Tomorrow's Technology and You

8th Edition

Tomorrow's Technology and You 8/e

Chapter 1
Our Digital Planet

Objectives

- ✓ Describe critical role of computers in modern life.
- ✓ Discuss the development of the modern computer.
- ✓ Describe trends in the evolution of modern computers.
- ✓ Explain the relationship between hardware and software.




Objectives (continued)

- ✓ Outline the five major types of computers in use today.
- ✓ Describe how the Internet is use of computers and information technology.
- ✓ Explain how today's information age differs from other times in history.
- ✓ Discuss the social and ethical impact of computers and information technology.



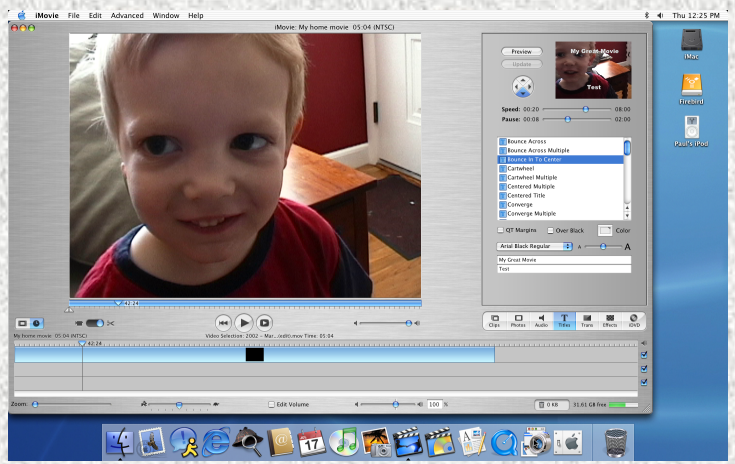

Creating Communities on the Living Web

- ✓ Facebook is a social networking service launched in 2004
- ✓ MySpace creates an online community experience for young people.
- ✓ Flickr creates a community for people to share their pictures.




Living in a Non-Digital World

- ✓ Computers are no longer a luxury but rather a commodity.
- ✓ Computers and their applications are involved in all aspects of our daily life.

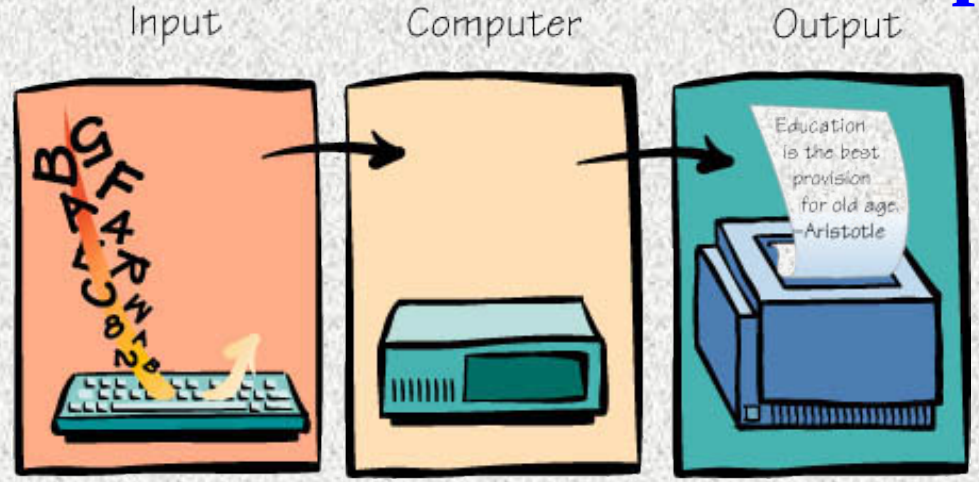


Computers in Historical Perspective

- **Computers** evolved from mechanical calculating devices performing repetitive calculations to **electronic programmable machines that process data using programs stored in their memories**.
- http://www.cis.usouthal.edu/faculty/daigle/project1/timeline.ht

Computers in Perspective

- ✓ All computers take in information called **input** and give out information called **output**.



Computers in Perspective

- The computer's versatility is built upon its:
  - **Hardware**: The physical part
  - **Software**: The instructions that tells hardware how to transform the input data (information in a form it can read) into the necessary output




Computers in Historical Perspective

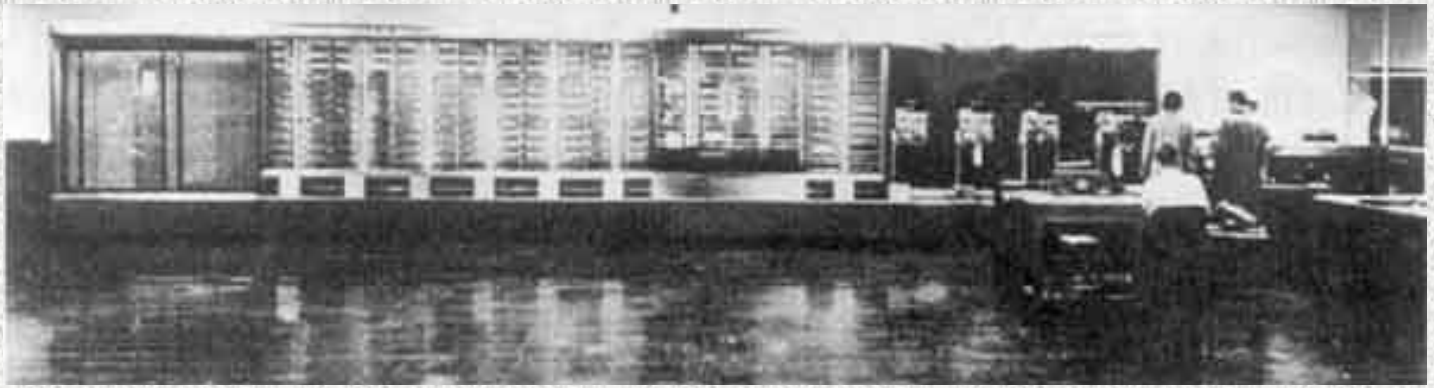
- **1939**: Iowa State University professor John Atanasoff developed what could have been the first (prototype of) electronic digital computer, the Atanasoff-Berry Computer (ABC).

Computers in Historical Perspective

- **1943**: The team led by British mathematician **Alan Turing** completed **Colossus** that was used to crack Nazi military codes.
- It was considered by many to be the first fully functional electronic digital computer.

Computers in Historical Perspective

- **1944**: Thanks to a one million dollar grant from IBM, Harvard professor Howard Aiken developed the Mark I.



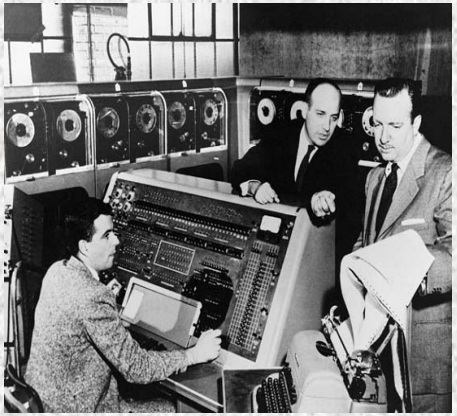
Computers in Historical Perspective

- John Mauchly and J. Presper Eckert helped the U.S. effort in World War II by constructing a machine to calculate trajectory tables for new guns.
  - **ENIAC** (Electronic Numerical Integrator and Computer)




Computers in Historical Perspective

- After the war, Mauchly and Eckert started a private company called Sperry and created UNIVAC I, the first general-purpose commercial computer.



Computers in Historical Perspective

- **Vacuum tubes** were used in early computers.
- **Transistors** invented in 1948 replaced vacuum tubes ca. 1958.
- By the mid-1960s **transistors** were replaced by **integrated circuits (a.k.a. silicon chips).**

Computers in Historical Perspective

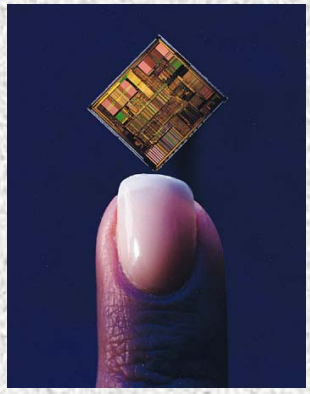
- Integrated circuits:
  - Increased reliability
  - Smaller size
  - Higher speed
  - Higher efficiency
  - Lower cost

Computers in Historical Perspective

- Integrated circuits:
  - each equivalent to millions of transistors
  - high density
  - and growing
  - **More's "Law"**:
  - density doubles every 18 months

Computers in Historical Perspective

- **1971**: The first **microprocessor** was invented by **Intel** engineers.
  - The **personal computer revolution** began in 1970:
    - Apple
    - Commodore
    - Tandy



Computers in Historical Perspective

- **Microprocessors**
  - CPU on one chip
  - (Central Processing Unit)

- Silicon Valley, CA, is where numerous microprocessor manufacturers are located.

Computers in Historical Perspective

Notebook PC diagram

http://richardbowles.tripod.com/durham/comparch/arch1.htm

http://focus.ti.com/vf/docs/blockdiagram.tsp?family=v1&blockDiagramId=6044

http://www.yaughns-1-pagers.com/computer/pc-block-diagram.htm

http://www.hitequest.com/Kiss/computer_arch.htm

System unit. a.k.a. motherboard

http://computer.howstuffworks.com/motherboard1.htm




Computers Today: A Brief Taxonomy

- **Embedded Computers**
  - Special-purpose computer: Dedicated computers that perform specific tasks.
    - Controlling the temperature and humidity
    - Monitoring your heart rate
    - Monitoring your house security system
  - The program is etched on silicon so it cannot be altered. This is called **firmware**.

Computers Today: A Brief Taxonomy

- **Personal Computers**
  - **PCs** serve a single user at a time.
    - Common applications include:
      - word processing
      - accounting
      - gaming
      - enjoying digital music and video

Computers Today: A Brief Taxonomy

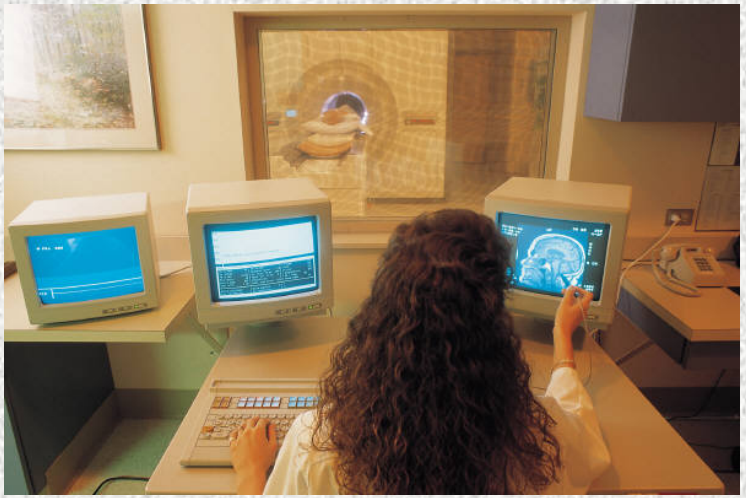
- **Workstations**
  - High-end desktop computers with massive computing power used for high-end interactive applications

Computers Today: A Brief Taxonomy

- **Portable Computers**: machines that are not tied to the desktop
  - Notebooks (laptops)
  - Hand held computers (PDAs)

Computers Today: A Brief Taxonomy

- **Servers**
  - Computers designed to provide software and other resources (e.g., data) to other computers over a network to users in different locations



Computers Today: A Brief Taxonomy

- **Mainframes**
  - Used by large organizations, such as banks and airlines, for big computing jobs

Computers Today: A Brief Taxonomy

- **Mainframes**
  - Communicate with mainframe through **terminals (mostly, a keyboard and a screen)**

Computers Today: A Brief Taxonomy

- **Mainframes**

  - Multiple users can access and use a mainframe at one time through process of **timesharing**

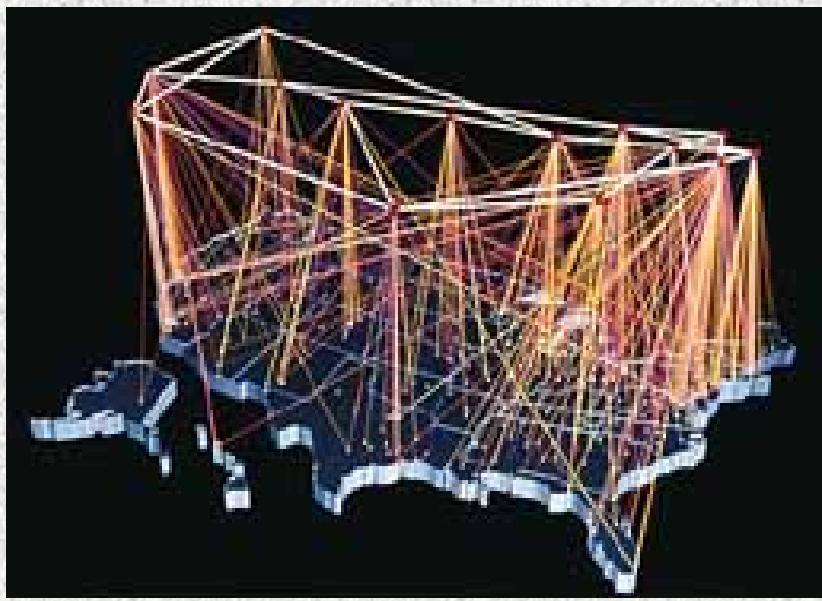
Computers Today: A Brief Taxonomy

- **Supercomputers**
  - For power users who need access to the fastest, most powerful computers made

Computer Connections: The Internet Revolution

The Emergence of Networks

- Connect computers together
- 1960s: **Internet** developed by a group of computer scientists and engineers with backing of the U.S. government



Computer Connections: The Internet Revolution

- The Internet Explosion- Over a billion people with Internet access by the end of 2005
  - Electronic mail
    - E-mail software
  - **World Wide Web**
    - a system of interlinked hypertext documents accessed via the Internet

Computer Connections: The Internet Revolution

- **Web browsers**
  - Programs that, in effect, serve as navigable windows into the Web
- **Hypertext links**
  - Tie together millions of Web pages created by diverse authors
- Internet **supports** varied activities
  - eBay used to make international transactions
  - Real-time multiplayer games




Into the Information Age

- In the history of our society we have had:
  - An agricultural age
  - An industrial age

Now we are in a new age, the information age:

- More and more people earn their livings working with words, numbers, and ideas.
- This change is referred to as **paradigm shift.**

Into the Information Age

- In the history of our society we have had:
  - An agricultural age
  - An industrial age

However, in 1700s during the Industrial Revolution, a **paradigm shift** did occur, too.

- The productivity and average incomes increased dramatically.
- Yet the Industrialized World ended up in revolutions (1848, 1917) and world wars.

Living with Digital Technology

- **Applications**: Computers in Action
  - Applications enable to use a computer for specific purposes
  - Applications are programs that run on behalf of **end users**.

Living with Digital Technology

Implications: **Social, Legal, and Ethical Issues**

- The threat to personal privacy posed by large databases and computer networks
- The hazards of high-tech crime and the difficulty of keeping data secure
- The difficulty of defining and protecting **intellectual property** in an all-digital age

Living with Digital Technology

- The threat of automation and the dehumanization of work (alienation)
- The abuse of information as a tool of political and economic power
- The emergence of bio-digital technology
- The dangers of dependence on complex technology




Lesson Summary

- ✓ Computers today come in all shapes and sizes, with specific types being well-suited for particular jobs.
- ✓ Connecting to a network enhances the value and power of a computer:
  - ➢ Internet
  - ➢ WWW
  - ➢ Email




Lesson Summary (continued)

- ✓ Computers and information technology have changed the world rapidly and irreversibly.
- ✓ Emerging technologies, such as artificial intelligence, offer promise for future applications.
- ✓ Computers also threaten our privacy, our security, and perhaps our way of life.