

The Computer System

The diagram illustrates the computer system as a cyclical interaction between three components:

- hardware**: Represented by a green arrow.
- software**: Represented by a red arrow.
- people**: Represented by a blue arrow.

Each component is associated with a description:

- hardware**: The equipment associated with a computer system.
- software**: The set of instructions that tell a computer what to do.
- people**: Use the power of the computer for some purpose.

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Digital Computer = Binary Processor

- Computer data is represented and using the **binary system** = Base 2
- Each digit in binary is called a **bit**
 - A bit value can be in one of two states
 - Represented by 0/1, T/F, On/Off.
- A group of 8 bits is called a **byte**
- Characters are represented using **ASCII** Code with one byte/character
 - 'A' = 0100,0001
 - '7' = 0011,0111
 - 'J' = 0100,1010

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Computer Literacy

- What is computer literacy?**
 - Knowledge of computers and their uses
 - Developing **End User Skills** is goal of IFSM201
- Why are computers important for success?**
 - Required employment skill
 - Computers deliver information
- What is a computer?**
 - Electronic device operating under the control of instructions stored in its own memory
 - Accepts **data input**: raw facts, figures, and symbols
 - Processes data into **information output** that is meaningful for people
 - Produces and stores results for later retrieval
 - Semiconductor electronics is fastest technology

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Components of the System Unit

- 5 major components of computer systems
- This section focuses on the CPU, Memory, Expansion, drive bays, and power supplies

System Unit

The diagram shows the System Unit with the following components and connections:

- Central processing unit (CPU)** (blue box)
- Power Supply** (green box)
- Memory** (purple box)
- Drive Bays** (red box)
- Expansion Bus** (yellow box)
- Peripherals** (blue box)
- Data Input Port** (blue arrow pointing to CPU)
- Information Output Port** (blue arrow pointing from CPU)
- Port** (blue arrow pointing from Expansion Bus to Peripherals)

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Computer Hardware Components

- ❖ **Processor = Central Processing Unit (CPU)**
 - ◆ The electronic component that interprets and executes the program instructions in the computer
 - ❖ **Memory = RAM, Cache, CPU Registers**
 - ◆ Memory is fast and temporarily stores instructions and data
 - ◆ **Volatile** = Data loss when power off
 - ❖ **Storage = Hard Drive, CD, DVD, Flash Memory Device**
 - ◆ Storage is slower, but permanent stores instructions and data
 - ◆ **Non-Volatile** = Retains data when power off
 - ◆ **Storage device**
 - ◆ Records and retrieves items on storage media
 - ◆ **Storage media**
 - ◆ Physical material on which data and instructions are stored
 - ❖ **Network**
 - ◆ **Communications device** that enables computer to send and receive data and instructions to another device via media
 - ◆ **Transmission media** may include cables, telephone lines, cellular radio networks, and satellites

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Microsoft Windows Open System

Apple
Closed System

- ❖ **Mobile Computing**
 - ◆ Notebook = Laptops
 - ◆ Tablets = iPad, Kindle
 - ◆ Smart Phones
 - ◆ iPhone = Apple
 - ◆ Android = Google



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Multi-User Computers

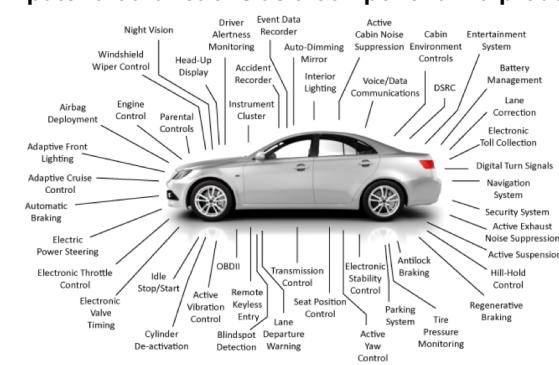
- ❖ These computers are shared by many users
 - ◆ Servers control access to network resources and provides centralized storage
 - ◆ Web Servers serve web applications and web pages for World Wide Web using Internet
 - ◆ Mainframe Powerful, expensive computer that supports thousands of connected users
 - ◆ Supercomputer Fastest, most powerful, most expensive computer used for applications requiring complex mathematics



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Embedded Computers

- ❖ An **embedded computer** is a special-purpose computer that functions as a component in a product.



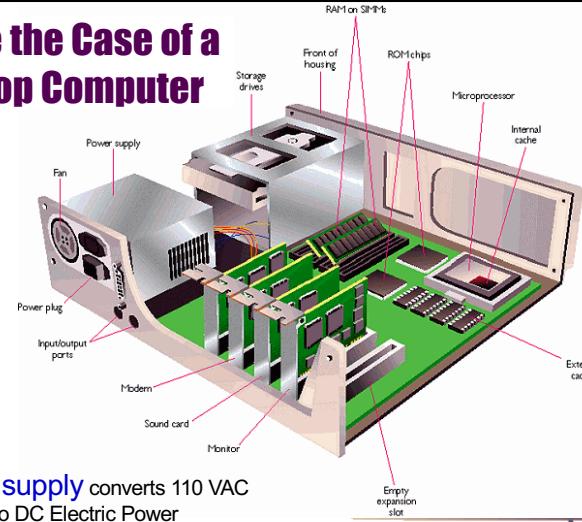
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Memory Size and Speed

- ❖ Storage and memory capacity is expressed in the **number of bytes**
 - ◆ 1 KiloByte = 2^{10} or 1024 bytes
 - ◆ 1 MegaByte = 2^{20} or 1,048,576 bytes
 - ◆ 1 GigaByte = 2^{30} or 1,073,741,824 bytes
 - ◆ 1 TeraByte = 2^{40} or 1,099,511,627,776 bytes
- ❖ Bus speeds
 - ◆ 1 KiloHertz = 10^3 or 1 milliSecond
 - ◆ 1 MegaHertz = 10^6 or 1 microSecond
 - ◆ 1 GigaHertz = 10^9 or 1 nanoSecond

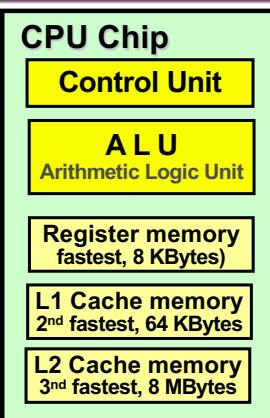
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Inside the Case of a Desktop Computer



The Central Processor Unit (CPU)

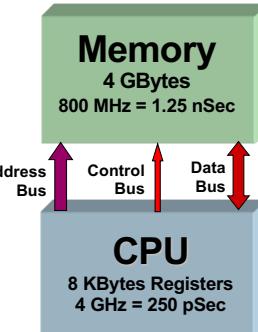
- ❖ The CPU contains 5 major functional components on one silicon chip
 - ◆ Control unit
 - ◆ Arithmetic/logic unit (ALU)
 - ◆ Register memory
 - ◆ L1 Cache memory
 - ◆ L2 Cache memory
- ❖ CPU interacts closely with memory
- ❖ Called Microprocessor



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Central Processor Unit and Memory

- ❖ **CPU**
 - ◆ Register memory (fastest)
 - ◆ Data transferred with memory via three buses
- ❖ **RAM Memory**
 - ◆ Random-access memory
 - ◆ **Volatile** memory
 - ◆ Stores program instructions and data
- ❖ **Parallel Processing**
 - ◆ Single-core processors
 - ◆ Dual-core processors
 - ◆ Quad-core processors
- ❖ **Speed** CPU → RAM → SSD → HD



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What is Storage?

- ❖ Holds data, instructions, and information for future use
- ❖ Also called secondary storage or auxiliary storage
- ❖ Storage medium is physical material used for storage



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Storage Sizes

- ❖ What is capacity?
 - ◆ Number of bytes (characters) a storage medium can hold

Kilobyte (KB)	1 thousand	2^{10} or 1024 bytes
Megabyte (MB)	1 million	2^{20} or 1,048,576 bytes
Gigabyte (GB)	1 billion	2^{30} or 1,073,741,824 bytes
Terabyte (TB)	1 trillion	2^{40}
Petabyte (PB)	1 quadrillion	2^{50}
Exabyte (EB)	1 quintillion	2^{60}
Zettabyte (ZB)	1 sextillion	2^{70}
Yottabyte (YB)	1 septillion	2^{80}

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Longevity of Digital Storage Media

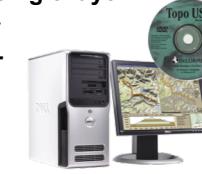
The physical media on which it is stored has a **limited physical lifetime**

	Magnetic tape <i>Sequential Access</i>	1 yr.
	Videotape <i>Sequential Access</i>	1–2 yrs.
	Magnetic disk <i>Random Access</i>	5–10 yrs.
	Optical disk <i>Random Access</i>	30 yrs.
	Microfilm <i>Sequential Access</i>	300 yrs.

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Optical Disc Storage Capacities

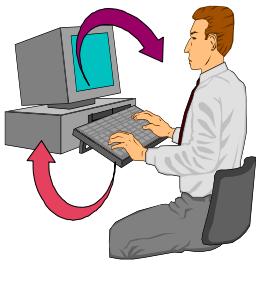
- ❖ CD-ROM, CD-R, CD-R/W
 - ◆ 700 MB per side
- ❖ DVD
 - ◆ 4.7 GB or 4700 MB: single side, single layer
 - ◆ 8.5 GB: single side, double layer
 - ◆ 17 GB: double side, double layer
- ❖ Blu-Ray or BD-ROM
 - ◆ 25 GB: single side, single layer
 - ◆ 50 GB: single side, double layer
 - ◆ 100 GB: double side, double layer
- ❖ Record and R/W
 - ◆ DVD Record has several formats



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Computer Input and Output

- ❖ It is from the computers perspective that Input/Output devices are defined
- ❖ Input data using input devices such as keyboard or mouse
- ❖ Output information that is the result of processing data to output devices like a monitor and printer



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Input Peripheral Devices

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Output Peripheral Devices

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Peripheral Devices Connect via Ports

1. Video Port = connects monitor
2. Keyboard/Mouse Port = PS/2 Port
3. Serial Port = 9 or 25 pins, mouse, modem
4. Parallel Port = 25 holes, LPT1, LPT2
5. Game Port = joystick
6. USB Ports = Universal Serial Bus
7. Fire Wire Port = High Speed Port
8. Audio In Port = Microphone
9. Audio Out Port = Speakers
10. MIDI (Musical Instrument Digital Interface) port
11. eSATA port
12. SCSI port
13. IrDA (Infrared Data Association) port
14. Bluetooth port
15. HDMI port (High-Definition Multimedia Interface)
16. DVI port (Digital Video Interface)



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Networks and the Internet

- ❖ A **network** is a collection of computers and devices connected together via communications devices and transmission media
- ❖ The **Internet** is a worldwide collection of networks that connects millions of businesses, government agencies, educational institutions, and individuals



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Cloud Storage



- ❖ Cloud storage refers to the creation and use of remote servers over Internet for data storage
- ❖ Can share files across multiple Devices
 - ◆ Free Services: Dropbox, Google Drive, iCloud,
 - ◆ Microsoft OneDrive, SpiderOak (secure), iDrive
 - ◆ Advantage: Good for data backup and file sharing
 - ◆ Disadvantages: Requires Internet and security risk
- ❖ **SAAS = Software As A Service**
 - ◆ Utilizes browser for UI user interface
 - ◆ Utilizes cloud storage for storing files
 - ◆ Office SAAS: Zoho, Google Docs, and Office 365

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Word Processing

- ❖ Typewriters become obsolete
- ❖ Word processing lets you:
 - ◆ Create document
 - ◆ Edit document
 - ◆ Format document
 - ◆ Store document
 - ◆ Retrieve document
 - ◆ Print document



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Edit and Format Document

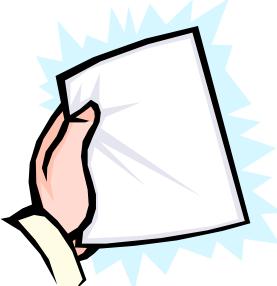
- ❖ **Edit document**
 - ◆ Editing a text document means to make changes to the contents of the document
 - ◆ Insertions or deletions to fix errors, improve its content, or move text
 - ◆ Powerful replace and replace all occurrences functions available
- ❖ **Format document**
 - ◆ Formatting refers to modifying the appearance of the text document
 - ◆ Does not alter content—only look of the document
 - ◆ Includes alignment, fonts, line spacing, and more



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Word Processing Basics

- ❖ Think of the computer screen as a page of typing paper with these differences:
 - ◆ Cursor
 - ◆ Scrolling
 - ◆ Word wrap
 - ◆ Character insertions
 - ◆ Character deletions
- ❖ Command Access
 - ◆ Pull Down Menus
 - ◆ Toolbar Buttons
 - ◆ Microsoft Office Ribbon
 - ◆ Shortcut keys
 - ◆ Context Sensitive Menu



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Navigation and Word Wrap

- ❖ Cursor
 - ◆ Cursor shows where next character will appear in your document
 - ◆ Move Cursor
 - ◆ Use mouse or other pointing device
 - ◆ Use keyboard arrow keys
- ❖ Scrolling
 - ◆ Scrolling is necessary to see portions of a document that can't fit on screen at one time
- ❖ Word Wrap
 - ◆ Words that won't fit on a line are automatically moved down at the beginning of the next line

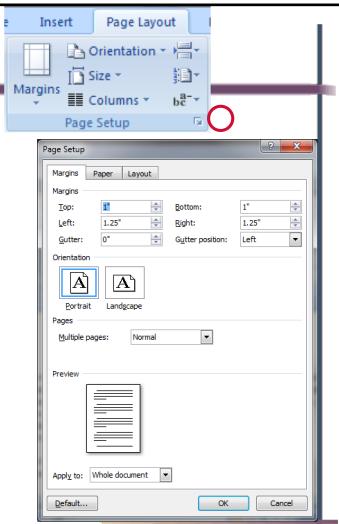


I
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Page Layout

- ❖ Margins adjust
 - ◆ Top, Bottom, Left, Right
- ❖ Orientation
 - ◆ Portrait
 - ◆ Landscape
- ❖ Pagination
 - ◆ Page Breaks
 - ◆ Header Layout
 - ◆ Footer Layout
- ❖ View Menu
 - ◆ Normal
 - ◆ Web Layout
 - ◆ Print Layout

WYSIWYG = What You See Is What You Get



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Edit Commands

- ❖ Edit Menu commands change text content
 - ◆ Undo Ctrl-Z
 - ◆ Redo Ctrl-Y
 - ◆ Cut Ctrl-X
 - ◆ Copy Ctrl-C
 - ◆ Paste Ctrl-V
 - ◆ Paste Special...

Short Cut Keys
Underlined letters are Alt-key selections used if mouse not available

Toolbar Buttons or Ribbon

- ❖ Clipboards
 - ◆ Windows = Paste between any application
 - ◆ Holds only 1 item, but pasted multiple times
 - ◆ Office = Paste between office applications
 - ◆ Holds 24 items and each can be pasted multiple times
 - ◆ Available as a Task Pane Ctrl-F1 in Office 2003
 - ◆ Available in Ribbon in Office 2007



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Document Formatting

- ❖ **Pagination** – controls appearance of pages
 - ❖ **Formatting** is controlling the visual appearance of the document:
 - ◆ Margins
 - ◆ Tabs/Indents
 - ◆ Alignment: Left, right, centered, justified
 - ◆ Font face: Times New Roman is default
 - ◆ Font size: 12 point for most text
 - ◆ Font style: bold, italic, underline
 - ❖ **Footnotes** – used for referencing sources

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Formatting: Typeface

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Formatting: Typeface

- ❖ **Proportional Typeface**
 - ◆ Variable character width
 - ◆ Compressed text with more words on a line
 - ◆ Examples:
Times New Roman, Georgia, Arial, **Impact**
 - ❖ **Monospaced Typeface**
 - ◆ Fixed character width
 - ◆ Typewriter style text
 - ◆ Examples:
Courier, Courier New, Lucida Console
 - ❖ **TrueType Fonts**
 - ◆ Appear Same on Screen an Printer

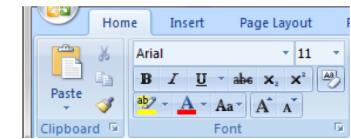


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Formatting: Font Size

- ◆ 12 pt font = 6 lines per inch
 - ◆ 1pt = 1/72 inch

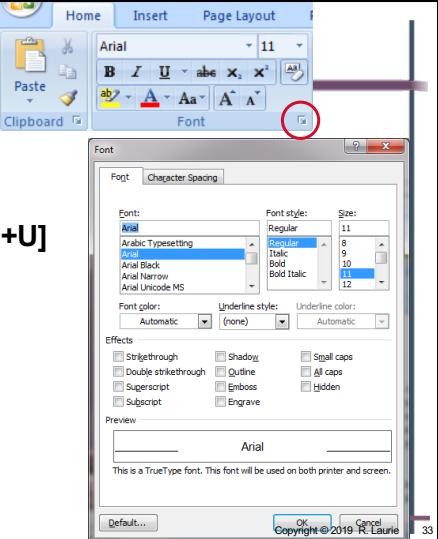
12 point
18 point
24 point
36 point
54 point
72 point



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Font Style

- ❖ **Font Style**
 - ◆ **Bold [Ctrl+B]**
 - ◆ **Italics [Ctrl+I]**
 - ◆ **Underline [Ctrl+U]**
 - ◆ **Shadow**
 - ◆ **Strikethrough**
 - ◆ **Superscript**
 - ◆ **Subscript**
 - ◆ **SMALL CAPS**



Word Processing Tools

❖ Spell checking

- ◆ Spelling checkers are a preliminary proofreading devices
- ◆ They lack scope or intuitive power of a human proofreader



❖ Grammar checking

- ◆ Grammar checkers will find errors in verb tense, point out active vs. passive voice, and a host of other grammatical rules that the user may have broken
- ◆ Not always accurate so use as a writing advisor

❖ Thesaurus

- ◆ Find words with similar meaning
- ◆ Find **Ctrl f** and Replace **Ctrl h**

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Bullet and Number Lists

❖ Organizes information by topic

- ◆ **Bullet List** emphasizes and separates items
 - ◆ Can use different styles of bullets
 - ◆ Can be used to create leveled Hierarchy
- ◆ **Number List** sequences or prioritizes items
 - ◆ Updated automatically with insert or delete
 - ◆ Outlines use Number List Leveled Hierarchy

◆ Examples

- | | | | | | |
|-----|----|-----|----|---|----|
| • 1 | 2 | 3 | 4 | 5 | 6 |
| • i | ii | iii | iv | v | vi |
| • A | B | C | D | E | F |
| • a | b | c | d | e | f |

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Clip Art

- ❖ Clip art is **ready-to-use** art than can enhance the text design
 - ◆ Cartoon style images with relatively few colors, improves compressibility (file size)
 - ◆ Accessed in Task Pane or Drawing toolbar 
 - ◆ Menu command **Insert | Picture | Clip Art**
 - ◆ Create your own using a painting program



Outlines

- ❖ Helps to organize thoughts
 - ◆ Leveled Hierarchy
 - ◆ Topic Independence
 - ◆ Sub-Topic Dependence
- ❖ First step when writing a college paper
- ❖ Good for organizing shopping lists

Shopping for a Computer

- I. Hardware
 - A. CPU
 - B. RAM
 - C. Hard Drive
- II. Software
 - A. OS
 - B. Applications
 1. Office
 - a. Word Processing
 - b. Spreadsheets
 2. Finances
 - III. Warranty and Service

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Tables

- ❖ Organizes Information
 - ◆ 2 dimensional grid
 - ◆ Rows, Columns, Cells
- ❖ Provides 2-D Layout Capability
 - ◆ Can put anything in a cell
 - ◆ Text, Numbers, Photos, Clip Art
- ❖ Table | Insert | Table command
 - ◆ Insert Rows, Columns, Cells
 - ◆ Delete Rows, Columns, Cells
 - ◆ Merge Cells, Split Cells
 - ◆ AutoFormat
 - ◆ Auto Fit
 - ◆ Gridlines

Insert Table

Table size
Number of columns: 5
Number of rows: 2
AutoFit behavior
 Fixed column width: Auto
 AutoFit to contents
 AutoFit to window
Table style: Table Grid [AutoFormat...](#)

Remember dimensions for new tables [OK](#) [Cancel](#)

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Styles

- ❖ Uniform and consistent appearance for document elements
 - ◆ Normal
 - ◆ Paragraph
 - ◆ Headings: Heading 1, Heading 2, Heading 3...
 - ◆ User Defined Styles
- ❖ Used to change appearance for all occurrences of an element in document
 - ◆ Paragraph Level
 - ◆ Character Level
- ❖ Automates document formatting



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