

**MANAGEMENT INFORMATION SYSTEMS 8/E**

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# Chapter 8

## Fundamentals of Computer Processing

# Objectives

- Know the basic architecture of computer systems.
- Understand the role played by the computer's processor, memory, and storage.
- Be familiar with input and output hardware and capabilities.
- Know the main features of system and application software, including how each is used in problem solving.
- Know how to keep abreast of changes in both hardware and software technology.

# Computing History

- ENIAC - 1946
- UNIVAC I
  - First sold in 1956 to Census Bureau
- IBM System 360 Line of Computers
  - 1960's
  - Revolutionized computing
- 1954 -- first computer installed in a business  
(another UNIVAC I at GE)

# Computing History

- Early 1970s -- minicomputers
- Late 1970s -- microcomputers (TRS-80, Commodore PET)
- IBM PC
  - 1982

# Computer Sizes

## ■ Mainframes

- Large
- Centrally located
- Used by large organizations

## ■ Minicomputers

- Mid-sized
- Today's server market descended from these machines

# Computer Sizes (cont.)

## ■ Microcomputers

- Made possible by microprocessor
- PC -- used by one person, or by a few people in the same area

# Literacy

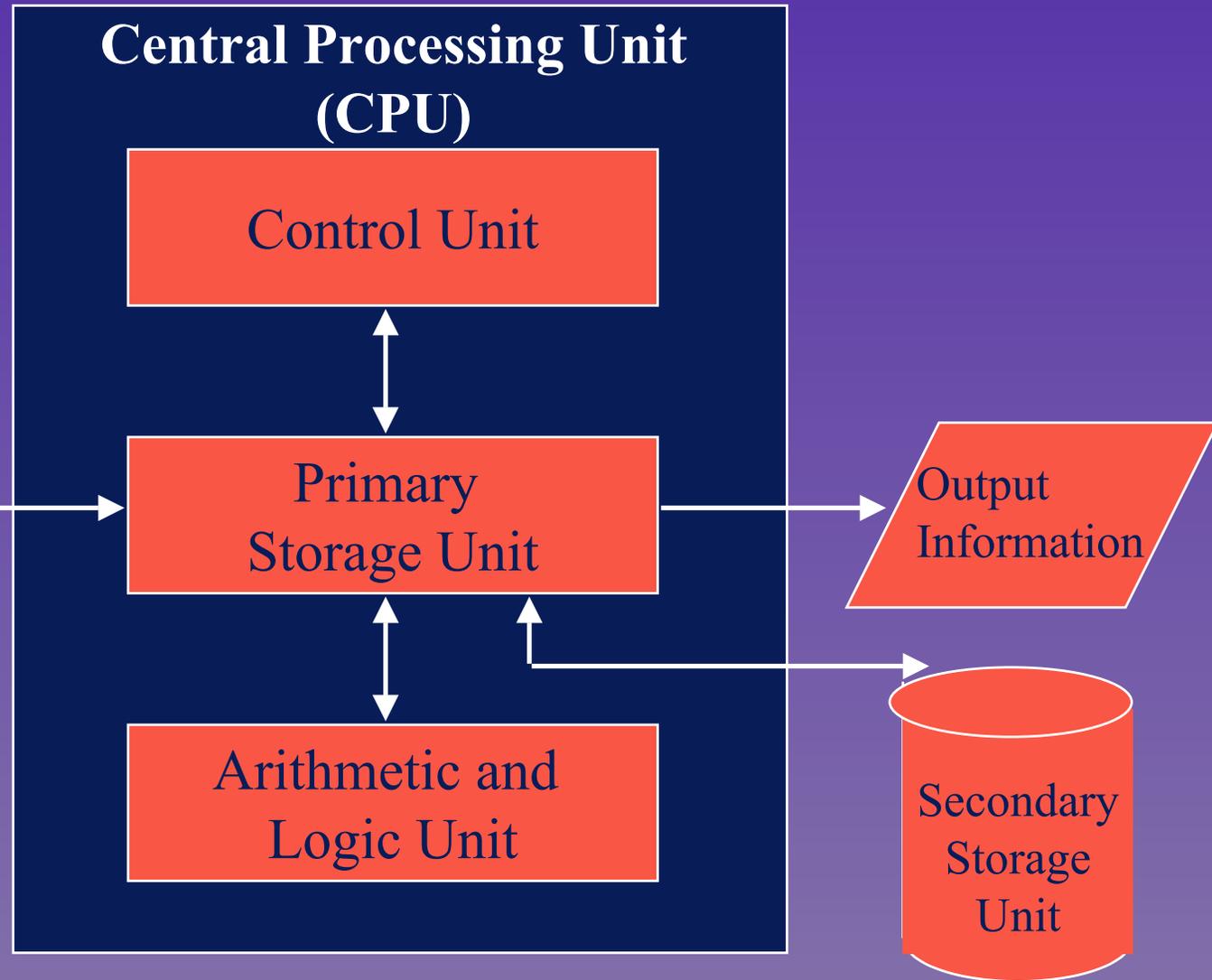
- Computer Literacy

- Ability to use computing resources

- Information Literacy

- Understanding how and why information affects the decision-making process

# The Computer Schematic



# Processors

- Main unit where processing is performed
  - Called CPU
  - Microcomputer CPUs called microprocessors
- Speed
  - Moore's Law
  - Megahertz (MHz)
  - Word Size

# Memory

## ■ Main memory

- Storage area where both data being processed and program instructions being executed are stored

## ■ Storage (secondary)

- Magnetized coding on the surface of a storage device

# Bits and Bytes

- One kilobyte (1KB)
  - $2^{10}$  bytes (1,024)
- One megabyte (1MB)
  - $2^{20}$  bytes (1,048,576)
- One gigabyte (1GB)
  - $2^{30}$  bytes (1,073,741,924)

# Different Memory Types

- RAM - Random access memory
  - Computer programs and data are loaded into RAM to be executed by the computer processor
- ROM - Read-only memory
  - Information used by the operating system and processor when the computer is started
- DRAM - Dynamic RAM
  - Allows buffering of data and increases efficiency of RAM

# Different Memory Types (cont.)

- SDRAM - Synchronous DRAM
  - Runs much faster than most conventional memory because it synchronizes its cycles with the processor's cycles
- SIMM - Single in-line memory module
  - Holds 9 memory chips and transmits 32 bits of data per cycle
- DIMM - Dual in-line memory module
  - Transmits 64 bits per data cycle

# Storage Devices

- Tape or disk drive
- Sequential storage
- Random storage
- High Capacity
  - DVD, CD-ROM, CD-RW, Zip, Jaz

# Removable Disks and their Storage Capacities

3.5 inch floppy disks holds 1.44 MB of data  
Zip disk may hold 100MB or 250MB of data  
Jaz disk holds 2GB of data  
CD disk holds 650MB of data  
DVD disk holds 5GB to 20GB of data

# Input Devices

- Keyboards
- Microphones
- Machine-captured data
  - Scanners/barcodes
  - Cost benefits

# Output Devices

## ■ Displayed

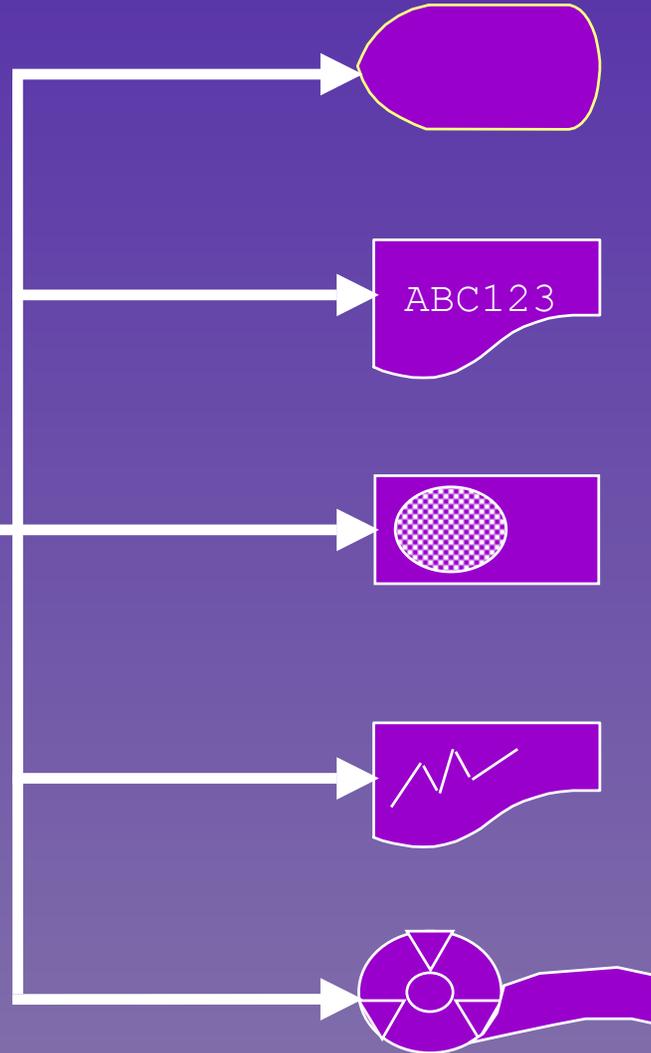
- Monitor
  - » Resolution
  - » Pixals
  - » GUI
- CGA, EGA, VGA, SVGA

## ■ Printed

- Speed
- Quality
- Impact/nonimpact

# Means of Producing Computer Output

Computer



Displayed Output Devices

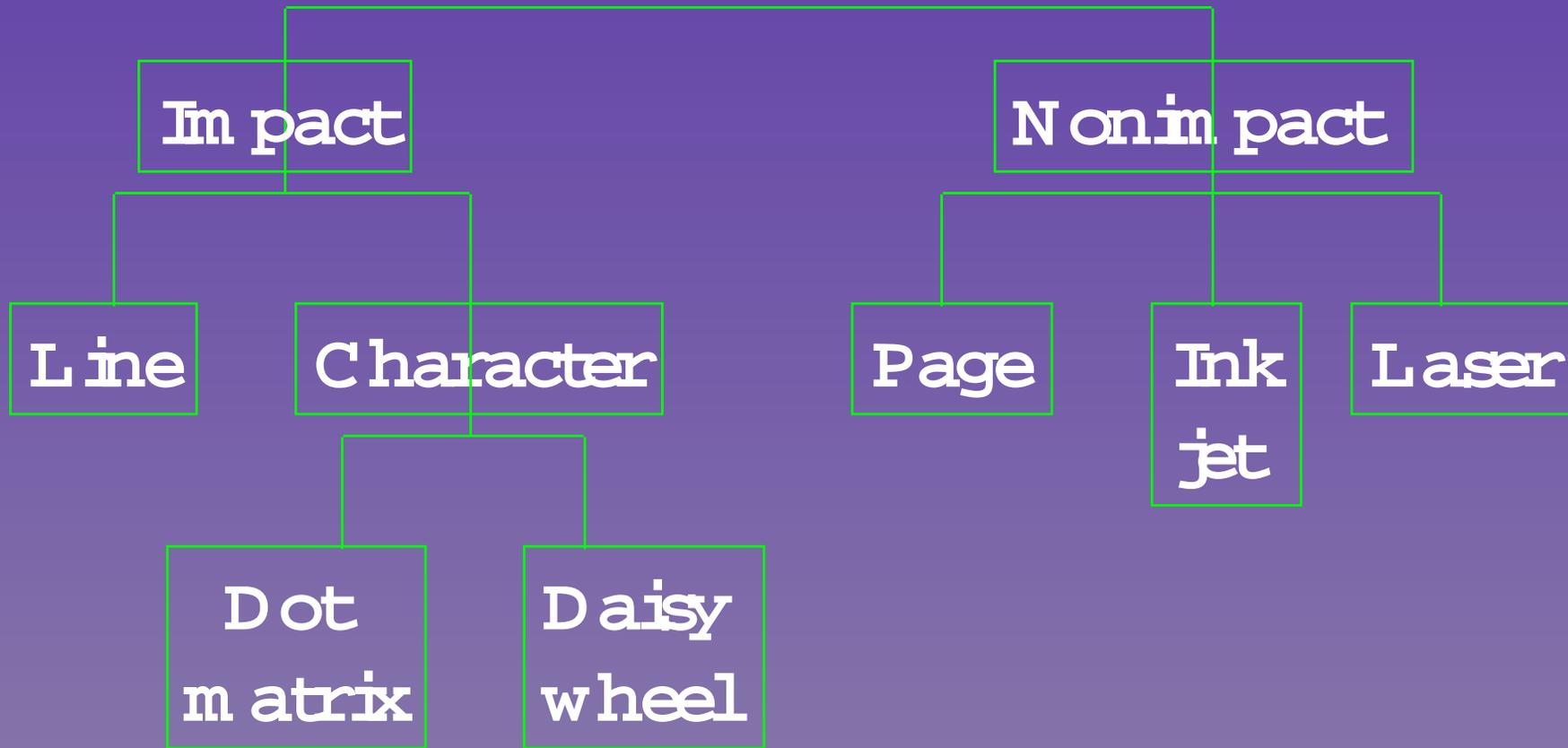
Printers

Speech Output Devices

Plotters

Microfilm

# Printers



# Multimedia

- Use of more than one media at one time
  - Image
  - Video
  - Audio
- Pointing devices
- Speech synthesis
- Animated images

# Hardware Changes

- Power compared to price doubles every 18 months
- Cultivate new information about computing resources
  - Trade journals
  - Professional societies
  - Continuing education
  - WWW

# Software

- Two main types of software -- system and application
- System
  - Performs fundamental tasks that all users of a particular computer require
- Application
  - Processes user's data

# Three Main System Software Types

## ■ Operating system

- Manages computer's processes
  - » Schedule tasks
  - » Manage hardware and software resources
  - » Maintain system security
  - » Enable sharing
  - » Handle Interrupts

# Three Main System Software Types(cont.)

## ■ Utilities

- Routine that enables the user to perform certain basic data processing activities
- Copy, erase, sort, merge, et cetera

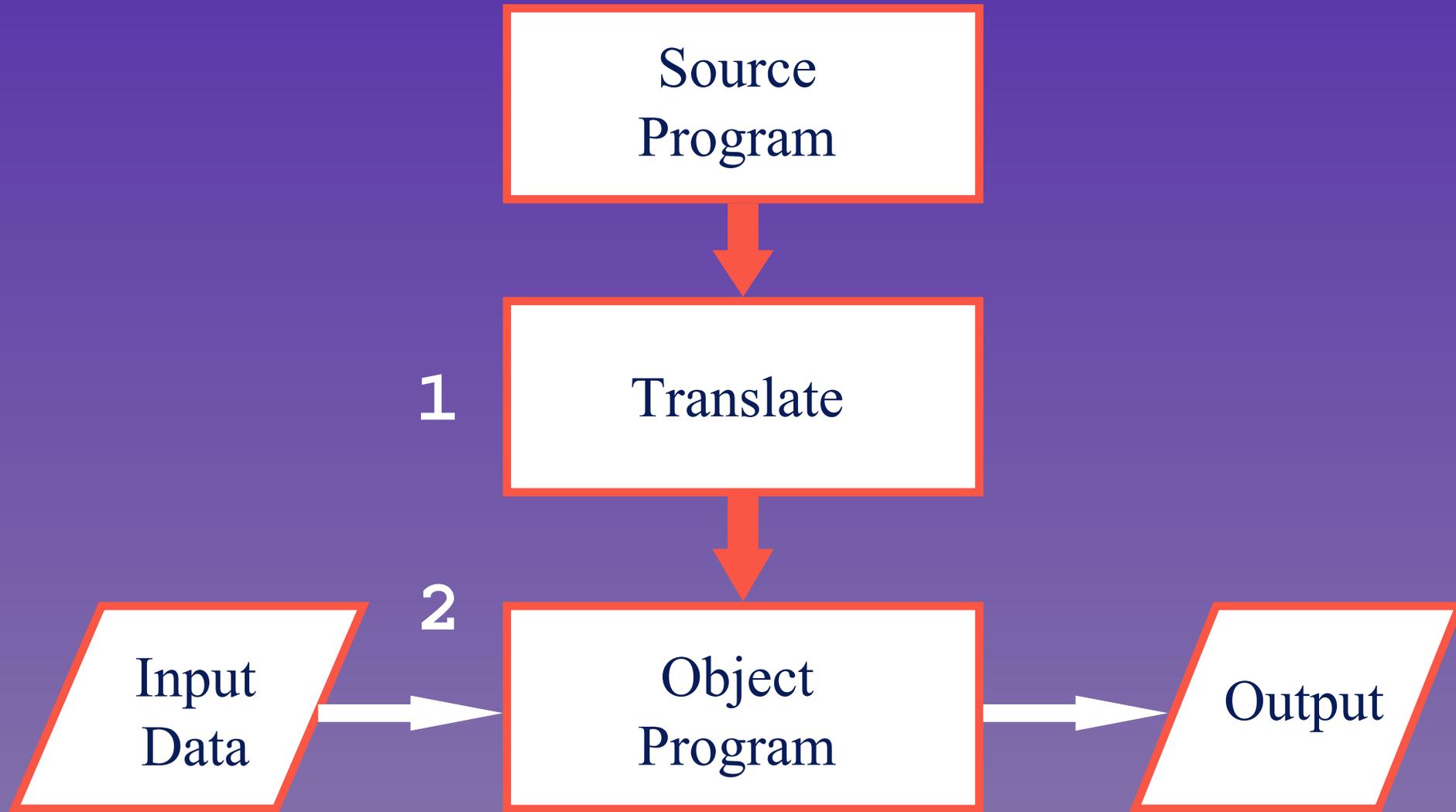
## ■ Language translators

- Change programmer instructions into computer instructions
- Highest form for translation is a natural language

# System Software Types (cont.)

- Fourth generation languages
  - Called 4GL
  - Describes what is to be done by computer
  - Does not describe explicitly how it will be done
  - DBMSs are related to this area
    - » SQL
    - » Query language
    - » SAS, SPSS

# The Program is Translated Before the Data is Processed



# Application Software

## ■ Prewritten software

- Standardized by business function
- Also called packaged application software and off-the-shelf application software
- Advantages
  - » Available now
  - » Less expensive

# Application Software (cont.)

- Custom software
  - Best for unique business operations
  - Far less is created today because of wide availability
  - Programmer salaries have risen

# Role of User-Friendly Software

- Businesses need programmers to create applications
  - Employees
  - Consultants
  - Contracts with other companies
- Simple intuitive software is user-friendly
- Business users have expertise in their areas
  - Need to work with technical experts

# Software Change

- Software changes almost as rapidly as hardware
  - IS professionals are routinely contacted concerning system updates
  - Professional societies and conferences
- Changes in business needs

# Summary

## ■ Hardware

- Processor, memory, storage
- Input, manipulation, output

## ■ Software

- Systems
- Application

## ■ Rapid changes

# Case Study

1. About how much data can be stored on a standard floppy disk such as a disk that would be put into the A: drive of a PC?
  - A) about 1 byte
  - B) over 1 megabyte
  - C) over 1 gigabyte
2. Which type of storage holds the most data?
  - A) compact disks (CDs)
  - B) Zip disks
  - C) digital versatile disks (DVDs)