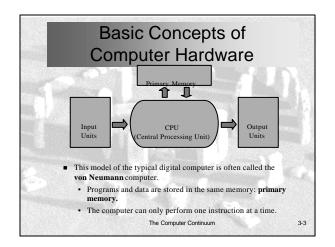
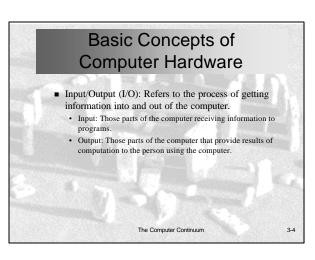
# Chapter 3: Computer Hardware Components: CPU, Memory, and I/O What is the typical configuration of a computer sold today? The Computer Continuum 1-1

# Computer Hardware Components In this lecture: How did the computer become known as the stored-program computer? Do they all have the same characteristics? Memory on chips and memory on magnetic media, how do they differ? What do you look for when comparing memory devices? How is information moved around within the computer?





## Sources of Data for the Computer

- Two types of data stored within a computer:
  - Original data or information: Data being introduced to a computing system for the first time.
    - Computers can deal directly with printed text, pictures, sound, and other common types of information.
  - Previously stored data or information: Data that has already been processed by a computer and is being stored for later use.
    - These are forms of binary data useful only to the computer.
      Examples: Floppy disks, DVD disks, and music CDs.
- Two categories of input hardware:
  - Those that deal with original data.
  - · Those that handle previously stored data.

The Computer Continuum

ium

## **Input Devices**

- Input hardware: Those that deal with original data.
- Keyboard
- Mouse
- Voice recognition hardware
- Scanner
- Digital camera
- We won't say much more about the input devices that deal with original data here
  - See book for more information
  - · Communicate via ports, and device drivers

The Computer Continuum

3-6

## **Input Devices**

- Common Basic Technologies for Storing Binary Information:
  - Electronic
  - Magnetic
  - Optical

The Computer Continuum

## **Input Devices**

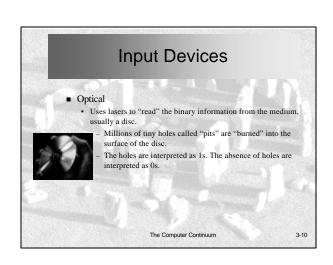
- Electronic Circuits
  - Most expensive of the three forms for storing binary information.
  - A flip-flop circuit has either one electronic status or the other.

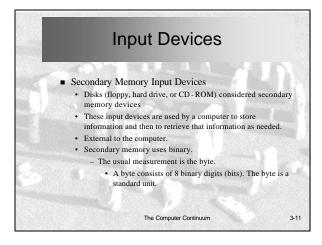
    It is said to flip-flop from one to the other.
  - Electronic circuits come in two forms:
    - Permanent (ROM Read Only Memory)
    - Non-permanent (RAM Random Access Memory)

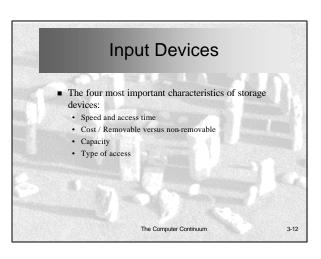
The Computer Continuum

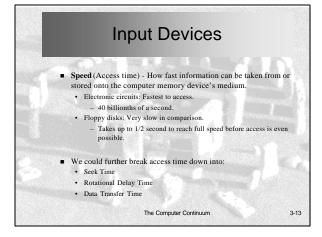
3-8

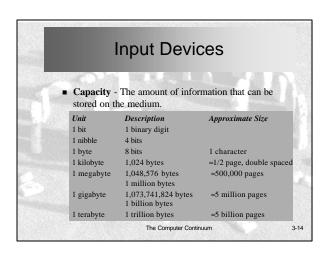
## ■ Magnetic Technology • Two parts to most of the magnetic forms of information storage: — The medium that stores the magnetic information. • Example: Floppy disk. Tiny spots on the disk are magnetized to represent 0s and 1s. — The device that can "read" that information from the medium. • The drive spins the disk. • It has a magnetic sensing arm that moves over the disk. • Performs nondestructive reading. The Computer Continuum 3-9

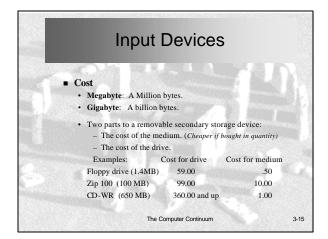


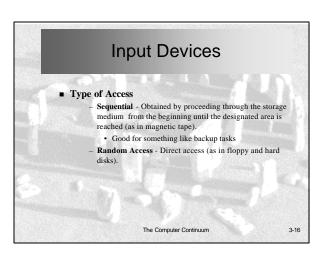












### **Primary Memory**

- Primary storage or memory: Is where the data and program that
  are currently in operation or being accessed are stored during use.
  - Consists of electronic circuits: Extremely fast and expensive.
  - · Two types:
    - RAM (non-permanent)
      - Programs and data can be stored here for the computer's use
      - Volatile: All information will be lost once the computer shuts down.
    - ROM (permanent)
      - · Contents do not change.

The Computer Continuum

## The Central Processing Unit

- The Central Processing Unit (CPU)
  - Often referred to as the "brain" of the computer.
  - Responsible for controlling all activities of the computer system.
  - The three major components of the CPU are:
    - Arithmetic Logic Unit (Computations performed)
       Accumulator (Results of computations kept here)
    - Control Unit (Has two locations where numbers are kept)
       Instruction Register (Instruction placed here for analysis)
       Program Counter (Which instruction will be performed next?)
    - 3. Instruction Decoding Unit (Decodes the instruction)
  - Motherboard: The place where most of the electronics including the CPU are mounted.

The Computer Continuum

3-18

## **Output Devices**

- Output units store and display information (calculated results and other messages) for us to see and use.
  - Floppy disk drives and Hard disk drives.
  - Display monitors: Hi-resolution monitors come in two types:
    - Cathode ray tube (CRT) Streams of electrons make phosphors glow on a large vacuum tube.
    - Liquid crystal display (LCD) A flat panel display that uses crystals to let varying amounts of different colored light to pass through it.
    - Developed primarily for portable computers.
  - Audio Output
  - Disk Output (CD-R, CD-RW)

The Computer Continuum

3-19

## **Output Devices**

■ Storage Requirements: How much storage capacity is needed for...

One keystroke on a keyboard.
 One page single-spaced document.
 Nineteen pages formatted text.
 One second of high-fidelity sound.
 Complete word processing program.
 8.4 MG

■ Storage Capacity: How much data can be stored on...

One inch of 1/2 in. wide magnetic tape.
One 3 1/2" floppy disk, high density.
One Compact Disk.

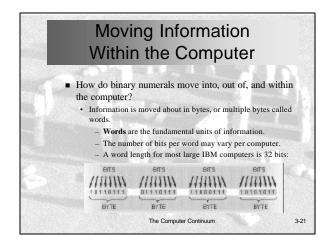
· One DVD.

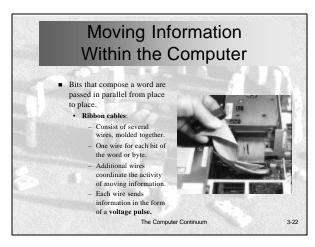
c. 650 MG up to 17 GB

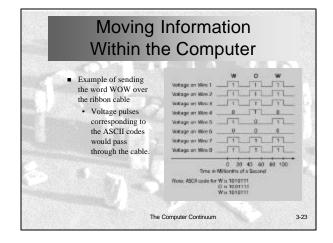
The Computer Continuum

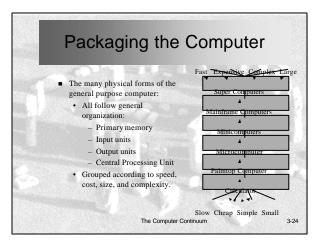
1.4 MG

The Computer Continuum









# Computer Architecture This has just been an introduction to the computer architecture, more specific details will follow! The Computer Continuum 3-25