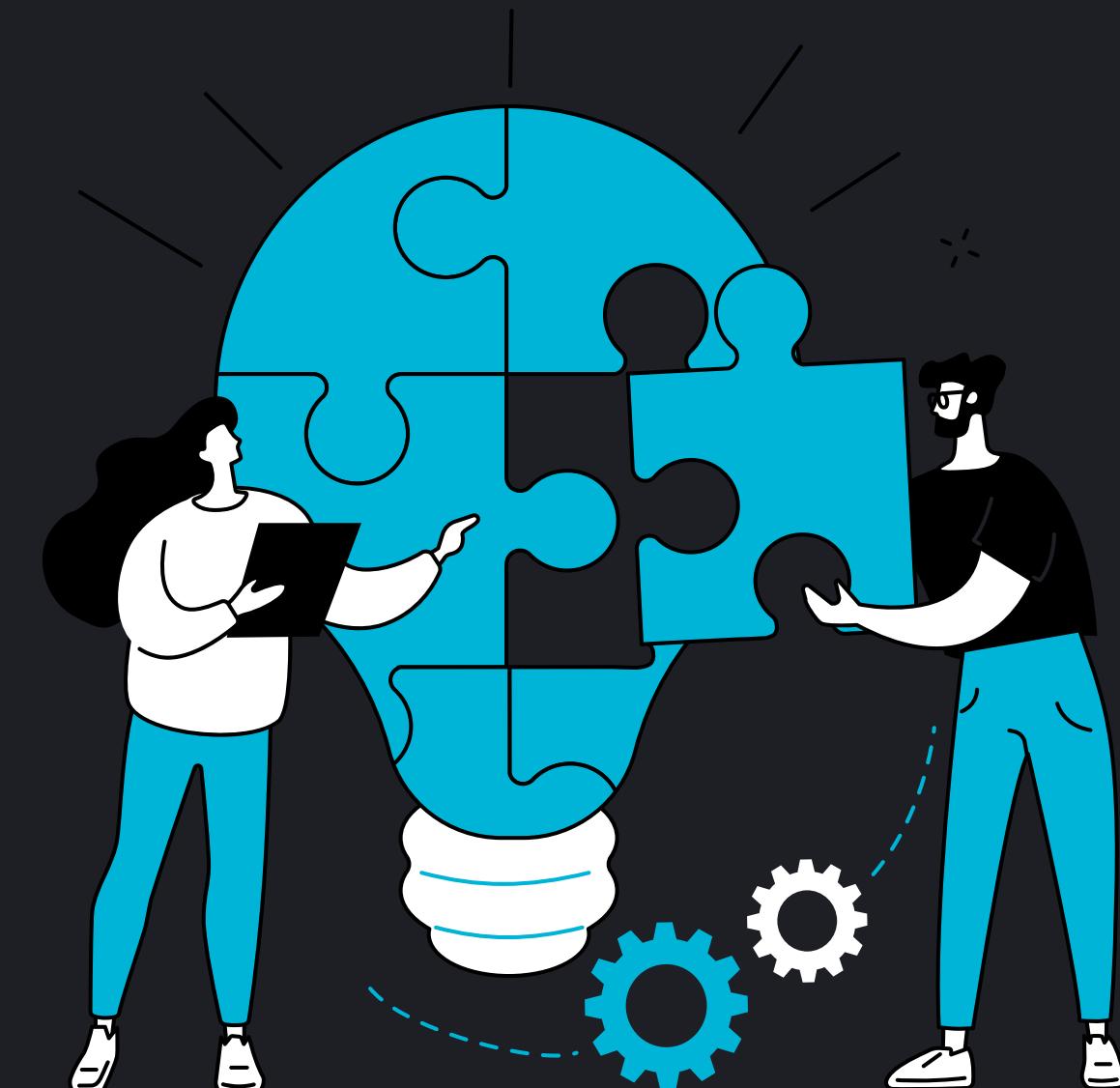
Closed Source Softwares

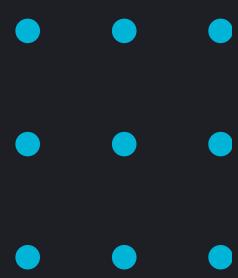
Software whoes **source code is closed** , means public is not given access to the source code

Only the person , team , or organization who created it can maintains , control and modify



When Source Code is available





When Source Code is available

Analyse

Add new
features

Improve

Develop new
software



GitHub



AlternativeTo



SourceForge

Open Source **Alternatives**



FreeCAD



Libre Office



GIMP



Audacity



Advantages of Opensource Software

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Absolute
Transparency

Flexibility

Cost
Efficiency

Security

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Absolute transparency

What you see is what you get

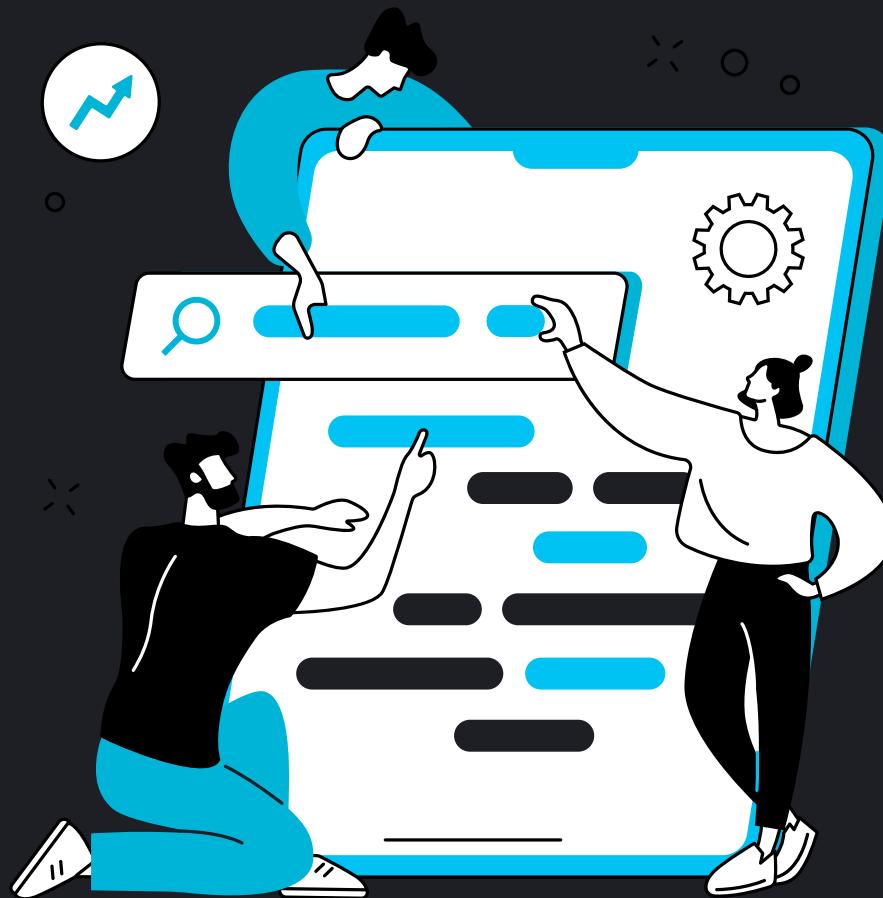
Nothing is hidden

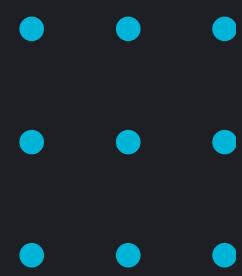
The point of open-source software is the transparency its code



Flexibility

Open-source software is flexible in a way that allows developers to see how the code works and make changes to it





Cost Efficiency

Open-source software is very often free or less expensive than proprietary software. Therefore, you save on licensing and maintenance fees.





Enhanced Security

- More people are inspecting the code. This enables more issues to be found and fixed.
- Bugs are fixed much faster and updates are more frequent.



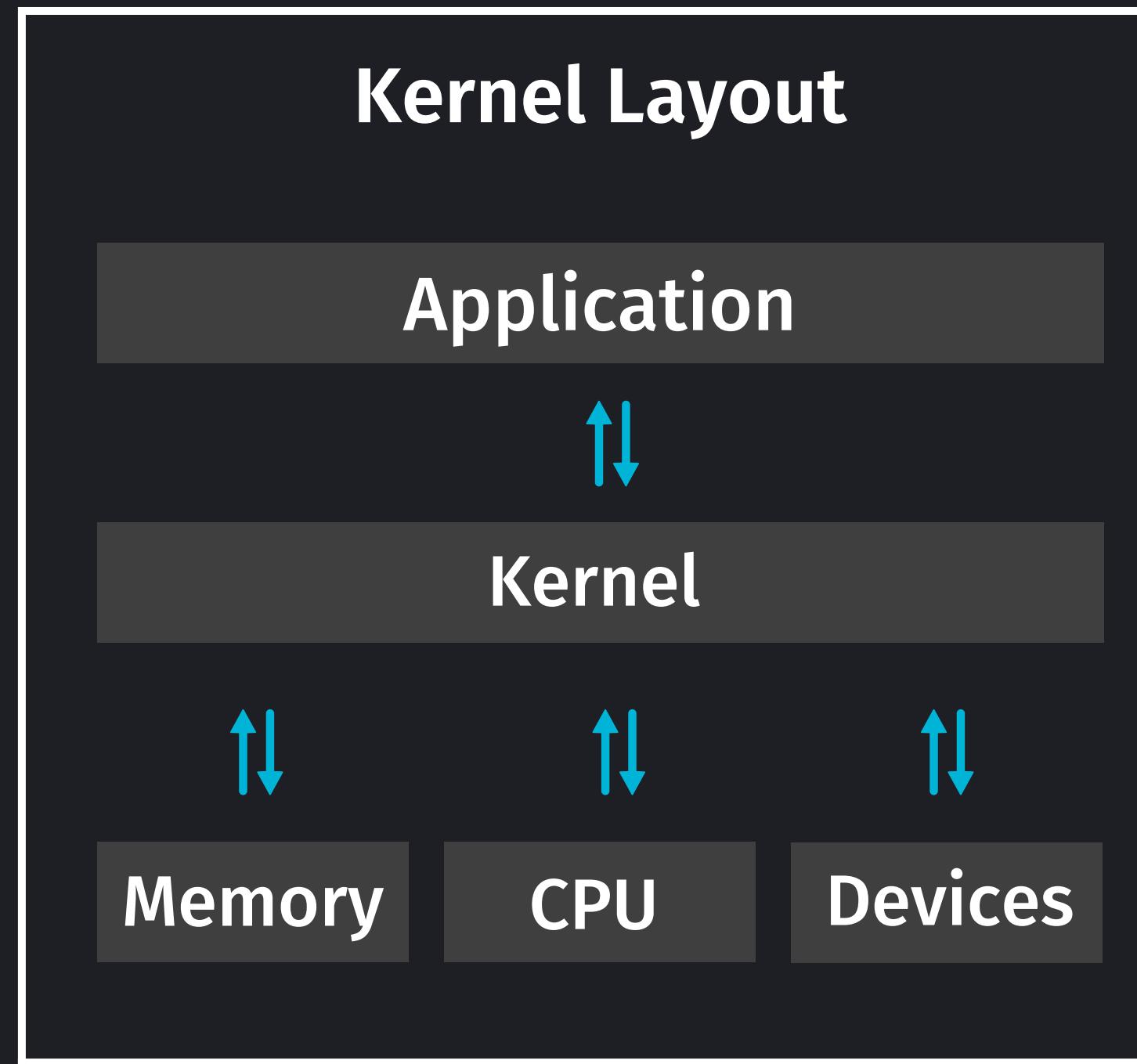
What is Linux ?



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- Linux is a **kernel**
- Kernel is core of **Operating System**
- Linux is not an OS we have **Linux based OS**
- It manages the **resources** of computer
- **Interface** between application and hardware

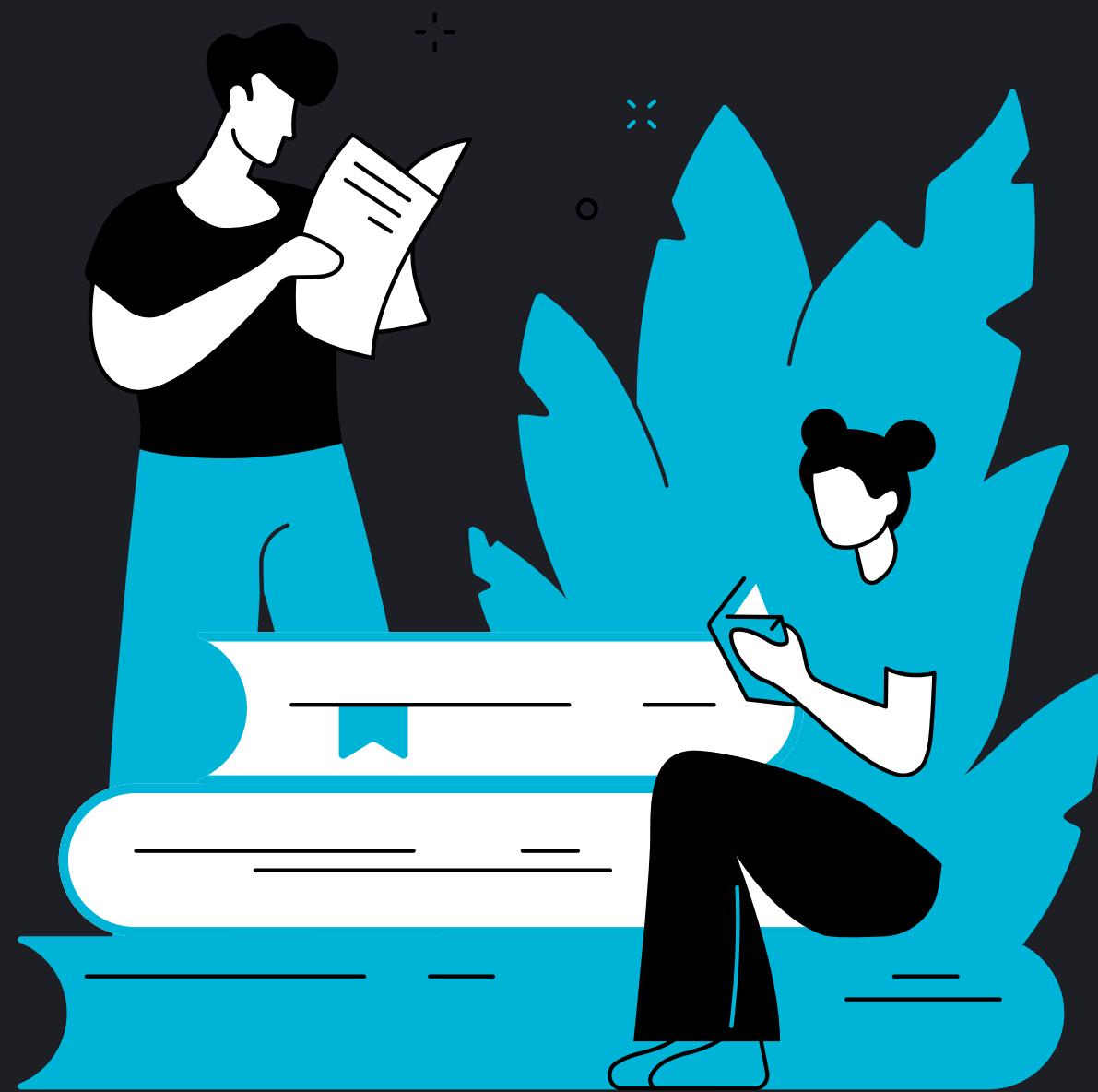






Kernel	Operating System
Kernal is a part of OS	OS is a system software
Interface between application and hardware	Interface between user and hardware
OS need kernel to run	Computer need OS to run

History of Linux



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1969 :

Dennis Ritchie and Ken Thompson developed UNIX operating system and C language in AT&T Bell Labs. They shared their source code in 70's

1975 :

AT&T started selling UNIX commercially

1978 :

Richard Stallman started the GNU project

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1991 :

The Linux kernel is publicly announced on 25 August by Linus Benedict Torvalds

1992 :

Linux Kernel version 0.01 is released

1993 :

Linux Kernel is adapted to the GNU environment, which creates a large spectrum of application types for Linux

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1994 :

Linux 1.0 is released

1998 :

Many major companies such as IBM and Oracle announce their support for Linux

2006 :

Oracle releases its own distribution of Red Hat Enterprise Linux

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2013 :

Google's Linux-based Android claims 75% of the smartphone market share, in terms of the number of phones shipped.

2014 :

Ubuntu claims 22,000,000 users

2017 :

All of Top500 list of fastest supercomputers run Linux

Before understanding Kernel:

- What is a **program**?
- What is a **process**?
- How does **process scheduling** work?



What is a program?

- A **Program** is an executable file
- Programs are never stored on the primary memory
- It is stored on a disk or secondary memory
- example VScode.exe



What is a process?

- A **Process** is an execution of a specific program.
- It is an active entity that actions the purpose of the application.
- For example, when you double-click on the Google Chrome browser, you start a process.

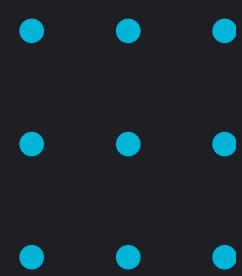


Shell

- To execute a **process**, the user has an interface called a **shell**
- It communicates between hardware and software according to the process.

Types of interfaces:

- Command Line Interface(CLI)
- Graphical User Interface(GUI)



Fun Command

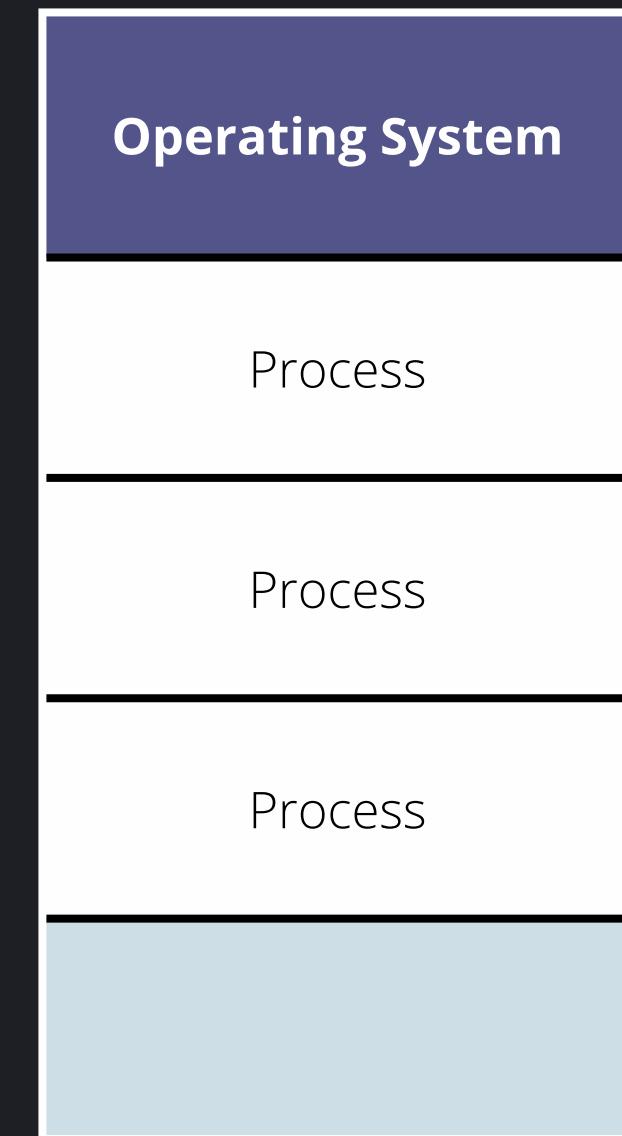
aafire

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How processes are stored in memory?

Main Memory



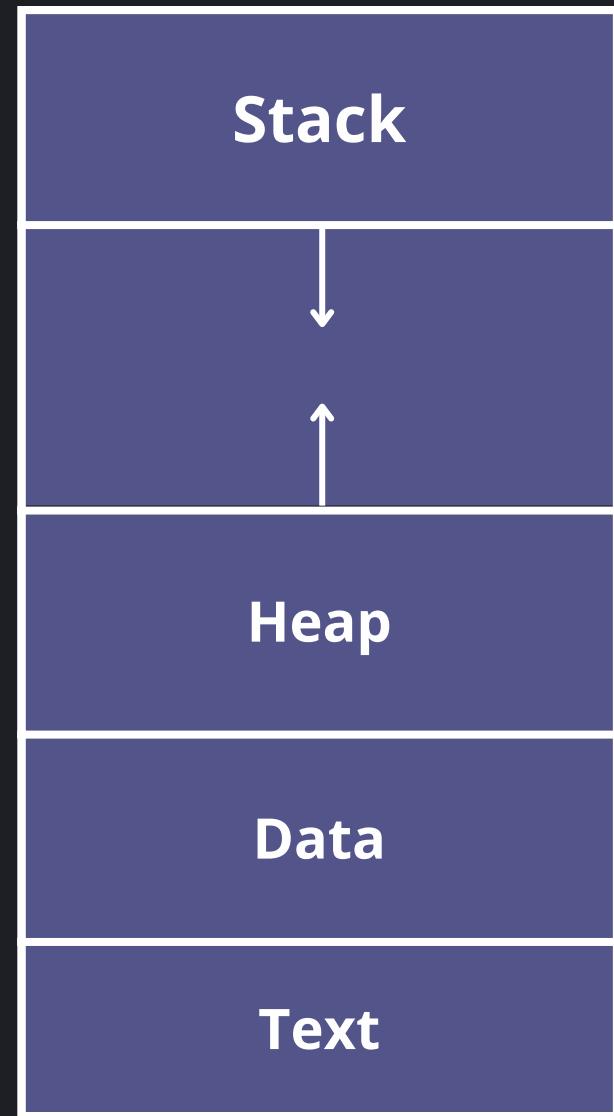
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Program as a process

```
#include <stdio.h>

int main() {
    int a=10, b=5;
    printf("Sum of a & b is: %d",a+b);
    return 0;
}
```

Process consists :



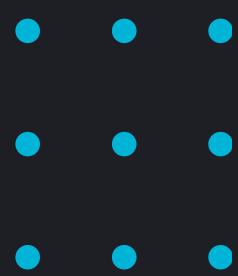


What is the Linux Kernel?

- A kernel is the core program of an operating system that never terminates
- It is the first program loaded on startup
- It has complete control over everything in the system
- Bridge between application and hardware layer

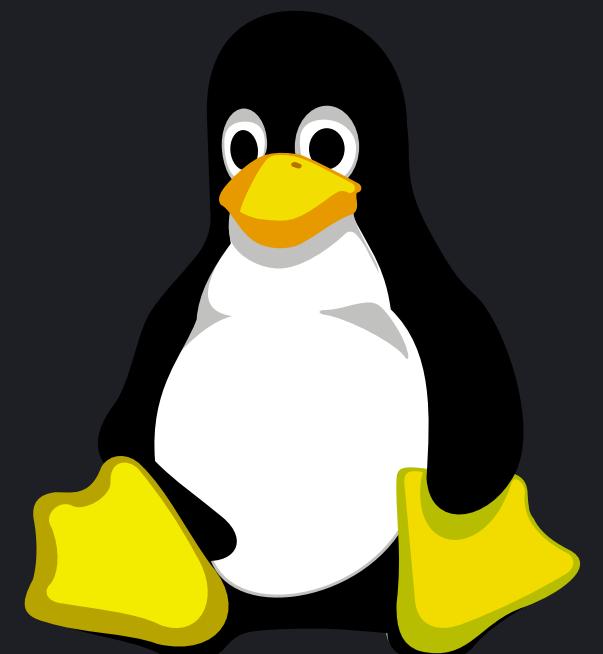
Linux Kernel handles the startup as well as :

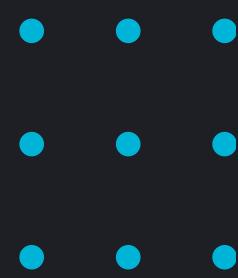
- Input or output request
- Process Management
- Network Management
- File System Management
- Memory and devices



Types of kernel:

- Monolithic Kernel
- Micro Kernel
- Hybrid Kernel





Monolithic kernel architecture:

The entire OS works in a single kernel space.

Micro kernel architecture:

The core services of the OS run in one process while the other services run in different processes.

Hybrid kernel architecture:

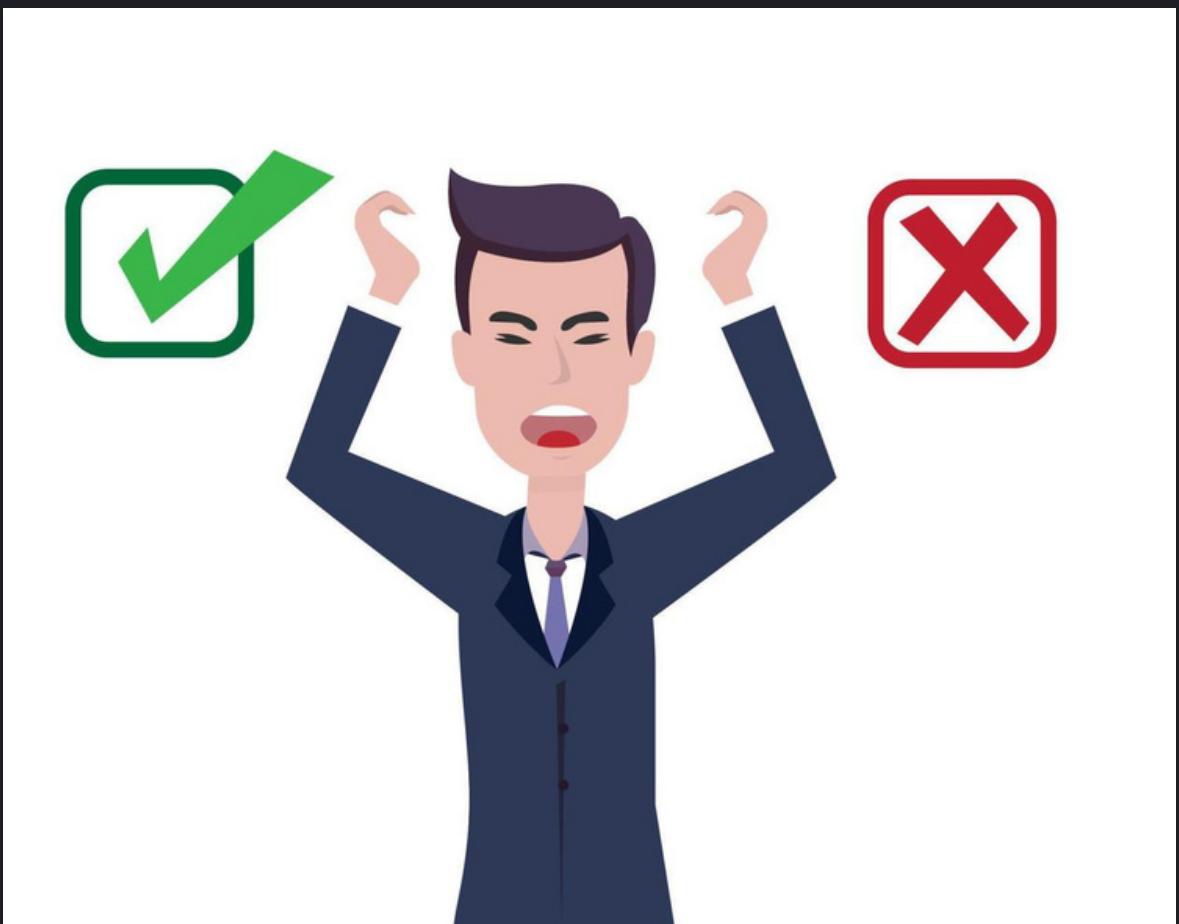
It is the combination of both monolithic kernel and microkernel.

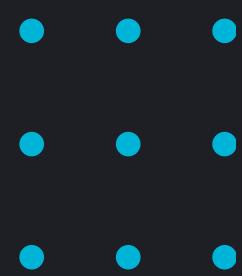
What is Unix?

- Unix is a multiuser, multitasking operating system.
- Originally developed in the 1970s.
- Unix was one of the first OS to be written in the C programming language.

Difference between Unix and Linux.

- Is Unix different from Linux?
- Is Linux like Unix?
- Is Linux built on Unix?





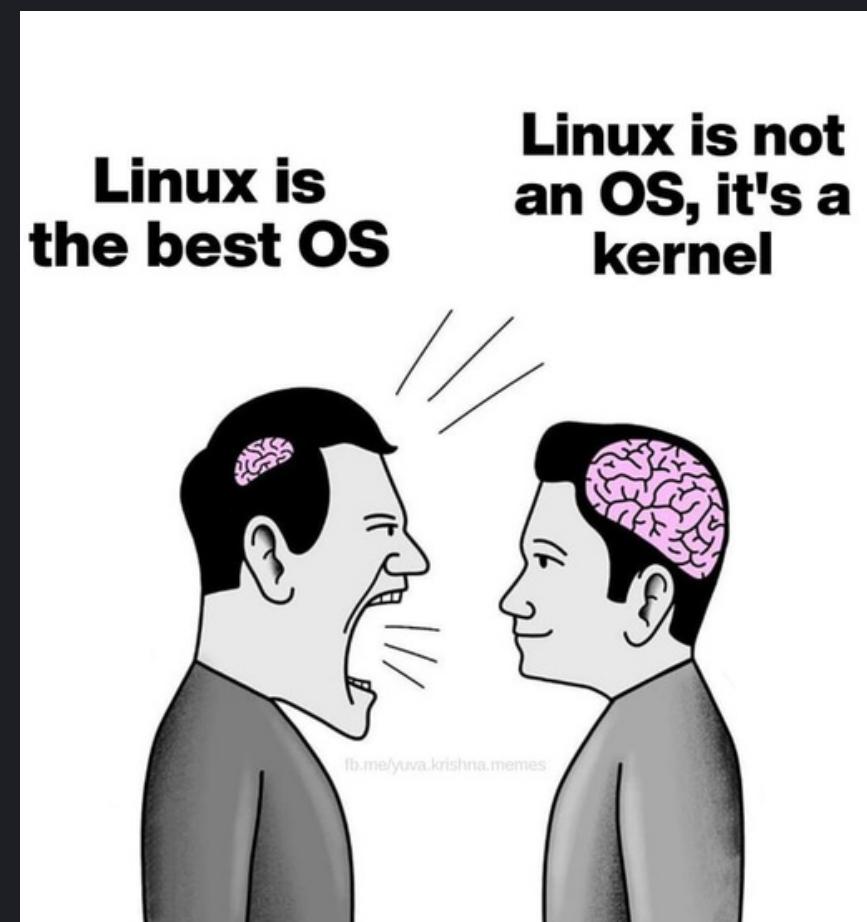
Linux and Unix are different.

- Linux system is derived from Unix.
- Linux plus the GNU utilities make a complete UNIX-like operating system.
- Linux is only the Kernel, while Linux distributions can be treated as the OS.



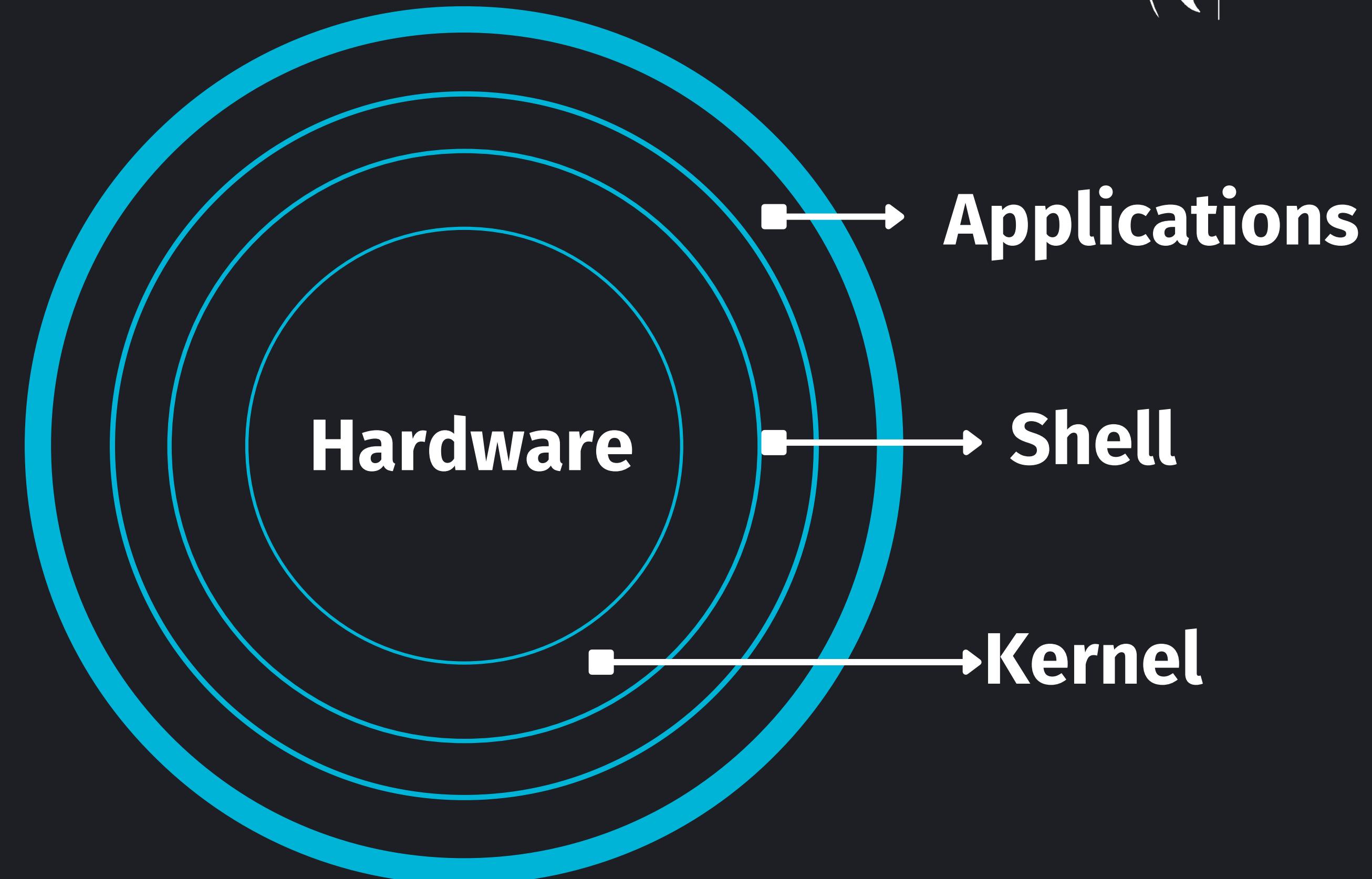
A Linux distribution is an OS composed of:

- The Linux kernel
- GNU tools
- Additional software
- Package manager



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Linux Based
Operating System
Architecture:





Architecture of Linux Based Operating System:

Kernel:

- The kernel is one of the core sections of an operating system.
- It is responsible for each of the major actions of the Linux based OS.

System Libraries:-

- These libraries can be specified as some special functions.

System Utility Programs:-

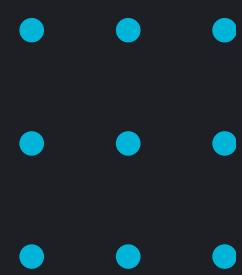
- These are used to list or change info related to data sets and volumes. Responsible for doing specialized level and individual activities.

Hardware layer:-

- Linux operating system contains a hardware layer that consists of several peripheral devices.

Shell:-

- It can take commands through the user and runs the functions of the kernel.

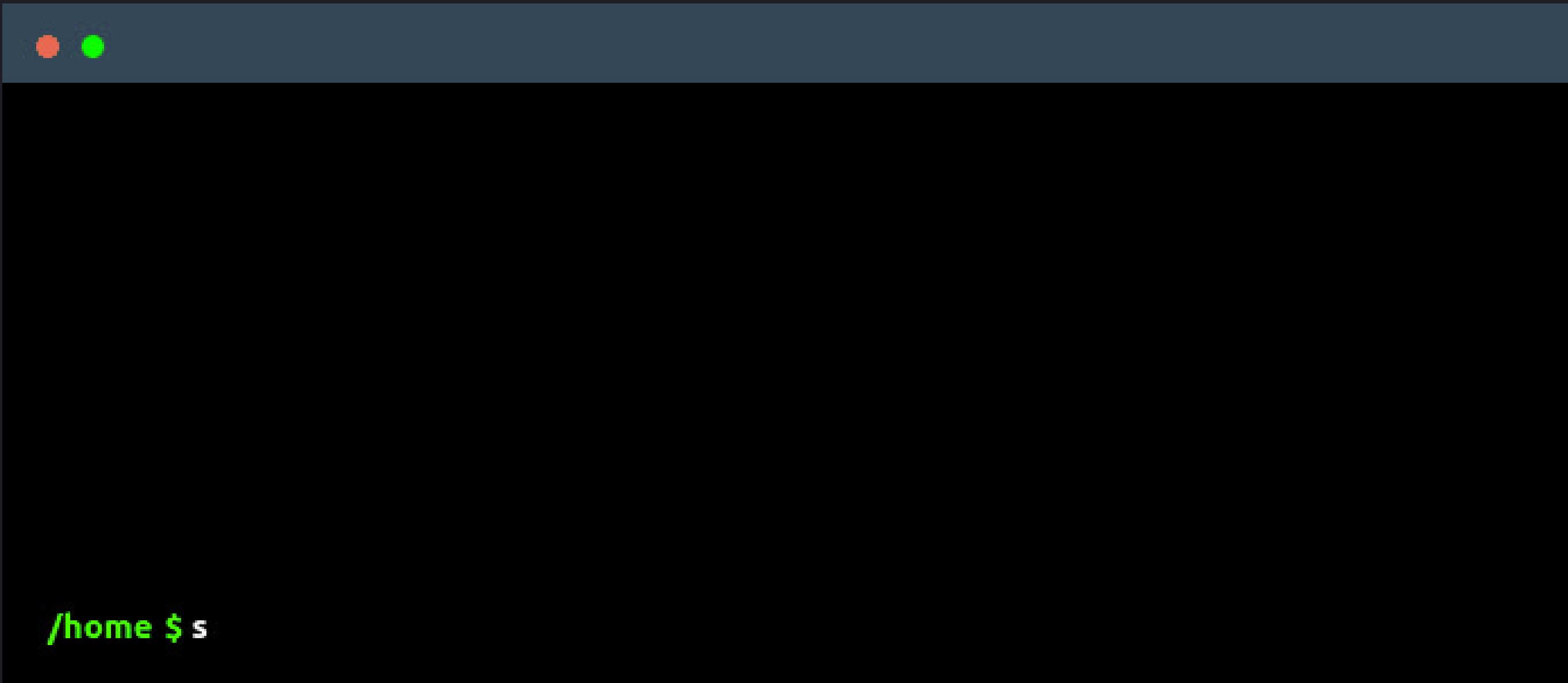


Fun Command

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Applications of Linux



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- **Web Servers:**

The biggest real-world use of Linux is on servers, especially web servers.

- **Super Computers:**

Supercomputers like IBM's Summit played a part in developing COVID-19 vaccines, and are helping to track down variants.

- **Home Appliances:**

Smart TVs, Ebook Readers, Tablets, Phones, Smart Watches, Fitness Tracker use Linux Based Operating Systems

- **Surveillance Cameras and Electronic Locks**



- **Browsing Internet:**
 - Google, Facebook, Twitter, Oracle, IBM, Amazon, and Samsung are some of the big corporations that rely on Linux operating systems tools.
 - Surprisingly, even Microsoft uses some Linux software tools.

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Linux Distributions





ubuntu®

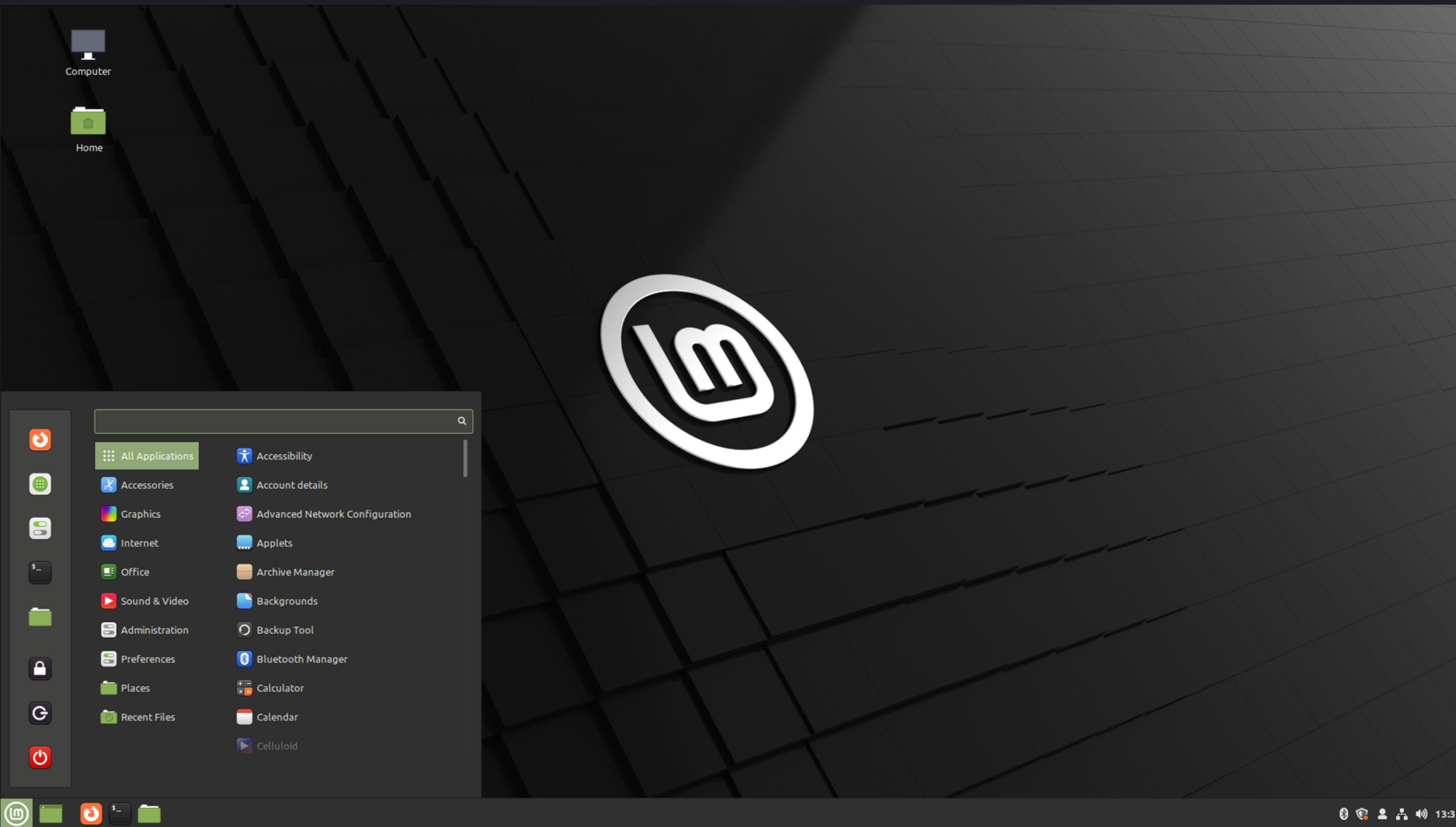
- Came in existence in 2004 by canonical .
- Most well known Linux distribution.
- It comes with lots of pre-installed apps and easy to use repository libraries.
- currently working to expand to run on tablets and smartphones.



Linux Mint

- Mint is based on Ubuntu and uses its repository software, so some packages are common in both.
- It has transcended time to provide one of the most elegant, and user-friendly distributions loved by desktop users and professionals alike.

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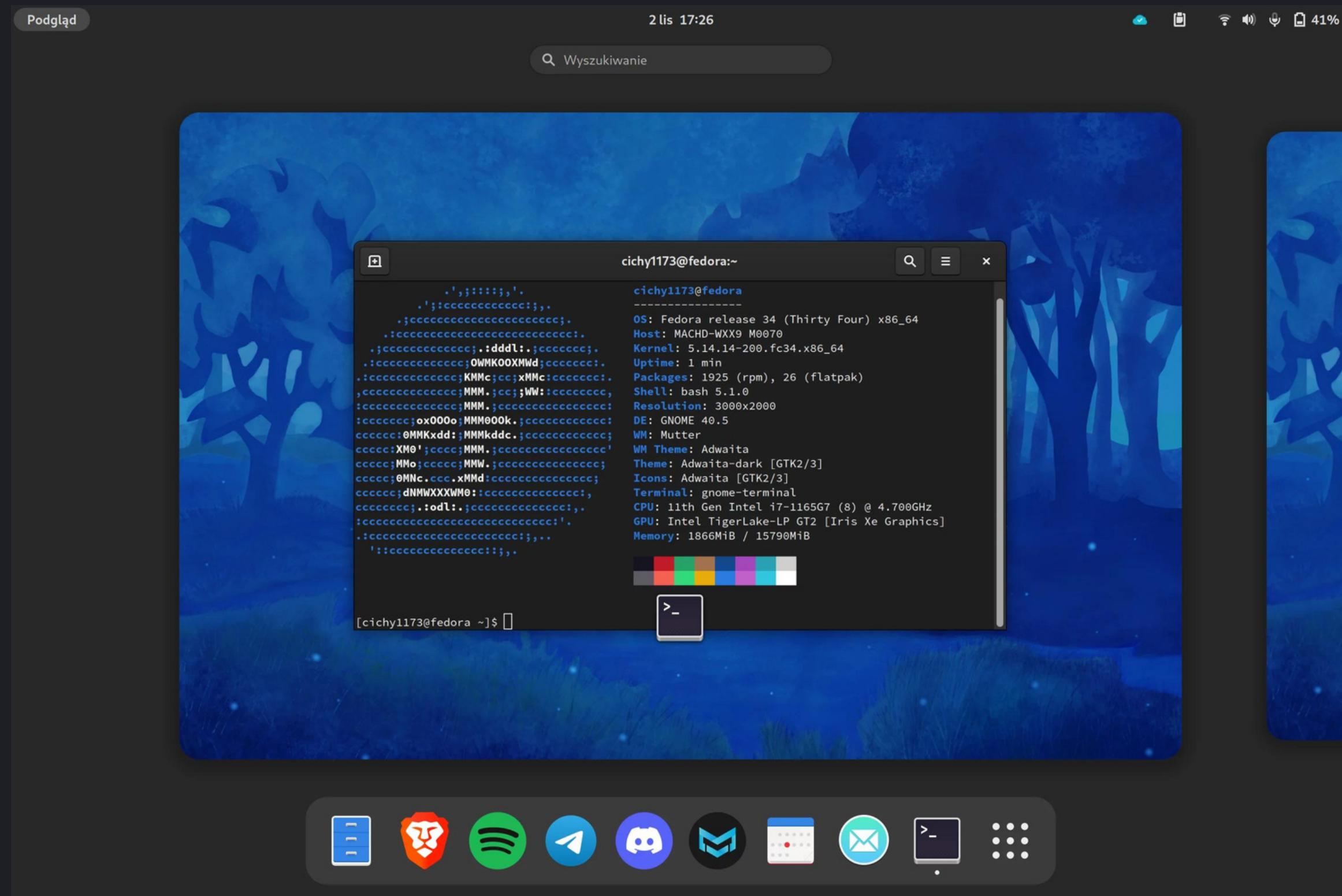




Fedora Linux

- One of the most user-friendly distros for quite a while now owing to its simplicity and out-of-the-box applications.
- Powerful and flexible operating system that's tailored for desktops & laptops, servers, and even for IoT ecosystems.

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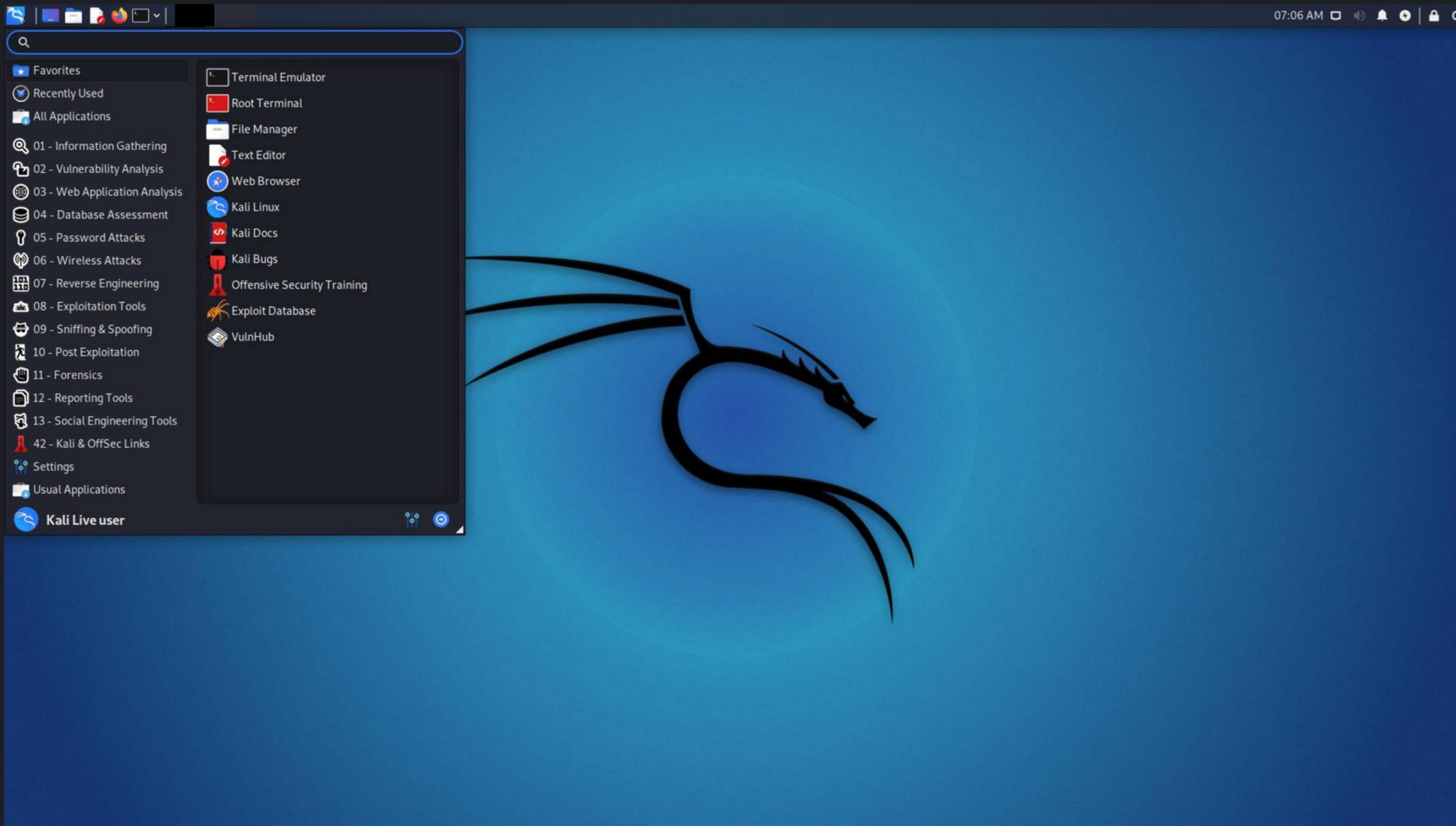




Kali Linux

- Developed and maintained by offensive security, Kali Linux is a Debian-based Linux distro.
- Designed for penetration testing and conducting digital forensics.
- Kali Linux is meant for Cybersecurity experts and students who want to venture into penetration testing.

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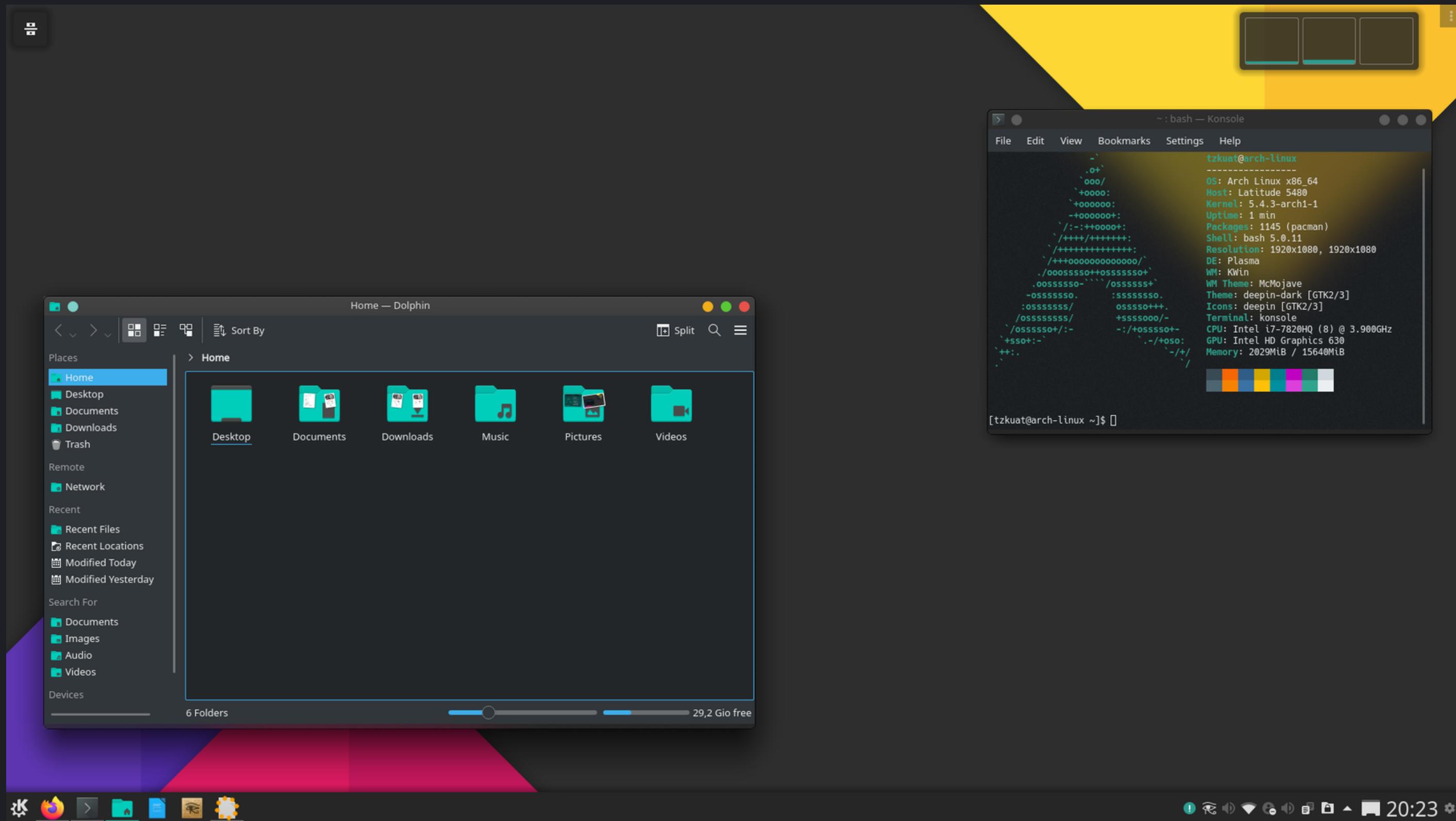




Arch Linux

- Arch Linux is a lightweight and flexible geeky Linux distro.
- It gives users the freedom to custom or configures the system, to their preference.
- Arch is a rolling release implying that it is constantly updated to the latest version and all you need is to update the packages on the terminal.

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Linux users fighting over
which distro is best

Me:





Fun Command

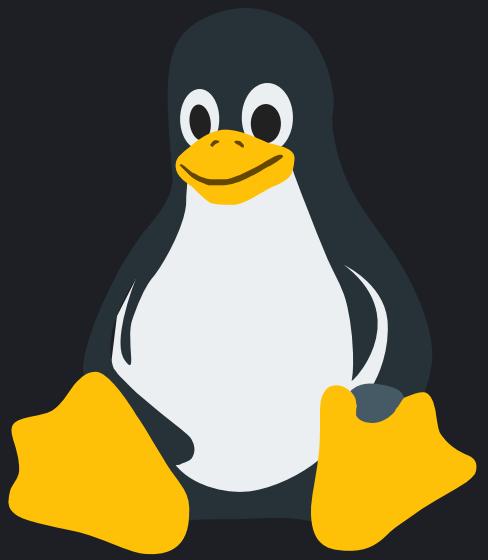
xeyes

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A dark-themed terminal window with a black background and a dark blue header bar at the top. In the top-left corner of the header bar are two small circular icons: a red one on the left and a green one on the right. The main body of the terminal is mostly blank, with only the bottom line visible.

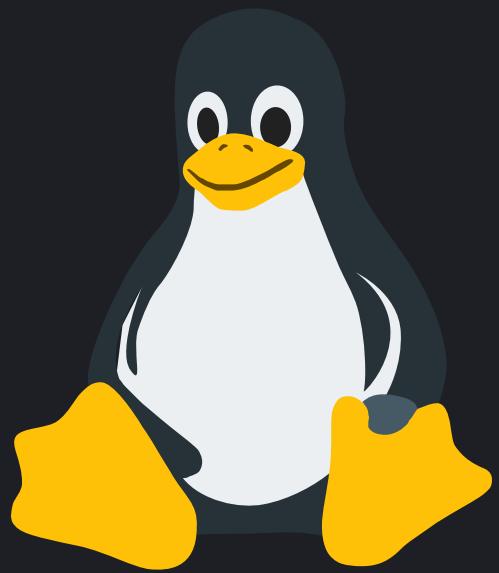
```
/home $ x
```



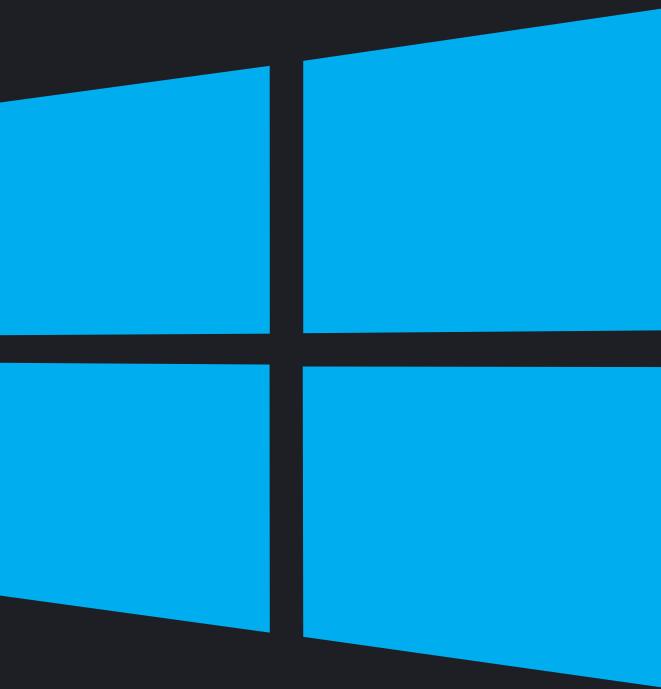
Is Linux Good for Developers and Student programmers?

- Open Source
- Linux has great support for most programming languages
- Various Distributions
- GUI and customization option
- Lightweight

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VS



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Linux

- Open Source
- Safe and Secure
- Free of Cost
- Used by developers, programmers and students as well

Windows

- Not a Open Source
- Less Secure
- Costlier
- Used mostly for regular day to day work

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Do you want
a computer?

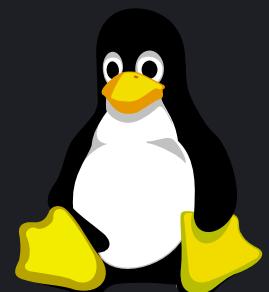
no

yes



Do you want
a working computer?

yes



no





Linux System Administrator

- A Linux System Administrator takes care of computers running on the Linux operating systems.
- Integrity and security of servers and computer systems.
- Annual salary in India is between 2.4 Lakhs to 7.2 Lakhs.

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Thankyou!