جامعة القاهرة الجديدة
التكنولوجية

Fall 2023

Linux Essentials

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Agenda

- Introduction.
- Learning Outcomes.
- Linux Operating System.

Linux Essentials

- Knowledge of Linux is a helpful skill for a wide variety of careers in business and Information Technology fields.
- Many emerging and growing career opportunities including **big data, cloud computing, cyber security, information systems, networking, programming and software development** (to name a few) require basic to advanced knowledge of the Linux command line.

Unit Title	Linux Essentials					
Unit Code		Total	Lec.	Tut	Lab/WS	Practice
Credit hours	3	5	2	0	3	0

Introduction

- This course covers the fundamentals of the **Linux operating system and command line.**
- The goal of this course is to provide academic institutions and students a **“starting place”** for learning the Linux operating system.
- Students who complete this course should understand **Linux as an operating system, basic open source concepts, how Linux is used and the basics of the Linux command line.**
- This course implements a ***"practice as you read"*** approach to learning. Each learner has hands-on access to a **Linux virtual machine** to practice, explore and trial Linux command line concepts.

Linux Essentials

- **Linux as an Operating System.**
- **Investigating Linux's Principles and Philosophy.**
- **Using Common Linux Programs.**
- **Getting to Know the Command Line.**
- **Managing Files under Linux.**
- **Creating Scripts.**
- **Creating Users and Groups.**
- **Managing Network Connections.**

Learning Outcomes

1. Discover Linux as an **Operating System**.
2. Understand the **command line and shell scripts.**
3. Understand the **directory commands** and management of **users and groups** under Linux.

Learning Outcomes

- **LO1 Discover Linux as an operating system.**
- Being aware of different operating systems and assessing their commonalities and differences.
- The basic **principles of Linux** and free software.
- The basics of the operating system **kernel and processes**. Familiar with the most important Linux distributions. Linux desktop environment and browsers.

Learning Outcomes

- **LO2 Understand the command line and shell scripts.**
- Appreciating the advantages of a **command-line user interface.**
- Working with Bourne-Again Shell (Bash) scripts. **Linux terminals and shells.**
- **Shell variables and the environment.**
- **The structure of Linux commands**, Command Types, The shell script as a programming language.

Learning Outcomes

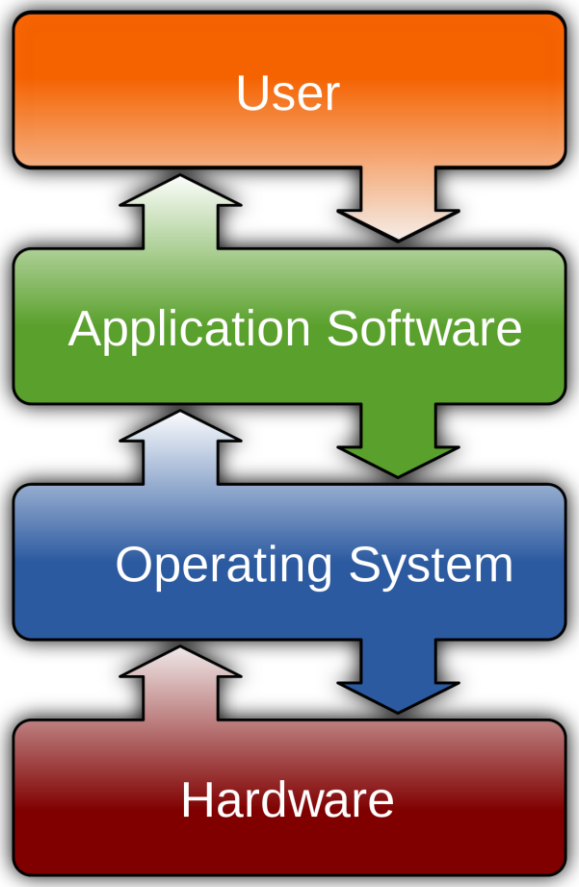
- **LO3 Understand the directory commands and management of users and groups under Linux.**
- Trying simple Linux functionality.
- Create and modify **files using a text editor.**
- Create and Modify Text Files.
- Link and Search Files. Recognition of the directory tree of a Linux system.
- Creation and Deleting Directories.
- Having insight into the role of a **Linux administrator**. Knowing about Linux package management concepts.
- Use the **user and group administration commands**. How user and group information is stored on Linux.
- Linux access control/privilege mechanisms.
- **Assign access permissions** to files and directories.
- Specifying **File Owners and Groups. Process Ownership.**

Objectives

- **Evaluate the benefits** of using Linux as an operating System.
- **Analyze the usage of Shell** in Linux OS for files and directories handling.
- **Evaluate the use of commands** in different Shells.
- **Evaluate the Linux Package Management.**

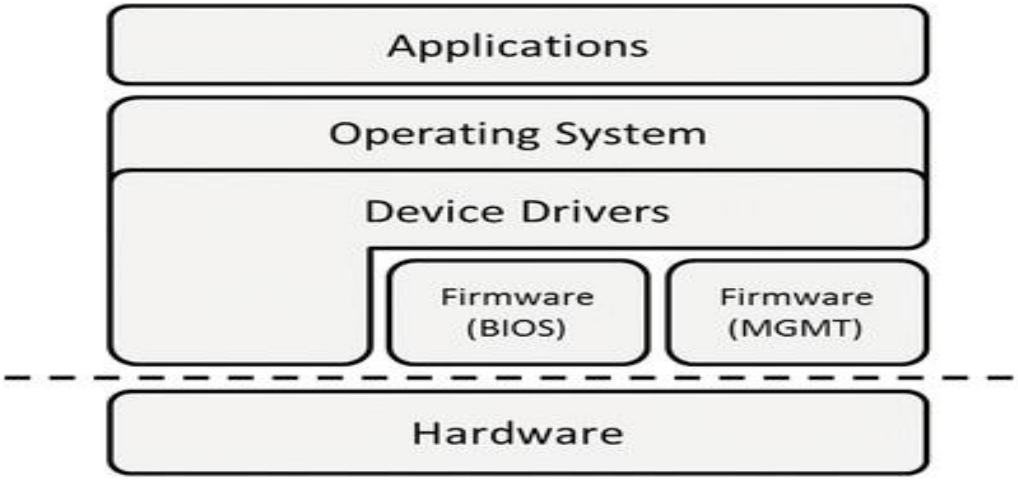
Computers, Software and Operating Systems

- Before we get into the details of what a computer is, here are a few quotes from notable people within the computing community:
- "**Originally one thought that if there were a half dozen large computers in [the United States], hidden away in research laboratories, this would take care of all requirements we had throughout the country.**" Howard H. Aiken, 1952



What Is A Computer, Anyway?

- A computer processes data according **to a sequence of automatically executed instructions, a program.**
- Programs must allow for **conditional execution and loops.**
- It must be possible to **change or replace the program** that a computer executes.
- **For example,** many technical devices – from television sets and digital cameras to washing machines or cars – today contain **programmed control units**, almost small computers. Even so, we don't consider these devices "computers", because they only **execute fixed, unchangeable programs**. Conversely, a pocket calculator can be used to "process data", but – at least as long as it isn't a more expensive "programmable calculator" – that doesn't happen automatically; a human being must tap the keys.

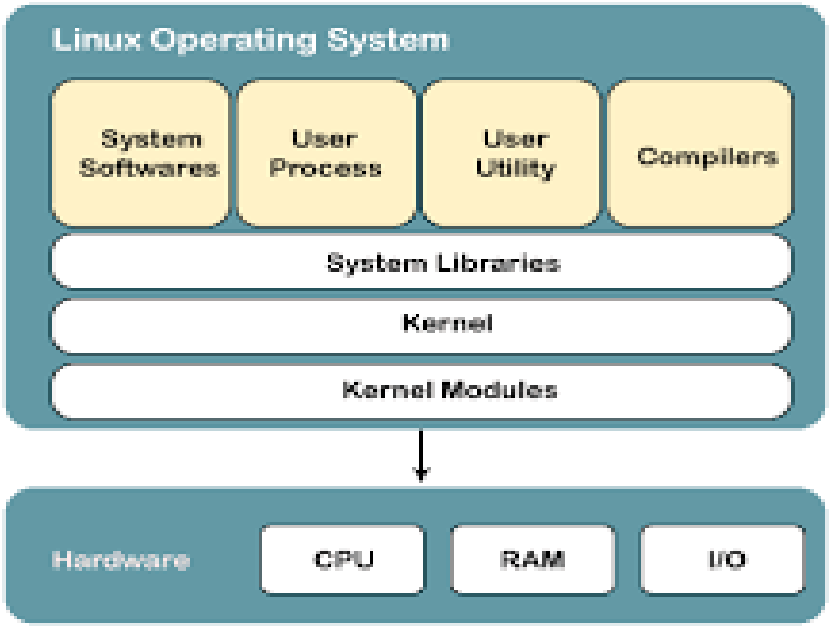


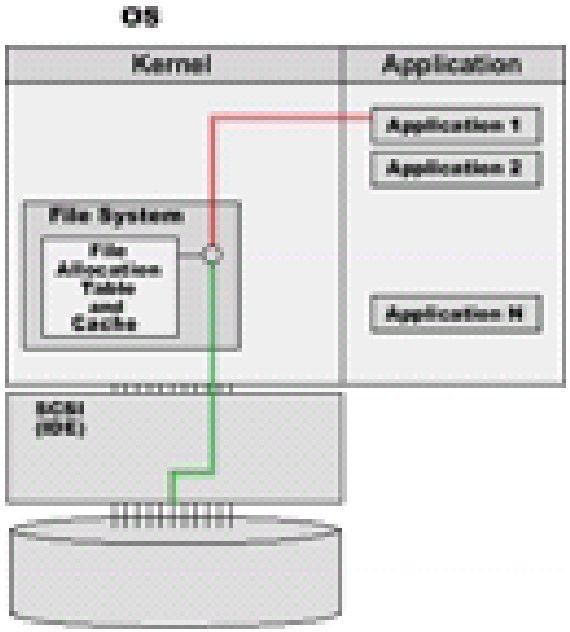
Linux Operating System

- **Linux® is an open source operating system (OS).**
- An operating system is the software that directly manages a system's hardware and resources, like CPU, memory, and storage. **The OS sits between applications and hardware and makes the connections between all of your software and the physical resources that do the work.**
- **Open source commonly** refers to software that uses an **open development process** and is licensed to include the source code. It is, essentially, a software solution whose code is publically available and free for its users and anyone else who is able to use, modify and distribute in various formats.

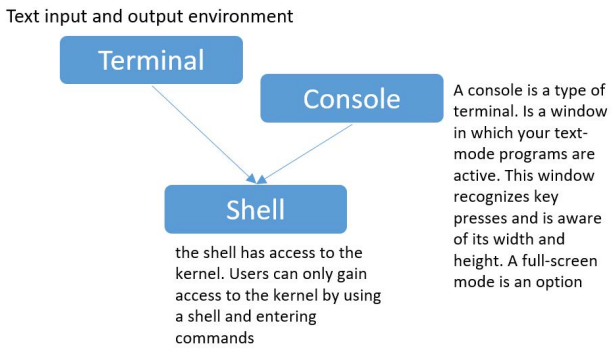
Kernel

- Kernel acts as a **bridge between applications and data processing** performed at hardware level using inter-process communication and system calls. Kernel loads first into memory when an operating system is loaded and remains into memory until operating system is shut down again.

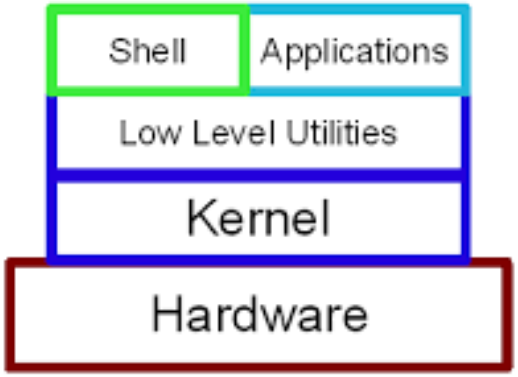




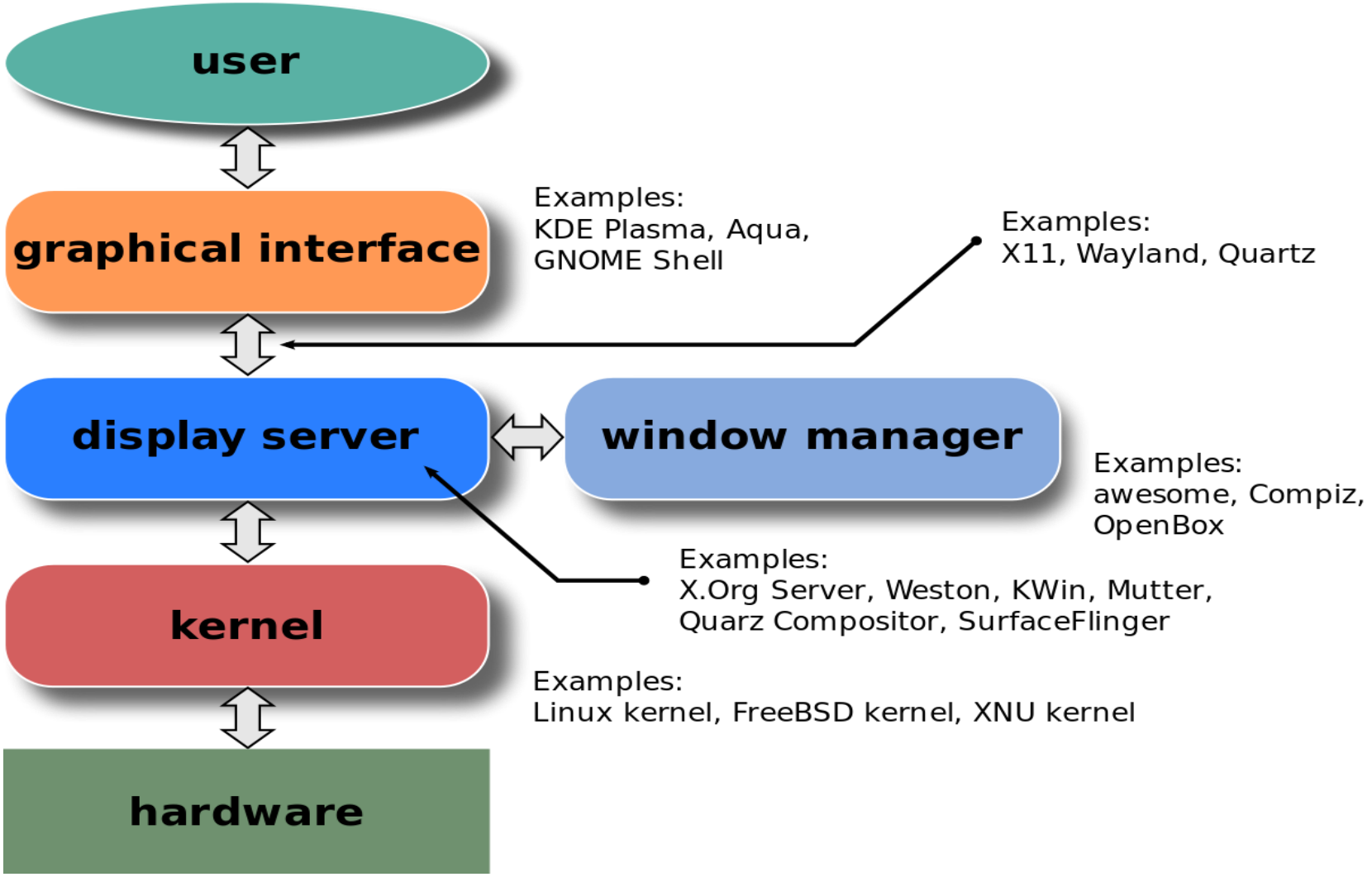
Linux Operating System



- A **Shell** is a **user interface** for access to an operating system's services. Most often the user interacts with the shell using a **command-line interface (CLI).**
- The terminal is a program that opens a graphical window and lets you interact with the shell.
- The Linux® kernel is the main component of a Linux operating system (OS) and is the core interface between a computer's hardware and its processes. It communicates between the two, managing resources as efficiently as possible.

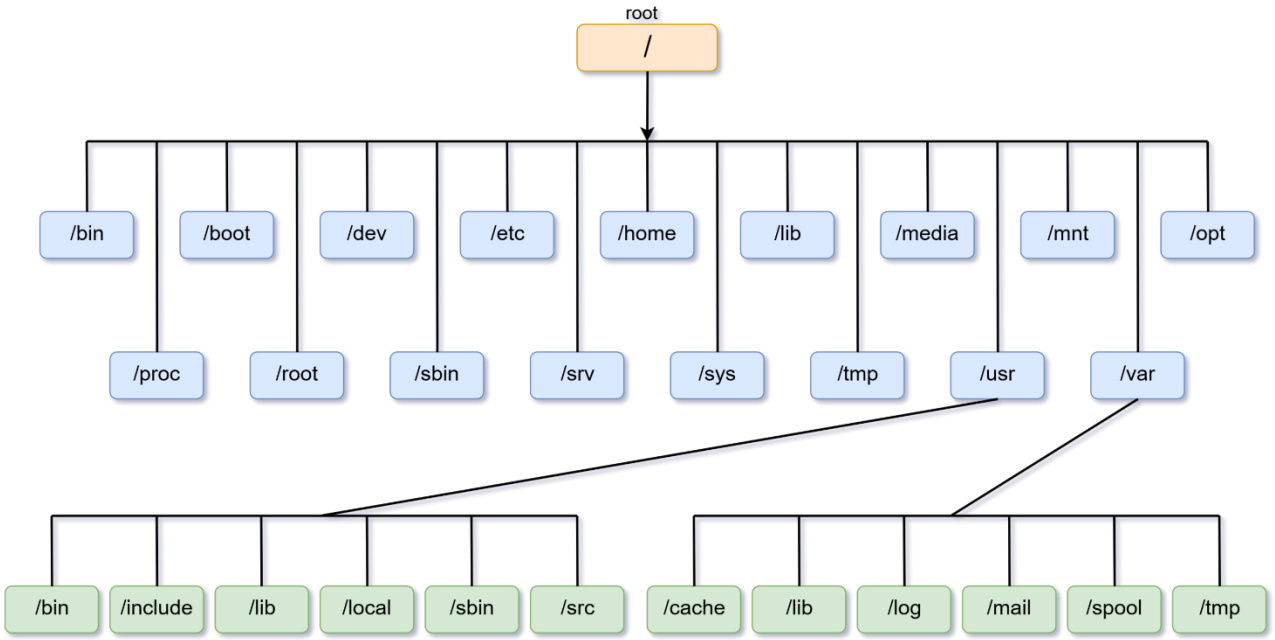


Linux Operating System

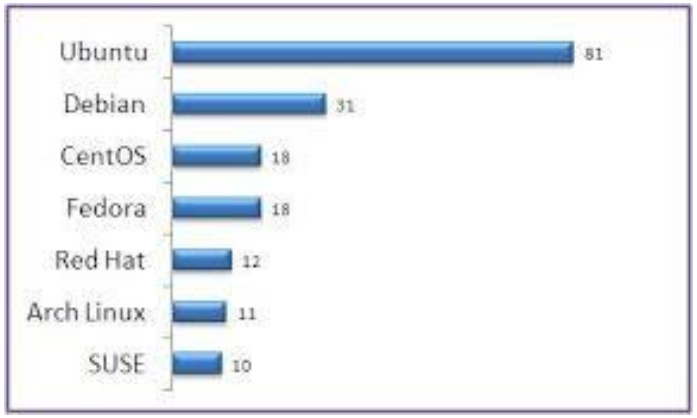


Linux File System Directory Architecture

- In Linux, the directories can be divided into two classifications:
- **Root Directory** → It is denoted by ” / ” (forward slash). Root directory is the root/base of the entire file system and cannot be renamed or deleted. There can be only one root directory.
- **Sub Directories** → Directories that are under the root (/) directory are called sub-directories.



Popular Linux



Recommended Resources

1. **Christine Bresnahan, Richard Blum. Linux Essentials, 2nd Edition Year: 2015. ISBN: 978-1-119-09214-8**
2. **Linux Essentials the LPI Introductory Programmer.**

Portfolio

- Selective Lecture Slides.
- Your Private Notes from Lectures , Sections, Trips, Reports, Labs, and Recommendations.
- Complete answers Tasks and Assignments.
- Complete answers to Quizzes, Midterm.
- Final Project Paper.
- In addition to, any related Course martials.

Thank You

Linux

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