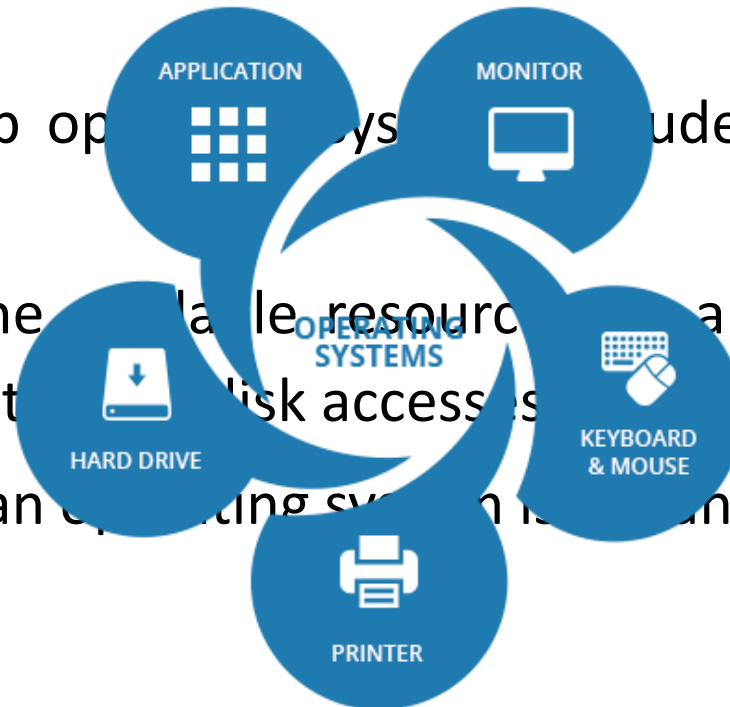


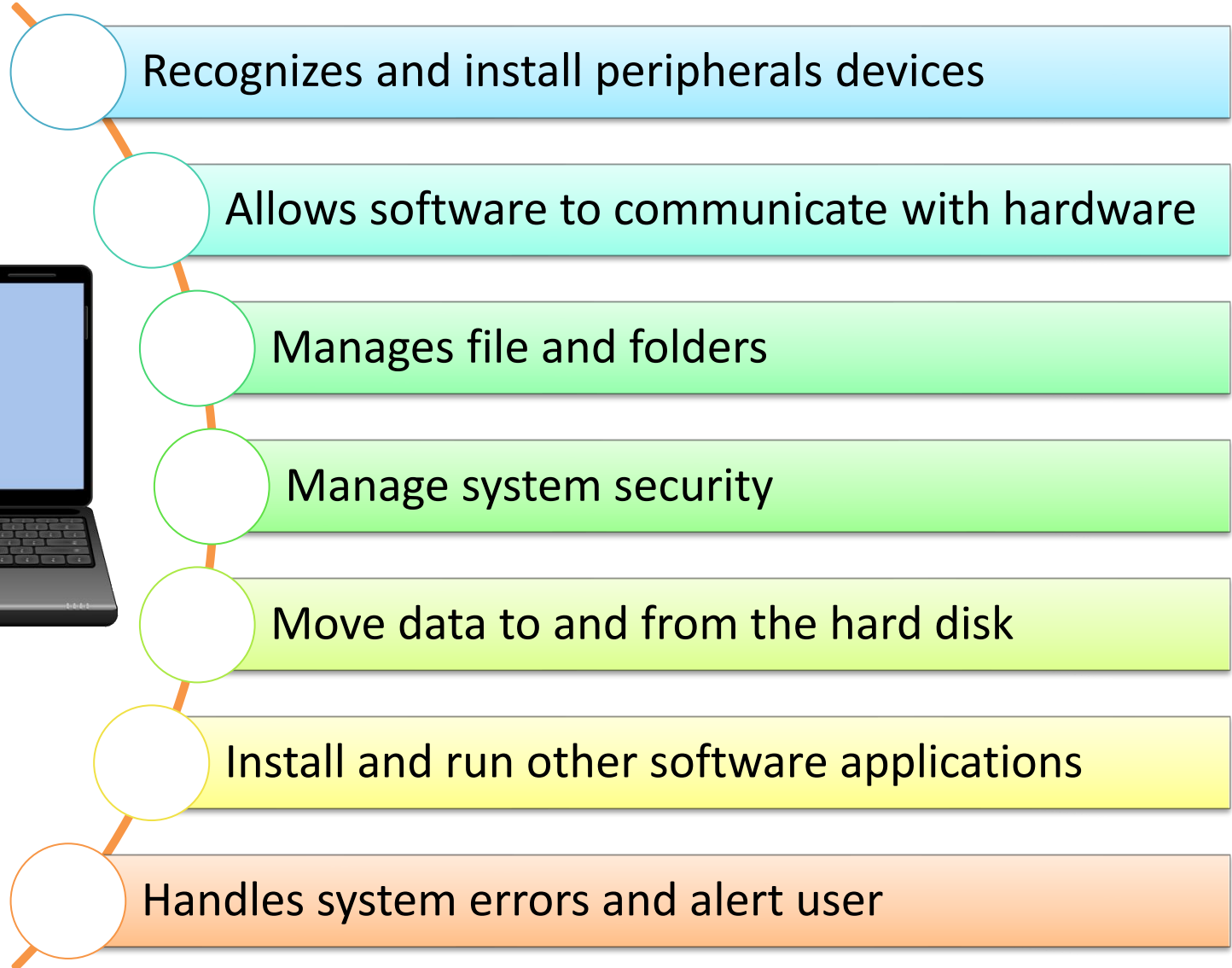
# What is an Operating System?

---

- An **operating system**, or "**OS**," is software that communicates with the hardware and allows other programs to run.
- Every desktop computer, tablet, and smartphone includes an operating system that provides basic functionality for the device.
- Common desktop operating systems include Windows, Mac OS, and Linux.
- It manages all the available resources of a computer, from the CPU, to memory, to disk accesses.
- In simple terms, an operating system is a resource manager.



# Tasks of Operating System





# Operating System

Controls the hardware and coordinates its use among the various application programs for the various users.

# What is UNIX ?

---

- Unix is a portable, multitasking, multiuser, time-sharing operating system (OS) originally developed by AT&T Bell Labs.
- Several people can use a UNIX computer at the same time; hence ***UNIX is called a multiuser system.***
- Any of these users can also run multiple programs at the same time; hence ***UNIX is called multitasking.***
- There are many different versions of UNIX, although they share common similarities.
- The most popular varieties of UNIX are Sun Solaris, GNU/Linux, and MacOS X.

# The UNIX Operating System

- The UNIX operating system is made up of three parts; ***the kernel***, ***the shell*** and ***the Application***.

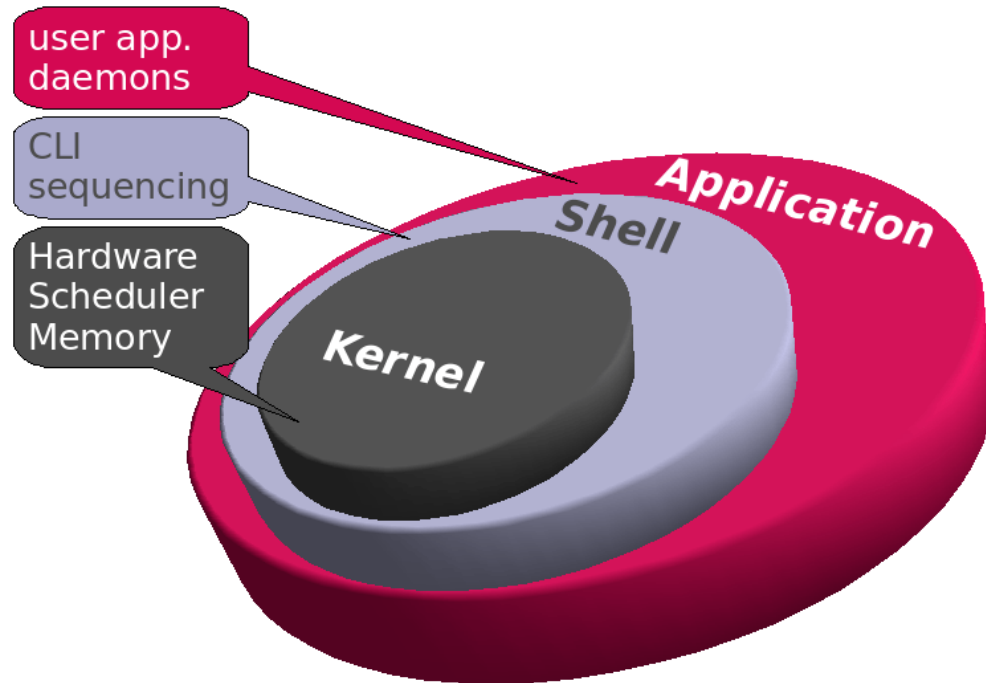
- The **kernel** is the part of the operating system that manages whatever comes from the hardware.

- The **shell** is the part of the operating system that manages the user interface.

- The **shell** is the part of the operating system that manages the user interface and the actions on the system.

- **Application** is the part of the operating system that manages the user interface like a web browser.

- The file system is the part of the operating system that manages the files and directories.



sources of

requests into  
rams.

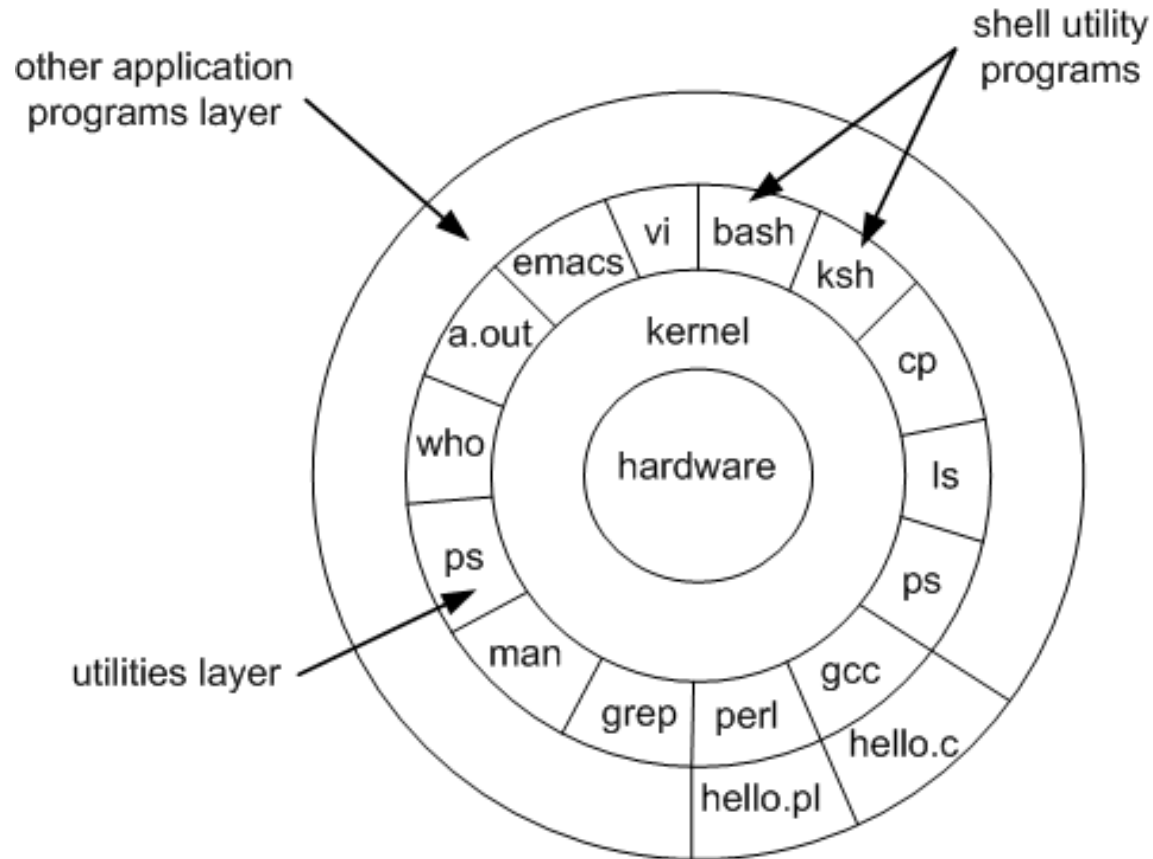
utility program

# What exactly is a “shell”?

---

- The shell acts as an interface between the user and the kernel.
- The shell is a command line interpreter (CLI).
- User commands are often entered on a command line interface that is provided by a ‘**shell**’.
- The shell is a program that reads the user commands, evaluates it, and then prints the result.
- For evaluating the command, the shell may execute other commands, or pass them to the ‘kernel’.
- The most popular shells are: **bash**, tcsh, csh, and korn
- Shell commands are **CASE SENSITIVE!**

# Operating System Organization



# UNIX History

---

- The UNIX operating system was born in the late 1960s.
- It originally began as a one man project led by Ken Thompson of Bell Labs.
- In the time since UNIX was first developed, it has gone through many different generations.
- Some differ substantially from the original version, like Berkeley Software Distribution (BSD) or Linux.
- Others, still contain major portions that are based on the original source code.



# The Features of the Unix

---

- **Open Source**

- Linux source code is freely available and it is community based development project.

- **Multiuser capability**

- In a multi user system, the same computer resources hard disk, memory etc. are accessible to the many users.
- Users are given the different terminal to operate, a terminal in turn, is a keyboard and a monitor.
- All the terminals are connected to the main computer whose resources are available by all users.

# The Features of the Unix

---

- **Multitasking capability**

- Unix is a powerful multi-tasking operating system.
- It means when a active task in in process, there can be a simultaneous background process working too

- **Communication**

- UNIX has the excellent communication with the users.
- The communication may be within the network of a single main computer or between two or more such computer network.

# The Features of the Unix

---

## ▪ **Security**

- Unix Has the three provisions for protecting the data.
  1. Re-assigning the passwords and login names
  2. Read, write and execute permissions
  3. File encryption

## ▪ **Portability**

- Portability means *software can works on different types of hardware* in same way.
- A portability credit of the UNIX is because of the C language, it *written in C language and C language is portable.*

# Linux Architecture

set of procedures.  
collection of  
system level files.

Comes for  
processing  
and interact  
with system

To make user  
programs and make  
work easier  
Like compilers,  
assemblers, editors

It contains  
physical devices  
of computer like  
CPU, Memory,  
Disk, printer etc.

management and  
process  
management

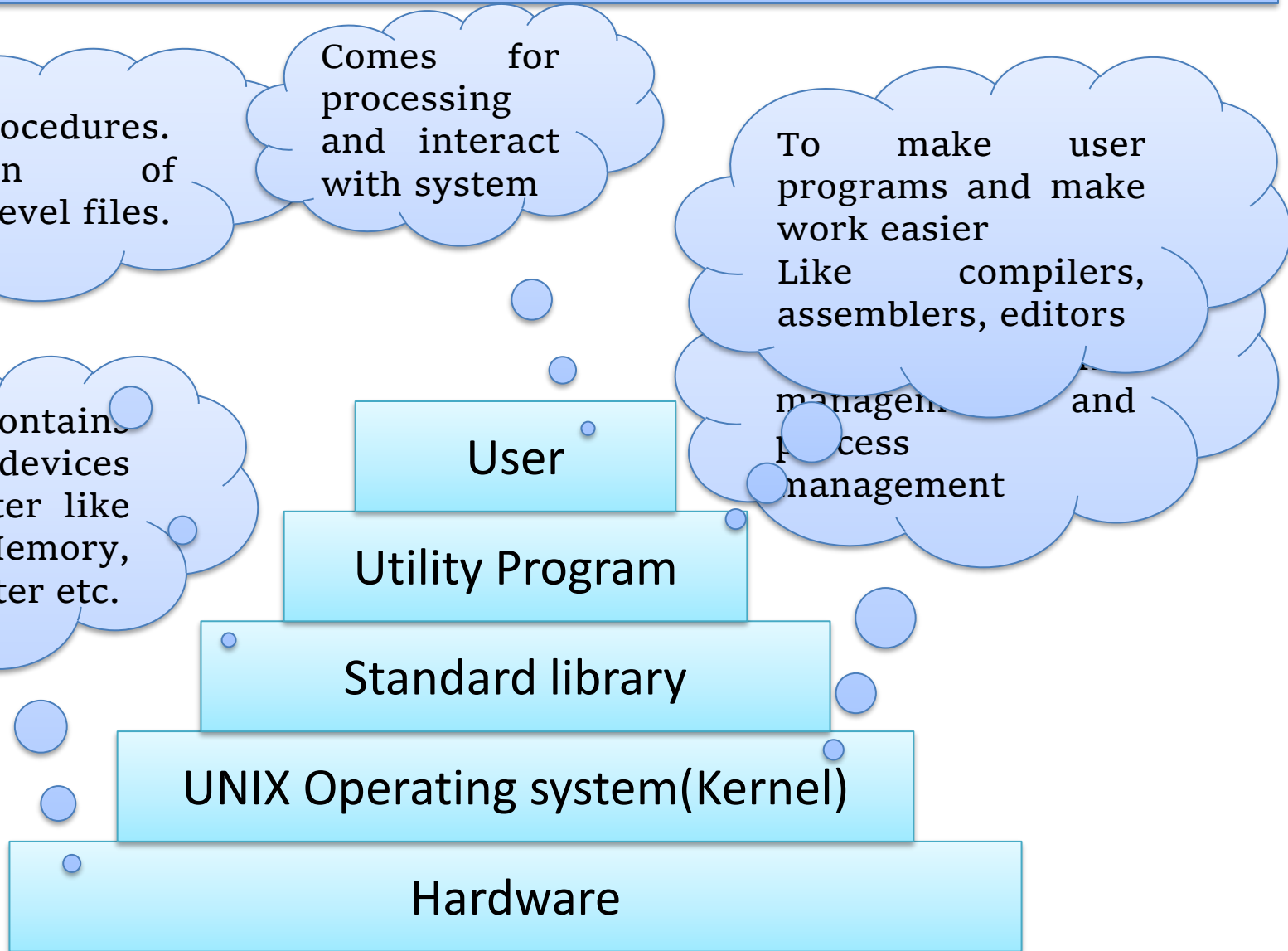
User

Utility Program

Standard library

UNIX Operating system(Kernel)

Hardware



# Components of Linux System

---

- **Kernel**

- Kernel is the core part of Linux. It is responsible for all major activities of this operating system. It consists of various modules and it interacts directly with the underlying hardware.

- **System Library**

- System libraries are special functions or programs using which application programs or system utilities accesses Kernel's features.

- **System Utility**

- System Utility programs are responsible to do specialized, individual level tasks.

# Basic function of Kernel

---

- **Resource allocation**

- Manage the computer's resources and allow other programs to run and use these resources.
- Example: CPU, Memory and I/O devices.

- **Process Management**

- A process defines which memory portions the application can access.
- To allow the execution of applications and support them with features.

# Basic function of Kernel – Cont...

---

- **Memory Management**

- It allows processes to safely access this memory as they require it.
- Virtual addressing helps kernel to create virtual partitions of memory in two disjointed areas.
  1. kernel space(reserved for the kernel)
  2. User space(for the applications)

# Basic function of Kernel – Cont...

---

## ▪ I/O Device Management

- Processes need access to the peripherals connected to the computer, which are controlled by the kernel through **Device Drivers**.
- It is a computer program that enables the operating system to interact with a hardware device.
- A kernel maintains a list of available devices.

## ▪ Inter- Process Communication

- It methods for Synchronization and Communication between processes called Inter- Process Communication (IPC).
- There are various approaches of IPC say, semaphore, shared memory, message queue, pipe (or named fifo), etc.



# Basic function of Kernel – Cont...

---

- **Scheduling**

- The kernel uses Scheduling Algorithms to determine which process is running next and how much time it will be given.

- **System Calls and Interrupt Handling**

- A system call is a mechanism that is used by the application program to request a service from the operating system.
- System calls include close, open, read, wait and write.
- To access the services provided by the kernel we need to invoke the related kernel functions.

# Basic function of Kernel – Cont...

---

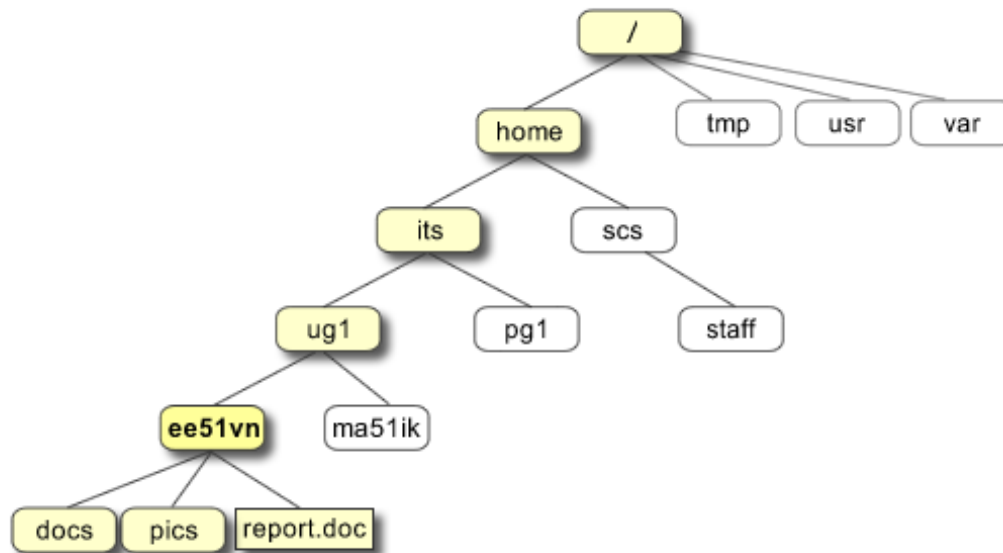
- **Security or Protection Management**

- Kernel also provides protection from faults (error control) and from malicious behaviours (Security).
- One approach toward this can be language based protection system.
- Here, the kernel will only allow code to execute which has been produced by a trusted language compiler.

# Directory Structure

---

- A **directory** is a container that is used to contain folders and file. It organizes files and folders into a hierarchical manner.
- All the files are grouped together in the directory structure.
- The top of the hierarchy is traditionally called root (written as a slash / ).



# Linux Vs. Windows

Linux	Windows
✓ Linux is an open source operating system.	✓ Windows are not the open source operating system.
✓ Linux is free of cost. No Licence	✓ It is costly. Licence required.
✓ It's file name case-sensitive.	✓ It's file name is case-insensitive.
✓ Monolithic kernel is used.	✓ Micro kernel is used.
✓ Linux is customizable.	✓ Windows are not customizable.
✓ There is forward slash is used for separating the directories.	✓ There is back slash is used for separating the directories.
✓ Booting possible in either primary or logical partition.	✓ Booting possible in Only primary partition.
✓ File System: EXT2, EXT3 and EXT4	✓ File System: FAT, FAT32 and NTFS