普通高等教育“十一五”国家级规划教材 计算机系列教材

计算机英语实用教程

（第四版）

刘兆毓 郑家农 编著

清华大学出版社

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内 容 简 介

本书是用英文编写的、按计算机知识结构的层次组成的计算机技术教材，书中内容涉及计算机的技术基础、系统和应用等各个方面。本书由4部分组成：计算机和网络基础、因特网及其应用、程序设计和计算机应用。全书共13章，46节。

书中对一些较难翻译和理解的句子和词语进行了注释；每一节后面列出了关键词汇，给出了练习题，以提高读者阅读计算机英文资料和文献的水平。书后附有参考译文，供读者学习时参考。

本书可供大专院校学生使用，也可供参加计算机水平考试的考生和广大工程技术人员参考。

图书在版编目（CIP）数据

计算机英语实用教程/刘兆毓，郑家农编著．—4版．—北京：清华大学出版社，2010.9
（计算机系列教材）
ISBN 978-7-302-22797-7

Ⅰ．①计…　Ⅱ．①刘…　②郑…　Ⅲ．①电子计算机－英语－高等学校－教材
Ⅳ．①H31

中国版本图书馆CIP数据核字(2010)第095876号

责任编辑：袁勤勇
责任校对：时翠兰
责任印制：杨　艳

出版发行：清华大学出版社　　**地　　址**：北京清华大学学研大厦A座
http://www.tup.com.cn　　**邮　　编**：100084
社　总　机：010-62770175　　**邮　　购**：010-62786544
投稿与读者服务：010-62795954，jsjjc@tup.tsinghua.edu.cn
质　量　反　馈：010-62772015，zhiliang@tup.tsinghua.edu.cn
印 装 者：北京国马印刷厂
经　　销：全国新华书店
开　　本：185×260　　**印　　张**：16.75　　**字　　数**：391千字
版　　次：2010年9月第4版　　**印　　次**：2010年9月第1次印刷
印　　数：1～3000
定　　价：25.00元

产品编号：035291-01

普通高等教育“十一五”国家级规划教材　计算机系列教材　编委会

EDITORS

前　言

本书是《计算机英语(第四版)》(2009 年 7 月清华大学出版社出版,ISBN:978-7-302-20063-5)的压缩版本,内容主要是计算机及网络基础知识和基本应用技术,适合于学时数较少的情况下使用。

本书出版后,将提供电子演示文稿供教师和读者使用。

本书由刘兆毓和郑家农等编著。全书共 13 章,分为 46 节,其中郑家农编写了第 8 章、第 11 章、第 12 章和第 13 章,武华编写了第 7 章和第 9 章,闫金平编写了第 2 章和第 10 章,栗琳红编写了第 3 章和第 4 章,刘华群编写了第 1 章;刘兆毓编写了第 5 章和第 6 章,刘兆毓和郑家农负责全书的统稿。

由于作者水平有限,书中难免有不当之处,敬请读者批评指正。

编　者

2010 年 1 月于北京

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PART Ⅰ

BASICS OF COMPUTER AND NETWORK

CHAPTER 1 COMPUTER HARDWARE

1.1 COMPUTER ORGANIZATION

We build computer to solve problems. Early computers solved mathematical and engineering problems, and later computers emphasized information processing for business applications. Today, computers also control machines as diverse as automobile engines, robots, and microwave ovens. A computer system solves a problem from any of these domains by accepting input, processing it, and producing output. Fig. 1-1 illustrates the function of a computer system.

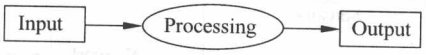

Fig. 1-1 Three activities of a computer system

Computer systems consist of hardware and software. Hardware is the physical part of the system. Once designed, hardware is difficult and expensive to change. Software is the set of programs that instruct the hardware and is easier to modify than hardware. Computers are valuable because they are general-purpose machines that can solve many different kinds of problems, as opposed to special-purpose machines that can each solve only one kind of problem. [1] Different problems can be solved with the same hardware by supplying the system with a different set of instructions, that is, with different software.

Every computer has four basic hardware components:

- Input devices.
- Output devices.
- Main memory.
- Central processing unit(CPU).

Fig. 1-2 shows these components in a block diagram. The lines between the blocks represent the flow of information flows from one component to another on the bus, which is simply a group of wires connecting the components. [2] Processing occurs in the CPU and main memory. The organization in Fig. 1-2, with the components connected to each other by the bus, is common. However, other configurations are possible as well.

An arbitrary desktop computer(not necessarily a PC) is shown in Fig. 1-3. It has a large main memory to hold the operating system, applications, and data, and an interface to mass storage devices(disks and DVD/CD-ROMs). It has a variety of I/O devices for user input(keyboard, mouse, and audio), user output(display interface and audio), and connectivity(networking and peripherals). The fast processor requires a system manager to monitor its core temperature and supply voltages, and to generate a system reset.

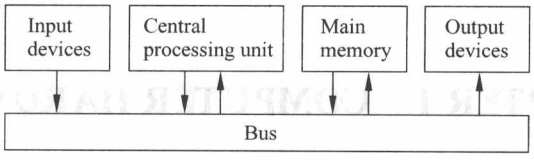

Fig. 1-2 Block diagram of the four components of a computer system

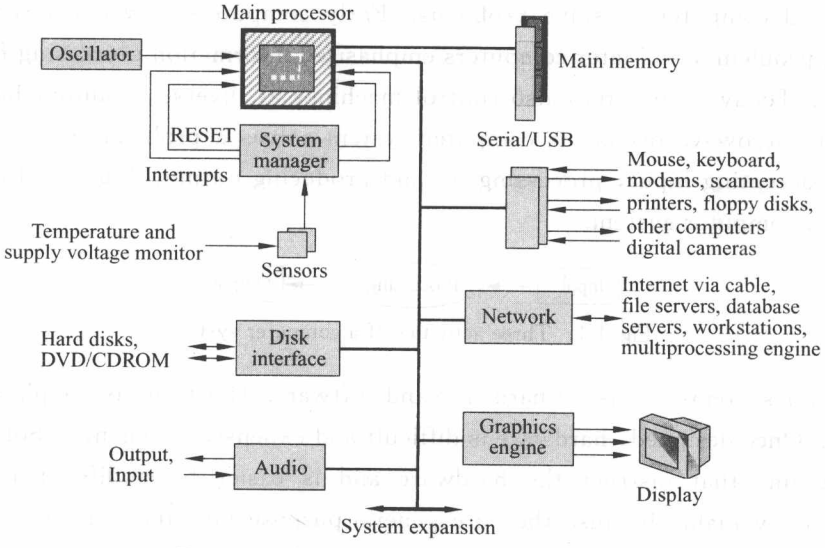

Fig. 1-3 Block diagram of a generic computer

Computer hardware is often classified by its relative physical size:

- Small microcomputer.
- Medium minicomputer.
- Large mainframe.

Just the CPU of a mainframe often occupies an entire cabinet. Its input/output (I/O) devices and memory might fill an entire room. Microcomputers can be small enough to fit on a desk or in a briefcase. As technology advances, the amount of processing previously possible only on large machines becomes possible on smaller machines. Microcomputers now can do much of the work that only minicomputers or mainframes could do in the past.

The classification just described is based on physical size as opposed to storage size. A computer system user is generally more concerned with storage size, because that is a more direct indication of the amount of useful work that the hardware can perform.[3] Speed of computation is another characteristic that is important to the user. Generally speaking, users want a fast CPU and large amounts of storage, but a physically small machine for the I/O devices and main memory.

NOTES

[1] 长句。主要部分是 because 引导的原因状语从句,该从句由 as opposed to...分开的两部分组成,每

部分都有一个 that 引导的定语从句。

[2] 总线不仅仅是一组线缆，它还包括一些逻辑电路。此处是一种形象的说法，有关总线的概念请见本章 1.5 节。本句中 the flow of information 被后面的 flows from...省略 that 的定语从句修饰；which 引导的是非限定性定语从句。

[3] because 引导的是原因状语从句；句子后面的 that 引导的是定语从句，修饰 work。

KEYWORDS

computer	计算机
information processing	信息处理
hardware	硬件
software	软件
program	程序
general-purpose machine	通用(计算)机
special-purpose machine	专用(计算)机
instruction	指令
set of instruction	指令集，指令系统
input device	输入设备
output device	输出设备
input/output(I/O)	输入/输出
main memory	主存储器
central processing unit (CPU)	中央处理器
bus	总线
microcomputer	微型计算机
minicomputer	小型计算机
mainframe	主机，特大型机
desktop computer	台式计算机
personal computer(PC)	个人计算机
operating system	操作系统
disk	磁盘
Digital Video Disk(DVD)	数字视(频光)盘
Compact Disk Read-Only Memory(CD-ROM)	光盘只读存储器
keyword	键盘
mouse	鼠标
audio	声(音)频的，声音的
interface	接口
peripheral	外围，外围设备
monitor	监视，监视器
reset	复位

EXERCISES

1. Multiple choices.

(1) A large main memory can be used for storing _____.

a. data　　b. operating system　　c. applications　　d. interface

(2) Early computer solved _____ problems.

a. control b. business applications c. engineering d. mathematical

(3) The system manager used by a fast processor can _____.

a. reset a system b. monitor processor's core temperature

c. monitor processor's supply voltages d. connect a network

(4) We can say a bus is simply _____.

a. a group of wires b. a wire c. a 8-bit bus d. a 16-bit bus

(5) A computer system user generally more cares for _____.

a. physical size of the computer b. storage size

c. speed of computation d. efficiency of the computer

(6) According to the physical size of computers we can classify the computers into _____.

a. microcomputer b. minicomputer c. mainframe d. supercomputer

(7) The basic hardware components of any computer include _____.

a. CPU b. main memory c. input devices d. output devices

(8) The following devices are belong to the mass storages _____.

a. DVD b. CD-ROM c. mouse d. disk

2. Fill in the blanks with appropriate words or phrases found behind this exercise.

(1) A computer system solves a problem by _____.

(2) The amount of effective work of a computer can be indicated by _____ directly.

(3) Computer systems consist of _____.

(4) Computer that can solve only one kind of problem is a _____.

(5) Computer that can solve many different kinds of problems is a _____.

(6) _____ instruct the hardware.

(7) _____ is difficult and expensive to change.

(8) We usually show the computer components in a _____.

a. general-purpose machine

b. hardware

c. accepting input, processing problem, and producing output

d. block diagram

e. software

f. storage size

g. special-purpose machine

h. hardware and software

1.2 WHAT IS A PROCESSOR

A processor is a functional unit that interprets and carries out instructions. Every processor comes with a unique set of operations such as ADD, STORE, or LOAD that represent the processor's instruction set. Computer designers are fond of calling their computers machines, so the instruction set is sometimes referred to as machine instructions and the binary language in which they are written is called machine language![1] You shouldn't confuse the processor's instruction set with the instructions found in high-level programming languages, such as BASIC or Pascal.[2]

An instruction is made up of operations that specify the function to be performed and operands that represent the data to be operated on. For example, if an instruction is to perform the operation of adding two numbers, it must know (1) what the two numbers are and (2) where the two numbers are. When the numbers are stored in the computer's memory, they have their addresses to indicate where they are. So if an operand refers to data in the computer's memory it is called an address. The processor's job is to retrieve instructions and operands from memory and to perform each operation. Having done that, it signals memory to send it the next instruction.

This step-by-step operation is repeated over and over again at awesome speed. A timer called a clock releases precisely timed electrical signals that provide a regular pulse for the processor's work. The term that is used to measure the computer's speed is borrowed from the domain of electrical engineering and is called a megahertz (MHz), which means million cycles per second. For example, in an 8MHz processor, the computer's clock ticks 8 million times to every 1 second tick of an ordinary clock.

A processor is composed of two functional units—a control unit and an arithmetic/logic unit—and a set of special workspaces called registers.

Fig. 1-4 depicts its structure, in which the Internal CPU Interconnection provides communication among the Control Unit, ALU, and register.

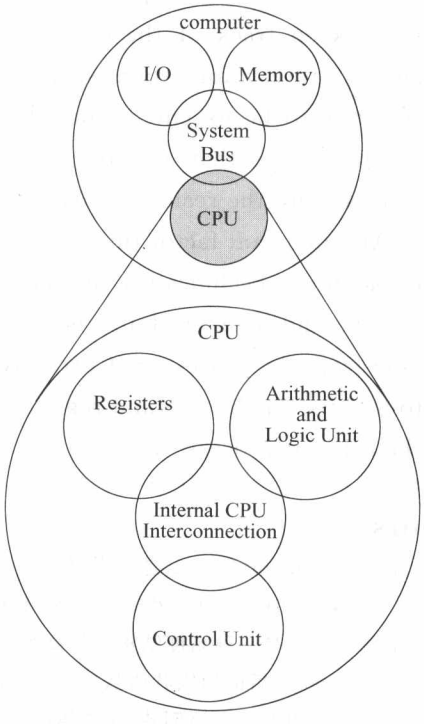

Fig. 1-4 The Central Processing Unit (CPU)

1. The Control Unit

The control unit is the functional unit that is responsible for supervising the operation of the entire computer system. In some ways, it is analogous to a telephone switch-board with intelligence because it makes the connections between various functional units of the computer system and calls into operation each unit that is required by the program currently in operation. [3]

The control unit fetches instructions from memory and determines their types or decodes them. It then breaks each instruction into a series of simple small steps or actions. By doing this, it controls the step-by-step operation of the entire computer system.

2. The Arithmetic and Logic Unit

The arithmetic and logic unit (ALU) is the functional unit that provides the computer with logical and computational capabilities. Data are brought into the ALU by the control

unit, and the ALU performs whatever arithmetic or logic operations are required to help carry out the instruction. [4]

Arithmetic operations include adding, subtracting, multiplying, and dividing. Logic operations make a comparison and take action based on the results. For example, two numbers might be compared to determine if they are equal. If they are equal, processing will continue; if they are not equal, processing will stop.

3. Registers

A register is a storage location inside the processor. Registers in the control unit are used to keep track of the overall status of the program that is running. Control unit registers store information such as the current instruction, the location of the next instruction to be executed, and the operands of the instruction. In the ALU, registers store data items that are added, subtracted, multiplied, divided, and compared. Other registers store the results of arithmetic and logic operations.

An important factor that affects the speed and performance of a processor is the size of the registers. Technically, the term word size (also called word length) describes the size of an operand register, but it is also used more loosely to describe the size of the pathways to and from the processor. Currently, word sizes in general purpose computers range from 8 to 64 bits. If the operand registers of a processor are 16 bits wide, the processor is said to be a 16 bit processor.

NOTES

[1] be fond of doing...是短语"乐于……,喜欢……";call computers machines 意为"把计算机称为机器"。句中 so that 引导的是结果状语从句,in which 引导的是定语从句,修饰 language。

[2] Pascal 是一种高度结构化的高级程序设计语言。

[3] because 后的原因状语从句,由 makes 和 calls 带出的两个并列分句组成。calls into operation each unit 中的双宾语倒装,正常语序为 calls each unit into operation。原意为"传唤各部件进行操作",这里指微操作,实际上是指"完成微操作"。

[4] 这是一个 and 连接的并列句。后一个分句中的 whatever 是关系代词,引导后面的宾语从句。

KEYWORDS

instruction	指令
instruction set	指令系统,指令集
processor	处理器
operation	操作、操作码、操作码指令
operand	操作数
register	寄存器
clock	时钟
megahertz (MHz)	兆赫
control unit	控制器,控制部件
decode	译码,解码