LESSON 1

The Shapes of Computers Today

The Shapes of Computers Today
- Computers

- **A Computer is an electronic device that can process data and Convert it in to information that is useful for people. OR**
- **Computer is a programmable device or set of devices that can work under the control of stored programs.**
- **Programs: Tells computer what to do & How to do.**
- **Device: Anything that exist physically.**

The Shapes of Computers Today
- Types of Computers

- **Digital Computer: Work with numbers.**
- **Break every type of information into tiny pieces & use numbers to represent those pieces of information.**
- **Not very much flexible but reliable & precise.**
- **They represent one distinct value or other not between them.**
- **Discrete values. (High,Low;On,Off;0,1;T,F)**
- **Mostly used every where.**

The Shapes of Computers Today
- Types of Computers

FIGURE 1A.1

The personal computer is an example of a digital computer.

The Shapes of Computers Today
- Types of Computers

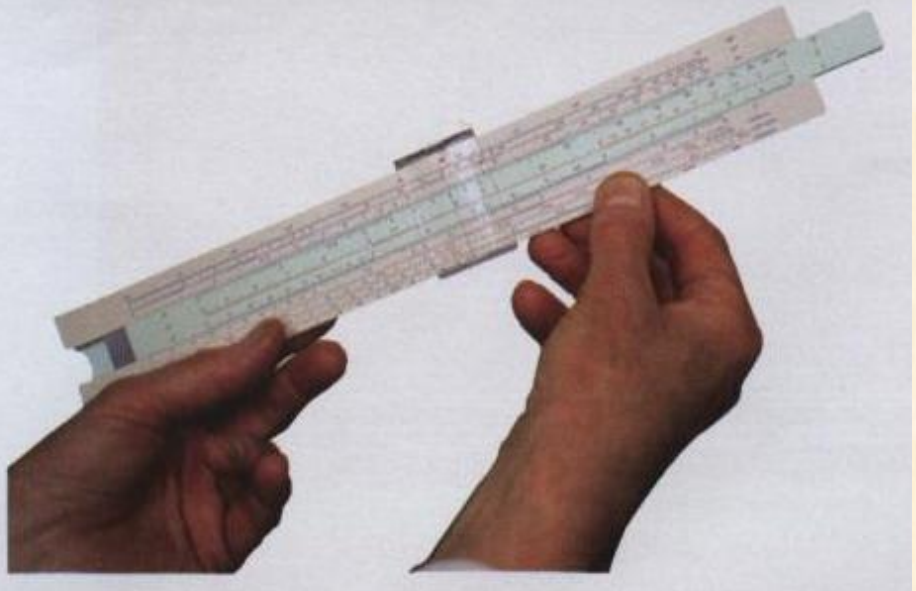
The Shapes of Computers Today
- Types of Computers

- **Analog Computer: Earlier computers.**
- **An analog computer is a form of computer that uses the continuously changeable aspects of physical phenomena such as electrical or mechanical quantities to model the problem being solved. In contrast, digital computers represent varying quantities symbolically, as their numerical values change**
- **Represent data as variable points along a continuous spectrum of values.**
- **That makes them flexible , But**
- **Less precise & Reliable.**
- **Continuous values.**

The Shapes of Computers Today
- Types of Computers

FIGURE 1A.3

Although analog computers have largely been forgotten, many of today's computer scientists grew up using slide rules—a simple kind of analog computer.



The Shapes of Computers Today
- Types of Computers

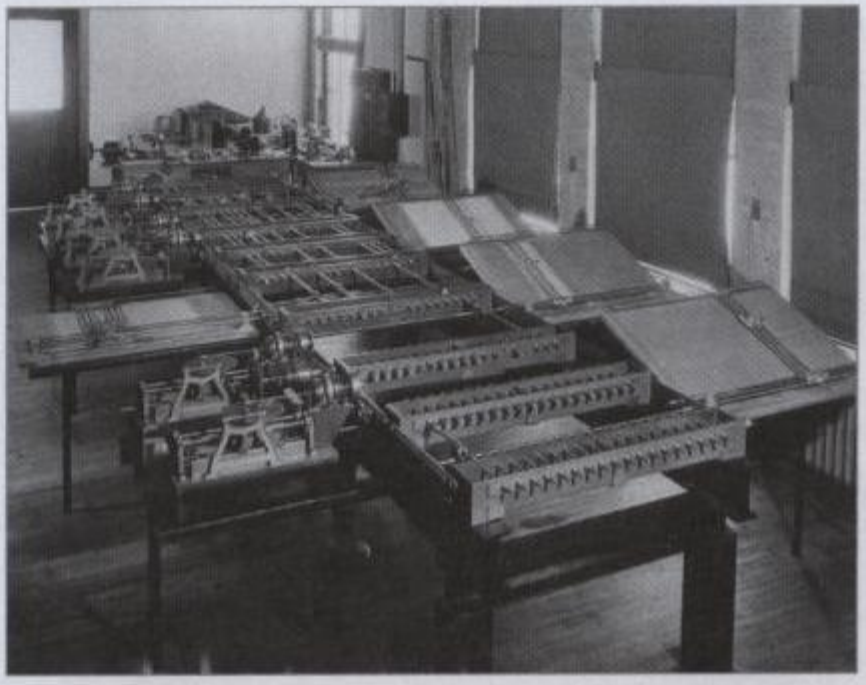


FIGURE 1A.2

This early analog computer, created by Vannevar Bush in the late 1920s, was called a "differential analyzer." It used electric motors, gears, and other moving parts to solve equations.

The Shapes of Computers Today
- Types of Computers

The Shapes of Computers Today - Categorizing Computers

- Some are used by single person & some by group of people or even some are user-less computers
- Can be categorized on the basis of speed. Or
- The type of task they perform.
- The type of hardware they use. Or Even
- On the basis of price

Computers for Individual Use

- Computers can be shared by multiple users but can be used by only one person at a time.

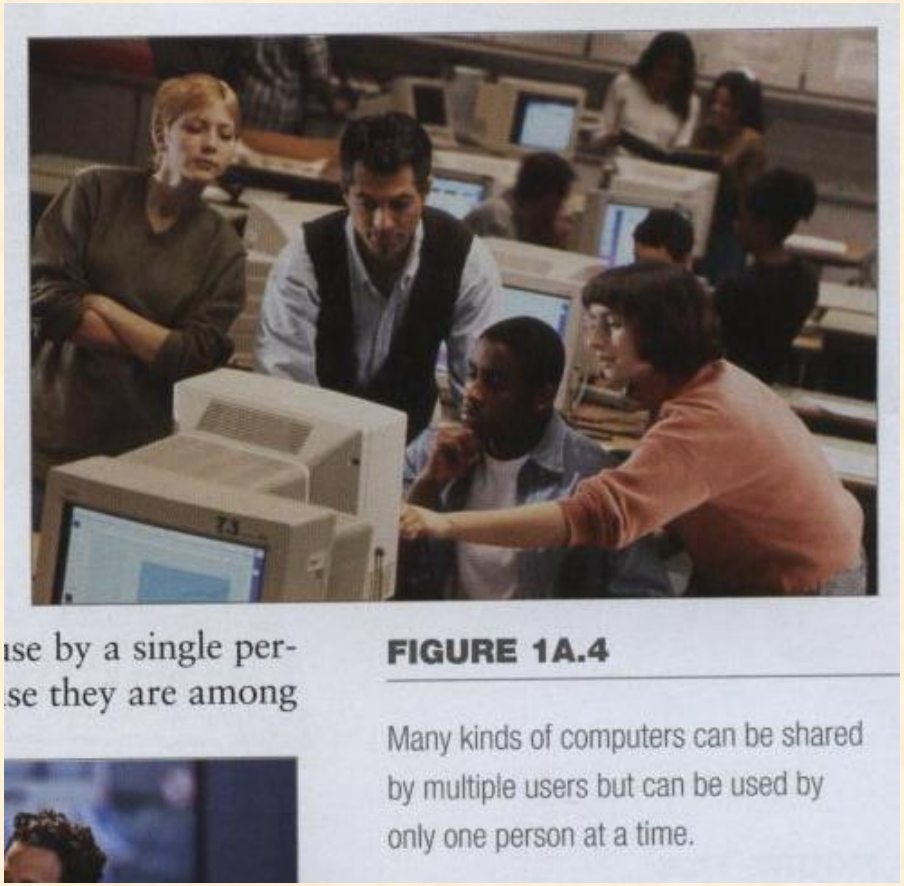


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FIGURE 1A.4

Many kinds of computers can be shared by multiple users but can be used by only one person at a time.

Computers for Individual Use

- Although PCs are used by individuals, they also can be connected together to create networks.

Many kinds of computers can be shared by multiple users but can be used by only one person at a time.

FIGURE 1A.5

Networking is a key task for today's computers, especially portable systems that allow users to connect to their home or office even when they are traveling.

The Shapes of Computers Today – Microcomputers, or Desktop or Personal Computers

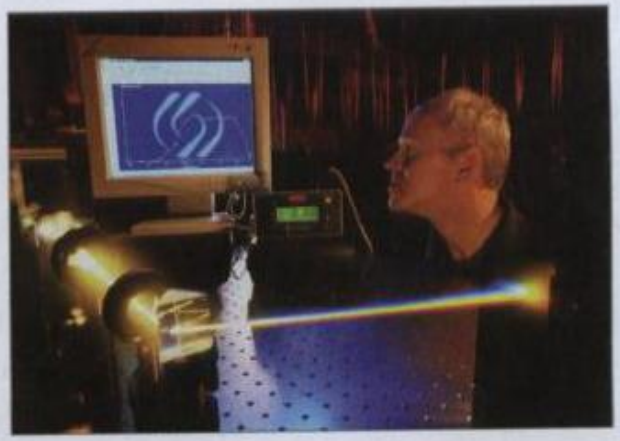
- Microcomputers are more commonly known as personal computers. The term "PC" is applied to IBM-PCs or compatible computers.
- Full-size desktop computers are the most common type of PC.
- Main component is the SYSTEM UNIT which is the case that houses critical components of computer e.g.
- CPU , RAM , Storage Devices.

The Shapes of Computers Today – Microcomputers, or Desktop or Personal Computers

be used to communicate, produce music, edit photographs and videos, play sophisticated games, and much more. Used by everyone from preschoolers to nuclear physicists, desktop computers are indispensable for learning, work, and play (see Figure 1A.6).

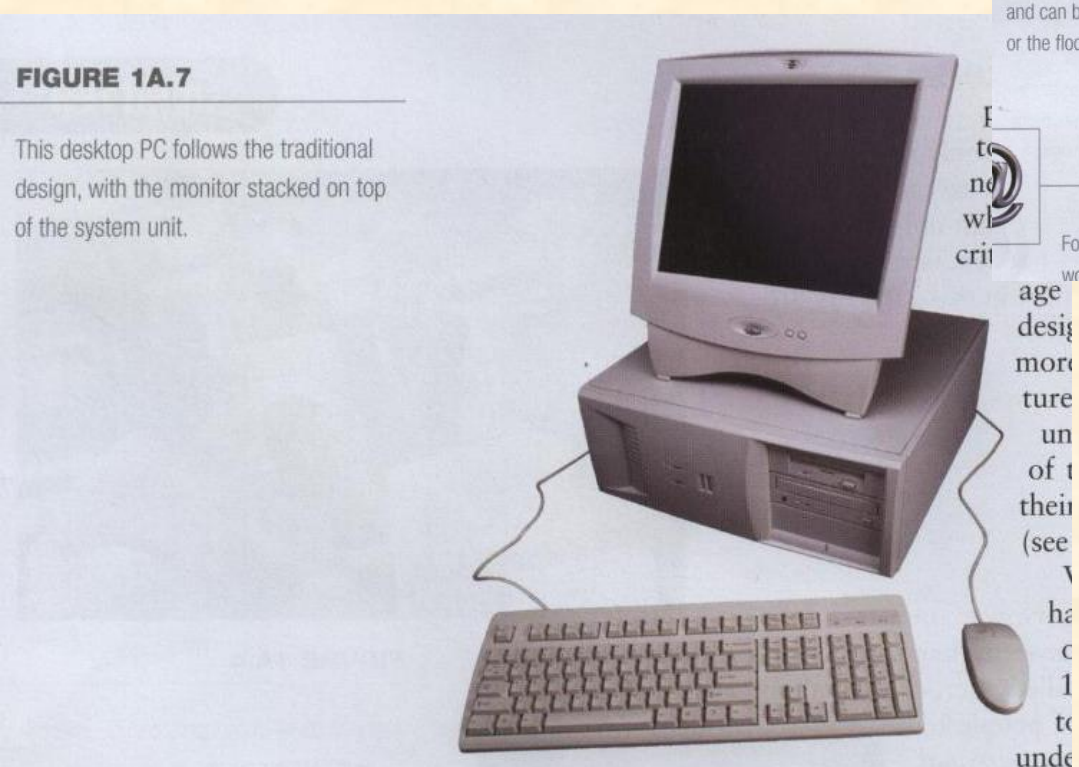
FIGURE 1A.6

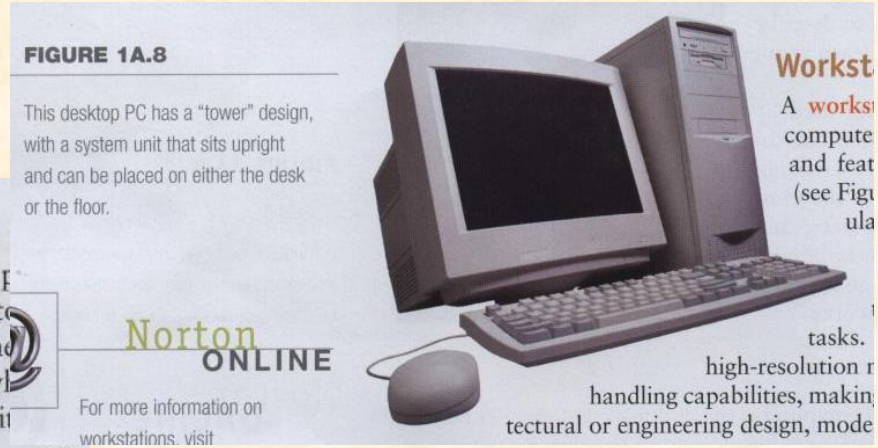
Desktop PCs are a familiar item in homes, schools, and workplaces.



The Shapes of Computers Today – Microcomputers, or Desktop or Personal Computers

- Desktop computers
  - Different design types





The Shapes of Computers Today – Workstations

- Workstations are more powerful single-user computers.
- Workstations are used for tasks that require a great deal of Graphics, such as product design and computer animation , modeling & Video Editing.
- Also used in Science experiments by engineers.
- A workstation is a computer intended for individual use that is faster and more capable than a personal computer. It's intended for business or professional use (rather than home or recreational use).
- Workstations are often used as network and Internet servers.

The Shapes of Computers Today – Workstations

http://www.mhhe.com/
peternorton.

FIGURE 1A.9

Workstation computers are favored by engineers and designers who need a high-performance system.

Norton

Sun Workstation

Sun Workstation

The Shapes of Computers Today
- Note-Book computers

- **Small Portable Computers with Weigh between 3-8 Pounds.**
- **About 8 ½ by 11 inches.**
- **Typically as power full as desktop computers with extra feature of PORTABLITY.**
- **As people put them on their lap so called Lap-Top.**
- **They can work on AC or special batteries.**
- **When not in use, can be folded from lid.**
- **Also called MOBILE Computers.**

The Shapes of Computers Today
- Note-Book computers

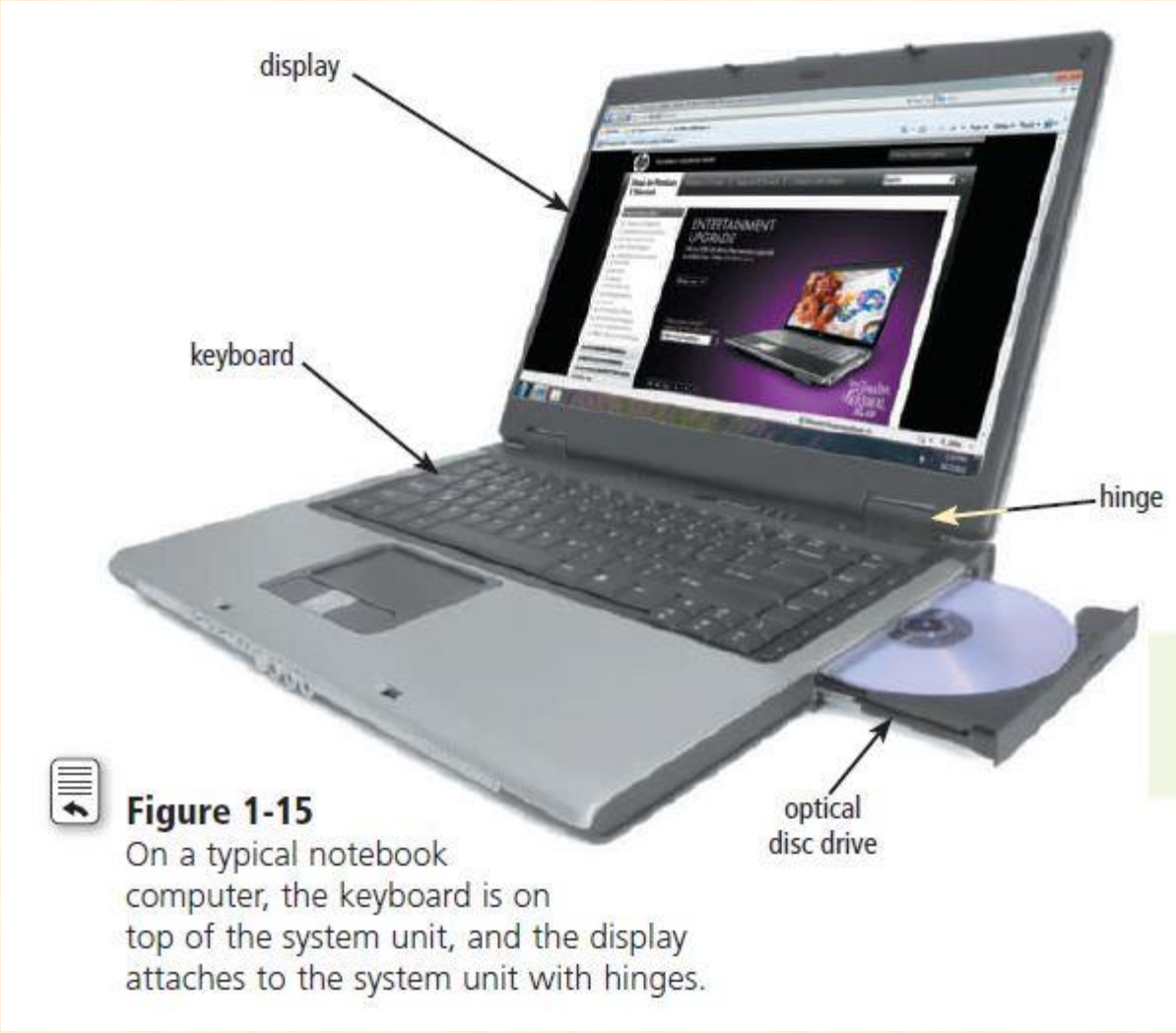


Figure 1-15
On a typical notebook computer, the keyboard is on top of the system unit, and the display attaches to the system unit with hinges.

The Shapes of Computers Today
- Note-Book computers

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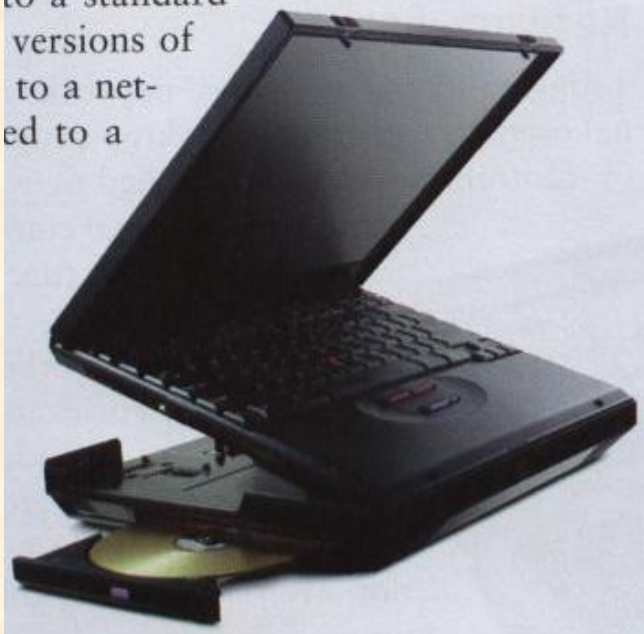


FIGURE 1A.11

A docking station can make a notebook computer feel like a desktop system, by adding a full-size monitor, keyboard, and other features.

Norton ONLINE

For more information on handheld PCs, visit

The Shapes of Computers Today - Tablet PCs

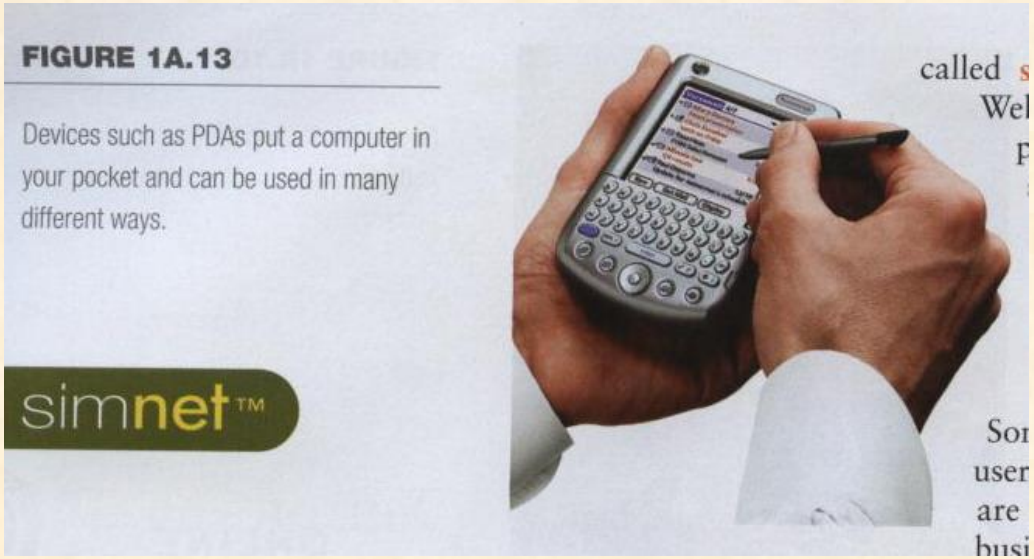
- Tablet computers
  - Newest development in portable computers
  - Input is through a pen called STYLUS or Digital Pen,
  - Run specialized versions of office products

The Shapes of Computers Today
- Tablet PCs

- **Same functionality as Note-Book Computers.**
- **Many Tablets also have built-in micro-phones & special software's for taking I/P through user voice.**
- **Some of them have Fold-Out Keyboard making them like Note-Book Computers.**
- **Some models can be connected to the network &**
- **Few of them can be connected to Keyboard & Full size monitors.**

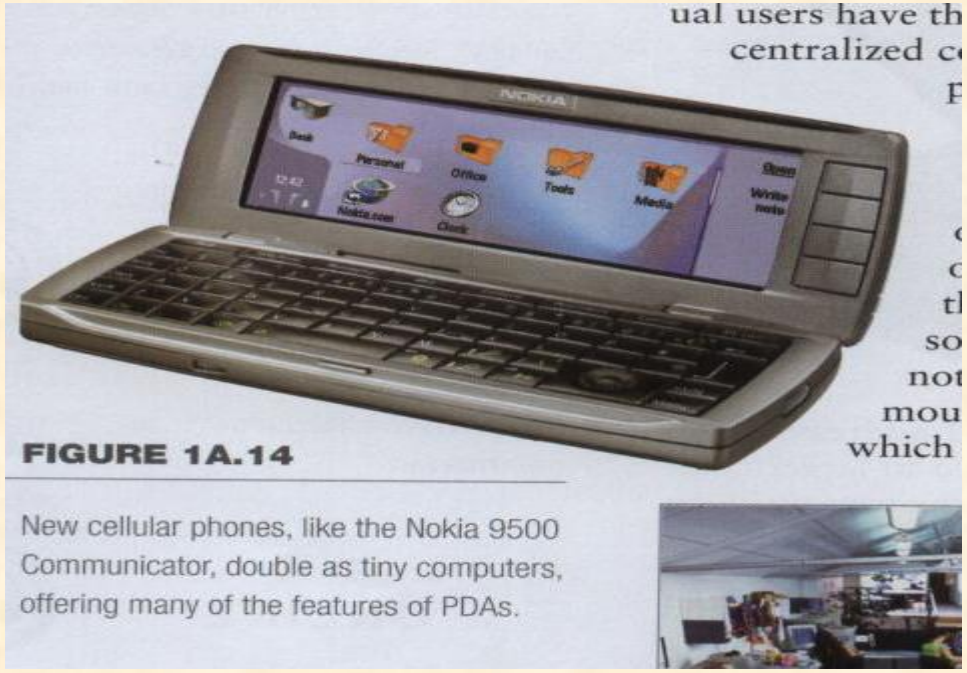
The Shapes of Computers Today
- HandHeld PCs OR Palm Computers

- Very small computers actually fit to your hand.
- A popular type is Personal Digital Assistants (PDA)
- Note taking or contact management
- Data can synchronize with a desktop by connecting.
- Mostly have pen for I/P & some have Micro-Phones.
- They can be used for internet surfing with wireless connection & many more features.



The Shapes of Computers Today - Smart Phones

- Hybrid of Cell Phones & PDAs.
- Web Surfing & email Access.
- Called Smart as they have extra features than Cell Phones.
- Special Hardware & S/W.



Handheld PC

Philips Velo

HP Jornada

Philips Velo

HP Jornada

Computers for Organizations

- **Some computers handle need of many users at the same time & are very power full than usual Desktop PCs.**
- **Often use in organizations & Universities etc.**
- **Each user interact with these computers through his/her own device freeing people to wait for the turn.**
- **Butt they are also expensive & large in sizes.**

The Shapes of Computers Today
- Network Servers

- **Individual users are connected to centralized computer called Network Server.**
- **It is a powerful PC with special H/W & S/W.**
- **PC based servers give full flexibility to the organizations.**

New cellular phones, like the Nokia 9500 Communicator, double as tiny computers, offering many of the features of PDAs.

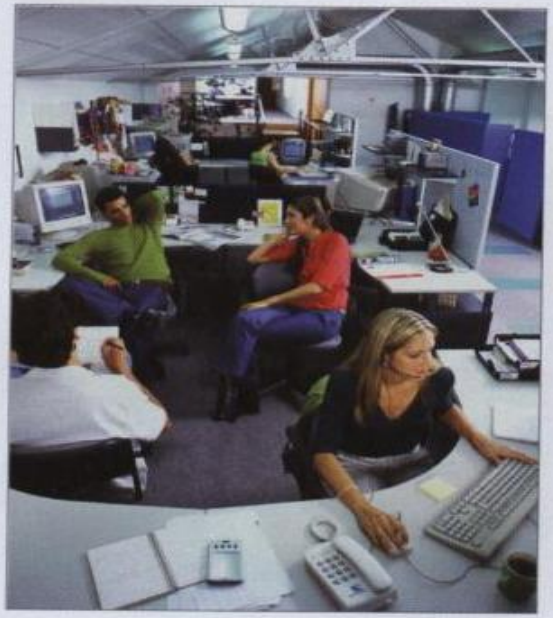


FIGURE 1A.15

In many companies, workers use their desktop systems to access a central, shared computer.

The Shapes of Computers Today - Network Servers

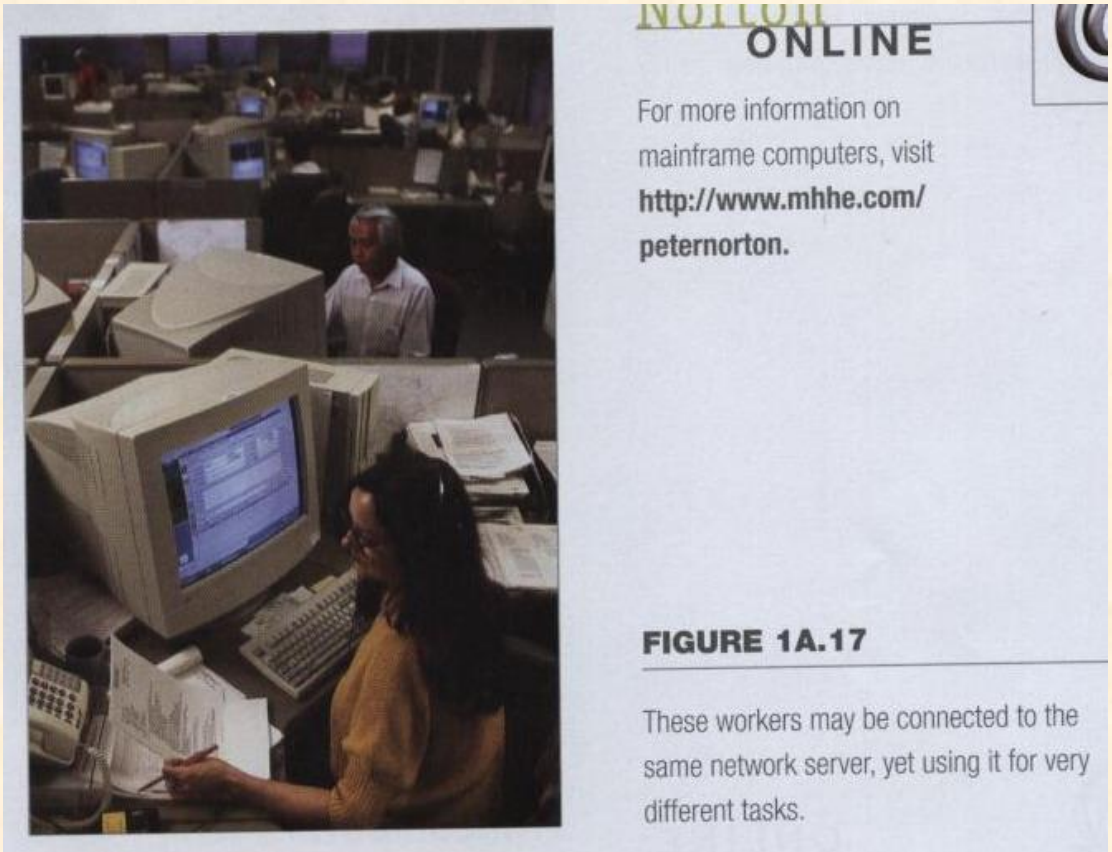
- Network servers
  - Provides access to network resources
  - Multiple servers are called server farms
  - Often simply a powerful desktop: Google

FIGURE 1A.16

Large corporate networks can use hundreds of servers.

The Shapes of Computers Today - Network Servers

- Network servers
  - Flexibility to different kinds of tasks



ONLINE

For more information on mainframe computers, visit **http://www.mhhe.com/peternorton.**

FIGURE 1A.17

These workers may be connected to the same network server, yet using it for very different tasks.

The Shapes of Computers Today - Network Servers

- Network servers
  - Users use the Internet as a means of connecting even if away from the offices.

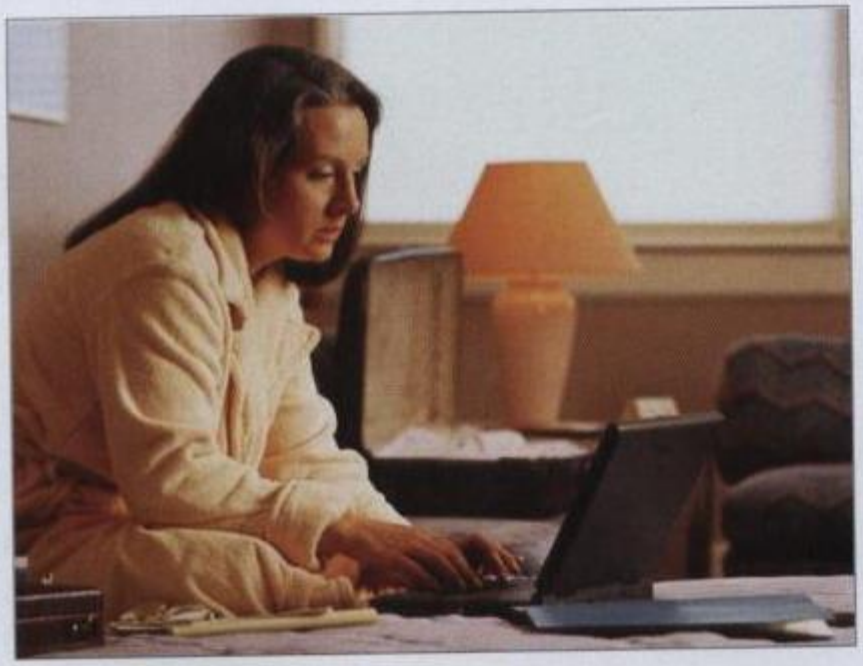


FIGURE 1A.18

Many users can access their organization's network no matter where they go.

The Shapes of Computers Today
- Mainframe Computers

- Mainframe computers can support hundreds or thousands of users, handling massive amounts of input, output, and storage.

- Mainframe computers are used in large organizations where many users need access to shared data and programs.

- Mainframes are also used as e-commerce servers, handling transactions over the Internet.

The Shapes of Computers Today - Mainframe Computers

- Mainframes
  - Used in large organizations
  - Handle thousands of users
  - Users access through a terminal

FIGURE 1A.19

Hundreds, even thousands, of mainframe users may use terminals to work with the central computer.

The Shapes of Computers Today
- Mainframe Computers

- Dumb Terminal: Does not process or stores data.
- Simply an I/O act as window located in computer.
- Intelligent Terminal: Does the processing but no Storage.
- Main Frame computers are not flexible.
- They are task oriented.
- Can be used for some specific task not many tasks.
- Reserving seat using airline's Website.

Figure 1-23 Mainframe computers can handle thousands of connected computers and process millions of instructions per second.

The Shapes of Computers Today
- Minicomputers

- Called midrange computers
- Power between mainframe and desktop
- Handle hundreds of users
- Used in smaller organizations
- Users access through a terminal
- Minicomputers may be used as network servers and Internet servers.

Minicomputer

The Shapes of Computers Today
- Supercomputers

- Supercomputers are the most powerful computers. They are used for problems requiring complex calculations.
- Because of their size and expense, supercomputers are relatively rare.
- Supercomputers are used by universities, government agencies, and large businesses.
- Process trillions of operations per second
- Housed by thousands of processors.

Figure 1-24 This supercomputer, IBM's Roadrunner, can process more than one quadrillion instructions in a single second.


Cray T90 Supercomputer

Embedded Computers

- An embedded computer is a special-purpose computer that functions as a component in a larger product.
- A variety of everyday products contain embedded computers:
- Consumer electronics
- Home automation devices
- Automobiles
- Process controllers and robotics
- Computer devices and office machines

Embedded Computers

- Because embedded computers are components in larger products, they usually are small and have limited hardware.
- Embedded computers perform various functions, depending on the requirements of the product in which they reside.
- Embedded computers in printers, for example, monitor the amount of paper in the tray, check the ink or toner level, signal if a paper jam has occurred, and so on.

Adaptive cruise control systems detect if cars in front of you are too close and, if necessary, adjust the vehicle's throttle, may apply brakes, and/or sound an alarm.

Advanced airbag systems have crash-severity sensors that determine the appropriate level to inflate the airbag, reducing the chance of airbag injury in low-speed accidents.

Tire pressure monitoring systems send warning signals if tire pressure is insufficient.

Cars equipped with wireless communications capabilities, called telematics, include such features as navigation systems, remote diagnosis and alerts, and Internet access.

Drive-by-wire systems sense pressure on the gas pedal and communicate electronically to the engine how much and how fast to accelerate.

Figure 1-25 Some of the embedded computers designed to improve your safety, security, and performance in today's automobiles.

Computers in Society

- **More impact than any other invention**
  - **Changed work and leisure activities**
  - **Used by all demographic groups**
- **Computers are important because:**
  - **Provide information to users**
  - **Information is critical to our society**
  - **Managing information is difficult**

Computers in Society

- Impact of computers
  - Like the Impact of automobile

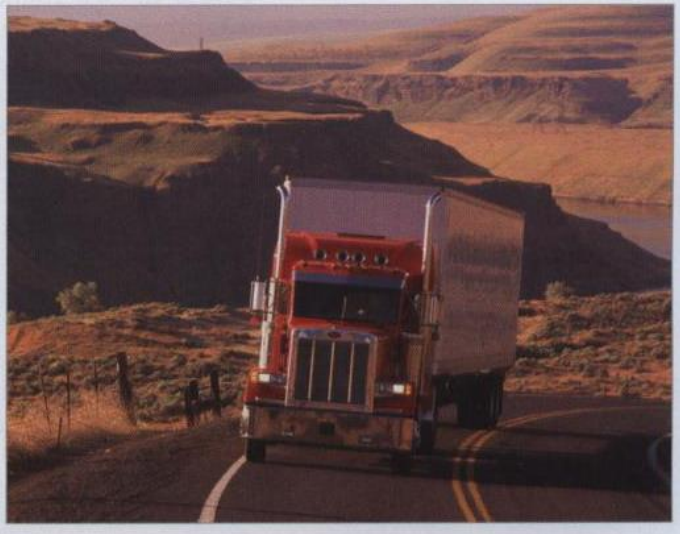
industry changed and throngs of people began working on assembly lines.

» Because of road development, suburbs became a feasible way for people to live close to a city without actually living in one.

» Because of car travel, motels, restaurants, and shopping centers sprang up in places where there had previously been nothing.

FIGURE 1A.22

At the beginning of the 20th century, few could envision how the automobile would change the world. Today, the same holds true for computers and other forms of technology.



Computers in Society

- The benefits of using computers
  - As varied as users

FIGURE 1A.23

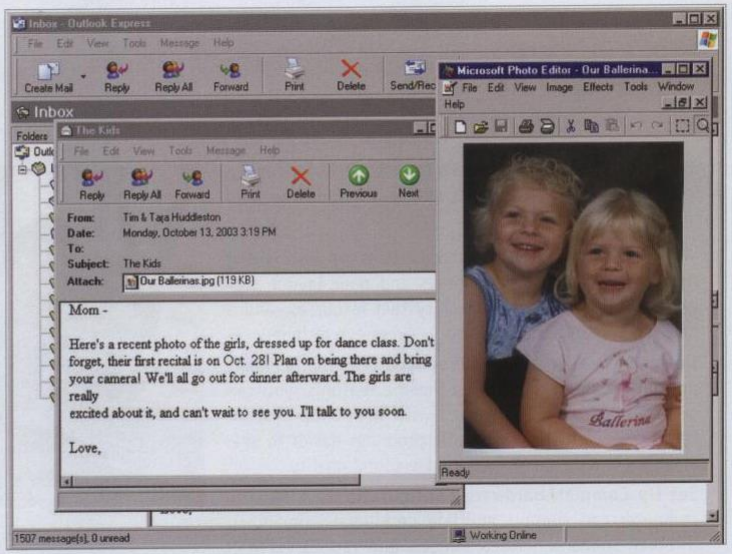
The benefits of using computers are as varied as the people who use them.

Computers in Society

- Computers at home
  - Many homes have multiple computers
  - Most American homes have Internet
  - Computers are used for
    - Communication

FIGURE 1A.24

E-mail software and Internet connections make it easy for people to keep in touch.



Computers in Society

- Computers at home
  - Computers are used for
    - Business
    - Entertainment
    - Schoolwork
    - Finances

FIGURE 1A.25

The Internet is a tremendous resource for study, offering thousands of authoritative Web sites where students can find information and help on all kinds of subjects.

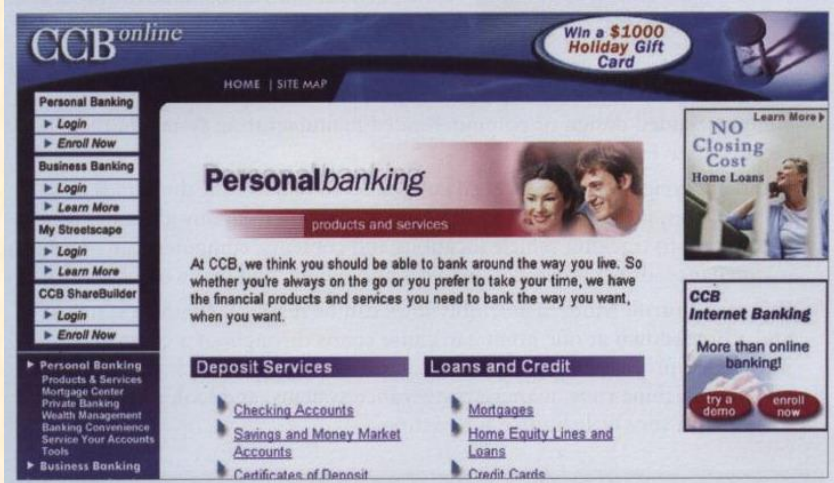


FIGURE 1A.26

Many banks now offer their services online. If you have an account with such a bank, you can access your accounts, pay bills, and conduct other transactions online.

Computers in Society

- Computers in education
  - Computer literacy required at all levels

Figure 1-31 In some schools, students have mobile computers on their desks during classroom lectures.

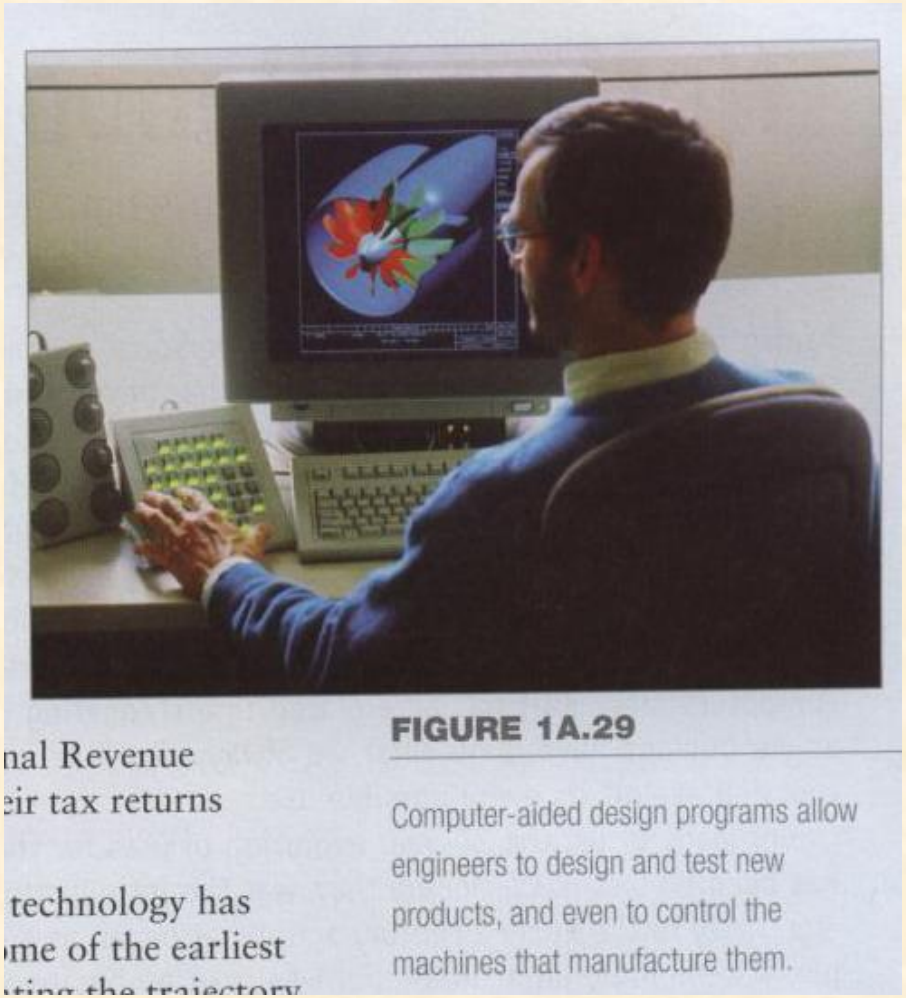
Computers in Society

- Computers in small business
  - Makes businesses more profitable
  - Allows owners to manage

Figure 1-32 An online banking Web site.

Computers in Society

- Computers in industry
  - Computers are used to design products
  - Assembly lines are automated



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eir tax returns

technology has
me of the earliest

FIGURE 1A.29

Computer-aided design programs allow engineers to design and test new products, and even to control the machines that manufacture them.

Computers in Society

- Computers in government
  - Necessary to track data for population
    - Police officers

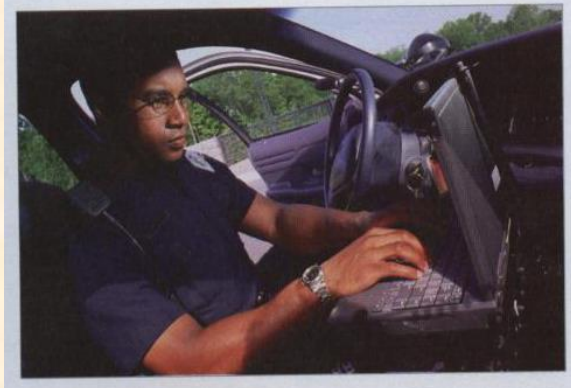


FIGURE 1A.30

Portable computers are now among police officers' weapons of choice.

    - Tax calculation and collection
  - Governments were the first computer users

Computers in Society

- Computers in health care
  - Revolutionized health care
  - New treatments possible
  - Scheduling of patients has improved
  - Delivery of medicine is safer

Figure 1-34 Doctors, nurses, technicians, and other medical staff use computers and computerized devices to assist with medical tests.

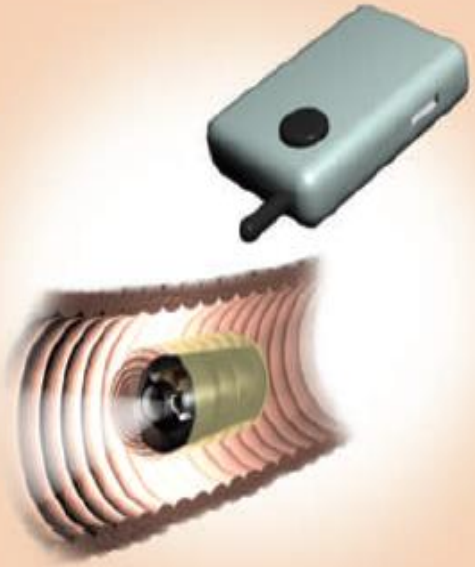
Computers in Society

- Computers in Science

How a Camera Pill Works

Step 1

A patient swallows a tiny capsule that contains a miniature disposable camera, lights, a transmitter, and batteries. The camera is positioned at the clear end of the capsule.



Step 2

As the capsule moves through the inside of the patient's body, the camera snaps about 50,000 pictures, which are transmitted to a recording device worn as a belt on the patient's waist.

Step 3

The doctor transfers the data on the recording device to a computer so that it can be processed and analyzed.

Computers in Society

- Computers in Publishing

Figure 1-36 Many magazine and newspaper publishers make the content of their publications available online.

Computers in Society

- Computers in Travelling

Figure 1-37 This handheld navigation device gives users turn-by-turn voice-prompted directions to a destination.

Computers in Society

- Computers in Manufacturing

Figure 1-38 Automotive factories use industrial robots to weld car bodies.