Introduction to Computer Software

Computer Software

What we'll cover for this lecture topic:

- Software categories
  - **Applications** software
  - **Systems** software
    - What is an **operating system**?
      - What does it do for me?
      - What does it do for application programs?
    - What is a **translator**?

System Software

System Software includes the Operating System and all the utilities that enable the computer to function.

System software is a term referring to any computer software which manages and controls the hardware so that application software can perform a task.

Example:

Operating Systems, Compiler, Loader, Linker, Interpreter.

System Software

- Helps computer carry out its *basic tasks*.
  - Includes:
    - **Operating systems (OS)** - master control programs
      - BIOS (Basic Input/Output System)
      - Some utilities are built into OS
    - **Translators** (program language compilers)

System Software

I. The Operating System

- A type of *system* software that underlies *all other software*.
- It manages all software and hardware tasks.
- It provides a common set of **computer functions** such as input from a keyboard and output to a monitor.
- It provides the **user interface**……that is:

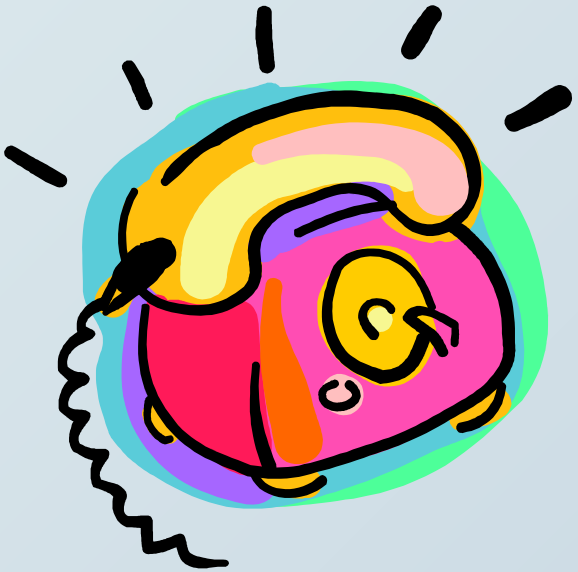
System Software

- What does an OS do for me? *LOTS!*
  - Provides ***user interface*** ...as we saw.
  - Allows **applications** to run.
  - What are some tasks you need done even when *no apps* are running?
  - ***Common*** tasks useful to all programs —put those in the OS (the *most basic* are put in BIOS) so each app doesn't have to handle those tasks.
    - So what are some of these tasks? 

System Software

System calls

- You ask **MS Word** to OPEN a document
  - File menu/Open…
  - What will you see ?
  - What *really* just happened *in the box*?



WORD called on **O.S.** to present you with that file list!

O.S. must look at:

1. Disk Directory (list of *filenames*)
2. File Allocation Table (**FAT**)….

System Software

Input/output

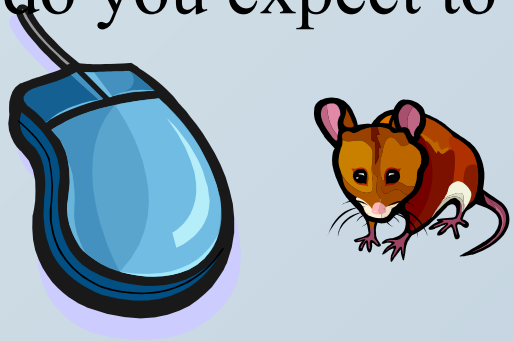
Reads from and *writes to* the I/O devices.

- In the past, **application** programmers had to write control programs for I/O devices. Painful!
- Today, **O.S.** *reads from* and *writes to* the I/O devices: mouse, keyboard, printer, monitor…
- About **half** the instructions in today's OS are to manage input and output operations.

System Software

EXAMPLES of I/O operations

- OS reads mouse **movement** and writes to display screen.
  - You *move the mouse*---what do you expect to happen?
  - What that involves…
    - Manage interrupt.
    - OS reads mouse wheels.
    - OS draws cursor arrow (changes pixel colors so arrow *appears* to be "moving").



Manages 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… whoa! 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

- *What do **you** do with files and folders…cont'd*
  - You **Start** an app from **Start Menu ...**
  - You **Copy** a file or a folder.
  - You **Print** a file.
  - You **Save**, or **Save As** (see FAT, later) …
  - You **Exit** from an app *(What does OS do???)*
- User **file management** and **viewing <u>tools</u>** are provided by OS: *SUCH AS?*
  - My Computer
  - Windows Explorer

System Software

Misc Services and Utilities

- **OS** does system control ops from Start button**:**
  - Shut down; Restart.

- **OS** does universal ops from the Edit menu:
  - Cut, Copy, Paste, Clear, Select All
  - Clipboard … (also between different apps)

- **OS** does **universal ops** from the **View menu**:
  - Show/Hide Toolbars & Status bar;
  - Large icons, Small icons;
  - List; Details;
  - Arrange Icons; etc.

- **OS also** has many built-in **utilites** & goodies that are universally provided: *(**differs** from OS to OS; and version to version)*
  - Taskbar and Start button: unique to Win O.S.
    - Control panel, Find, Help, Format or Erase disk, Properties
  - Right-click menus
    - Properties; Rename; Shortcuts, and more

Provides (and loads) Device Drivers

- **Small programs that control a peripheral device** (printer, hard disk, tape drive, modem …)
  - Allow OS & applications to activate *(drive)* the hardware device.
  - The driver accepts commands from the operating system and converts them into a form that a *particular device* can understand.
  - Newer OSs: provide ***most*** device drivers.
  - Else: find and download device driver program from manufacturer's web site.

Application Software

– It is the reason that one wants to buy a computer:

- Play Games
- keep track of a stamp collection
- do your taxes
- Generate a fancy newsletter
- Guide robots
- keep a budget
- Browse the Web
- design a car

Application Software

- Includes many *executable* files and *data* files:
  - **Installer** program (eg: setup.exe)
  - **Uninstaller** program *(why important?)*
  - **Main** executable file (eg: winword.exe)
  - **Support** modules (eg: .dll files)
    - Called by the PROGRAM, not by the user
  - **Data** modules (eg: MS Word dictionary)

Application Software

Word Processors:

Word processing is a tool that helps user in creating, editing, and printing documents.

- Spell checking
- Standard layouts for normal documents
- Have some characters appear in bold print, italics, or underlined
- Save the document so it can be used again
- print the document.

Examples: Microsoft Word

Application Software

Spreadsheets:

The spreadsheet packages are designed to use numbers and formulas to do calculations with ease.

- Budgets
- Payrolls
- Grade Calculations
- Address Lists

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

Application Software

Graphic Presentations: The presentation programs can make giving presentations and using overheads easier. Other uses include:

- Slide Shows
- Repeating Computer Presentations on a computer monitor
- Using Sound and animation in slide shows

The most recognized graphic presentation programs are Microsoft PowerPoint and Harvard Graphics.

Application Software

Database Management System (DBMS):

- A DBMS is a software tool that allows multiple users to store, access, and process data into useful information.
- Database programs are designed for these types of applications:
    - Membership lists
    - Student lists
    - Grade reports
    - Instructor schedules

  All of these have to be maintained so you can find what you need quickly and accurately.

- Example:Microsoft Access, dBASE, Oracle.