

UCC 1100

Computer Fundamentals

Computer Software

Lecture 3

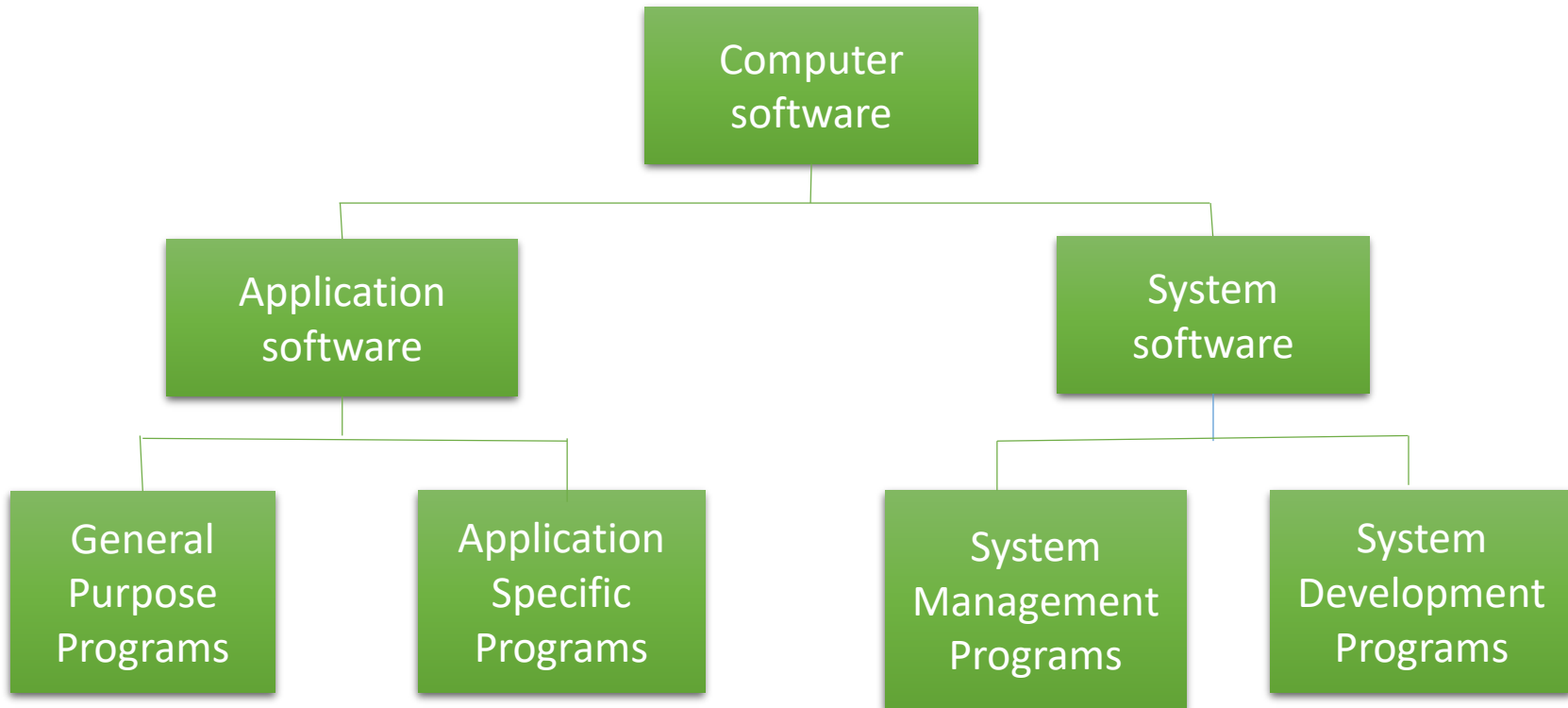
Computer Software

- **Software** is a set of instructions that drive a computer to perform specific tasks.
- These instructions tell the machine's physical components what to do.
- A set of instructions is often called a **program**.
- When a computer is using a particular program, it is
- said to be **running** or **executing** the program.
- The two most common types of programs are **system software** and **application software**.

Computer Software

- **System software:** helps the computer to carry out its basic operating tasks.
- **Application software:** helps the user carry out a variety of tasks.
- A Computer hardware is useless without software.

Types of software

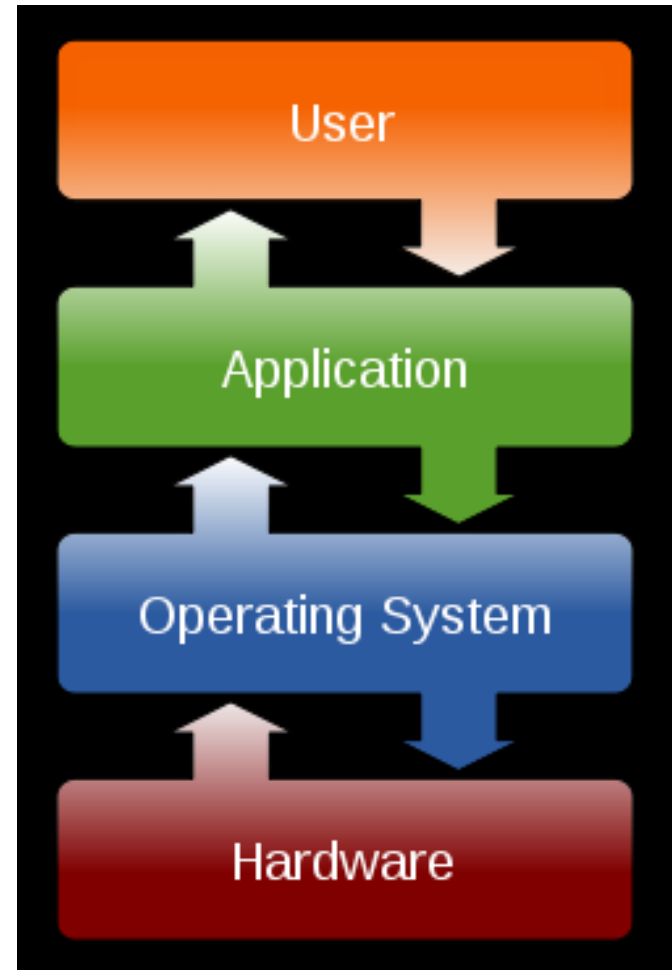


System Software

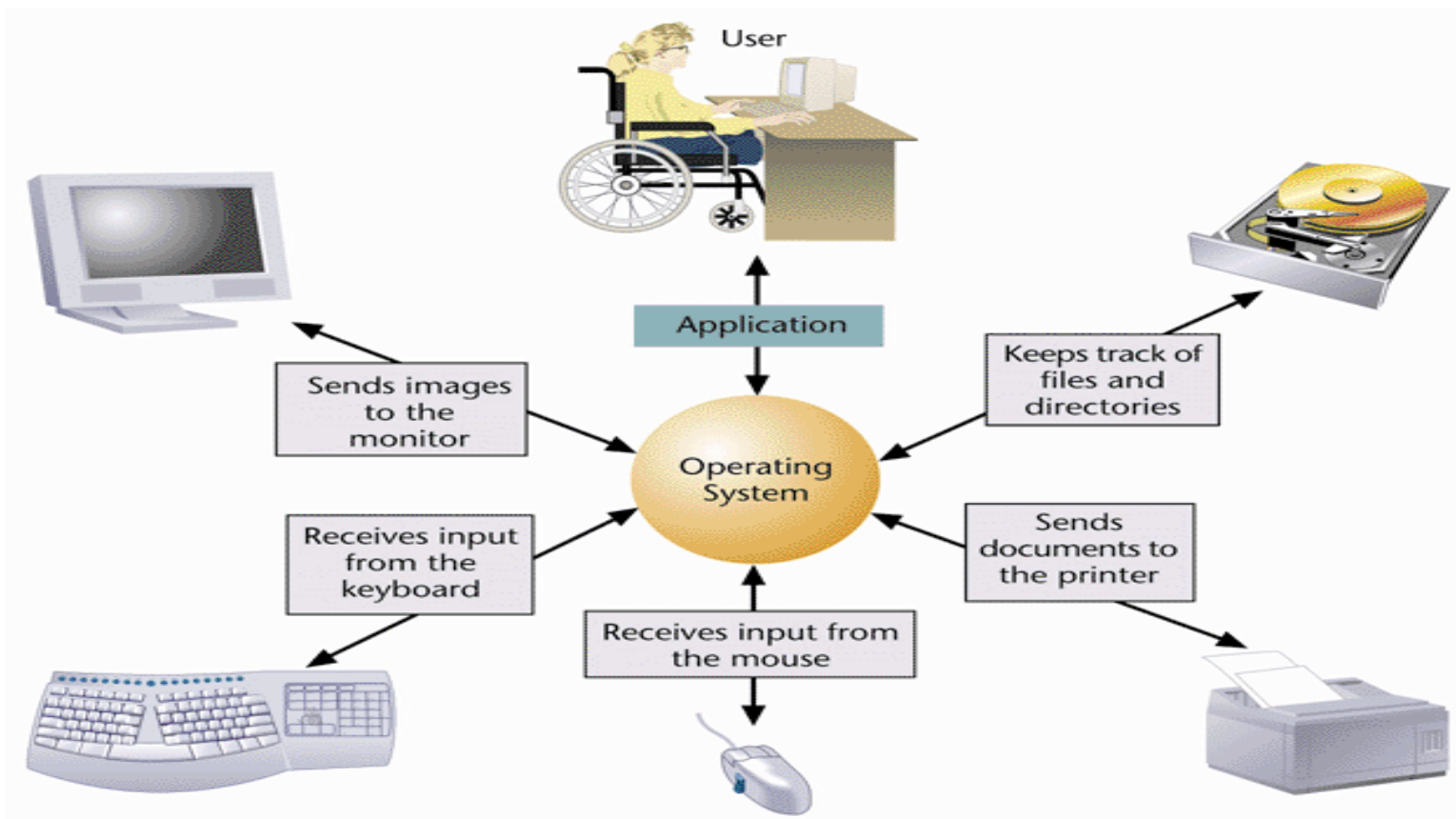
- **System Software:** computer software designed to operate the computer hardware, to provide basic functionality, and to provide a platform for running application software.
- It functionality is to bridge computer system hardware and application software.
- **Examples**
 - Device drivers
 - Utility programs
 - Operating systems
 - Compiler
 - Firmware
 - Networking software

Operating System (OS)

- ❖ It is a software that **controls** the system's hardware and interacts with the user and application software.
- ❖ The operating system acts as an intermediary between application programs and the computer hardware.



Operating System (OS)



- ❖ Mediates between the application and computer, and control peripheral devices.

How OS works?

- When a computer is powered on, it loads the OS, normally from the disk drive into RAM.
- **Kernel:** portion of OS code that interact with the computer hardware.
- **Shell:** portion that interfaces with the applications and user using either the command line interface (CLI) or graphical user interface (GUI).
- CLI, user interacts directly with the system in text-based environment by entering commands on the keyboard at command prompt.
- GUI users interact with the system in an environment that uses graphical images, multimedia, and text. Its user friendly and requires less knowledge.

Functions of an OS

- ❖ Resource management: allocate computer resource such as CPU time, main memory, secondary storage, i/o devices for use.
- ❖ Data management: govern the input & output of data and their location storage and retrieval.
- ❖ Task management: monitors, control, schedules and prepares jobs for execution.
- ❖ Memory management
- ❖ File management
- ❖ Booting the computer
- ❖ Provides user interface
- ❖ Enforces protection policies
- ❖ Provides a variety of support services

Types of an operating system

Operating systems can be categorized according to availability, number of users, type of interface design and manufacturer:

According to manufacturer

- Microsoft window: XP, Vista, 2003 Server, windows7,8
- UNIX-Based
- Linux (Ubuntu)
- Macintosh OS

User Interface

- **User interface**
 - A function of the operating system that allows individuals to access and command the computer
- **Command-based user interface (CLI)**
 - A particular user interface that requires text commands be given to the computer to perform basic activities
E.g., unix, DOS
- **Graphical user interface (GUI)**
 - A user interface that uses pictures (icons) and menus displayed on the screen to send commands to the computer system E.g. Windows, MAC OS

Types of an operating system

Single-User/Single-Tasking Operating Systems:

- ❖ Allows a single user to perform just one task at a time
- ❖ Take up little space on disk
- ❖ Run on inexpensive computers
- ❖ Examples include; MS-DOS and Palm OS for palm handheld computers.

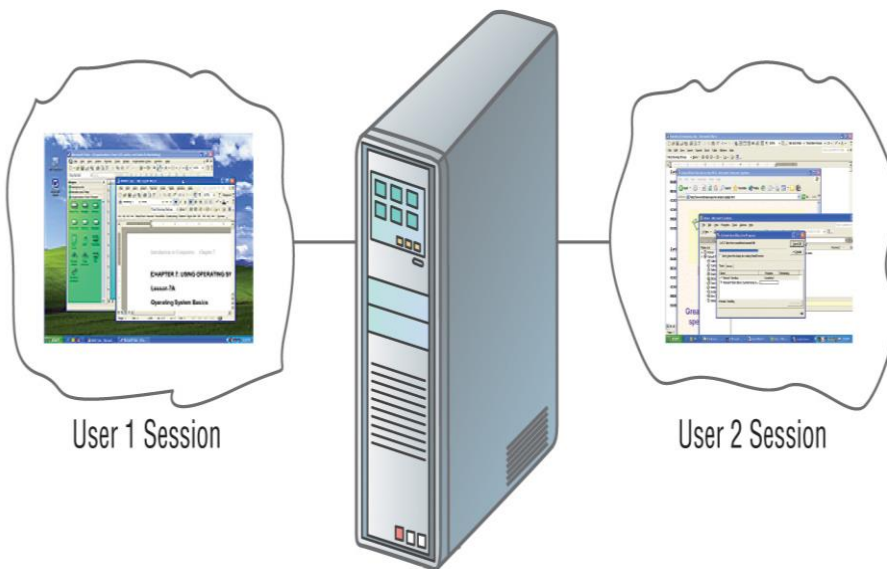
Single-User/Multi-Tasking Operating Systems:

- ❖ Allows a single user to perform two or more functions at once.
- ❖ Commonly used on personal computers.
- ❖ Examples include; Microsoft Windows and MAC OS.

Types of an operating system

4) Multi-User/Multitasking Operating Systems:

- ❖ Allows multiple users to use programs that are simultaneously running on a single network server.
- ❖ Here, each user is given a user session on the server.
- ❖ UNIX, Linux are examples.
- ❖ Maintenance can be easy.
- ❖ Requires a powerful computer.



Types of an operating system

Real-Time operating Systems:

- Very first, relatively small OS.
- Also referred to as embedded OSs
- Built into a circuitry of a device, not loaded from a disk drive
- RTOS is needed to run real-time applications.
- A real time application is an application that responds to certain inputs extremely quickly.
- As the name suggests, there is a deadline associated with tasks and a RTOS adheres to this deadline **as missing a deadline can cause affects ranging from undesired to catastrophic.**

Types of an operating system

The two most common types of user interfaces are graphical and command line.

1) **Graphical user Interfaces (GUI):**

- ❖ Most common interface used in versions of;
 - ❖ Windows, MAC OS, in some versions of LINUX and UNIX.
- ❖ Uses a mouse to work with graphical objects such as windows, menus, icons, buttons and other tools.
- ❖ Can use Shortcuts to open programs or documents.
- ❖ It enables task switching.
- ❖ **Advantage:** It frees a computer user from memorizing and typing text commands.

System Software

- **A utility program:** is a program used to enhance performance of the system. Utilities are used to manage disks, troubleshoot hardware problems....
- Some independent software developers offer utilities for sale separately. E.g. Norton Utilities by Symantec.

For example

- Symantec antivirus
- Partition Magic
- Disk defragmentation
- Screen saver
- Backup, etc...

System Software

- **Device driver:** A computer program that can establish communication because it contains information about the characteristics of your computer and of the device.
- Each peripheral device requires a device driver.
- Helps the computer communicate with that particular device.
- When we add a device to an existing computer, part of its installation includes adding its device driver to the configuration.

System Software

- **Compiler:** Software that translates a high-level language program into machine language.
- Input to the compiler is a source file (created by word processor or editor) containing the text of a high-level language program.
- If it is syntactically correct, compiler will save in an object file which is a machine language instructions for the same job.

Files

- A **file** is a named collection of data, stored on a storage medium such as a hard disk.
- There are two types of **files**
 - **Data files** contains text, images, or other data that can be used by a program.
 - **Executable files** contains programs or instructions that tell the computer how to perform a task.
- **Filename extensions** describe a file's contents. For example Executable files usually end in .exe, word files end in .doc, adobe acrobat documents end in .pdf etc.

Managing files and folders

- What do you do with **files** and **folders**?
 - You Create a new file or folder....
 - You Move files and folders; you “nest” folders
 - You Open a document file... Let’s see:
 - OS looks at file extension
 - OS checks if enough free memory space
 - OS finds and loads the APP (if not loaded)
 - OS finds and loads the document
 - OS keeps track of what data goes with what program (all sharing same RAM)
 - OS turns control over to the APP

Application Software

Application Software: Tells the computer how to accomplish specific tasks, such as word processing or drawing, for the user.

Most applications are purchased on diskette or CD-ROM.

They are installed by copying the programs from the diskettes/CD-ROM to the hard disk.

Payroll systems, Inventory Control, Manage student database

Categories of Applications Software

- Word processing software for creating text-based documents
- Spreadsheets for creating numeric-based documents such as budgets.
- Presentation programs for creating and presenting electronic slide shows.
- Graphics programs for designing illustrations or manipulating photographs, movies etc.
- Database management software for building and manipulating large sets of data such as names, addresses etc.

Word Processors:

It is a tool that helps user in creating, editing, and printing documents. Word processors will normally have the following capabilities built into them:

- Spell checking
- Standard layouts for normal documents
- Some characters appearing in bold print, italics, or underlined
- Center lines, make text line up on the left side of the paper, or the right side of the paper
- Save the document so it can be used again
- Print the document.

Examples: WordPerfect and Microsoft Word

Spreadsheets:

The spreadsheet packages are designed to use numbers and formulas to do calculations with ease. Examples of spreadsheets include:

- Budgets
- Payrolls
- Grade Calculations
- Address Lists

The most commonly used spreadsheet programs are Microsoft Excel and Lotus 123.

Actions to prevent virus infection

- Forget opening unexpected e-mail attachments, even if they're from friends
- Get trained on your computer's anti-virus software and use it.
- Have multiple backups of important files. This lowers the chance that all are infected.
- Install security updates for your operating system and programs as soon as possible.
- Jump at the chance to learn more about your computer. This will help you spot viruses.

Security Software

- **Security software:** designed to protect computers from various forms of destructive software and unauthorized intrusions
- The terms malicious software and malware refer to any computer program designed to secretly enter a computer, gain unauthorized access to data, or disrupt normal processing operations

What is computer virus?

- Computer virus refers to a program which damages computer systems and/or destroys or erases data files
- Once it's running, it spreads by inserting copies of itself into other executable code or documents

Types of Computer Virus

- Computer Worm
- Trojan Horse
- Spyware
- Time Bomb
- Logical Bomb
- Micros Virus
- Script Virus

What does malware/virus do?

- Display irritating messages and pop-up ads.
- Delete or modify your data.
- Encrypt your data and demand ransom for the encryption key.
- Upload or download unwanted files.
- Log your keystrokes to steal your passwords and credit card numbers.
- Propagate malware and spam to everyone on your e-mail address book or your instant messaging buddy list.
- Disable your antivirus and firewall software.
- Block access to specific Web sites and redirect your browser to infected Web sites.
- Cause response time on your system to deteriorate.
- Allow hackers to remotely access data on your computer.
- Allow hackers to take remote control of your machine and turn it into a zombie.
- Link your computer to others in a botnet that can send millions of spam e-mails or wage Denial of Service attacks against Web sites.
- Cause network traffic jams.

Symptoms of computer virus

- Computer runs slower than usual
- Display unusual error messages
- New icons appear on desktop
- Programs disappear from the computer
- Reformat the hard disk
- Duplicate of files
- Computer restarts all the time

Typical things that some current Personal Computer (PC) viruses do

- Display a message
- Erase files
- Scramble data on a hard disk
- Cause erratic screen behavior
- Halt the PC
- Many viruses do nothing obvious at all except spread!

Actions to prevent virus infection

- Always update your anti-virus software at least weekly.
- Back up your important files and ensure that they can be restored.
- Change the computer's boot sequence to always start the PC from its hard drive
- Don't share Drive C: without a password and without read-only restrictions.
- Empty floppy drives of diskettes before turning on computers, especially laptops.

Sources of computer virus

- Fake games
- Infected software
- Opening infected files
- Contact with infected systems or devices
- Free or shareware software