Module 1 – Intro to Linux

What is Operating System?

- An **operating system or OS** is a software program that enables the computer hardware to communicate and operate with the computer software
- It acts as a **bridge** between computer hardware and the computer user
- An operating system (abbreviated as "OS") is the program that, after being initially loaded into the computer by a boot program, manages all the other programs in a computer.
- The other programs are called applications or application programs
- Users can interact directly with the operating system through a user interface such as a **command line interface (CLI) or a graphical user interface (GUI).**

Types of Operating Systems:

- **Desktop Operating Systems**, e.g., Microsoft Windows, macOS, and Linux such as Ubuntu
- **Server Operating Systems**, e.g., Windows Server, Linux distributions like CentOS, Red Hat Enterprise Linux
- **Mobile Operating Systems**, e.g., Android, iOS, Windows Mobile
- **Embedded Operating Systems** used in devices like routers, smart TVs, automobiles, home appliances etc.
- **Real-Time Operating Systems (RTOS)** used in critical systems like medical equipment, aerospace, defense, network firewalls, home security system etc.

What is Linux?

- Linux, in simple terms, is a **free** and **open-source** operating system
- It's similar to Windows and macOS, but it's different in several ways
- Linux is very popular for its stability, security, and flexibility.
- It can be modified and distributed by anyone, which has led to many different versions, known as "**distributions**," and each distribution is tailored for different uses
- Its **open-source** nature means that a community of developers and users contribute to its development

Linux Vs Unix

- **Origins and Development**:
  - Unix: Originated in the 1970s at AT&T's Bell Labs. It was developed by Ken Thompson, Dennis Ritchie, and others
  - Linux: Created in the early 1990s by Linus Torvalds. It's free and open-source, meaning its source code can be used, modified, and distributed by anyone
- **OS Distribution:**
  - Unix: Solaris, HP-UX, AIX. BSD etc.
  - Linux: Red Hat, CentOS, Fedora, Ubuntu, SUSE, Kali etc.
- **Licensing and Cost:**
  - Unix: Generally requires a paid license, especially for commercial use
  - Linux: Free to use, modify, and distribute
- **Community and Development:**
  - Unix: Development and updates are controlled by the owning organization
  - Linux: Maintained and developed by a global community of developers

Linux Flavors /Distributions

"Linux flavors" = "Linux distributions" = or "distros" for short

- Ubuntu 

- Fedora 
- Debian 

- Red Hat Enterprise Linux (RHEL) 

- CentOS 

- Arch Linux 

- openSUSE 

- Linux Mint 

- Gentoo 

- Slackware 

- Alpine Linux 

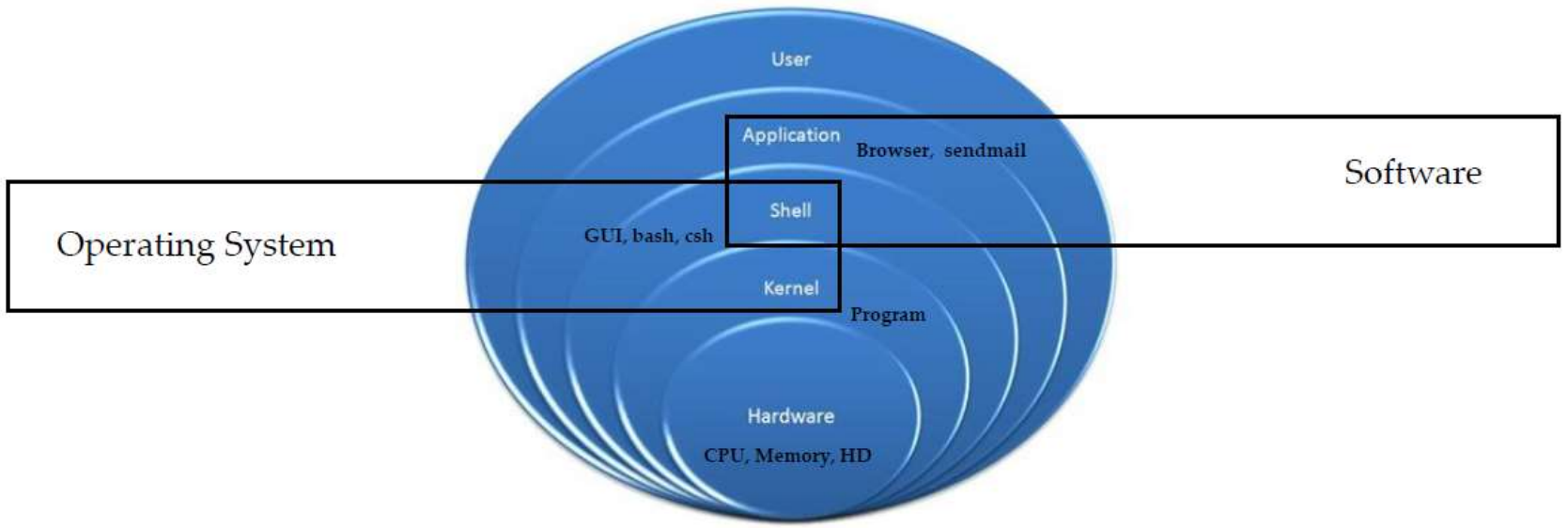
- Kali Linux 

Linux Vs Windows

	Linux	Windows
Price	Free	$$$
Ease	Not user-friendly	User friendly
Reliability	Very reliable. Often runs for months or years	Often requires reboot
Software	Mostly enterprise level softwares	Much larger selection of softwares e.g. office, games, utlities etc.
Multi-tasking	Best for multi-tasking	Multi-tasking is avaliable but with very high cpu or memory resources
Security	Very secure	Some what secure
Open source	Open to public	No an open source OS

What is Kernel ?

- The kernel is a **core** component of any **operating system**, responsible for managing hardware resources, providing system services, and ensuring the stable and secure operation of the system.
- It manages how **hardware** and **software communicate** and ensures that everything runs smoothly
- The kernel manages system resources, such as the **CPU**, **memory**, and devices, ensuring everything works together smoothly and efficiently.
- It handles tasks like running **programs**, accessing **files**, and connecting to **devices** like printers and keyboards.


User
Application
Browser, sendmail
Software
Shell
GUI, bash, csh
Operating System
Kernel
Program
Hardware
CPU, Memory, HD