# Introduction to Information Technology: The Future Now

Chapter 1

# Chapter 1 Topics

## UNIT 1A: The Mobile World, Information Technology, & Your Life

1.1 Information Technology & Your Life: The Future Now

1.2 Information Technology Is Pervasive: Cellphones, Email, the Internet, & the E-World

## UNIT 1B: The Basics of Information Technology

1.3 The Practical User: How Becoming tech Smart Benefits You

1.4 The "All-Purpose Machine": The Varieties of Computers

1.5 Understanding Your Computer

1.6 Where Is Information Technology Headed?

# UNIT 1A: The Mobile World, Information, & Your Life

- As the result of developments in information technology, *smartphones* and *tablet computers* are changing nearly everything we do.
- *Information technology* refers to any technology that helps produce, manipulate, store, communicate, and/or disseminate information.

# 1.1 Information Technology & Your Life

## The Future Now

# Two Parts of IT: Computers & Communications

*Information technology affects almost all aspects of our lives, including education, health, finance, recreation and entertainment, government, jobs and careers, and your personal life.*

- Part 1: Computer Technology

A *computer* is a programmable, multiuse machine that accepts data—raw facts and figures—and processes, or manipulates, it into information we can use.

- Part 2: Communications Technology

*Communications technology*, also called *telecommunications technology*, consists of electromagnetic devices and systems for communicating over any distance.

# Education: The Promise of More Interactive & Individualized Learning

*Education has become heavily involved in information technology.*

- Information technology can be used for:
  - Personalizing students' education
  - Automating tedious and rote tasks and managing classes
  - Reducing instructors' workload (course-management software)
  - Graphical presentations (e.g., PowerPoint)
- What is misuse?
  - Text messaging or emailing friends during class
  - Surfing the Internet for entertainment
  - Doing assignments for other classes
  - Sharing answers

# Education: The Promise of More Interactive & Individualized Learning

- *Online Learning*, or *distance learning*, is becoming common.
  - Not all online schools/courses are accredited; students should check.
  - Online courses are less expensive than traditional courses.
  - Distance learning is available to students in rural areas.
- *Tutoring, simulation*, and *avatars* are also aspects of IT in education:

# Health: High-Tech for Wellness

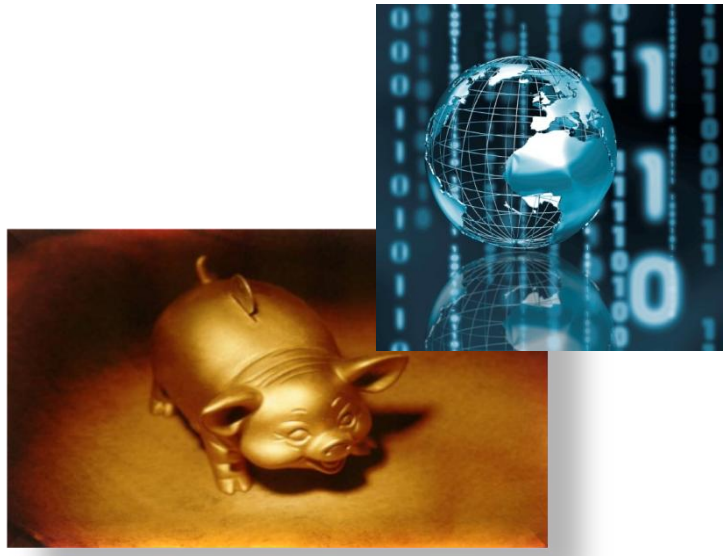
*Computers are playing important roles in our personal lives.*

- ***Telemedicine:*** Medical care via telecommunications lets doctors treat patients from far away.
- 3D Computer models allow accurate tumor location inside a skull; X rays, MRIs, CT scans can be done remotely.
- ***Robots*—*automatic devices that perform functions***
- ***ordinarily performed by human beings*—permit precise microsurgery.**
- Health websites provide medical information.
- Many health records are stored electronically.

# Money & Business: Toward the Cashless Society?

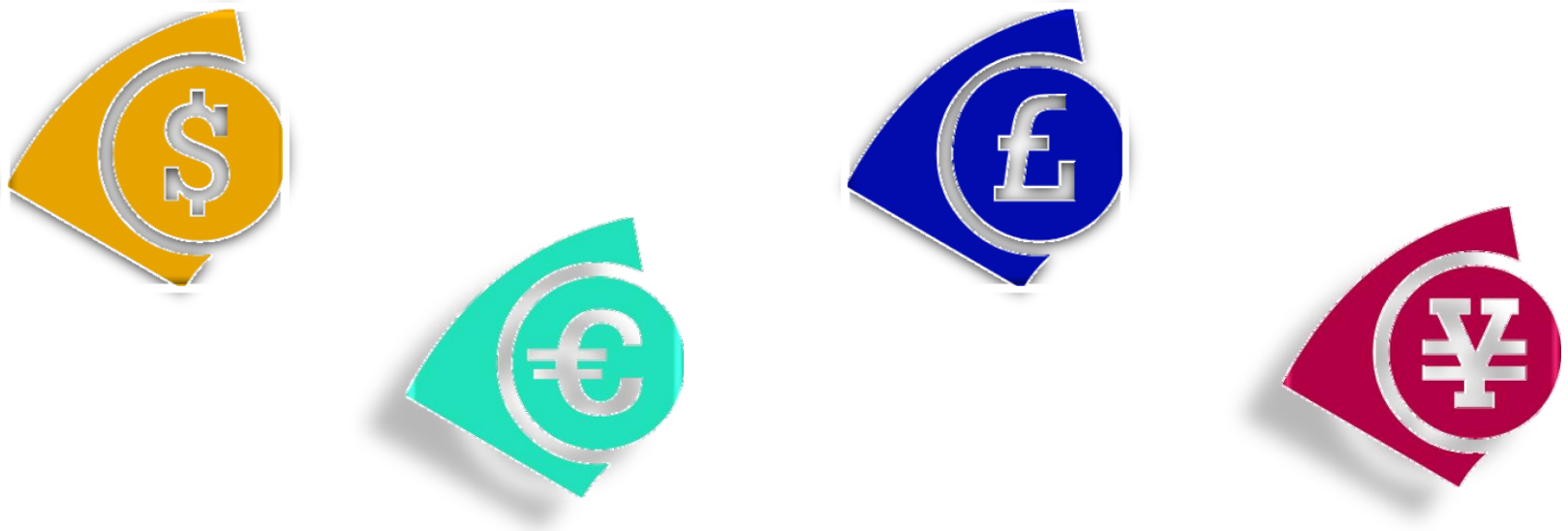
*Information technology is reducing the use of traditional money.*

- *Virtual* means something that is created, simulated, or carried on by means of a computer or a computer network.
- Virtual money includes cash-value cards, automatic transfers, and digital money
  - "Electronic wallets" (e.g., PayPal)
  - Electronic payroll deposit
  - Online bill paying via debit and credit cards
  - Micropayments for online products and to help charities



# Money & Business: Toward the Cashless Society?

- Smartphones are used for “showrooming” and shopping.
- Technology can also be used to telecommute and to start businesses and earn money.



# Government & Electronic Democracy: Participating in the Civic Realm

*Information technology is helping governments to deliver services and is affecting political activism.*

- IT can help governments to improve services, including police services, which use *databases,* **computer systems with a collection of interrelated files.**
- Online voting is becoming common.
- Information is easier to disseminate.
- Watchdog websites are growing.
- Easier fund raising from small donors.


BUT:

- Gerrymandering is becoming easier—redrawing voting districts for partisan advantage.
- Voting machine problems can occur.
- Invasion of privacy is becoming an important issue.

# Jobs & Careers

*People now use computers to post résumés and find jobs.*

- IT is used in starting new business ventures.
- IT is used to prepare résumés and find jobs on many websites.
- To help find jobs, participate in social media and write comments on ***blogs*** **(weblogs), frequently updated sites on the web intended for public consumption that contain a writer's observations, opinions, images, and links to other websites.** (But be aware of privacy issues and DON'T POST inappropriate pictures or text!) (Internet postings live forever!)

# Jobs & Careers

- Basic computer skills are needed for most jobs:
  - Know how to use a keyboard.
  - Use email.
  - Be able to use a word processor (usually Microsoft Word).
  - Know basic spreadsheet and database software skills.
  - Understand the basics of file sizes, computer memory limitations, and network arrangements.
  - Know what the basic computer system components are.

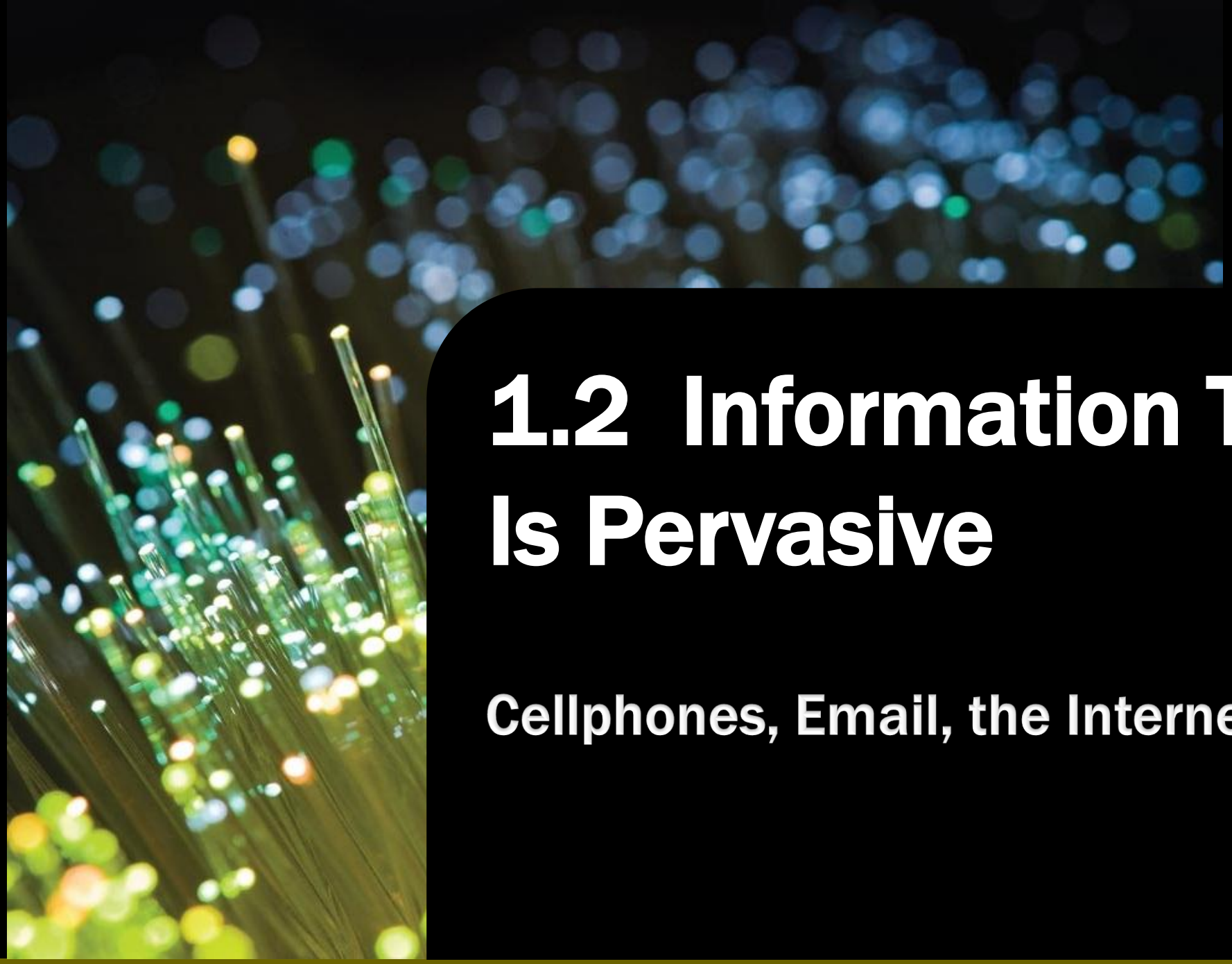
Discussion Question: Can anyone think of a career that does not require computer skills at all?

# Your Personal Life

*Computers are playing important roles in our personal lives.*

- *Online relationship sites*, or *online dating sites*, provide electronic forums that people may join in the hope of meeting compatible companions or mates.
- "Digital is embedded into the fiber of every aspect of our culture and our personal lives"– public safety and security; in the home; entertainment; finance; communications; traveling; shopping; medical care; and so on.

Discussion Question: Can anyone think of an area of life NOT affected by IT?



# 1.2 Information Technology Is Pervasive

## Cellphones, Email, the Internet, & the E-World

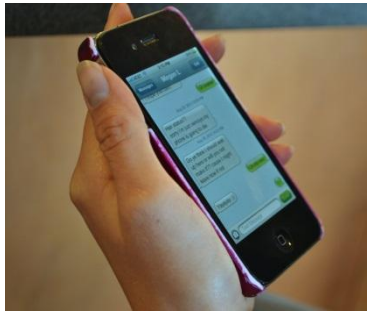
# The Phone Grows Up

*The telephone is not what it used to be.*

- 1973: First cellphone call
- Mobile phone use estimated to rise to 7 billion users in 2014
- Today's smartphones can:
  - Make voice calls
  - Connect to Internet and web for all sorts of activities
  - Send and receive text messages
  - Take and send pictures and download music and video
  - Obtain news and TV programs
  - Scan special barcodes that take users to a website
  - Provide maps
  - Do research
  - Pay for products and services

# Email's Mass Impact

*Email revolutionized communication, and has many benefits, but in many areas it is being supplanted by texting.*



- Introduced in 1981
- Reached 10 million users in about one year
- 1998 surpassed hand-delivered mail
- In 2013 about 144 billion messages per day
- In business, at least, email requires writing skills
- For personal activities, texting is replacing email
  - *Texting,* or *text messaging,* **is sending and receiving short written messages between mobile phones or other portable or fixed devices**

# The Internet, the World Wide Web, & the "Plumbing" of Cyberspace

*The net, the web, and cyberspace are not the same things.*

- Cyberspace
  - Term coined by William Gibson in *Neuromancer* (1984) to describe a futuristic computer network people "plugged" into directly with their brains
- Now the term *cyberspace* encompasses not only the online world and the Internet in particular but also the whole wired and wireless world of communications in general.

# The Net & Web Defined


- **The *Internet* (the "Net" or "net") is a worldwide computer network that connects hundreds of thousands of smaller networks.** These networks link educational, commercial, nonprofit, and military entities, as well as individuals.
- The ***World Wide Web*** **(the "Web" or the "web" is an interconnected system of Internet computers (called *servers* ) that support specially formatted documents in multimedia form.** (The word *multimedia,* from "multiple media," refers to technology that presents information in more than one medium, such as text, still images, moving images, and sound.)



# UNIT 1B: The Basics of Information Technology

- As the result of developments in information technology, *smartphones* and *tablet computers* are changing nearly everything we do.
- *Information technology* refers to any technology that helps produce, manipulate, store, communicate, and/or disseminate information.

# 1.3 The Practical User

## How Becoming tech Smart Benefits You

*Being informed about information technology has practical payoffs.*

- **Know** how to make better buying decisions
- **Know** how to fix ordinary computer problems
- **Know** how to upgrade equipment and integrate it with new products
- **Know** how to use the Internet effectively
- **Know** how to guard against online dangers
- **Know** how computer knowledge can advance your career

# 1.4 The "All-Purpose Machine"

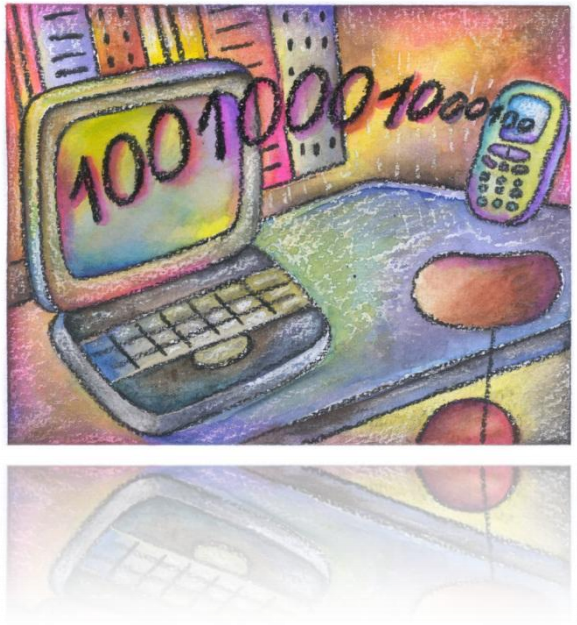
## The Varieties of Computers

# All Computers, Great & Small: The Categories of Machines

*Computers come in different sizes; they also function as clients and/or servers.*

- *There are five basic computer sizes.*

1. Supercomputers
2. Mainframes
3. Workstations
4. Microcomputers
5. Microcontrollers



# 1. Supercomputers

*Supercomputers are used in very special situations.*

- Priced from $1 million to over $350 million.
- High-capacity machines with thousands of processors that can perform more than several quadrillion calculations per second.
- Faster and largest computer available.
- Used for government census, weather forecasting, designing aircraft, scientific projects, etc.
- The Titan (U.S.A.) computer is currently the largest supercomputer.
- The next supercomputer generation may use *nanotechnology.*

# 2. Mainframes

*Mainframe computers are used in many large businesses.*

- Priced from $5,000 to $5 million
- Process billions of instructions per second
- Size is dependent on the use
- Water-cooled or air-cooled
- Used to be called *midsize computers*
- Used by banks, airlines, colleges, and the like for millions of transactions

# 3. Workstations

*Workstations are used for graphics, special effects, and certain professional applications.*

- Expensive, powerful personal computers
- Used for scientific, mathematical, engineering, computer-aided design (CAD), computer-aided manufacturing (CAM) applications
- Used for designing cars, drugs, movie special effects
- Are usually connected to a network

# 4. Microcomputers

*Microcomputers are used by individuals as well as businesses, and they can be connected to networks of larger computers. There are many types of microcomputers.*

- Personal computers that cost $500 to over $5,000
- Used either stand-alone or in a network
- Types include: desktop, tower, notebooks (laptops), netbooks, tablets, mobile devices, personal digital assistants (PDAs), and e-readers

# Types of Microcomputers (1)

- Desktop and tower PCs

Desktop PC

Tower PC

- Notebooks & netbooks

- Tablets

# Types of Microcomputers (2)

- Mobile devices & PDAs
- E-readers

- Also called *embedded computers*, ***microcontrollers*** are tiny, specialized microprocessors inside appliances and automobiles They are in microwaves, programmable ovens, blood-pressure monitors, air bag sensors, vibration sensors, MP3 players, digital cameras, keyboards, car systems, etc.

# Servers

- The word *server* describes the way a computer—whether mainframe, workstation, or PC—is used.
- **A *server*, or *network server* , is a central computer that holds collections of data (databases) and programs for connecting or supplying services to PCs, workstations, and other devices, which are called *clients*. These clients are linked by a wired or wireless network. The entire network is called a *client-server network*.**
- Purpose: Hold data and programs for clients to access and to supply services for clients.

# 1.5 Understanding Your Computer

# How Computers Work: Three Key Concepts

*All computer users must understand three basic principles: (1) Data is turned into information; (2) hardware and software have their own specific functions; and (3) all computers involve input, processing, storage, and output, plus communications.*

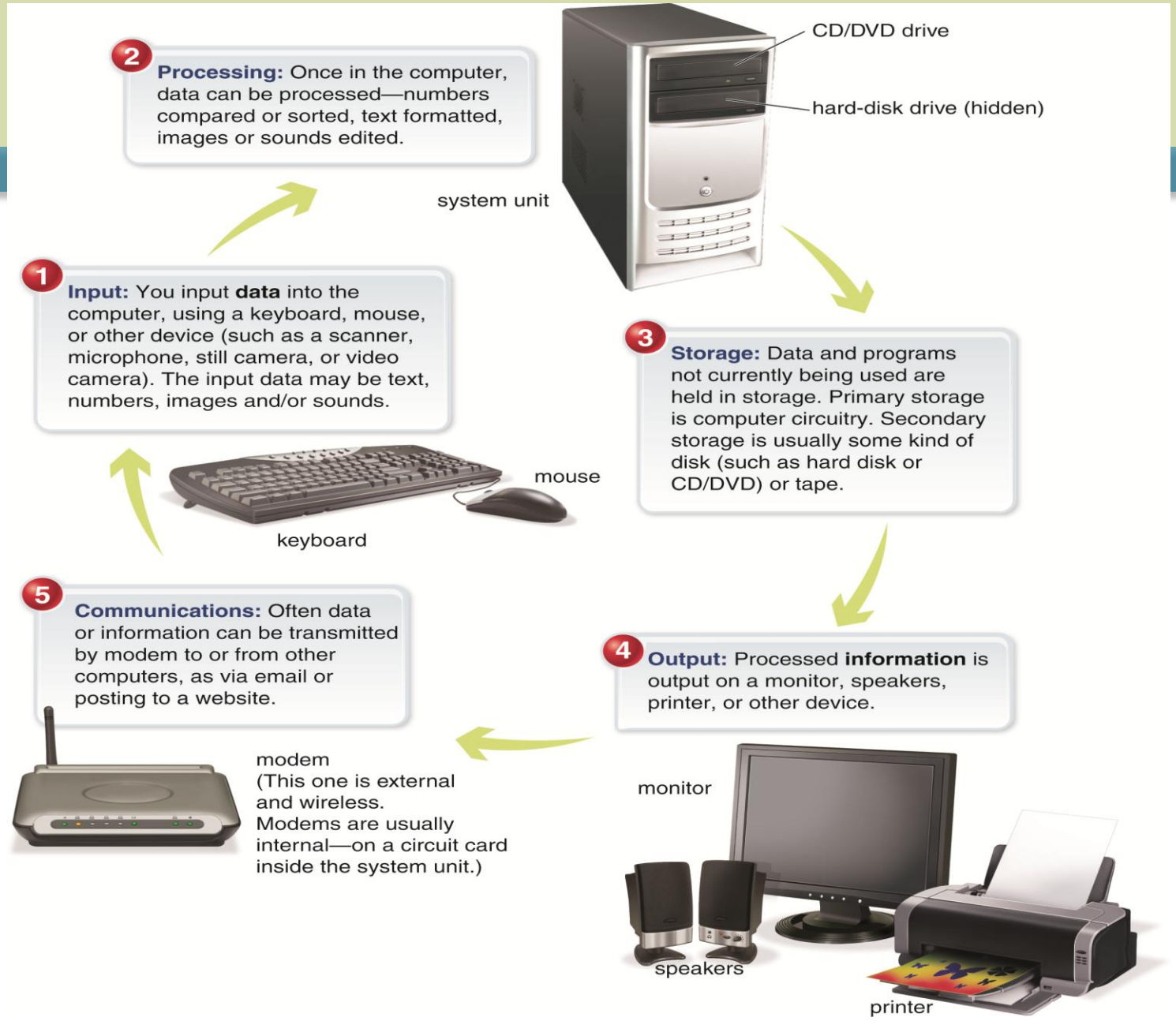
1. Purpose of a computer: Turning data into information
   - *Data*: the raw facts and figures
   - *Information:* data that has been summarized or otherwise transformed for use in decision making
2. Hardware vs. software
   - *Hardware* = the machinery and equipment in a computer system
   - *Software* (programs) = the electronic instructions that tell the computer how to perform a task

(*continued*)



3. The basic operations of a computer: All computers use 4 basic operations + communications:

- *Input:* What goes into the computer system
- *Processing:* The manipulation a computer does to transform data into information
- *Storage:*
  - *Primary storage,* or *memory,* is temporary storage for data waiting to be processed
  - *Secondary storage* is permanent storage: media such as hard disk, DVDs, and CDs
- *Output:* What comes out—the results of processing, such as on the screen, printouts, sound
- ***Communications:*** Sending and receiving data

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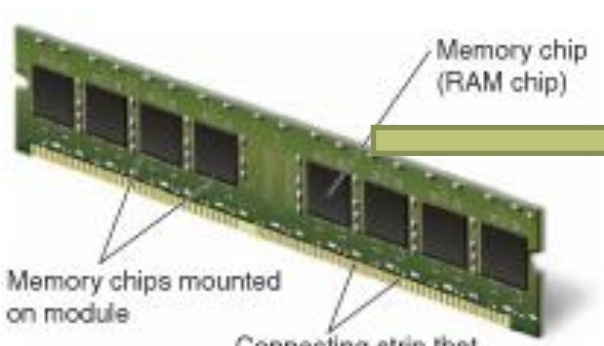
# Customizing a Desktop Computer

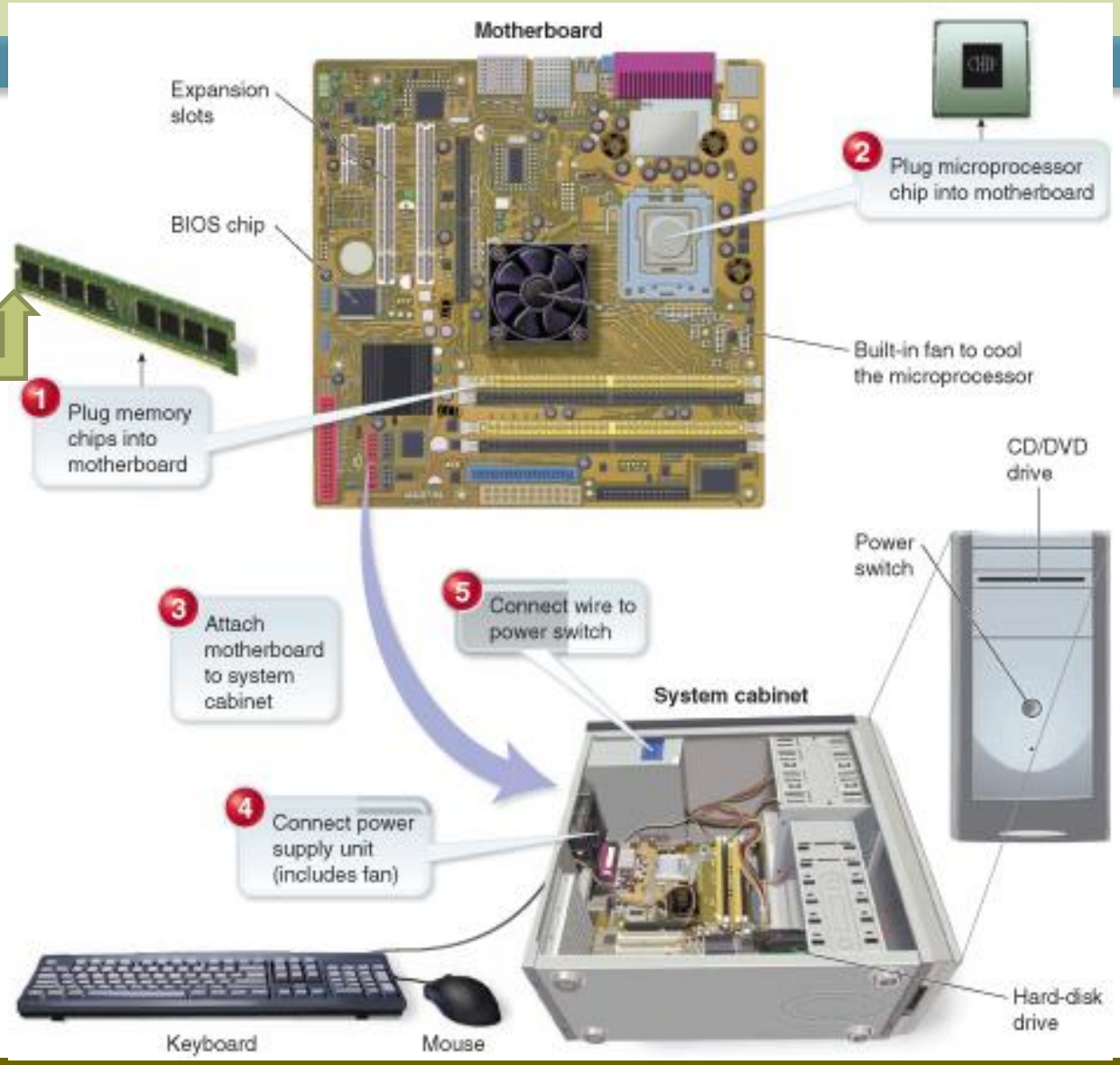
- What would you need?
  - Keyboard & mouse (**input hardware**)
  - Inside the system cabinet (**processing & memory hardware**)

- Case and power supply
- **Processor** chip – the central processing unit (CPU)

- **Memory** chips – random access memory (RAM) or primary storage
- Motherboard – the system board, the main circuit board, with expansion slots to plug in components




**Memory chip**




Putting the components together
Panel 1.8
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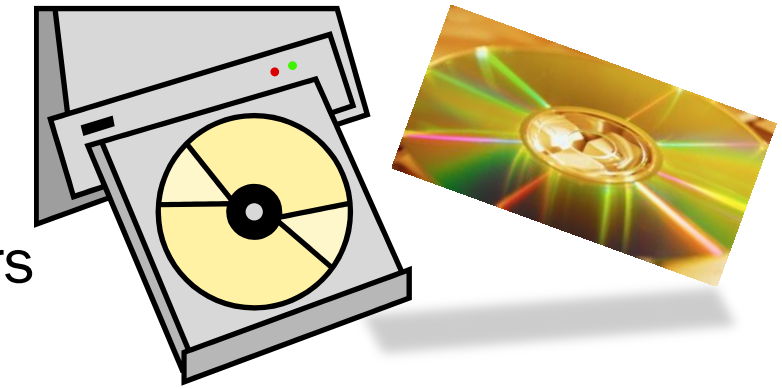
- Storage Hardware: Hard Drive, CD/DVD Drive
  - Storage capacity is represented in bytes
    - 1 byte = 1 character of data
    - 1 kilobyte = 1,024 characters
    - 1 megabyte = 1,048,576 characters
    - 1 gigabyte = over 1 billion characters
    - 1 terabyte = over 1 trillion characters
    - 1 petabyte = about 1 quadrillion characters



- Output hardware

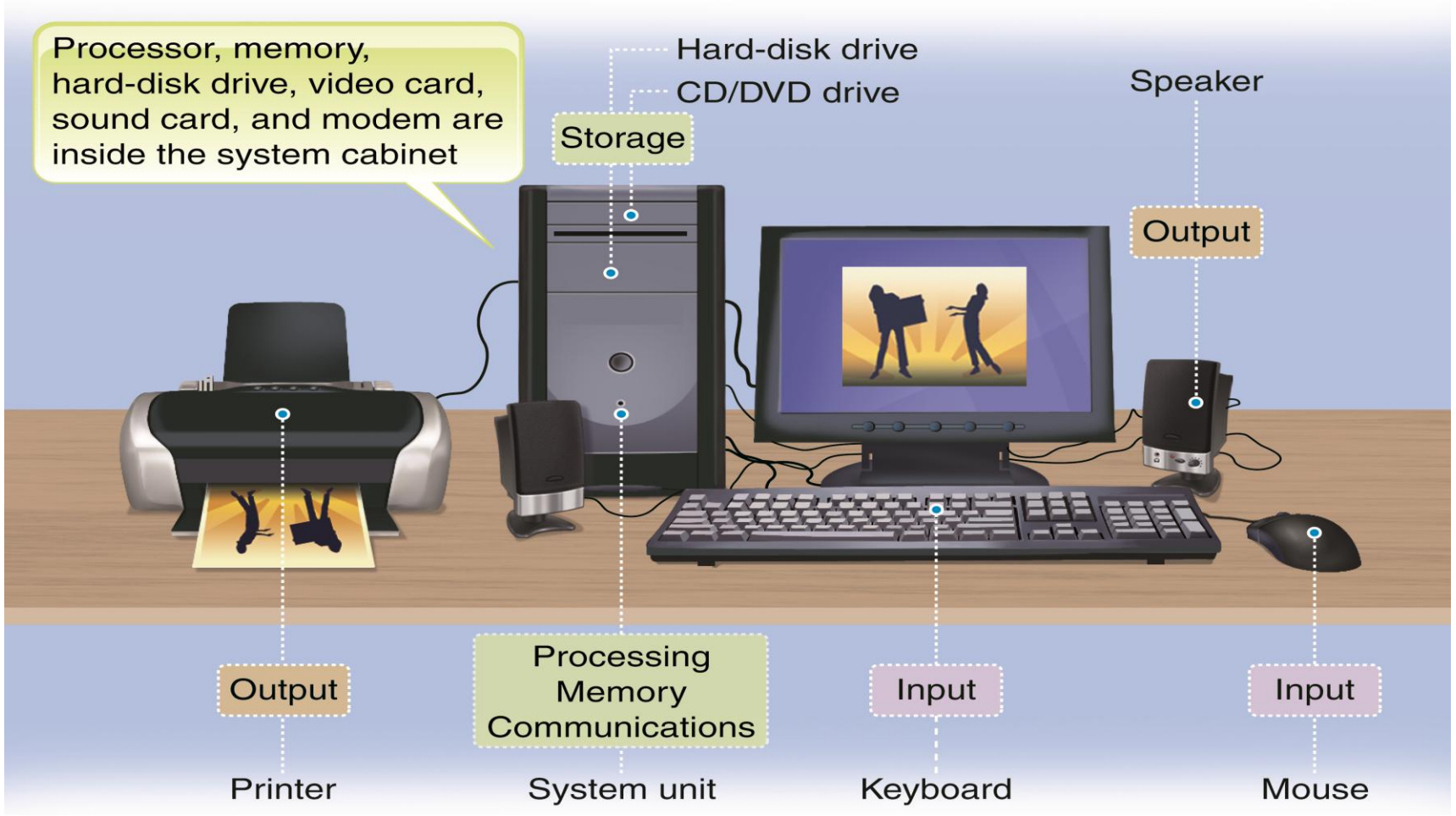
  - Video
  - Sound cards

  - Speakers
  - Monitor

  - Printer

- Communications hardware
  - Modem

# Basic PC System

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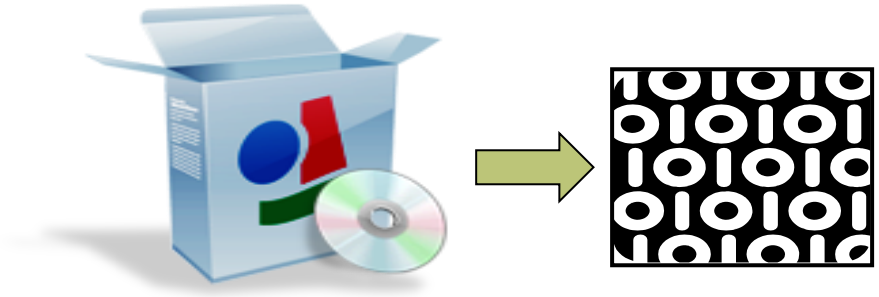
# Software

*Computers use two basic types of software: system software and application software.*

- System Software — enables the computer to perform essential operating tasks and makes it possible for application software to run.
  - Most important part: operating system (OS)
  - Some operating system options
    - Windows
    - Unix
    - Linux
    - Mac OS



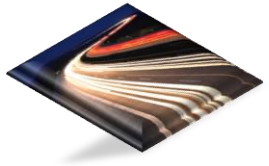
# Software

- Application Software—enables you to perform specific tasks—solve problems, perform work, or entertain yourself.
  - Compatibility: Application software is specific to the system software you use.
    - Linux applications won't work on Windows.
    - Windows applications won't necessarily work on Linux.

# 1.6 Where Is Information Technology Headed?

*Computers are headed in three basic directions—*

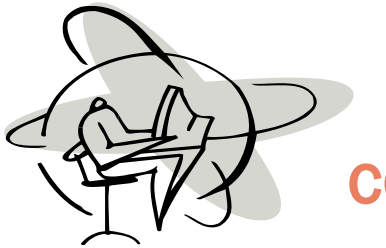
miniaturization,



faster speeds, *and*

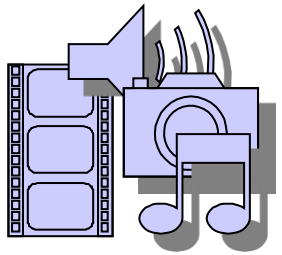
greater affordability

*—and communications are improving*



connectivity,

interactivity, *and support of*



multimedia.

# When Computers & Communications Converge: Five Results

Convergence—combination of several industries

- Computers
- Communications
- Consumer electronics
- Entertainment
- Mass media

1. Portability
2. Personalization
3. Collaboration
4. Cloud computing
5. Artificial intelligence

- **Cloud computing** basically means that instead of storing your software and/or data on your own PC or your own company's computers, you store it on servers on the Internet.
- **Artificial intelligence (AI)** refers to a group of related technologies used for developing machines to emulate human qualities, such as learning, reasoning, communicating, seeing, and hearing. Much of AI is based on the use of **algorithms,** formulas or sets of steps for solving particular problems. AI deals with **Big Data,** data that is so large and complex that it cannot be processed using conventional methods,

# Ethics

*Many important ethical issues are involved in the use of information technology.*

- Ethics is the set of moral values or principles that govern the conduct of an individual or a group.
- 3 ethical considerations resulting from development of IT:
  - Speed & scale affect security and personal privacy
  - Unpredictability—IT can be less predictable and reliable than other technologies
  - Complexity—computer systems can be unmanageable

# Latihan

1. Sebutkan dua **teknologi utama** pengusung Teknologi Informasi
2. Sebutkan lima **kategori komputer** berdasarkan ukurannya, dan masing-masing beri contoh produknya
3. Sebutkan tiga **prinsip dasar** komputer
4. Sebutkan lima **operasi dasar** suatu komputer
5. Sebutkan dua **tipe dasar perangkat lunak**