CREATIVE ENGINEERING LAB

CSE-105

Module Outline

- Know your course
  - Course outcome
  - Course Outline
  - Course textbook
  - Course Assessment Model

- Why OS?
- Why LINUX?

COURSE OUTCOME

- Analyze and configure Linux environment
- Set up privileges for different kind of users and groups and manage disk space.
- Understand workflow design and interaction using shell scripts

COURSE OUTLINE

1. Linux basics and its installation
2. System Utilities
3. File System
4. The Shell
5. Customizing the Environment
6. Essential System Administration
7. Manual Page
8. Shell Programming
9. Programming development tools.

COURSE TEXTBOOK

Text Books:

1. UNIX CONCEPTS AND APPLICATIONS by SUMITABHA DAS, MCGRAW HILL EDUCATION

References:

1. DESIGN OF THE UNIX OPERATING SYSTEM by MAURICE J. BACH, PRENTICE HALL
2. BEGINING REDHAT LINUX 9 by SANDEEP BHATTACHARYA, WROX PROGRAMMER

COURSE ASSESSMENT MODEL

- 3,6,9,12 week we will have lab evaluations

Operating System Characteristics

1. Collection of Programs those are Responsible for the Execution of other Programs.
2. Responsible for Controlling all the Input and Output Devices those are connected to the System.
3. Responsible is for Running all the Application Software's.
4. Provides Scheduling to the Various Processes Means Allocates the Memory to various Process those Wants to Execute.
5. Provides the Communication between the user and System.
6. Stored into the BIOS(Basic Input and Output System) means when a user Starts his System then this will Read all the instructions those are Necessary for Executing the System.

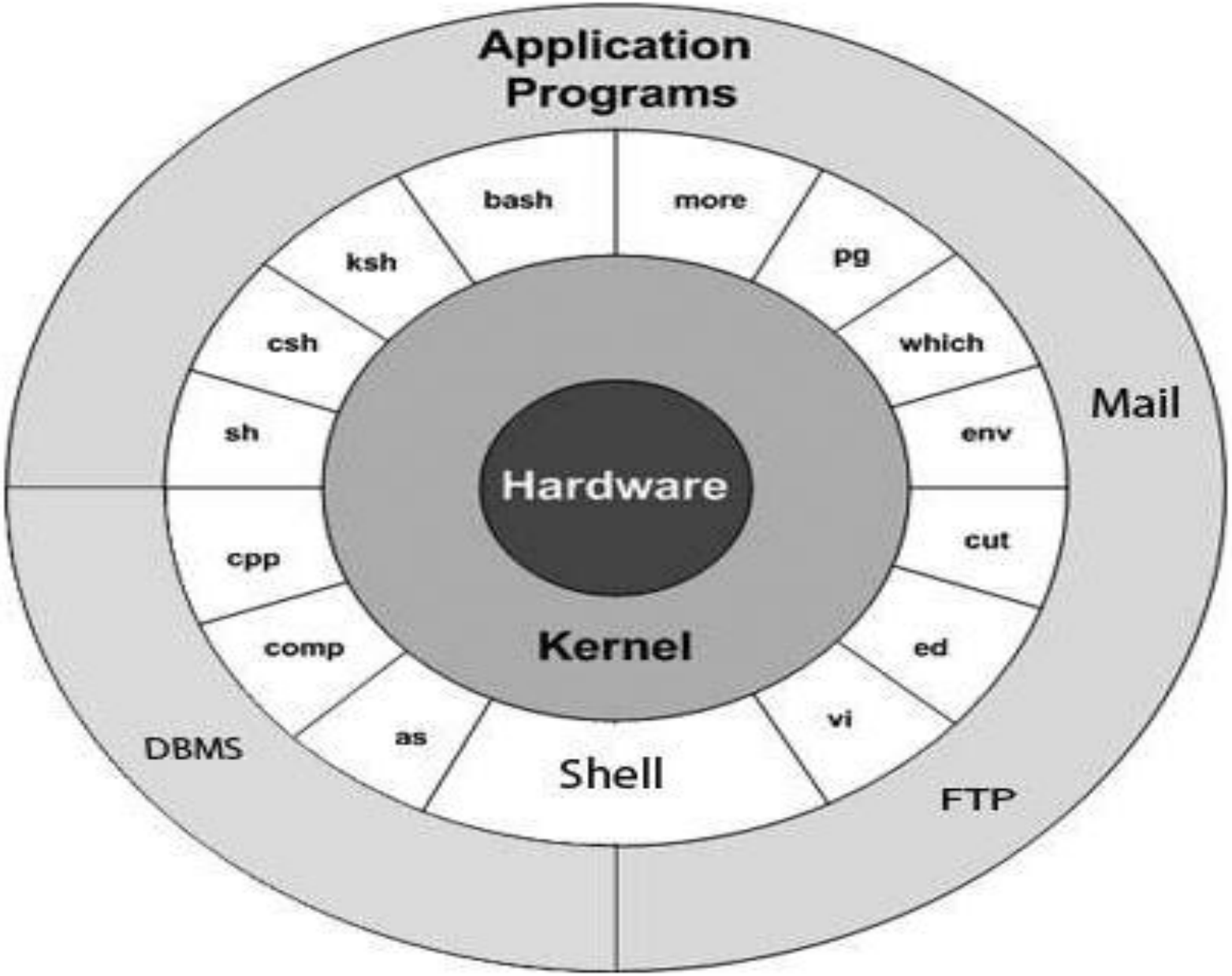
UNIX

- Set of programs that act as a link between the computer and the user.
- Computer programs that allocate the system resources and coordinate all the details of the computer's internals is called the **operating system or the kernel.**
- Users communicate with the kernel through a program known as the **shell.**
- **The shell is a** command line interpreter; it translates commands entered by the user and converts them into a language that is understood by the kernel.

UNIX

- Unix was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie, Douglas McIlroy, and Joe Ossanna at Bell Labs.
- Linux is also a flavor of Unix which is freely available.
- Unix is called a **multiuser system** and **multitasking** environment.

UNIX ARCHITECTURE



UNIX ARCHITECTURE

The main concept that unites all the versions of Unix is the following four basics −

- **Kernel:**
  - **heart of the operating system.**
  - It interacts with the hardware and most of the tasks like memory management, task scheduling and file management.
- **Shell:**
  - **utility that processes your requests.**
  - When you type in a command at your terminal, the shell interprets the command and calls the program that you want.
  - C Shell, Bourne Shell and Korn Shell are the most famous shells which are available with most of the Unix variants.

UNIX ARCHITECTURE

- **Commands and Utilities:**
  - Various commands and utilities are used in your day to day activities. **cp, mv, cat and grep, etc. are few** examples of commands and utilities.
  - All the commands come along with various options.
- **Files and Directories:**
  - All the data of Unix is organized into **files**.
  - All files are then organized into **directories**.
  - These directories are further organized into a tree-like structure called the **file system.**

LINUX

- Linux is also distributed under an open source license. Open source follows the following key philosophies:
- The freedom to run the program, for any purpose.
- The freedom to study how the program works, and change it to make it do what you wish.
- The freedom to redistribute copies so you can help your neighbour.
- The freedom to distribute copies of your modified versions to others.

LINUX DISTRIBUTORS

- The most popular Linux distributions are:
- Ubuntu Linux
- Linux Mint
- Arch Linux
- Deepin
- Fedora
- Debian
- openSUSE.

LINUX VS UNIX

The Source Code of Linux is freely available to its Users.	The Source Code of Unix is not available for the general public.
Linux primarily uses Graphical User Interface with an optional Command Line Interface.	Unix primarily uses Command Line Interface.
Linux OS is portable and can be executed in different Hard Drives.	Unix is not portable.
Linux is very flexible and can be installed on most of the Home Based Pcs.	Unix has a rigid requirement of the Hardware. Hence, cannot be installed on every other machine.
Linux is mainly used in Home Based PC, Mobile Phones, Desktops, etc.	Unix is mainly used in Server Systems, Mainframes and High End Computers.
Different Versions of Linux are: Ubuntu, Debian, OpenSuse, Redhat, Solaris, etc.	Different Versions of Unix are: AIS, HP-UX, BSD, Iris, etc.
Linux Installation is economical and doesn't require much specific and high end hardware.	Unix Installation is comparatively costlier as it requires more specific hardware circuitry.
Linux is development by an active Linux Community worldwide.	Unix is developed by AT&T Developers.

LINUX VS WINDOWS

BASIS FOR COMPARISON	LINUX	WINDOWS
Cost	Free of cost	Expensive
Open source	Yes	No
Customizable	Yes	No
Security	More secure	Vulnerable to viruses and malware attacks.
Separation of the directories using	Back slash	Forward slash
File names	Case sensitive	Case insensitive
Efficiency	Effective running efficiency	Lower than Linux

RULES FOR COMMANDS

- Command names must be between 2 and 9 characters in length
- Command names must be comprised of lowercase characters and digits
- Option names must be one character in length
- All options are preceded by a hyphen (-)
- The first option argument, following an option, must be preceded by white space. For example **-o sfile** is valid but **-osfile** is illegal.

RULES FOR COMMANDS

- A double hyphen -- may be used to indicate the end of the option list
- The order of the options are order independent
- The order of arguments may be important
- A single hyphen - is used to mean standard input
- Options without arguments may be grouped after the hyphen
- Option arguments are not optional

How to check for External and Internal command

- ***type*** utility can be used to check whether a command is internal or external.

EXTERNAL VS. INTERNAL

SNO	EXTERNAL COMMANDS	INTERNAL COMMANDS (BUILT-IN COMMANDS)
1.	These are executed by the kernel.	These are executed by the shell.
2.	A separate process is spawned every time a new external command is executed.	No new process is created.
3.	These are separate files in /bin directory.	These are built-ins in the shell.
4.	A few examples are cp, ls, cat, mv, etc.	Some examples are cd, echo, pwd, etc.
5.	Execution is slower.	Execution speed is high.
6.	External commands are loaded when the user requests for them.	Internal commands are already loaded in the system. They can be executed any time and are independent.
7.	Commands for which some path is displayed are **external** commands.	All those commands which gives "**shell builtin**" message are **internal** commands