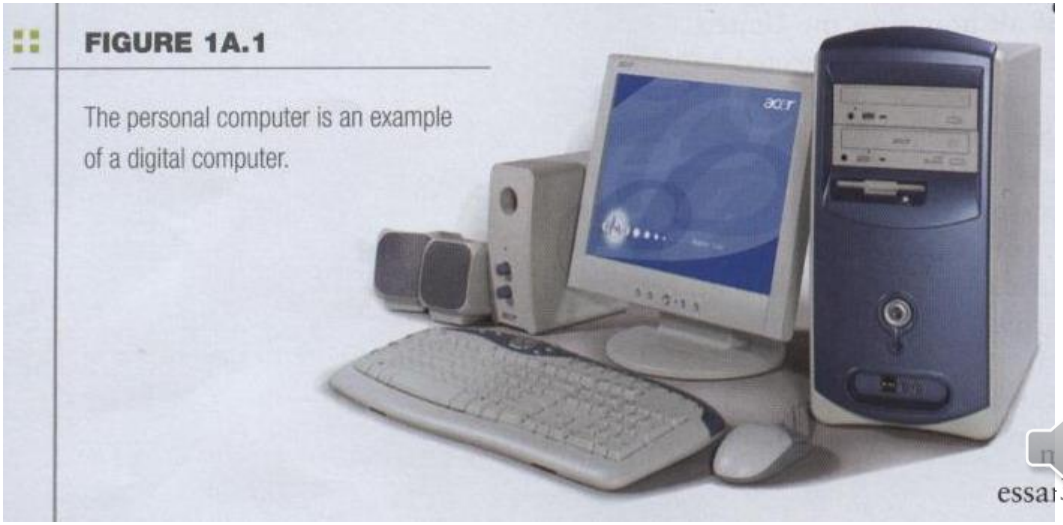
Chapter 01

Introduction to Computer System

- **In these days, a computer is an essential gadget that most people want to have. But it's hard to catch up with new software such as various applications. It's always a thrill to unpack a new computer, but most people hate the process of migrating applications and data. First of all, let's study computer systems.**
  - Gadget : a small piece of equipment that does a particular job

The Computer Defined

- Electronic device
- Converts data into information
- Modern computers are digital
  - Two digits combine to make data (0, 1)



The Computer Defined

- Older computers were analog
  - A range of values made data

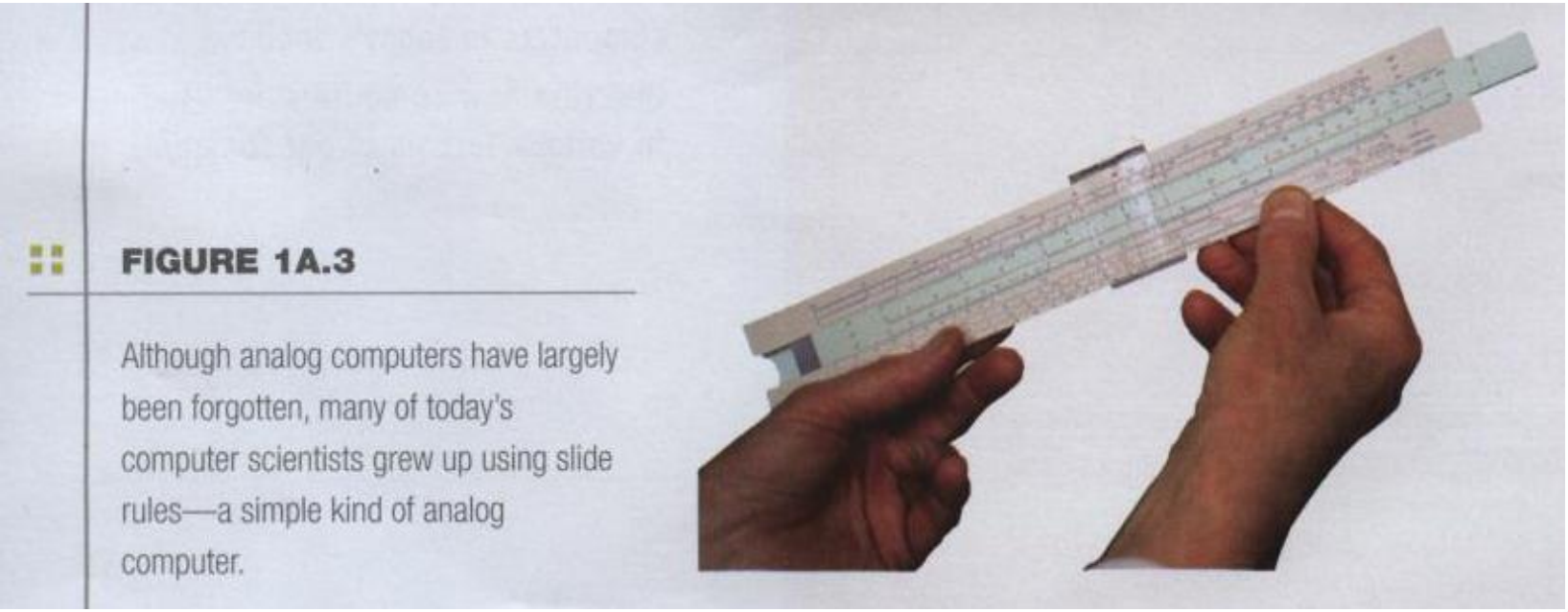


FIGURE 1A.3

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

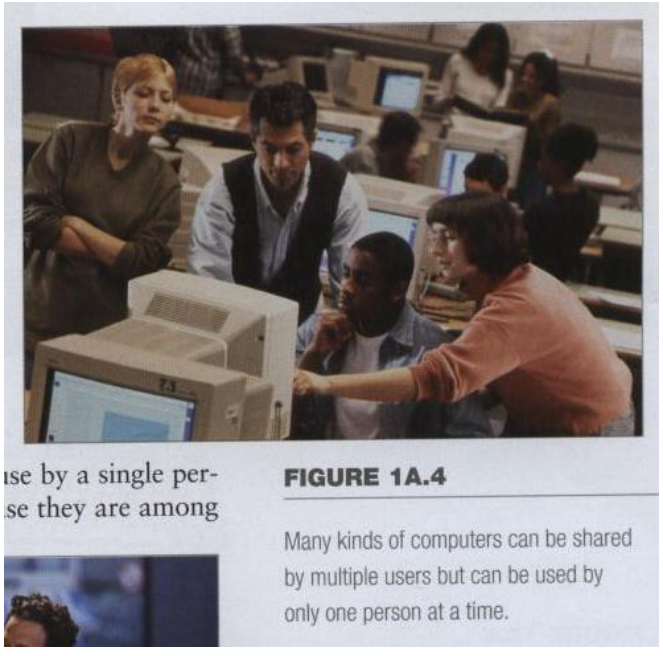
Computers for Individual Use

- Computers can be share d by multiple users

  but can be used by only one person at a time.

- Although PCs are used b y individuals,

  they also can be connect ed together to create net works.



…se by a single per-
…se they are among

FIGURE 1A.4

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

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.

Types of Computer for individuals

- Desktop computers
  - The most common type of computer
  - Sits on the desk or floor
- Notebook computers(laptop)
  - Small portable computers
- Tablet computers
  - Newest development in portable computers
  - Input is through a pen or touch
- Handheld computers, palm computer
  - Very small computers
  - Personal Digital Assistants (PDA)
- Smart phones
  - Hybrid of cell phone and PDA
  - Web surfing, e-mail access

Types of Computer for Organization

- Workstations
  - Specialized computers
  - Optimized for science or graphics
  - More powerful than a desktop

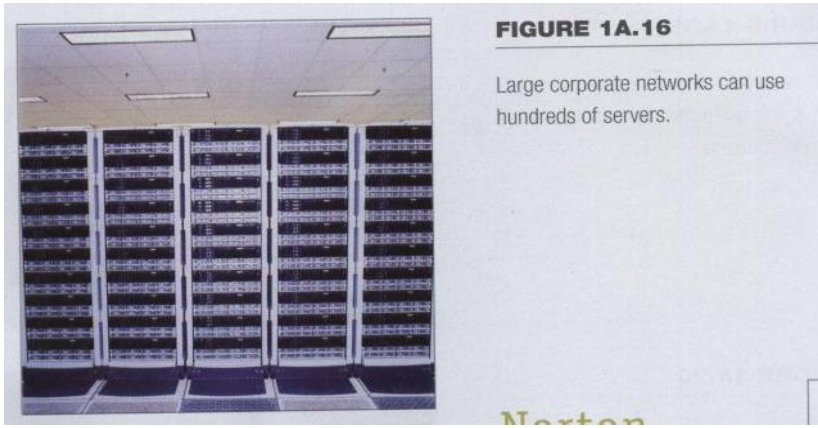


FIGURE 1A.16

Large corporate networks can use hundreds of servers.

- Network servers
  - Centralized computer
  - All other computers connect
  - Provides access to network resources
  - Multiple servers are called server farms
  - Often simply a powerful desktop
  - Flexibility to different kinds of tasks
  - Users use the Internet as a means of connecting even if away from the offices.

Types of Computer for Organization

- Mainframes
  - Used in large organizations
  - Handle thousands of users
  - Users access through a terminal
  - Large and powerful systems

- Supercomputers
  - The most powerful computers made
  - Handle large and complex calculations
  - Process trillions of operations per second
  - Found in research organizations

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

- 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 homes have Internet
  - Computers are used for
    - Communication
    - Business
    - Entertainment
    - Schoolwork
    - Finances

Computers in Society

- Computers in education
  - Computer literacy required at all levels

Norton ONLINE

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

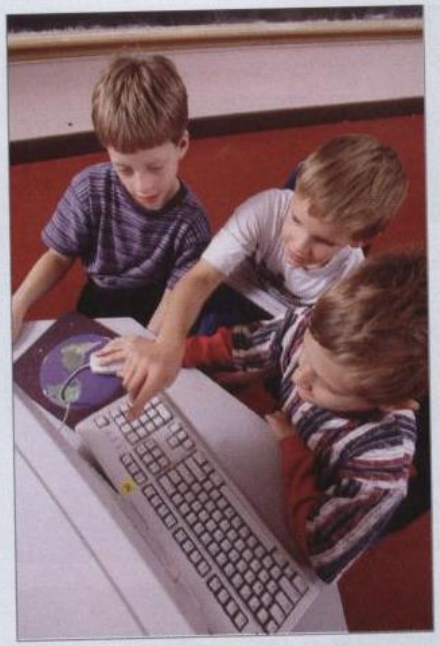


FIGURE 1A.27

Basic computer skills are now being taught to early learners, who quickly pick up mouse and keyboard use.

» **Design.** Nearly any company tha

Computers in Society

- Computers in industry
  - Computers are used to design products
  - Assembly lines are automated
- Computers in government
  - Necessary to track data for population
    - Police officers
    - 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 1A.31

Computers make many health care procedures more accurate and more comfortable for patients.

Section 01 The Definition and History of Computer(1)

The Definition of a Computer 컴퓨터 정의

- A device that accepts data, processes the data in accordance with a stored program, generates results, and usually consists of input, output, storage, arithmetic, logic, and control units.
- A functional unit that can perform computation, including numerous arithmetic operations or logic operations, without human intervention during a run.

Section 01 The Definition and History of Computer(2)

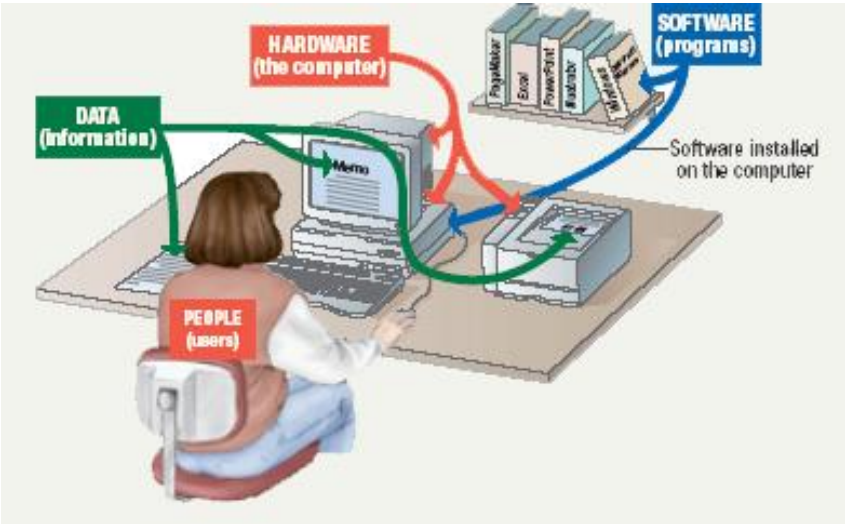
The History of Computer 컴퓨터 역사

- In 1944, the MARK I, composed of mechanical and electrical components, was developed to perform simple arithmetic. And the next models such as ENIAC and UNIVAC were built. Especially, the UNIVAC was the first commercial computer used by the U.S. Census Bureau. However, the vacuum tubes used in those machines generated enormous heat that shortened the life of tubes.
- After 1960s, the technology of the computer devices developed rapidly. The next devices used for computers were transistors and Integrated Circuits (IC). Finally, the microprocessors were adopted for the various computers today.

Section 02 The Structure of Computer(1)

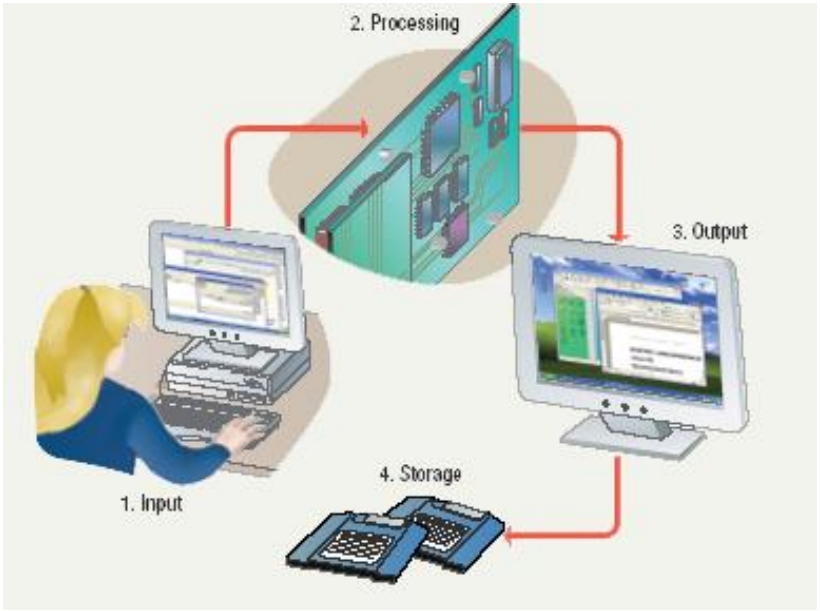
■ The Structure of a Computer 컴퓨터 구조

- A computer is an electronic device used to process data. A computer can convert data into information that is useful to people. A complete computer system includes four distinct parts:
  - Hardware
    - Mechanical devices in the computer
    - Anything that can be touched
  - Software
    - Tell the computer what to do
    - Also called a program
  - Data
    - Pieces of information
    - Computers organize and present data
  - User
    - People operating the computer



Information Processing Cycle

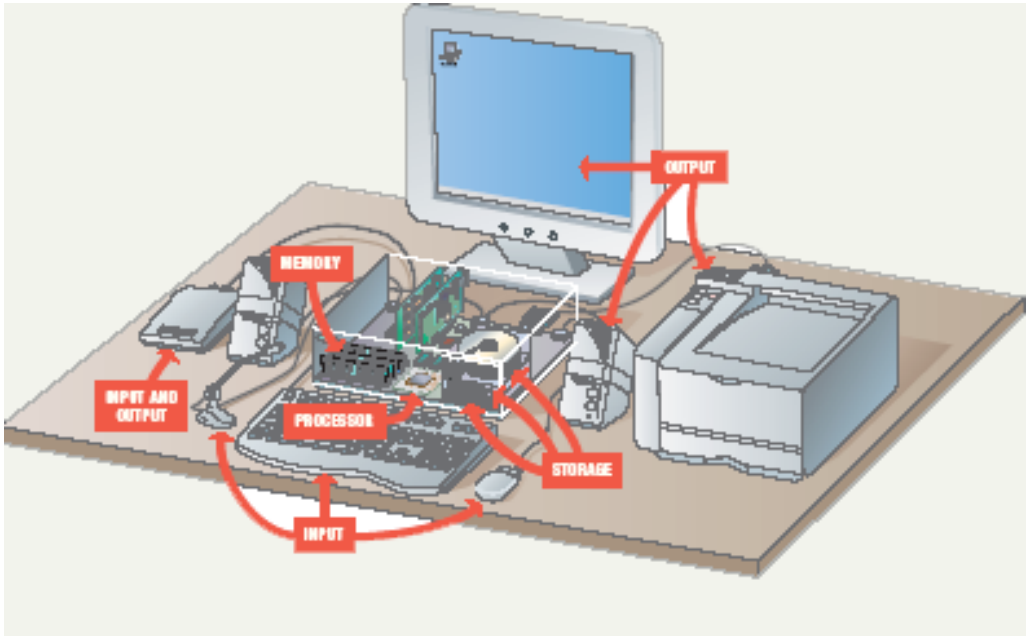
- Steps followed to process data
  - Input
  - Processing
  - Output
  - Storage



Section 02 The Structure of Computer(1)

Hardware 하드웨어

- Computer hardware consists of electronic devices; the parts you can see and touch. The term "device" refers to any piece of hardware used by the computer, such as a keyboard, monitor, mouse, etc.
- Computers use the same basic hardware
- Hardware categorized into four types



Essential Computer Hardware

- Processing devices
  - Central Processing Unit (CPU)
  - Brains of the computer
  - ‘heart’ of the digital computer, responsible for reading a program’s instruction from memory, executing it, and then control input’s and output’s within the machine, the CPU is not usually the memory holding the instruction and the input/output devices.
  - Control unit(CU)
    - Controls resources in computer
    - Instruction set
  - Arithmetic logic unit(ALU)
    - Simple math operations
    - Registers
  - Register
    - Temperary memory

How Computers Process Data

- Machine cycles
  - Steps by CPU to process data
  - Instruction cycle
    - CPU gets the instruction
  - Execution cycle
    - CPU performs the instruction
  - Billions of cycles per second
  - Pipelining processes more data
  - Multitasking allows multiple instructions

Affecting Processing Speed

- The computer's internal clock
  - Quartz crystal
  - Every tick causes a cycle
  - Speeds measured in Hertz (Hz)
    - Modern machines use Giga Hertz (GHz)

Essential Computer Hardware

- Memory devices(Primary Memory)
  - Stores data or programs
  - Small chips on the motherboard
  - More memory makes a computer faster

  - Random Access Memory (RAM)
    - Volatile
    - Stores current data and programs
    - More RAM results in a faster system
  - Read Only Memory (ROM)
    - Permanent storage of programs
    - Holds the computer boot directions

Memory

- Volatile memory
  - Requires power to hold data
  - Random Access Memory (RAM)
    - Vs. Sequencial Acess Memory, Direct Acess Memory
  - Data in RAM has an address
  - CPU reads data using the address
  - CPU can read any address

Essential Computer Hardware

- Storage devices(Secondary Memory)
  - Hold data and programs permanently
  - Different from RAM
  - Holds data when power is off
  - Nonvolatile memory
    - Read Only Memory (ROM)
    - Basic Input Output System (BIOS)

Describing Storage Devices

- Storage terms
  - Media is the material storing data
  - Storage devices manage the media
  - Magnetic devices use a magnet
  - Optical devices use lasers
  - Solid-state devices have physical switches

Magnetic Storage Devices

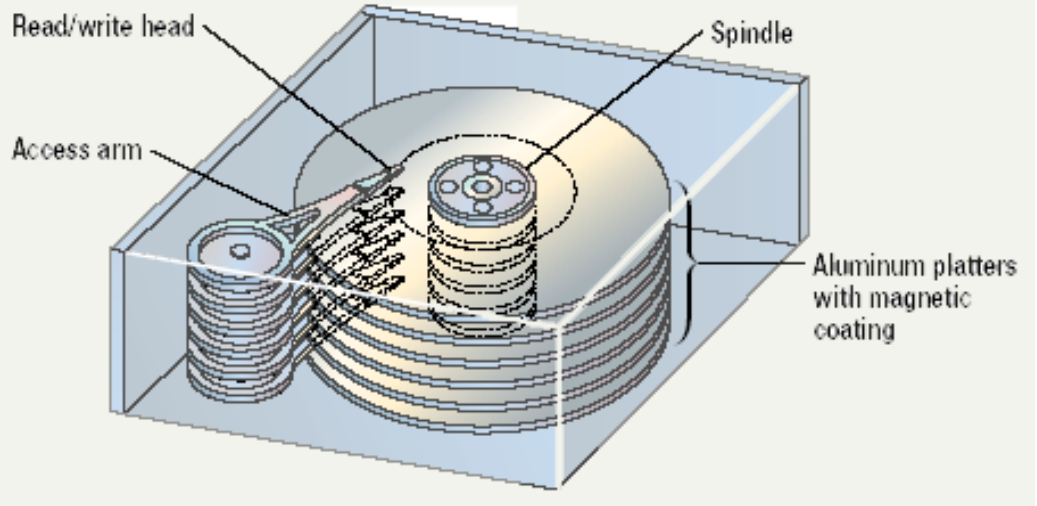
- Most common form of storage
- Hard drives, floppy drives, tape
- All magnetic drives work the same

Magnetic Storage Devices

- Data storage and retrieval
  - Media is covered with iron
  - Read/write head is a magnet
  - Magnet writes charges on the media
    - Positive charge is a 1
    - Negative charge is a 0
  - Magnet reads charges
  - Drive converts charges into binary

Magnetic Storage Devices

- Hard disks
  - 2 or more aluminum platters
  - Each platter has 2 sides
  - Spin between 5,400 to 15,000 RPM
  - Data found in 9.5 ms or less



Magnetic Storage Devices

- Tape drives
  - Best used for
    - Infrequently accessed data
    - Back-up solutions
  - Slow sequential access

- Diskettes
  - Also known as floppy disks
  - Read with a disk drive

Optical Storage Devices

- CD-ROM
  - Read using a laser
    - Lands, binary 1, reflect data
    - Pits scatter data
  - Written from the inside out
  - CD speed is based on the original
  - Standard CD holds 650 MB

- DVD-ROM
  - Digital Video Disk
  - Use both sides of the disk
  - Capacities can reach 18 GB

Solid State Devices

- Flash memory
  - Found in cameras and USB drives
  - RAM

- Data is stored physically
- No magnets or laser
- Very fast

Solid State Devices

- Solid-state disks
  - Large amount of SDRAM
  - RAM
  - Non volatile storage
  - Extremely fast

Affecting Processing Speed

- Virtual RAM
  - Computer is out of actual RAM
  - File that emulates RAM
  - Computer swaps data to virtual RAM
    - Least recently used data is moved

Affecting Processing Speed

- The bus
  - Electronic pathway between components
  - Expansion bus connects to peripherals
  - System bus connects CPU and RAM
  - Bus width is measured in bits
  - Speed is tied to the clock

Affecting Processing Speed

- Cache memory
  - Very fast memory
  - Holds common or recently used data
  - Speeds up computer processing
  - Most computers have several caches
  - L1 holds recently used data
  - L2 holds upcoming data
  - L3 holds possible upcoming data

Essential Computer Hardware

- Input and output devices
  - Allows the user to interact
  - Input devices accept data
    - Keyboard, mouse
  - Output devices deliver data
    - Monitor, printer, speaker
  - Some devices are input and output
    - Touch screens

How Computers Represent Data

- Number systems
  - A manner of counting
  - Several different number systems exist
- Decimal number system
  - Used by humans to count
  - Contains ten distinct digits
  - Digits combine to make larger numbers

How Computers Represent Data

- Binary number system
  - Used by computers to count
  - Two distinct digits, 0 and 1
  - 0 and 1 combine to make numbers

How Computers Represent Data

- Bits and bytes
  - Binary numbers are made of bits
  - Bit represents a switch
  - A byte is 8 bits
  - Byte represents one character

How Computers Represent Data

- Text codes
  - Converts letters into binary
  - Standard codes necessary for data transfer
  - ASCII
    - American English symbols
  - Unicode
    - All languages on the planet

Section 02 The Structure of Computer(2)

Software 소프트웨어

- Software, also called programs, consists of organized sets of instructions for controlling the computer. ① Some programs exist for the computer's use, to help it manage its own tasks and devices. ② Other programs exist for the user, and enable the computer to perform tasks for you, such as creating documents.

- Tells the computer what to do

- Two types
  - System software
  - Application software

Software Runs the Machine

- System software
  - System software is software designed to provide a platform for other software
    - Operating system
    - Development tools such as compiler, debugger.

Software Runs the Machine

- Application software
  - software that allows users to do user-oriented tasks such as create text documents, play games, listen to music, or browse the web are collectively
  - Accomplishes a specific task
  - Covers most common uses of computers

Section 02 The Structure of Computer(2)

Data 데이터

- Data consists of raw facts, which the computer can manipulate and process into information that is useful to people. Computerized data is digital, meaning that it has been reduced to digits. The computer stores and reads all data as numbers. Although computers use data in digital form, they convert data into forms that people can understand.

- Fact with no meaning on its own
- Stored using the binary number system
- Data can be organized into files

Section 02 The Structure of Computer(3)

User 사용자

- People are the computer operators, or users. Some types of computers can operate without much intervention from people, but personal computers are designed specifically for use by people.

- Role depends on ability
  - Setup the system
  - Install software
  - Manage files
  - Maintain the system
- "Userless" computers
  - Run with no user input
  - Automated systems

Section 04 Self Check

- The computer monitor is an output device that is part of your computer's display system. A cable connects the monitor to a video adapter (video card) that is installed in an expansion slot on your computer's motherboard. This system converts signals into text and pictures and displays them on a TV-like screen (the monitor).

- The various connectors and ports on the computer allow it to communicate with many different devices and peripherals attached. Because there are so many cables and cords attached to the back of the computer, and so many different types of connectors, it often seems a little intimidating to newer users. Although there are some devices which may use the same connector or port, the individual devices and their cords can only physically attach to one certain type of connector; so don't feel nervous about hooking your system together.

Section 05 Practical English(1)

"I'm using Hotmail, but my hands are still cold."

응용문장

- I 'm using a heater, but my hands are still cold.
- You're using a heater, but my legs are cold.

Section 05 Practical English(2)

"My screen is hard to read. Can I have a bigger monitor?"

응용문장

- It's easy to read.
- Can I have a hamburger?

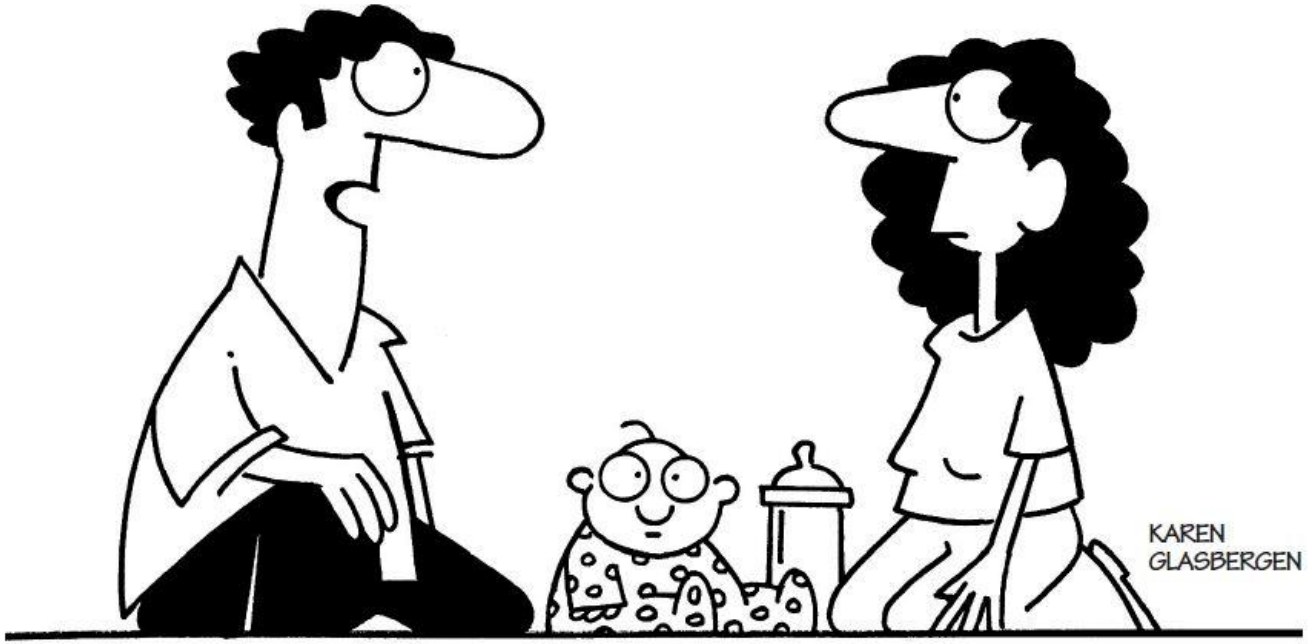
Section 05 Practical English(3)

"I looked up your symptoms on Google.
If you want a second opinion, I can check Yahoo."

응용문장

- On a second opinion, I caught a cold and I cannot go with you right now.
- Without a second thought, I can't wait for it!

Section 05 Practical English(4)



"I think he's ready to start using the computer.
He just said 'Google'!"

응용문장

- We are ready to study the C programming language.
- We are willing to study the C programming language.
- We are prepared for studying the C programming language.

Section 05 Practical English(5)

"Of course I brought it with me
- I still have 250 unused minutes!"

응용문장

- Bring it to me!
- I have a 20 gigabytes hard disk space in my computer.

Section 05 Practical English(6)

"You should turn off your cell phone on a date, especially if it's smarter and cooler than you are."

Section 05 Practical English(7)

"I love reading. I read about 3 hours a day.

My favorite book is Facebook"

Reference

- 쉬운 영어로 읽는 초신 전산 영어/조준모/한빛아카데미
- Peter Norton's Introduction to Computer/Peter Norton/the McGrawHill