Tishk International University
Science Faculty
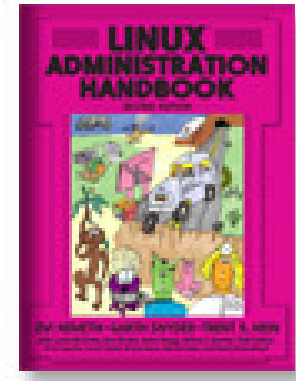**IT Department**

Open Source OS (Linux)

Lecture01: Introduction to Linux

4th Grade - Fall Semester 2021-2022

Instructor: Alaa Ghazi

Open Source OS (Linux)

Course Resources

- Textbook
  - Linux Administration Handbook (2nd edition)
  - By Evi Nemeth, Garth Snyder, Trent R. Hein
  - ISBN: 0131480049

  2nd Resource
  - *Getting Started with Ubuntu* 16.4
  - By The Ubuntu Manual Team

Course Topics

- Lecture 01 Introduction to Linux
- Lecture 02 Basic Commands
- Lecture 03 User Account Management
- Lecture 04 Booting and Shutdown
- Lecture 05 File Systems
- Lecture 06 Process and Package Management
- Lecture 07 Networking

LAB Sessions

- LAB 01 Linux Installation
- LAB 02 Basic Commands
- LAB 03 User Account Management
- LAB 04 Boot and Shutdown
- LAB 05 File Systems
- LAB 06 Process and Package Management
- LAB 07 Networking

Lecture 1
Introduction to Linux

1.1 History of Linux

- Created in 1991 by Linus Torvalds a student at the University of Helsinki, Finland
  - The name Linux is derived from "Linus" and "UNIX"
- The Minix source code served as a starting point
- Minix: is Unix-like OS originally developed by Andrew Tanenbaum as an educational tool to demonstrate operating system programming
- Developers of Linux continued to support the concept of a new, freely available operating system

1.2 Linux Overview

- Linux systems include user interfaces and applications in addition to the kernel

- Linux has layered system Like UNIX

- System contains kernel threads to perform services, Implemented as daemons, which sleep until awakened by a kernel component

- Linux is a Multiuser system

 – Restricts access to important operations to users with superuser (also called root) privileges
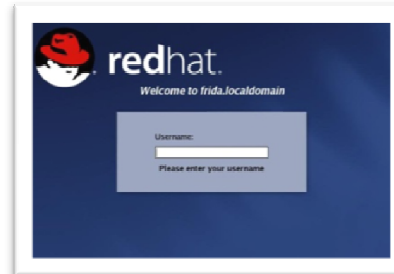
1.3 Linux Distributions

- **A Linux distribution** comprises the Linux kernel, which is the core of the operating system, and packages that make up all the commands you can run on the system
- Over 300 distributions available
- Popular distributions include:
  - Debian (Ubuntu)
  - Red Hat
  - SuSE
  - Linux Mint
  - Arch Linux
  - Tails
  - CentOS
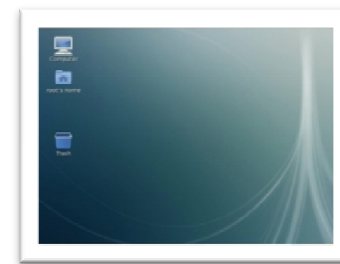 - Fedora

Operating Systems
Various Linux Distributions

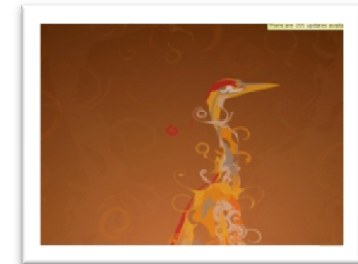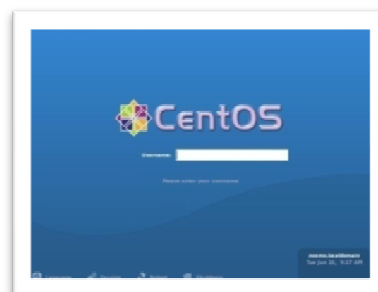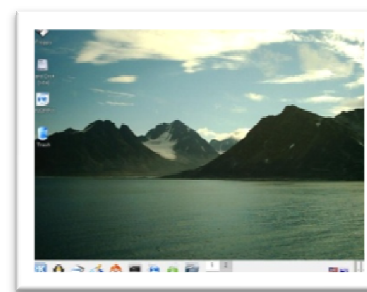OpenSUSE
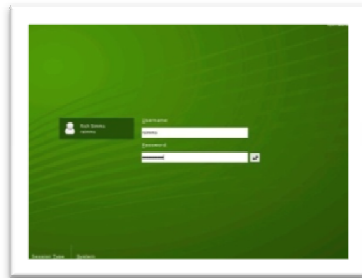
Red Hat 9

Fedora

Debian

Ubuntu

CentOS

Knoppix

Linux Distributions

compare and contrast

- **Similarities:**
  - kernel from kernel.org
  - system commands
  - bash shell
  - X Windows

- **Differences:**
  - Installation programs
 - Graphical utilities
  - 3rd party software
  - Package management

1.4 User Interface

- Can be accessed via the command-line via shells such as *bash*, *csh* and *esh*

- Most Linux GUIs are layered
  - X Window System
    - Lowest level interface that provides to higher GUI layers mechanisms to create and manipulate graphical components
  - Window manager
    - Builds on mechanisms in the X Window System interface to control the placement, appearance, size and other window attributes
  - Desktop environment (e.g., KDE, GNOME, Unity)
    - Provide user applications and services

1.5 Kernel Architecture

- Linux has Six primary subsystems:
  - Process management
  - Interprocess communication
  - Memory management
  - File system management
  - I/O management
  - Networking

1.6 Linux Architecture
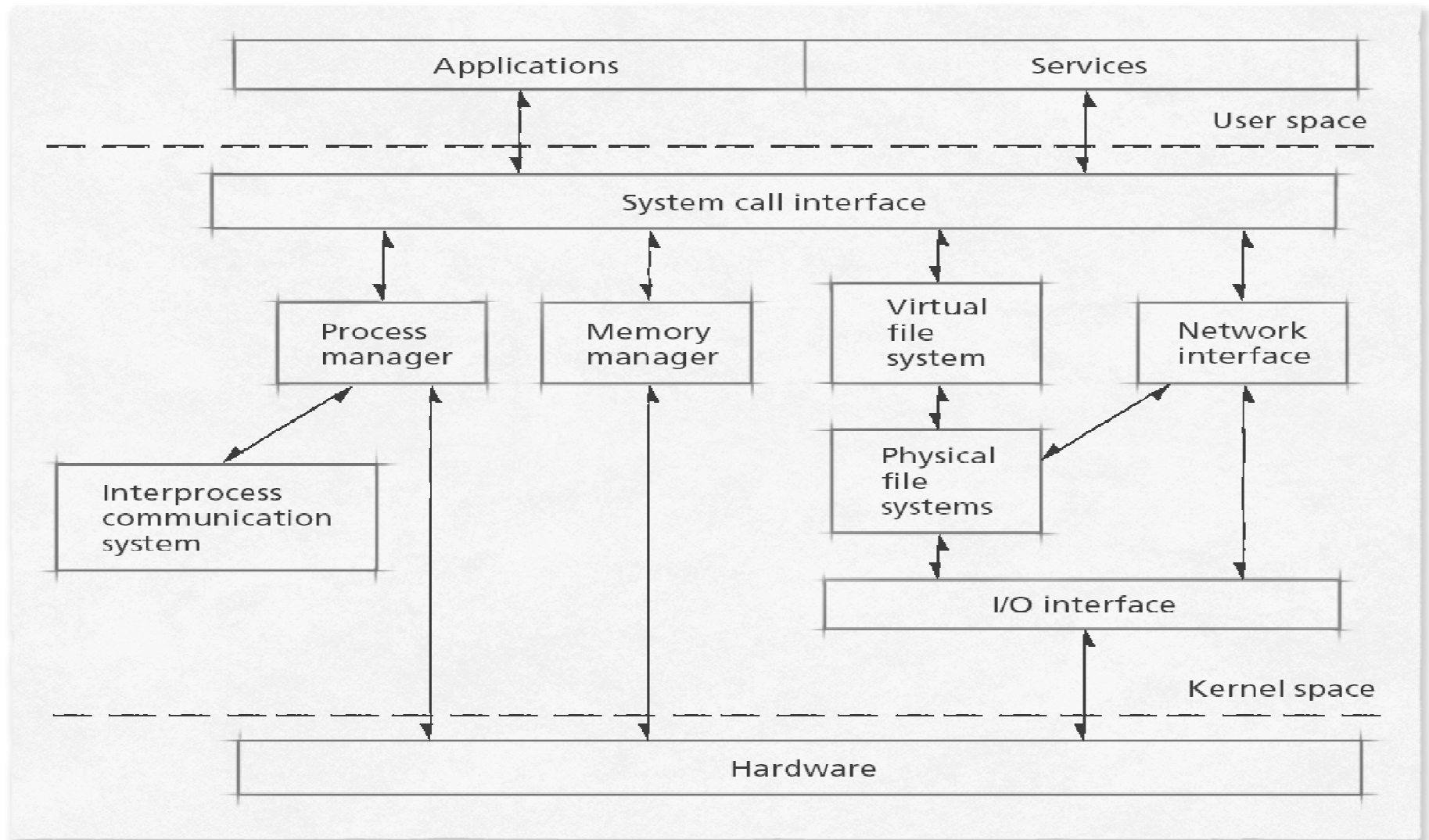
1.8 VirtualBox Overview

- **<u>VirtualBox</u>** is an application that can run on MS Windows, Mac OSX, or Linux and then it can create Virtual computers. From the inside that virtual computer will look like any other computer. It will have some memory, CPUs, disk(s), a CD player, a video card with some memory, network card(s). Whatever you decide. The Operating System installed in it, which we'll refer to as the **guest**, won't really know it is not running on real hardware.

- From the point of view of Host operating system, the one that you already have on your computer (Most likely some version of MS Windows) it is just a directory with a few files in it.

- When your guest operating system is running it is allocated a certain amount of memory, CPU, etc. just like any other application on your system. If you turn off your guest operating system, then all that is freed up and it will only take up space on your hard-disk.

Virtual Box Architecture