INTRODUCTION TO OPERATING SYSTEM
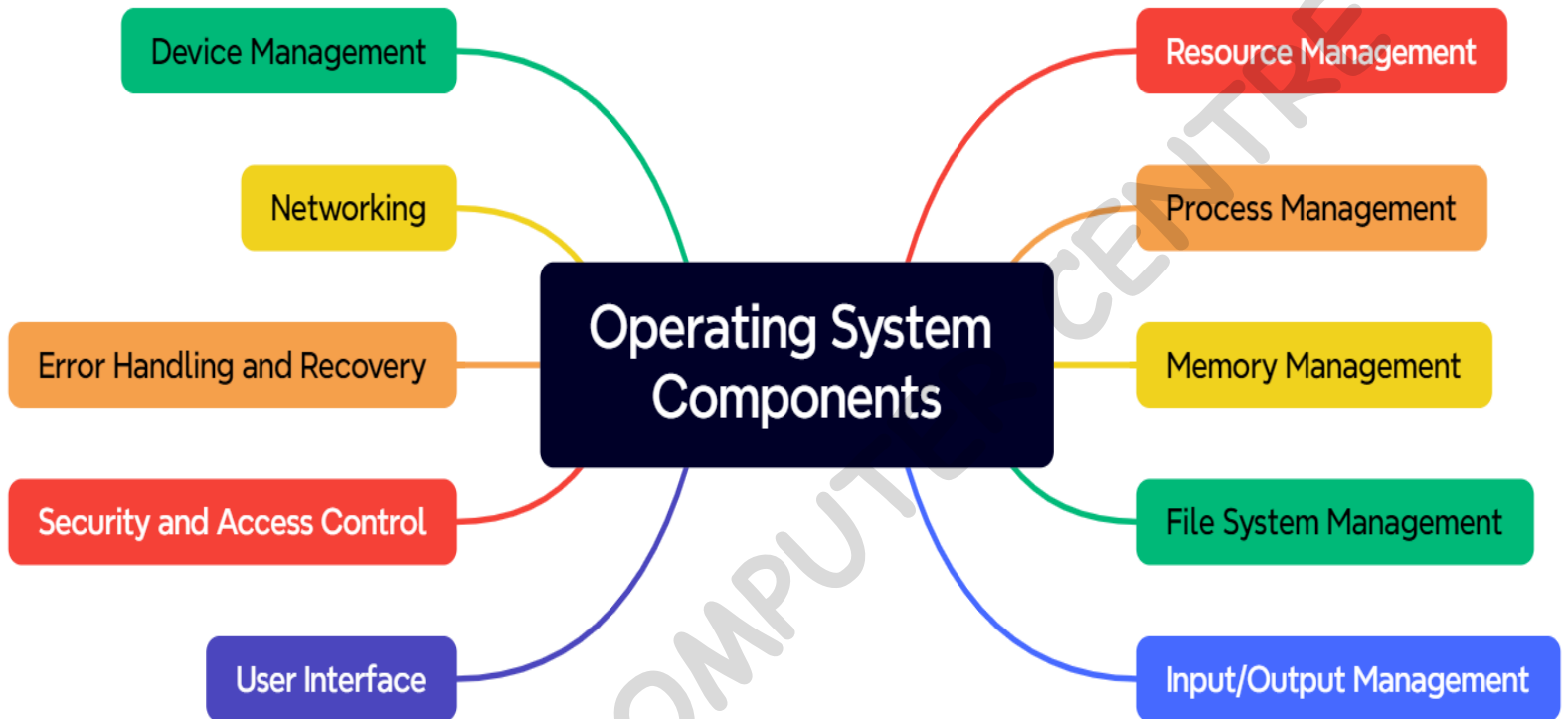
INDEX

OPERATING SYSTEM

1. **Controls computer hardware** and provides user interface.

2. Facilitates **interaction between application programs and hardware.**

3. **First program loaded** into computer's **memory at startup.**

4. Acts as **intermediary between user and hardware**, managing data flow.
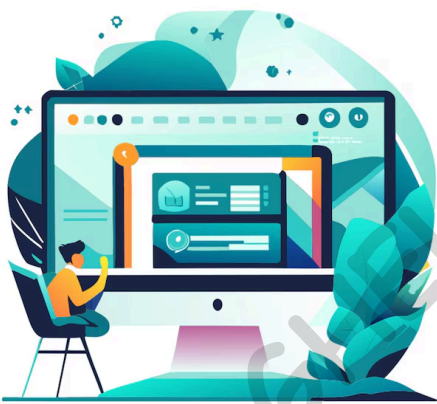
5. **Receives user instructions,** directs them to CPU, and manages hardware.

6. Examples: MS-DOS, Linux, Unix, Windows (XP, Vista, 7, 8, 8.1, 10).

7. It is the **soul of a computer.**

Functions of an Operating System

Operating System Components

Device Management
Networking
Error Handling and Recovery
Security and Access Control
User Interface

Resource Management
Process Management
Memory Management
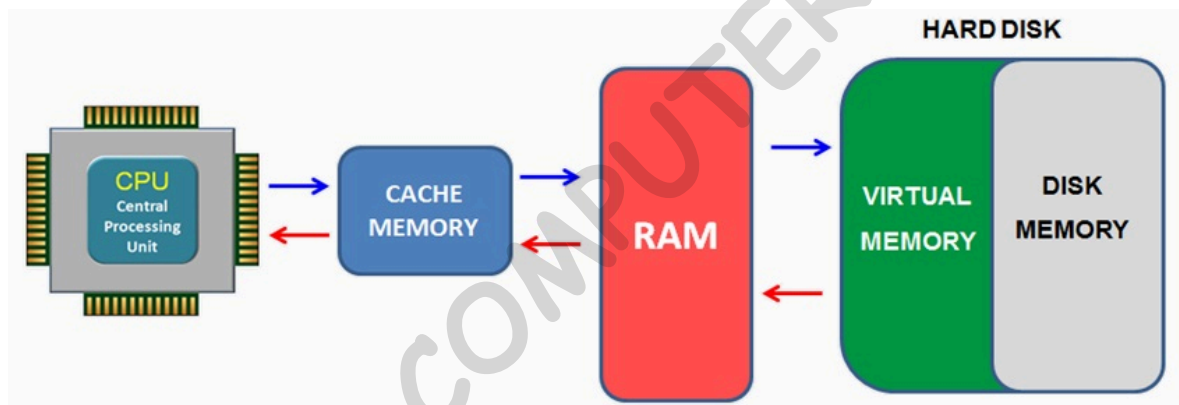File System Management
Input/Output Management

1. Resource Management: Controls and allocates computer hardware like CPU and memory efficiently among programs.
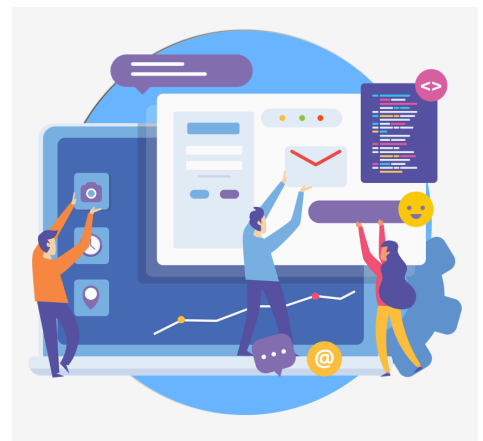
2. Process Management: Handles tasks running on the system, scheduling their execution and managing their resources.

3. Memory Management: Manages system memory, allocating space to programs and handling memory usage.

4. File System Management: Organizes and controls files on storage devices, allowing creation, deletion, and access.

5. Input/Output Management: Manages communication between the computer and its devices, like keyboards and printers.

Input   Process   Output

6. User Interface: Provides interfaces for users to interact with the system, like GUI

7. Security and Access Control: Protects the system and data from unauthorized access through authentication and encryption.

8. Error Handling and Recovery:

Detects and handles errors to ensure system stability and minimize data loss.
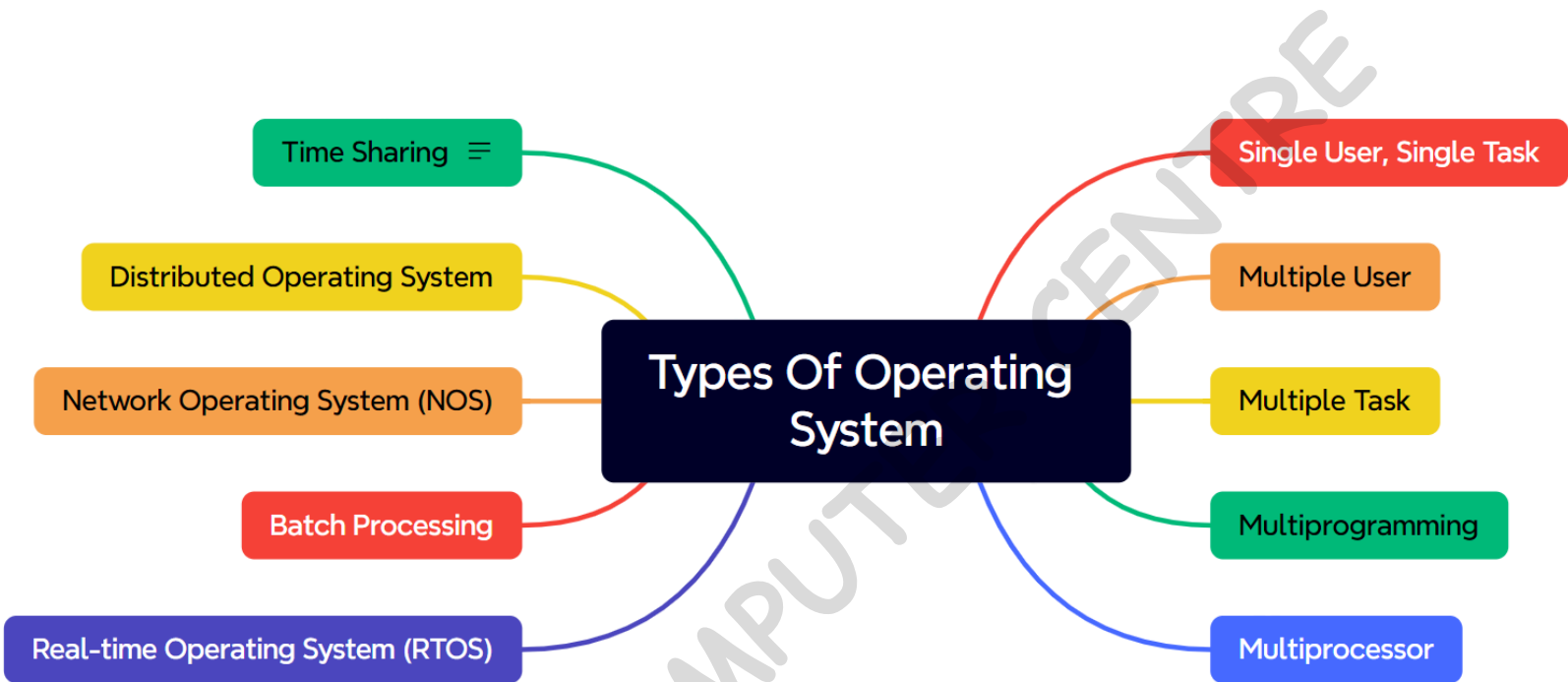
9. Networking: Facilitates communication between computers over a network, managing connections and protocols.

10. Device Management:

Manages hardware devices, including detection, configuration, and driver installation.

Types of Operating Systems

## Types Of Operating System

- Time Sharing
- Distributed Operating System
- Network Operating System (NOS)
- Batch Processing
- Real-time Operating System (RTOS)
- Single User, Single Task
- Multiple User
- Multiple Task
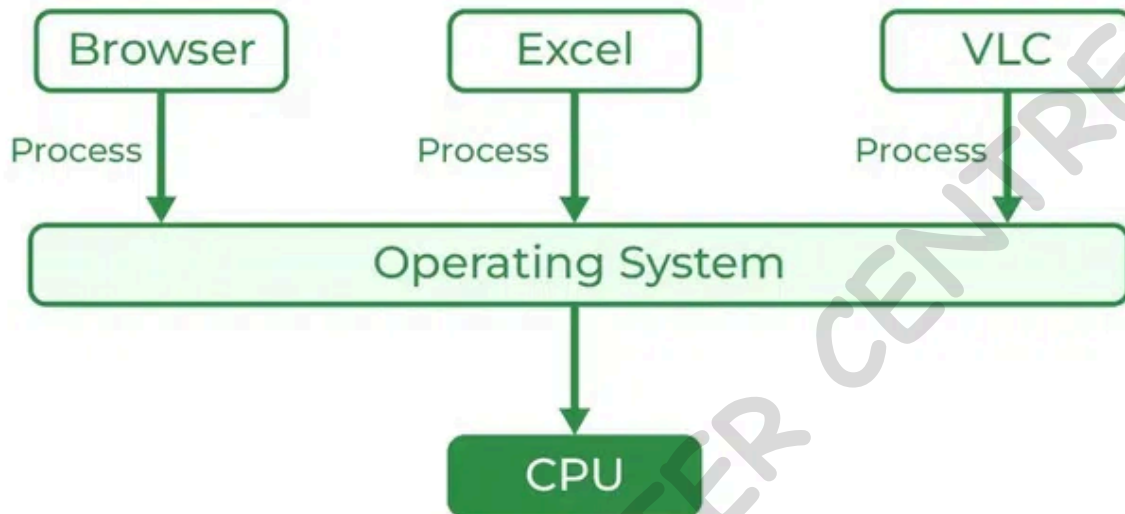- Multiprogramming
- Multiprocessor

1. Single User, Single Task: Supports one user and runs one program at a time, like early versions of MS-DOS.
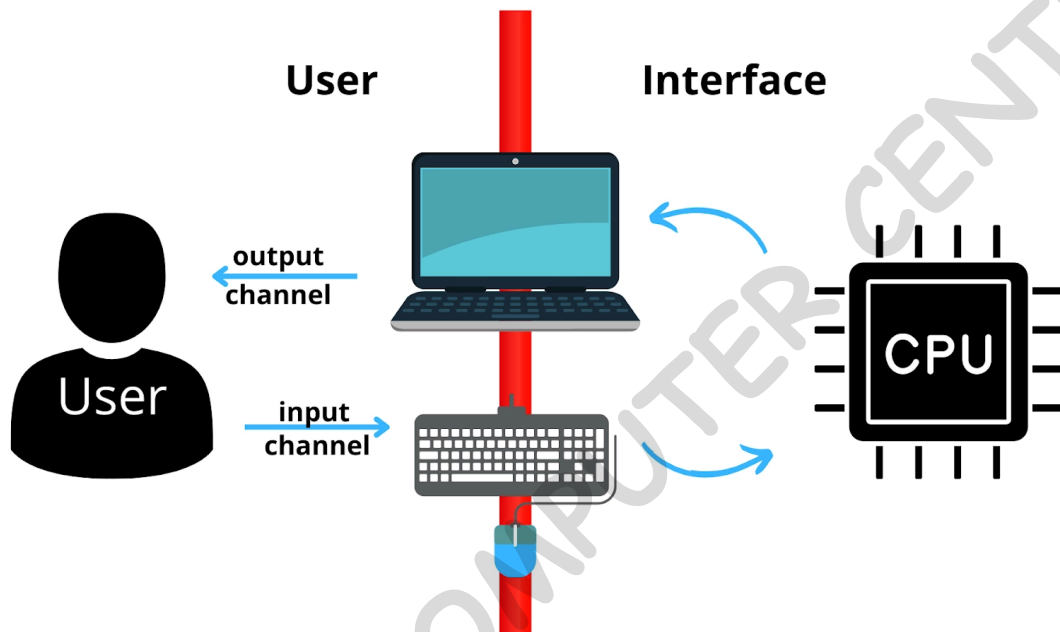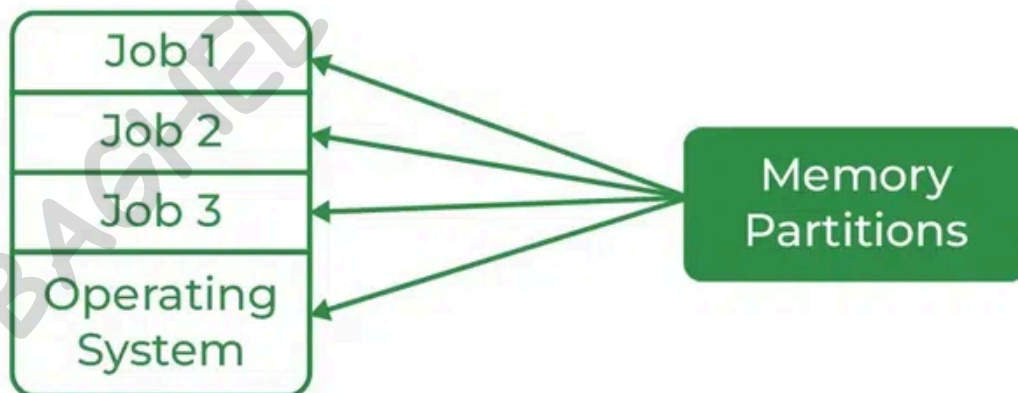

2. Multiple User: Allows multiple users to access the system.
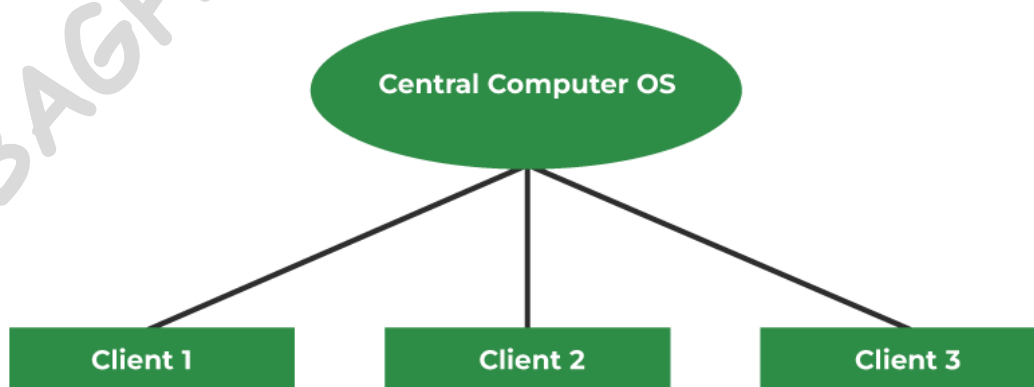
3. Multiple Task: Supports user running multiple programs simultaneously

5. Multiprogramming: Enables the execution of multiple programs on a single processor by switching between them rapidly, improving CPU utilization.

6. Multiprocessor: Utilizes multiple processors to execute multiple tasks simultaneously, enhancing system performance and scalability.
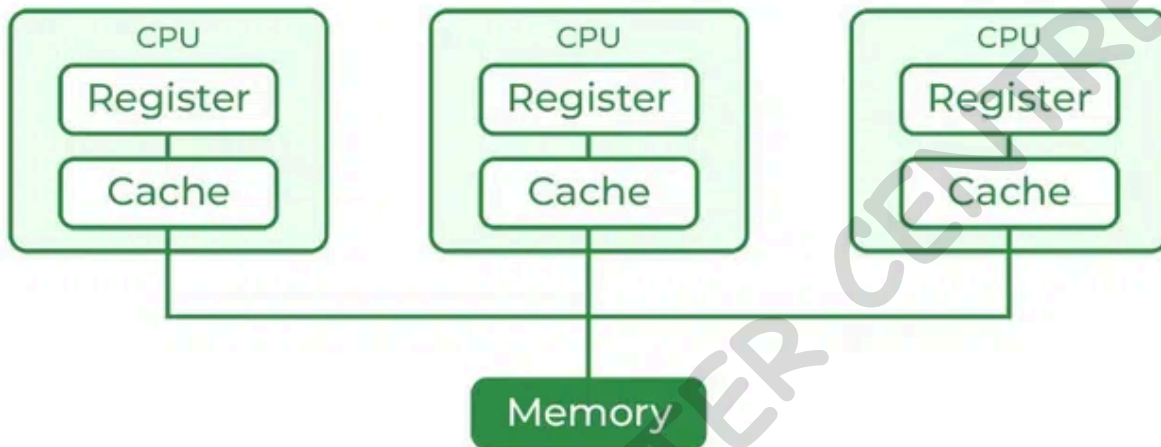
7. Real-time Operating System (RTOS): Designed for systems with strict timing requirements, ensuring timely response to events, common in embedded systems and industrial control.
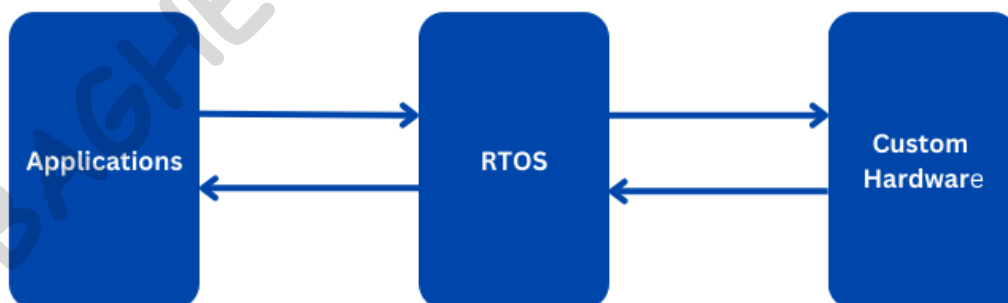
8. Batch Processing: Processes a series of tasks in batches without user interaction, often used for repetitive tasks like payroll processing.
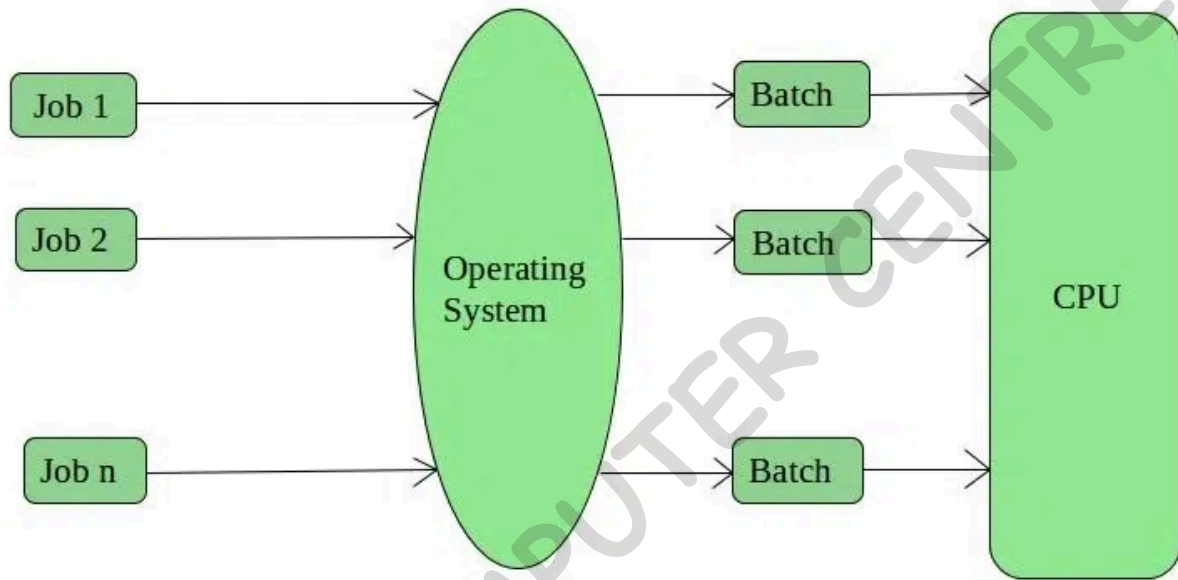
9. Network Operating System (NOS): Facilitates communication and resource sharing among multiple computers in a networked environment, such as Novell NetWare.

Client 1

Runs client program

Sends request   Response from server

Server

Runs server program

HUB

Client 2

Auxiliary Storage

Client 3
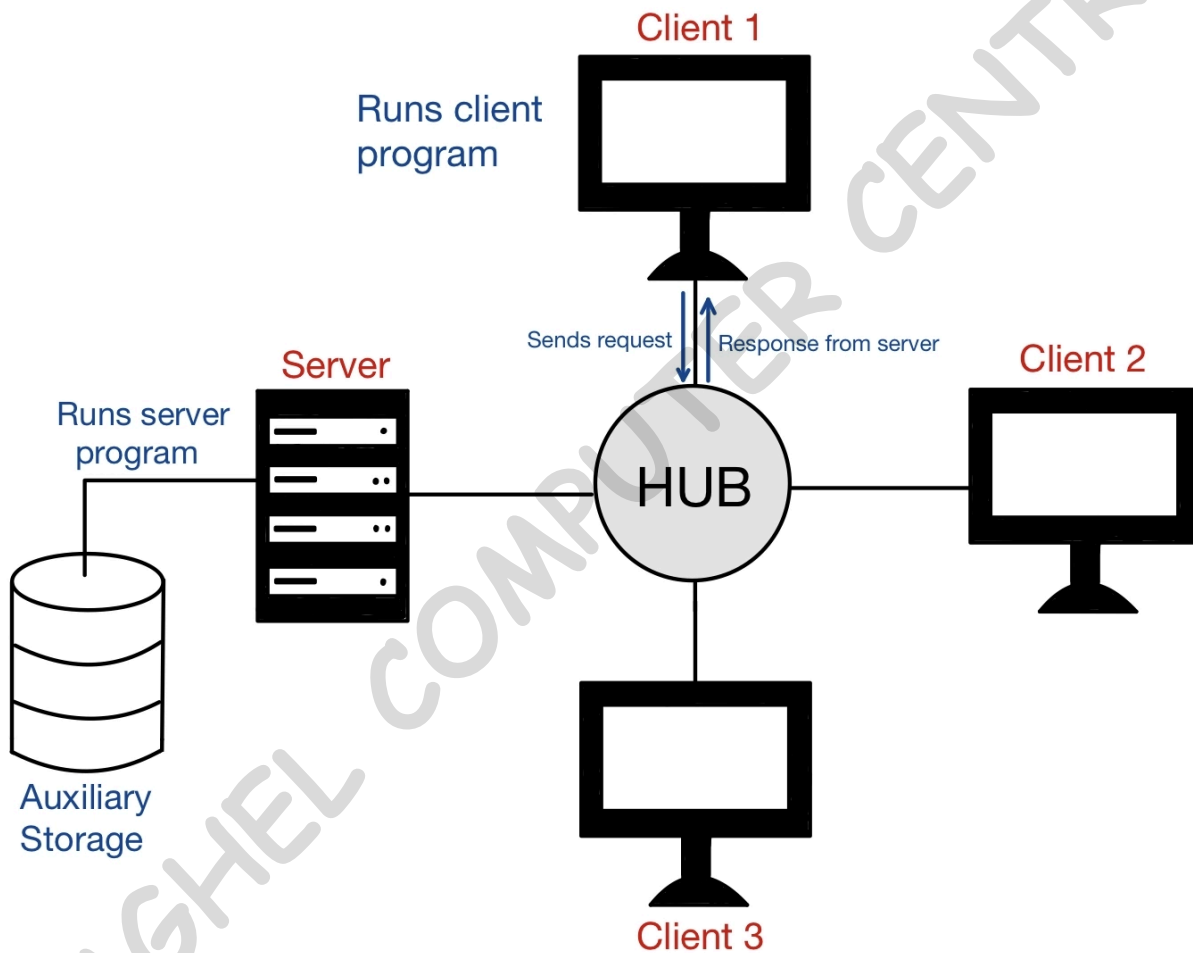
10. Distributed Operating System: Extends network operating systems to manage resources across multiple interconnected computers, enabling them to function as a single system, like Google's Chrome OS.
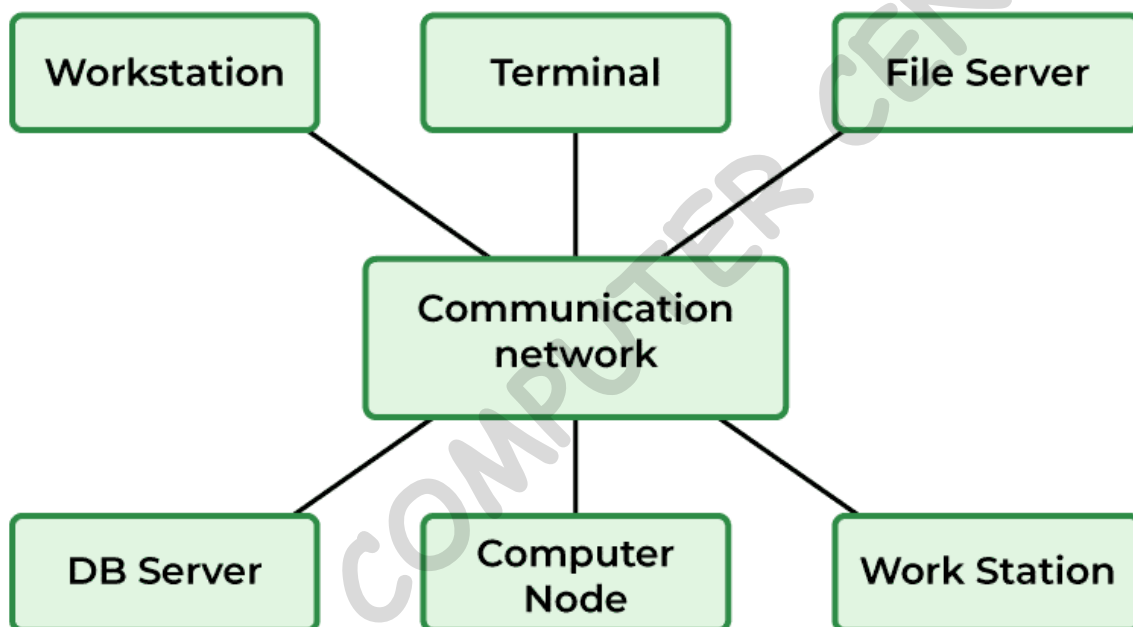
11.Time Sharing : Time-sharing operating systems enable multiple users to share the resources of a single system simultaneously by rapidly switching between tasks, allowing interactive use without significant delays.

DOS- DISK OPERATING SYSTEM

DOS (DISK OPERATING SYSTEM

Introduction:
- Developed by Microsoft.
- Initially released in 1981.
- Primarily used for personal computers.

Architecture:
- Single-tasking operating system.
- Text-based command-line interface (CLI).
- Typically designed for 16-bit processors, operating in a 16-bit real mode.

Features:
- Simple and lightweight.
- Limited multitasking capabilities.
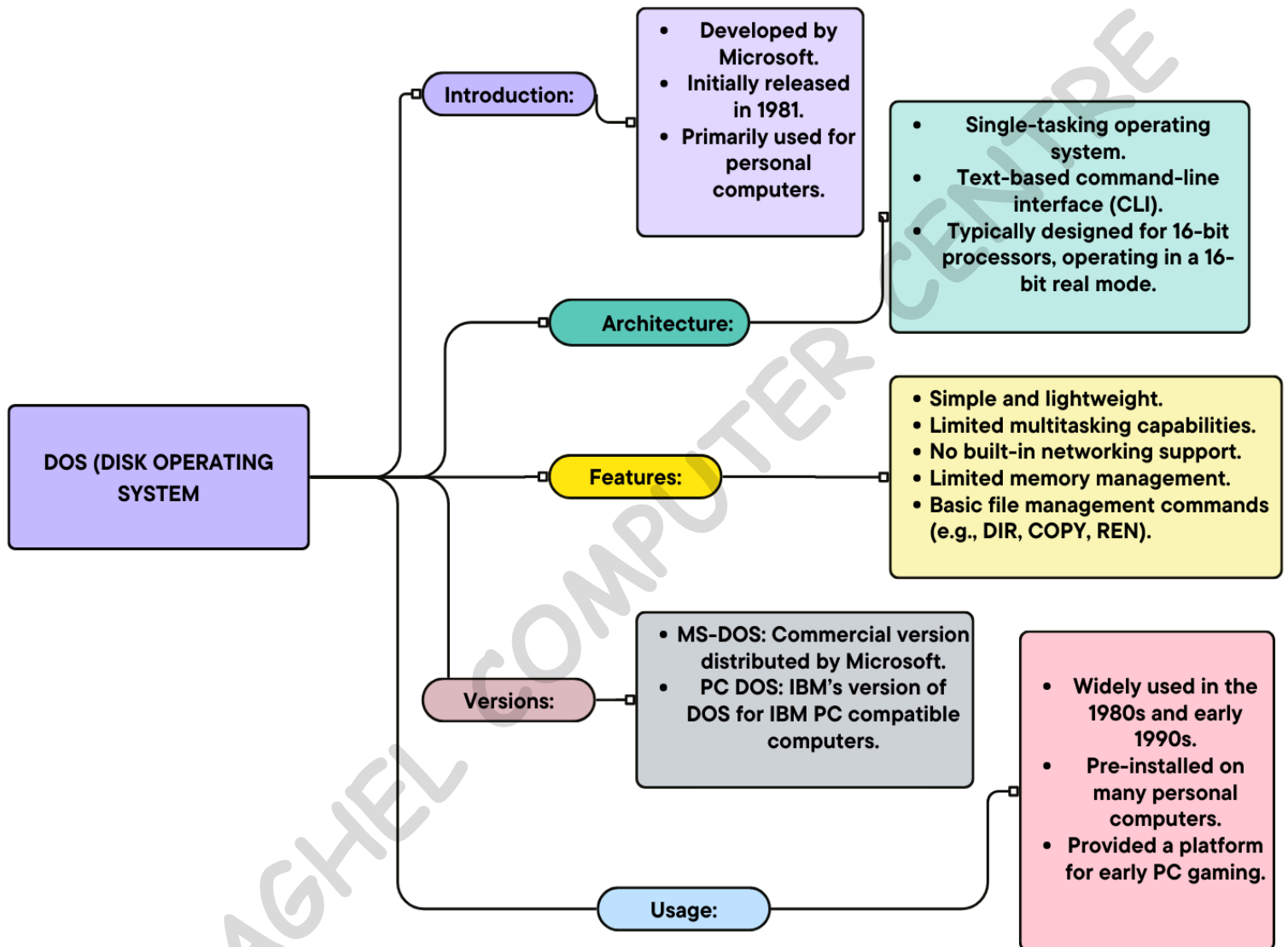- No built-in networking support.
- Limited memory management.
- Basic file management commands (e.g., DIR, COPY, REN).

Versions:
- MS-DOS: Commercial version distributed by Microsoft.
- PC DOS: IBM's version of DOS for IBM PC compatible computers.

Usage:
- Widely used in the 1980s and early 1990s.
- Pre-installed on many personal computers.
- Provided a platform for early PC gaming.

MICROSOFT WINDOWS

Microsoft Windows

Introduction:
- Developed by Microsoft Corporation.
- Initial release: 1985.
- Widely used operating system for personal computers.

Configuration:
- Customizable desktop themes, wallpapers, and settings.

Features:
- Graphical user interface (GUI) with multitasking support.
- Plug and Play for easy hardware setup.
- Built-in software applications and security features.

Specifications:
- Supports various architectures including 32-bit and 64-bit.
- Minimum RAM requirements typically range from 1 GB to 8 GB.
- Disk space requirements vary but generally require at least 16 GB for installation.
- Compatible with a wide range of processors and display resolutions.

Usage:
- Popular in homes, businesses, schools, and government institutions.
- Used for productivity, entertainment, communication, and gaming.

VERSIONS OF WINDOWS OS

Versions of Windows Operating System

Windows 1.0 — **Launch Date:** November 20, 1985

Windows 2.0 — **Launch Date:** December 9, 1987

Windows 3.0 — **Launch Date:** 1990

Windows 95 — **Launch Date:** August 15, 1995

Windows 98 — **Launch Date:** May 15, 1998

Windows 2000 — **Launch Date:** February 17, 2000

Windows XP — **Launch Date:** October 25, 2001

Windows Vista — **Launch Date:** January 30, 2007

Windows 7 — **Launch Date:** October 22, 2009

Windows 8 — **Launch Date:** October 26, 2012

Windows 10 — **Launch Date:** July 29, 2015

Windows 11 — **Launch Date:** October 5, 2021

BASIC WINDOW ELEMENTS

The main components are GUI (Graphical user interface). It is made of four parts as follows –

1-Windows

Menu bar

Address bar

Control menu

Navigation pane

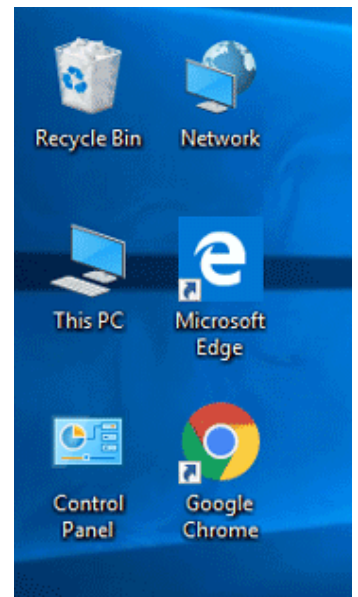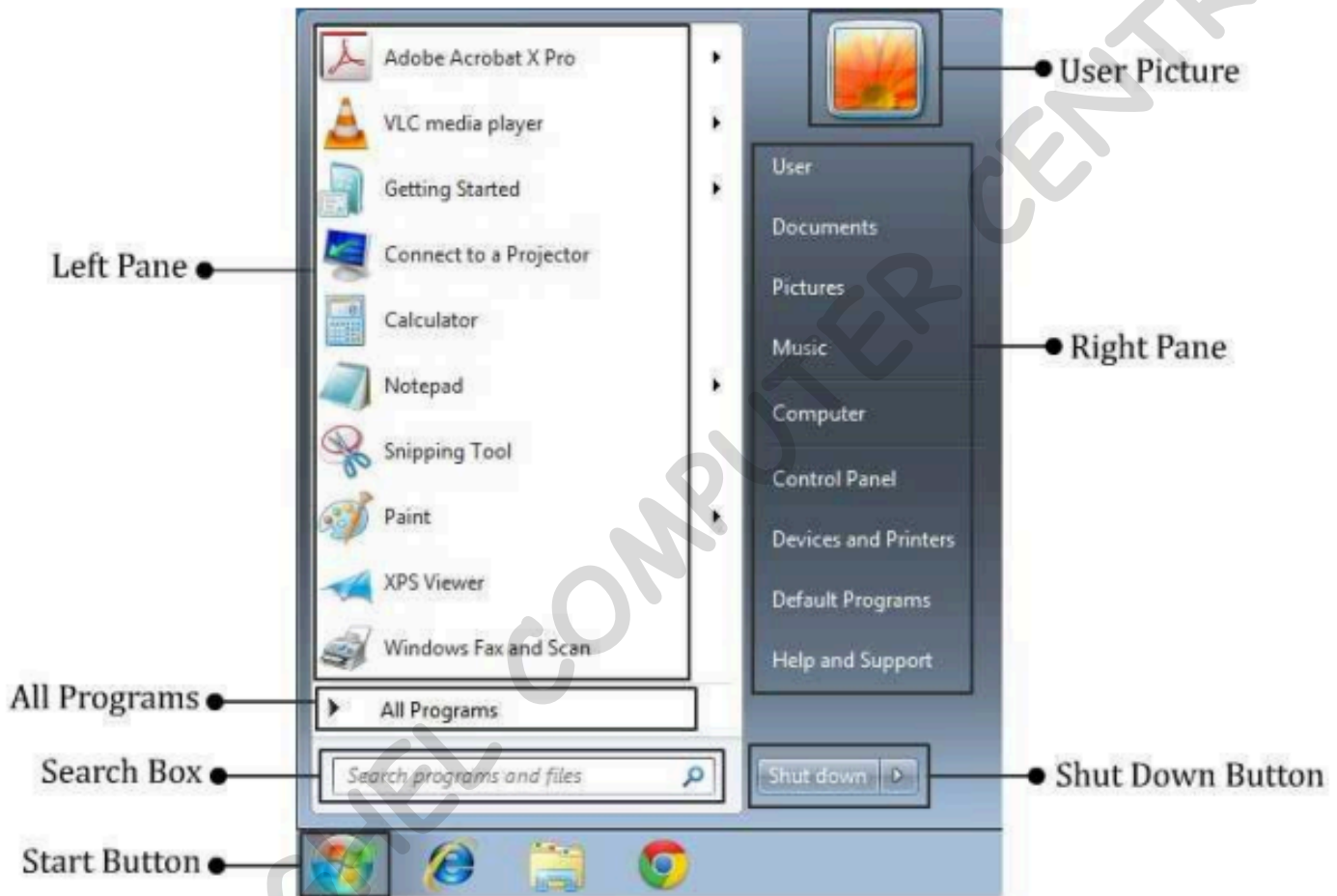## 2-Icons

Small graphical representation of program. When you double click on the icon the program file opens.
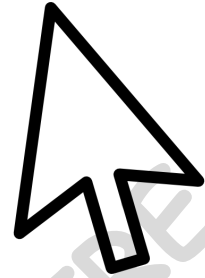
3-Menus

Set of options presented to the user, to the help of execution of the program.

4-Pointer

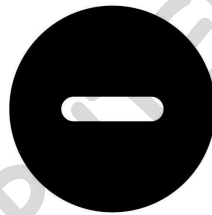A symbol that appears on the screen and that you move to select objects and commands.

5-The common windows controls are as follows –

Minimizing
Maximizing
Exit tabs

LINUX

- **Kernel Release: First Linux kernel released by Linus Torvalds in 1991.**
- **LINUX stands for Lovable Intellect Not Using XP**
- **Linux can work on different types of hardware, so Linux is portable.**
- **Linux is open source, so it is free to use**
- **It is multi-use operating system, that means multiple users can access the system.**
- **Linux is secure as it provide password protection and encryption of data.**
- **Linux is multi-programming as multiple application can be run at same time.**
- **Some of the most popular Linux distributions include Ubuntu, Red Hat, Fedora, Oracle Linux, CentOS and Debian.**
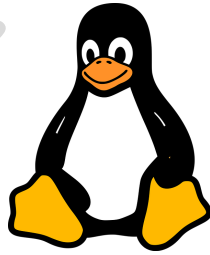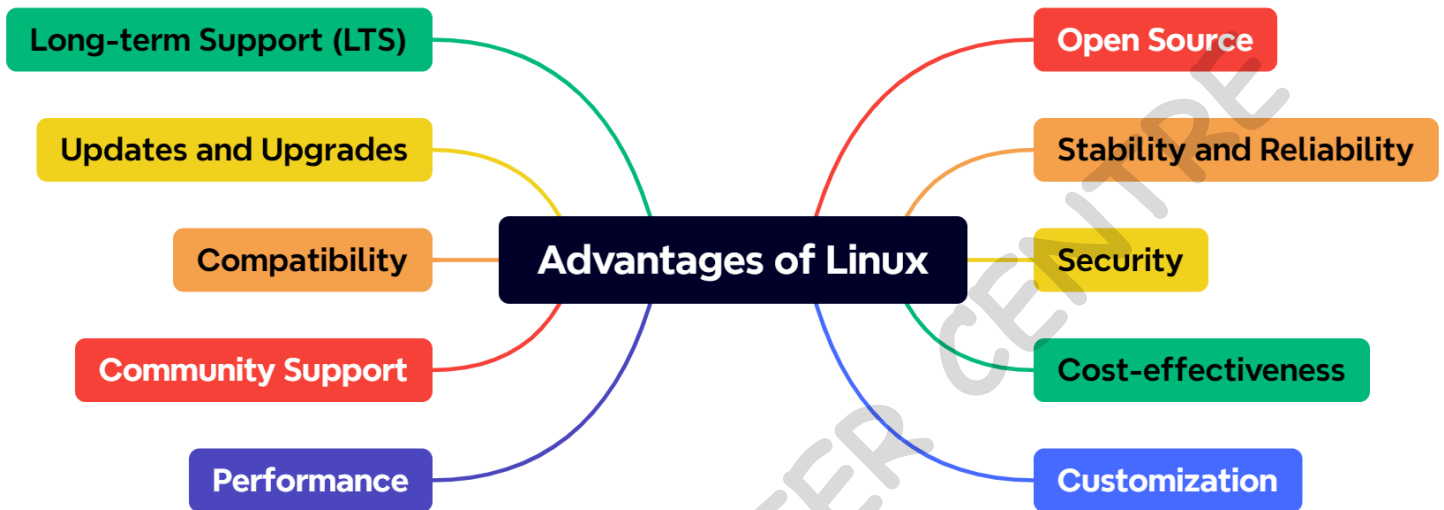
Features

- **Inspiration:** Linux based on Unix.
- **Collaboration:** Developed with global contributions.
- **Free and Open:** Linux is open-source and free to modify.
- **Versatility:** Runs on various devices.
- **Variety:** Many distributions available.
- **User-Friendly:** Known for ease of use and power.

ADVANTAGES OF LINUX

- **Open Source:**

Freely available source code fosters collaboration and innovation.

- **Stability and Reliability:**

Known for long uptimes and minimal crashes.

- **Security:**

Robust permissions system and active community patching enhance security.

- **Cost-effectiveness:**

Free to download and use, eliminating licensing fees.

- **Customization:**

Extensive options for tailoring the system to specific needs.

- **Performance:**

Efficient even on older hardware, providing a smooth user experience.

- **Community Support:**

Vast and active community offers troubleshooting and guidance.

- **Compatibility:**

Supports a wide range of hardware devices and platforms.

-

- **Updates and Upgrades:**

Regular updates and upgrades ensure access to the latest features and security patches.

- **Long-term Support (LTS):**

Many distributions offer extended support for stability and security.

DISADVANTAGES OF LINUX

5. Fragmentation:

Disadvantages of Linux OS:

1. Limited Application Support:

2. Driver Compatibility Issues:

3. Less Intuitive Interface:

4. Limited Vendor Support:

- **Limited Application Support:** Some Windows applications may not be available on Linux.
- **Driver Compatibility Issues:** Some hardware drivers may not be fully supported.
- **Less Intuitive Interface:** Linux interfaces can be less user-friendly than Windows.
- **Limited Vendor Support:** Lack of support from major software and hardware vendors.

- **Fragmentation:** Different Linux distributions may have varying standards, making software development challenging.
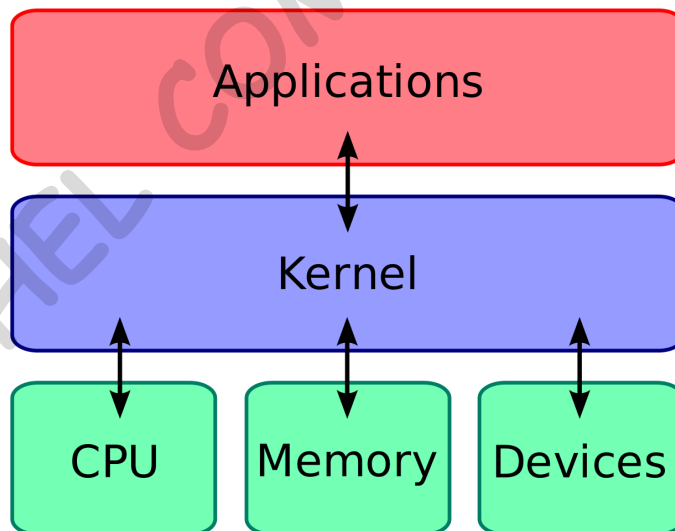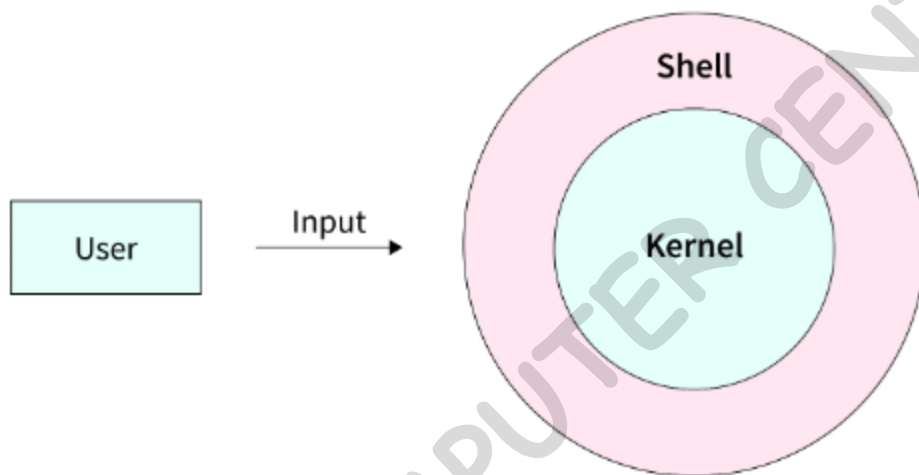
STRUCTURE OF LINUX
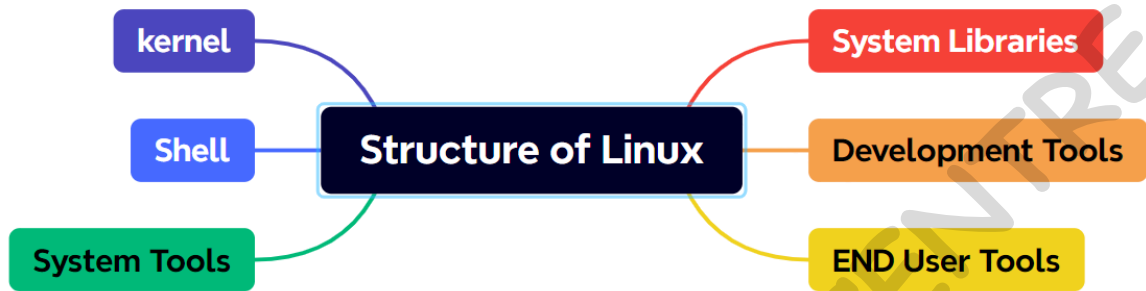
1. Kernel:

- **The core part of Linux that manages the computer's resources and allows other software to run.**
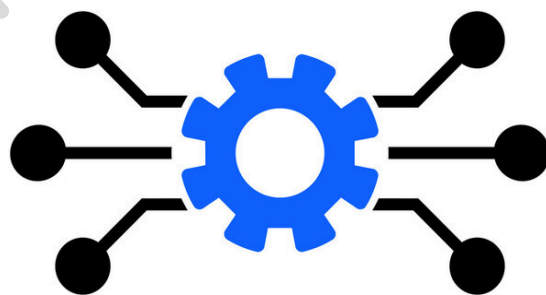
2. Shell:

- A way for users to communicate with Linux by typing commands. It's like a chat with the computer.

3. System Tools:

- Tools that help manage the computer, like copying files, checking what's running, or adding new users.
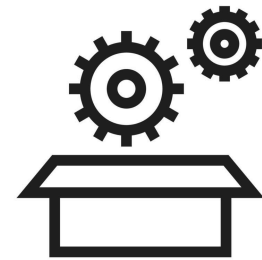
4. System Libraries:

- Collections of code that programs use to do common tasks, like reading files or connecting to the internet.

5. Development Tools:

- Software used by people who make programs for Linux, like writing code, fixing errors, or building new software.

6. End User Tools:

- Programs that regular people use for things like browsing the internet, writing documents, watching videos, or listening to music.