MODULE 1 :
Introduction

What is an Operating System?

- Operating System(OS) is a system software
- OS can be defined as an organized collection of software consisting of procedures for operating a computer
- OS provides an environment for execution of programs
- OS acts as an interface between the user and the hardware of the computer system

What is an Operating System? (contd.)

- Operating system interacts with user in two ways
- Operating system commands
  - ✓ Enables user to interact directly with the operating system
- Operating system calls
  - ✓ Provides an interface to a running program and the operating system
  - ✓ System calls in UNIX are written in C

What is UNIX?

- Unix is a multi-user, multi-tasking operating system
- You can have many users logged into a system simultaneously, each running many programs
- It's the kernel's job to keep each process and user separate and to regulate access to system hardware, including cpu, memory, disk and other I/O devices

History of UNIX

- First Version was created in Bell Labs in 1969
- Some of the Bell Labs programmers who had worked on this project, Ken Thompson, Dennis Ritchie, Rudd Canaday, and Doug McIlroy designed and implemented the first version of the Unix File System along with a few utilities. It was given the name UNIX by Brian Kernighan.
- 1973 Unix is re-written mostly in C, a new language developed by Dennis Ritchie
- Being written in this high-level language greatly decreased the effort needed to port it to new machines

History of UNIX (contd.)

- 1977 There were about 500 Unix sites world-wide.
- 1980 BSD 4.1 (Berkeley Software Distribution or Berkeley Unix because it was based on the source code of the original Unix.)
- 1983 SunOS, BSD 4.2, System V
- 1991 Linux was originated.

What is Linux ?

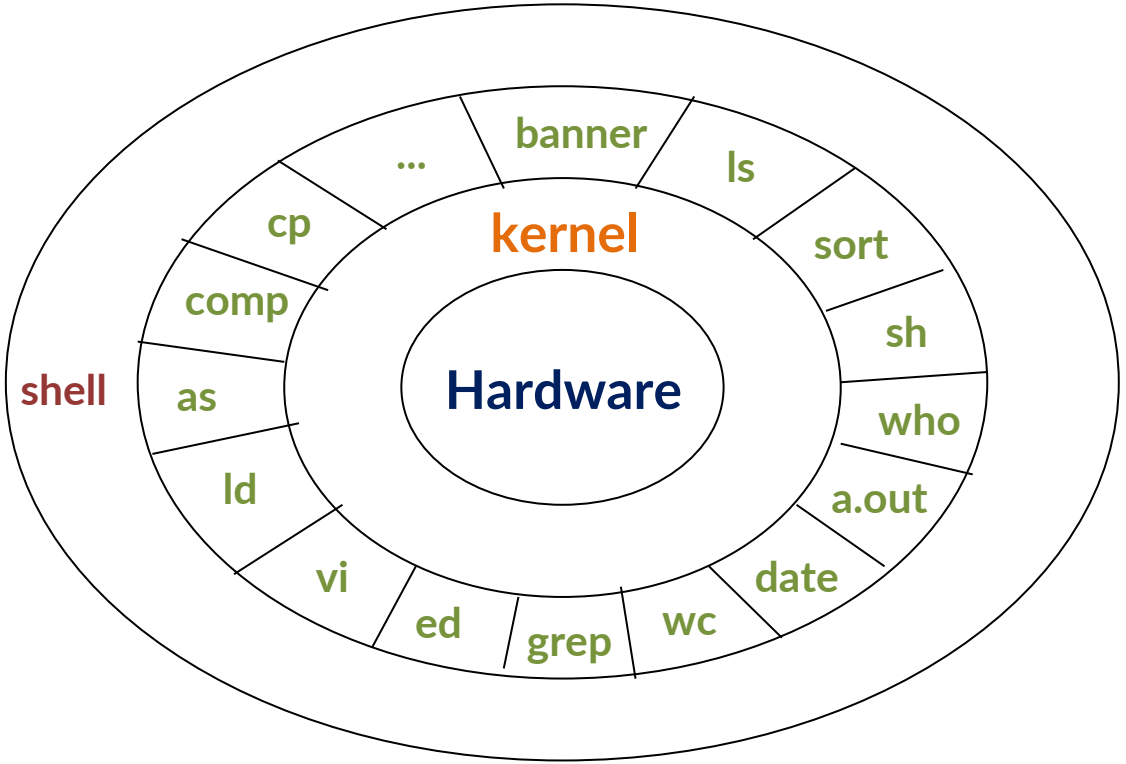
- Linux is a free Unix-type operating system originally created by “Linus Torvalds” with the assistance of developers around the world.
- It originated in 1991 as a personal project of Linus Torvalds, a Finnish graduate student.
- The Kernel version 1.0 was released in 1994 and today the most recent stable version is 4.18.5
- Developed under the GNU General Public License , the source code for Linux is freely available to everyone.

Features of Linux

- UNIX-like operating system.

  Features:
  - Preemptive multitasking, multiuser system.
  - Virtual memory (protected memory, paging)
  - Shared libraries
  - Demand loading, dynamic kernel modules
  - Shared copy-on-write executables
  - TCP/IP networking
  - SMP support
  - Open source

Layered Architecture



Unix System Architecture

Unix system follows a layered approach. It has four layers

- The innermost layer is the hardware layer
- In the second layer, the kernel is placed "*Core of OS*"
- The utilities and other application programs form the third layer
- Fourth layer is the one with which the user actually interacts.

What is a Kernel ?

- AKA: executive, system monitor.
- Controls and mediates access to hardware.
- Implements and supports fundamental abstractions:
  - ✓ *Processes*, *files*, *devices etc.*

- Schedules / allocates system resources:
  - ✓ *Memory*, *CPU*, *disk*, *descriptors*, *etc.*

- Enforces security and protection.
- Responds to user requests for service (system calls).

What is a Shell ?

Shell is a utility program that comes with the **UNIX** system.

Features of Shell are:

- Interactive Processing
- Background Processing
- I/O Redirection
- Pipes
- Shell Scripts
- Shell Variables
- Programming Constructs

Where is Linux used ?

Linux is simply a computer operating system, so its uses are as diverse as any other Operating System. It is popular in certain areas, though:

- Web Serving
- Networking
- Databases
- Desktops
- Scientific Computing
- Home Computing
- Smartphones

Distributions of Linux

Here are some of the most popular linux distributions:

- RedHat Enterprise Linux (RHEL)
- Fedora
- Ubuntu
- Debian
- SuSE Linux Enterprise Server (SLES)
- OpenSuSE
- Linux Mint

Logging in to Linux System

There are many ways that we can access a UNIX system. The main mode of access to UNIX machine is through a terminal, which usually includes a keyboard , and a video monitor.

For each terminal connected to the UNIX system, the Kernel runs a process called a `tty` that accepts input from the terminal, and sends output to the terminal.

Logging in

Logging in to a UNIX system requires two pieces of information:

A **username**, and a **password**. When we establish a connection to UNIX system, we are given a login prompt that looks like –

```
login:
```

Logging out

When we are ready to disconnect the session, type the command -

```
exit
```

Some shells will recognize other commands to log you out, like “`logout`” or even “`bye`”.

Thank You!