Essentials of ICT ICT1113

Lecture 05

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Lecture 05
System Software

Learning Objectives

▶ **After completing this chapter you should be able to:**

    ▶ Identify the two basic parts of computer software

    ▶ Explain the importance of system software

    ▶ Explain main functions of an operating system

    ▶ Identify different types of utility programs

Software

▶ There are two types of software in a computer system.

▶ **System Software**

▶ **Application Software**

System Software

▶ Programs that control or maintain operations of the computer.

▶ Two Types:

   ▶ **Operating Systems**

   ▶ **Utility Programs**

Operating System
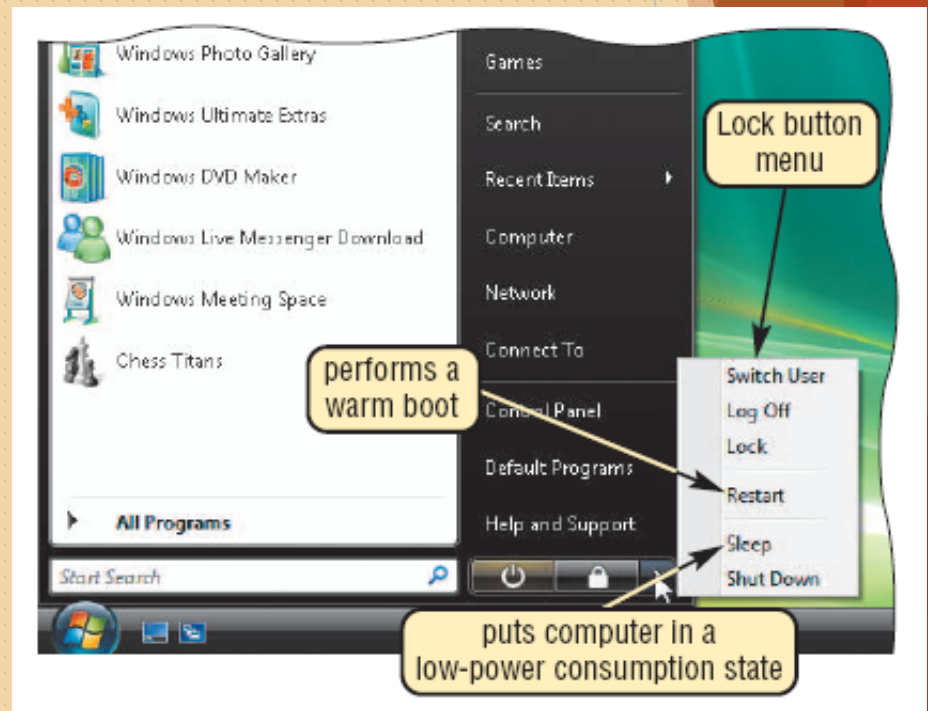
▶ Integrated set of programs that controls the resources (CPU, memory, I/O devices, etc.) of a computer system

▶ Provide its users with an interface that is more convenient to use

▶ **Two primary objectives of an OS:**

   ▶ ………………

   ▶ ………….

▶ Examples:

   ▶ Windows XP, vista, 7, 8, 10,, Appple's mac os, Apple's iOS / Google's Android (In smart phones) – Commercial

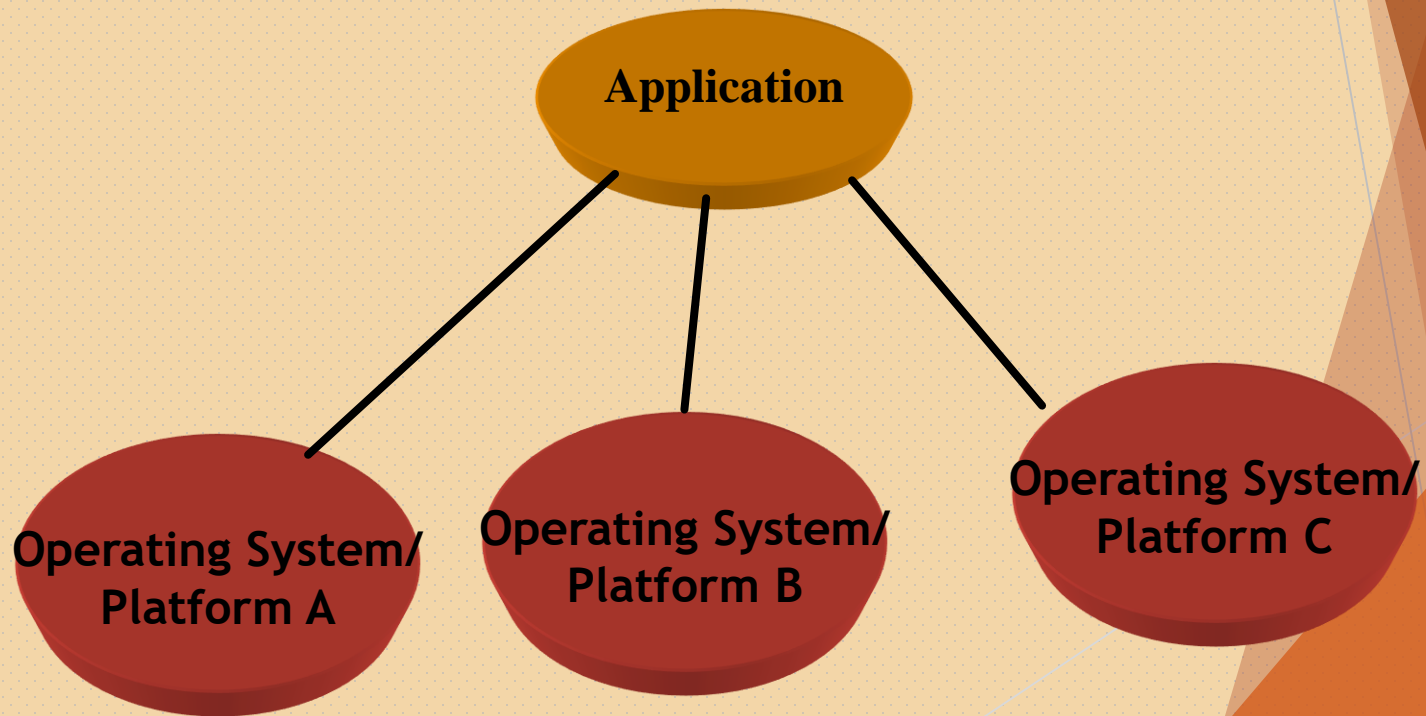   ▶ Linux, Unix – Free & Open Source

What is Booting ???

▶ **Process of starting or restarting a computer**

- **Cold boot** Turning on computer that has been powered off

- **Warm boot** Restarting computer that is powered on

Cross – Platform Application ?

- …………………………………….

Application

Operating System/
Platform A

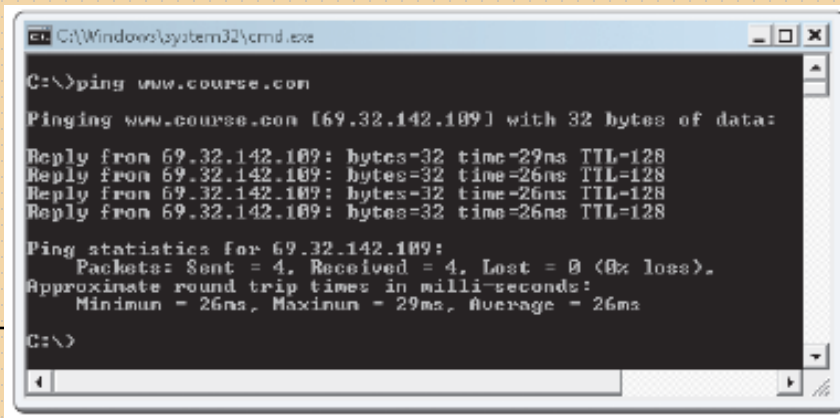Operating System/
Platform B

Operating System/
Platform C

User Interface

➤ **Controls how you enter data and instructions and how information displays on screen**

With a Command-Line Interface(CLI), a user types commands or presses special keys on the keyboard to enter data and instructions

With a Graphical User Interface (GUI),user interacts with menus and visual images such as buttons and other graphical objects to issue commands

Logical Architecture of a Computer System
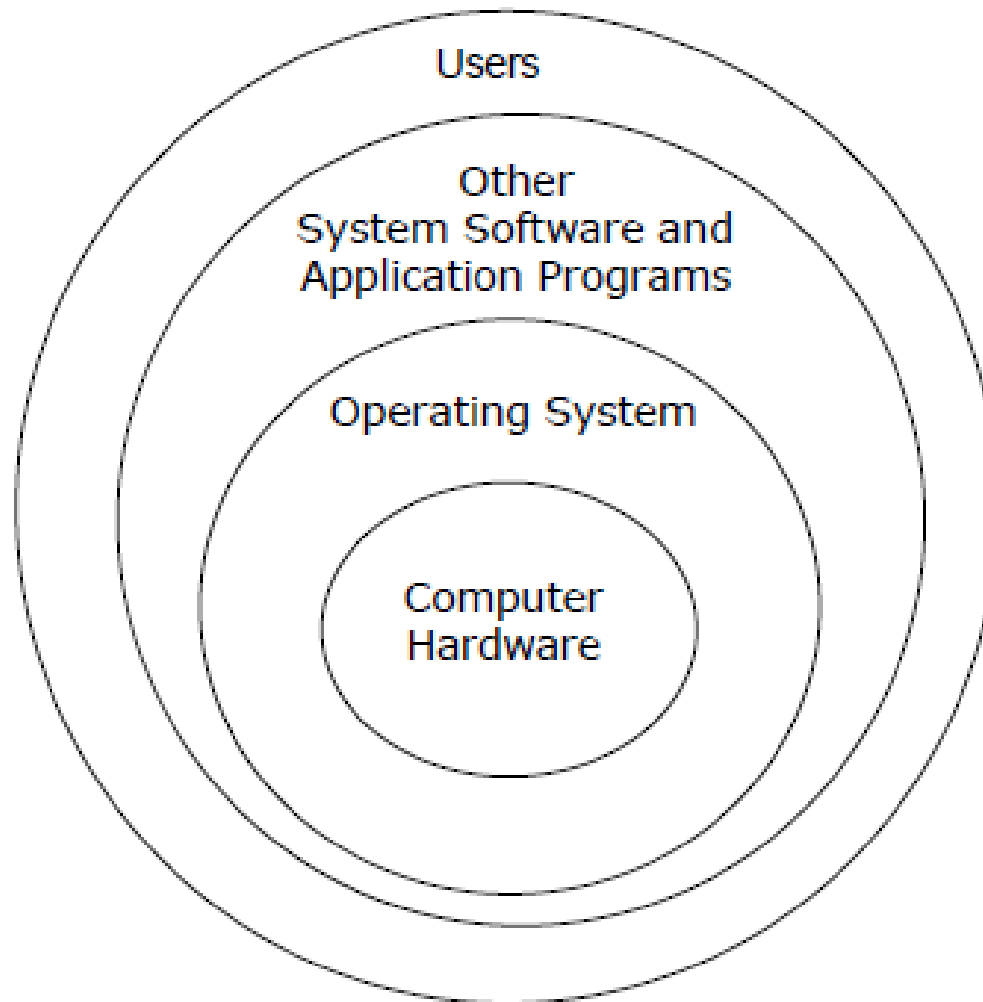
Main Functions of An Operating System

▶ Process Management

▶ Memory Management

▶ File Management

▶ Security

▶ Command Interpretation

Process Management

▶ A Process(job) is a program in execution

▶ Process management manages the processes submitted to a system in a manner to minimize waiting time of processors of the system

Memory Management

▶ Memory is important resource of a computer system that must be properly managed for the overall system performance.

▶ Memory Management Module:

  ▶ Keeps track of parts of memory in use and parts not in use

  ▶ Allocates memory to processes as needed and de-allocates when no longer needed

File Management

▶ A file is a collection of related information

▶ Every file has a name, its data and attributes

▶ File's name uniquely identifies it in the system and is used by its users to access it

▶ File's data is its contents

▶ **File management module of an operating system takes care of file-related activities such as structuring, accessing, naming, sharing and protection of files**

▶ File Operations: create, delete, open, close, read, write, seek, rename, copy …

File Management

- File Extensions:
  - .txt – general text file
  - .doc – Ms. Word document
  - .jpg – JPEG graphics file
  - .gif – GIF graphics file
  - .dat – data file

Security

▶ Deals with protecting information of a computer system against destruction and unauthorized access

▶ **External Security:** Deals with securing computer against external factors such as fires, floods, earthquakes, stolen, disk/tapes, etc. by maintaining adequate backup, using security guards, allowing access to sensitive information to only trusted employees/user, etc.

▶ **Internal Security:** Deal with user authentication, access control and cryptography mechanisms

Security

- **User Authentication**:………………

- **Access Control**:…………………

- **Cryptography**: …………………..

Command Interpretation

▶ Provides a set of commands using which the user can give instructions to the computer for getting some job done by it

▶ Commands supported by the command interpretation module are known as system call

▶ **Two types of user interfaces:**

  ▶ **Command Line Interface**

  ▶ **Graphical User Interface**

Operating System Types

- Three Types
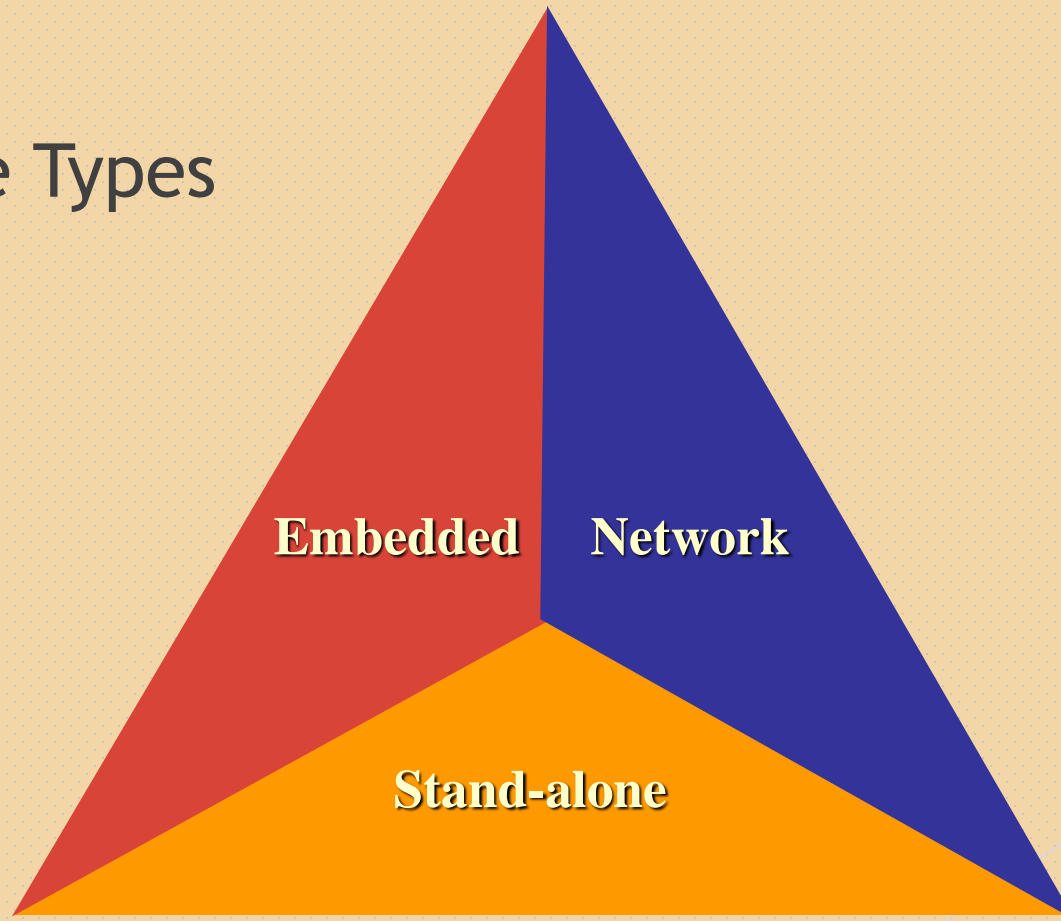
Stand-Alone OS

▶ A standalone operating system refers to any laptop or desktop computer that can run local applications on its own without needing a connection to a wide area network (WAN) or a local area network (LAN).

▶ All the application programs required for general use are installed on the hard disk.

▶ Examples:

  ▶ Windows, Linux, Unix, Mac Os,

Network OS

- Runs on a server and provides the server the capability to manage data, users, groups, security, applications, and other networking functions.

- Purpose: allow shared file and printer access among multiple computers in a network

- Examples:

  - Microsoft Windows Server 2003, Microsoft Windows Server 2008, UNIX, Linux, Novell NetWare

Embedded / Real Time OS

▶ Used to control machinery, scientific instruments and industrial systems.

▶ Found on most mobile computers and other small devices

▶ Examples:

  ▶ Windows Mobile for Pocket PC

  ▶ Palm OS for Palm

  ▶ BlackBerry OS

  ▶ Embedded Linux

What is An Utility Program ???

▶ System software that performs maintenance-type tasks

Utility Programs

▶ **File Manager**

  ▶ Performs functions such as formatting, copying, renaming, deleting, and moving files

▶ **Image Viewer**

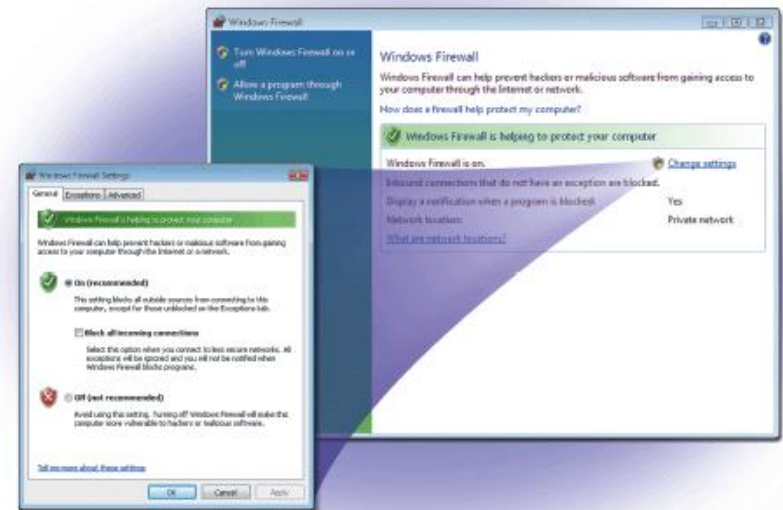 ▶ Displays contents of graphics file when you double click on it

Utility Programs

- **Firewall**

  - Detects and protects a personal computer from unauthorized intrusions

  - Windows Vista automatically enables the built-in personal firewall upon installation

Utility Programs

▶ **Uninstaller**

  ▶ Removes a program and all associated files

▶ **Disk Scanner**

  ▶ Searches for and removes unnecessary files

  ▶ Windows includes a disk scanner utility called Disk Cleanup

▶ **Disk Defragmenter**

  ▶ Reorganizes files and unused space on hard disk so programs run faster

Utility Programs

- **Diagnostic Utility**

  - Compiles technical information about hardware and certain system software

  - Prepares report outlining problems

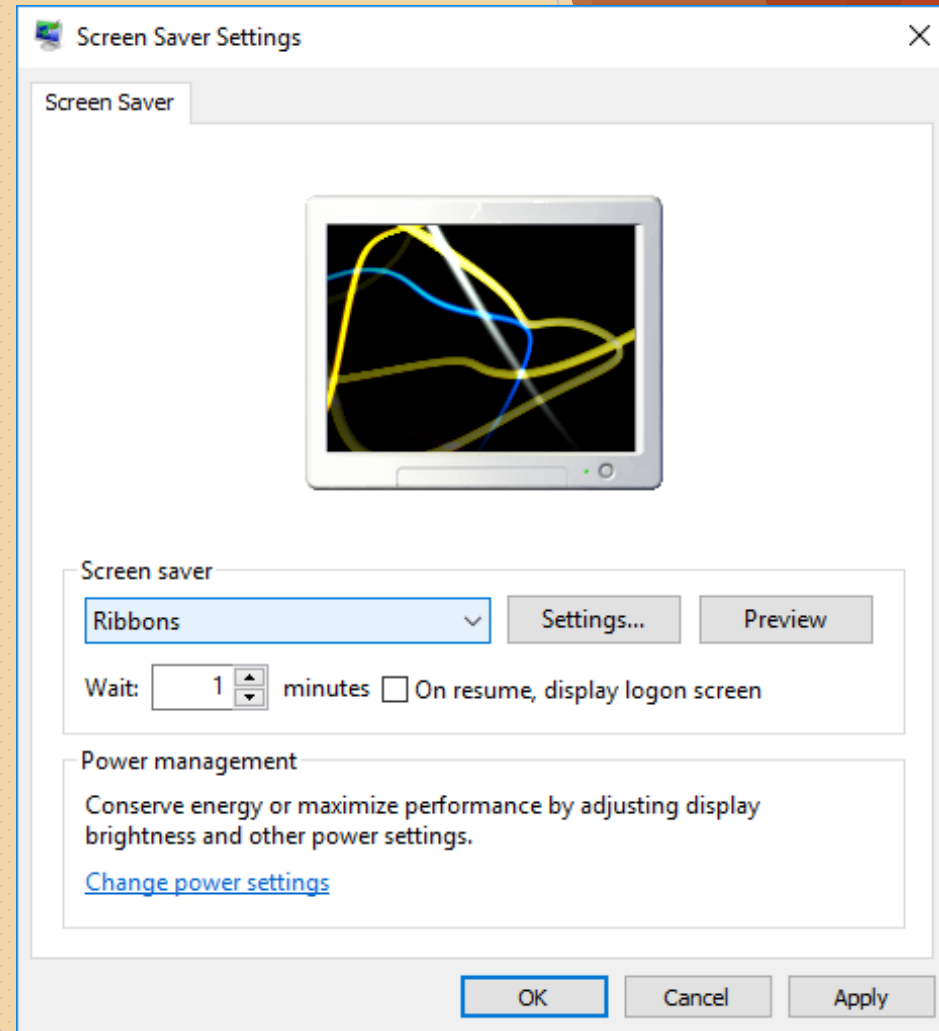- **Backup Utility**

  - Copies selected files or entire hard disk onto another storage medium

  - Most compress files during backup to require less storage space

  - A restore program reverses the backup process and returns backed up files to their original form

Utility Programs

▶ **Screen Saver**

   ▶ Causes monitor's screen to display moving image or blank screen if there is no activity for a specified time

   ▶ To secure computer, user configures screen saver to require password to deactivate

Questions ???