华东高校计算机基础教育研究会推荐教材

EASY ACCESS TO COMPUTER ENGLISH

◎黄亚平 主编

计算机专业英语

东南大学出版社
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高职高专教材系列

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东南大学出版社(南京)
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内 容 提 要

本书结合计算机专业基础课程和专业课程教学,将全书分为硬件知识、软件知识、网络知识和综合知识四个单元。在内容安排上力求从基础到专业,从基本知识到新技术、新知识。所选内容既有基础理论,又尽量反映当今的热点与新技术。目的是扩大学生的计算机专业英语词汇和术语,使学生不断提高计算机科技文献的阅读理解水平并掌握基本的科技英语翻译技巧,为今后进一步阅读计算机科技文献和学习计算机知识打下基础。

本教材可作为高职高专院校计算机及相关专业的英语教材,也可作为广大计算机应用专业技术人员和其他专业人员的参考用书。

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序

为了适应我国高校面向21世纪计算机基础教育的发展和需要，华东高校计算机基础教育研究会于1998年11月在浙江金华召开了理事扩大会，对高校计算机基础教育的教材建设问题进行了专题研讨。会议认为，华东地区经济发达、科教先进，高校多达300余所，而现有的计算机基础教育的教材建设与现有的地区优势极不相符。80年代中期华东高校计算机基础教育研究会曾组织出版过一批深受读者欢迎的计算机教材。面对当前计算机科学与技术的飞速发展，计算机基础教育已成为理、工、农、医、商、经民政治、文化、艺术等各行各业的公共基础教育。培养大批掌握计算机科学知识与应用技能的跨世纪高级人才，已成为历史赋予高校的一项重要任务。为此，加强高校计算机基础教材建设已提到重要议事日程，学会决定组织力量，编写一套面向21世纪的、适应高校计算机基础教学需要的新教材，推动华东高校计算机教育事业的发展。

学会于1999年1月在南京召开了华东地区高校计算机基础教育教材编委会第一次会议，编委会由浙江大学、上海交通大学、东南大学、同济大学、华东理工大学等知名高校的专家学者及上海交通大学出版社、东南大学出版社、中国水利水电出版社的代表共同组成。学会特邀中国工程院院士、浙江大学校长潘云鹤教授和中国工程院院士、东南大学校长顾冠群教授担任编委会名誉主任；由学会会长张森教授任编委会主任，学会副会长李文忠教授任编委会副主任，学会秘书长赵民德兼编委会秘书长。编委会汇集了浙江大学、上海交通大学、东南大学、复旦大学、华东师范大学等数十所院校长期从事高校计算机基础教育、有丰富教学实践经验的资深教师共同研讨，确定编写“华东高校计算机基础教育教材”第一批教材计21种，由上海交通大学出版社、东南大学出版社、中国水利水电出版社分别负责出版

发行，并作为华东高校计算机基础教育研究会的推荐教材面向大专院校。

教材是教学过程中的“一剧之本”，是当前高校计算机教学的首要问题。在编委会的领导下，经过参编教师的辛勤劳动和三家出版社的共同努力，编写及出版工作进展顺利，预计2000年可全部推出。第二批教材的组织准备工作正在进行中。

三家出版社联合策划、分工协作、联合出版、联合发行，在华东乃至全国还是首创，得到了教师和同行们的赞赏。

教材建设是一项长期艰巨的系统工程，尤其是计算机科学技术发展迅速，更新快，因此，教学内容就要不断更新。为使教材更新跟上科学技术的发展，本会将密切注视计算机科学技术的发展新动向，使我们的教材编写不断推陈出新，逐步与国际接轨，不断提高教材质量，为华东高校计算机基础教育的教材建设作出应有的贡献。

华东高校计算机基础教育研究会

1999年10月

华东高校计算机基础教育研究会

教材编委会名单

前　言

计算机技术日新月异，大量的新思想、新概念、新知识和新技术通过互联网及各种渠道不断涌现。计算机英语对学习计算机新知识和新技术有着重要作用，所以了解和掌握更多、更新的计算机专业词汇，学习计算机专业英语也就成为一种迫切的需要。

本书编写的特点是：选材新颖、广泛；课文难度适当，章节安排合理，专业知识介绍有较好的系统性。全书分为硬件、软件、网络和综合四个单元，共28篇课本。这些课文分别介绍了计算机的基本组成、RISC & CISC新技术、操作系统、程序设计、算法、数据结构、信息管理系统、网络、互联网、电子商务、网络管理、计算机安全、开放教育与远程教育、办公自动化、图形学和图像处理等内容。每课的内容主要有一篇主课文、配套练习和一篇阅读材料。课文后有词汇表及注释，以帮助读者理解。在学习每课后，掌握一些必要的和常用的计算机专业英语词汇，再进行词汇练习、阅读理解和英汉翻译练习，从而不断提高计算机专业英语的阅读与理解能力，并且每课都有相应的参考译文和练习参考答案。根据科技英语的特点，本教材还专门在每单元后结合实例配有语法讲解，共分四讲——计算机专业英语中的词汇、计算机专业英语中的长句处理、科技英语中的句法特点和科技英语中常用的翻译方法与技巧，这为提高学生的阅读理解水平并掌握一般的科技英语翻译方法作了基本的讲解。本书可作为高职高专院校计算机及相关专业的英语教材，也可作为广大计算机应用专业技术人员和其他专业人员的参考用书。

全书可用60～70学时讲授。也可由教师根据课时安排情况，节选相关内容的课文，进行有重点的教学。

本书由黄亚平老师主编，并担任其中网络部分和词汇表(附录1、附录2)的编写工作及标注音标和统稿工作，卜艳萍老师编写硬件部分，施一萍老师编写软件部分，赵巍老师编写综合部分。编者在此对本书的编写和出版过程中给予大力支持的顾元刚老师和张煦老师表示衷心的感谢。

由于编者的水平和经验有限，难免会有错误和不足之处，请读者批评指正。

编　者

2001年9月

CONTENTS

PART ONE HARDWARE KNOWLEDGE

Lesson 1 Hardware Basics

Computer Systems

A computer is a fast and accurate symbol manipulating system that is organized to accept, store, and process data and produce output results under the direction of a stored program of instructions.

A complete computer set is a system that basically includes the following five key parts: the processor, the memory, and the Input / Output (I/O), disk storage, and the programs.

The processor is the "brains" of the computer that has the ability to carry outour instructions or programs given to the computer. The processor is the part that knows how to add and subtract and to carry out simple logical operations. In a big mainframe computer the processor is called a Central Processing Unit, or CPU, while in a microcomputer, it is usually known as a microprocessor.

The memory is the computer's work area and nothing like our own memory, so the term can be misleading. The computer's memory is where all activity uakes place. The size of a computer's memory sets a practical limit on the kinds of work that the computer can undertake.

I/O are all the means that the computer uses to take in or out data. It includes input that we type in on the keyboard and output that the computer shows on the video display screen or prints on the printer. Every time the computer is taking in or putting out data, it's doing I/O using I/O devices, which is also called peripheral devices.

Disk storage, in fact, is a very important kind of I/O where the computer keeps its data when it's not in use inside the computer's memory.

Programs are the sets of instructions that make the computer go. Programs are the hardest part of computer work as only programs will bring a computer to life and turn it into a powerful working equipment.

Computers are currently classified into two kinds: digital and analog.

A digital computer is a counting device that operates on discrete data. It operates by directly counting numbers (or digits) that represent numerical numbers, letters, or other special symbols. Digital processors count discrete values in the form of numbers to achieve the desired output results.

An analog computer, however, deals with variables that are measured on a continuous scale and are recorded to some predetermined degree of accuracy. Analog computer systems are frequently used to control processes.

The analog processors obviously perform important specialized tasks. But the overwhelming majority of all computers currently in use are digital ones.

Logic Circuits

The key part of the computer's internal operations is done in the form known to us as the information processing, and it is realized by means of the logic circuits that have been integrated within various functional units of our computer.

Our point should be made clear is that all the integrated circuits physical elements within our computer can have only one of the two states: "On" or "Off".

Logic, on organized method of reasoning, is used in decision making. To make logic decision with our computer, therefore, we have developed three basic logic circuits (called gates): the OR circuit, the AND circuit, and the NOT circuit.

The design of digital computers is based on a logical methodology called Boolean Algebra which uses three basic operations: logical addition, called the OR function; logical multiplication, called the AND function; and logical complementation, called the NOT function. The variables in Boolean algebra are binary, namely, the resulting variable of an operation or a set of operations can have only one of the two values: One or Zero. These two values may also be interpreted as being True or False, Yes or No, and Positive or Negative.

A switch is ideally suited to represent the value of any two - state variable because it can only be "off" or "on".

There are only three basic logic operations: the conjunction (logical product) commonly called AND; the disjunction (logic sum) commonly called OR; and the negation commonly called NOT.

So far, it can be seen that different combinations of switches (the simplest electronic element) may be used to construct our computer's basic logic circuits.

The OR circuit has two or more inputs and a single output. The input and the output can each be at one of the two states, 0 or 1. The OR circuit is arranged so that the output is in state 1 when any one of the inputs is in state 1. We can list the various combinations of switch states and the resulting output states. This list is known as a truth table, from which it can be seen that all switches must be open (0 state) for the output 0 state.

This type of circuits is called an OR gate. It is used to make the logic decision on whether or not at least one of several inputs is in the 1 state.

The AND circuit also has several inputs and only one output. However, the circuit output is at a logical 1 state only if all inputs are in the logical 1 state simultaneously.

The AND gate makes the logic decision on whether or not several inputs are all in the 1 state at the same time.

The number of inputs to a gate is called the fan - in. There is only one output signal from a gate, but it may be required that this signal be fed to several other logic gates. The number of subsequent gates that the output of a particular gate can drive is called the fan - out.

The NOT circuit has a single input and a single output. It is arranged so that the output state is always opposite to the input state. The operation of making the output state opposite to that of the input is called inversion, and a circuit designed to do this is known as an inverter.

Obviously, an inverter has one input and one output while a gate has at least two inputs and one output.

As we have just mentioned above, there are only three basic logic operations and we can have these three logic operations performed by the corresponding logic circuits. All functions within a computer can be performed by combinations of these three basic logic operators.

Key Words

deal with	处理,安排,承担
predetermine	预先决定,预先确定
logic circuit	逻辑电路
integrate	集成,综合
methodology	方法学,方法论
Boolean Algebra	布尔代数
logic complementation	逻辑补码法
suit to	与……相称,使适合于
simultaneously	同时地,同步地
inversion	反相,倒装,倒置
corresponding	相当的,一致的
so far	迄今为止
overwhelming	压倒性的,无法抵抗的
majority	多数、大半
conjunction	合取,逻辑乘
disjunction	析取,逻辑加

Notes

1. The processor is the "brains" of the computer that has the ability to carry out our instructions or programs given to the computer.

处理器是计算机的"大脑",它具有执行程序或命令的能力。

句中,that 引导的定语从句修饰 processor。

2. Every time the computer is taking in or putting out data, it's doing I/O using I/O devices, which is also called peripheral devices.

每次计算机输入输出数据时,都使用 I/O 设备来实现 I/O 操作,这些设备也叫外围设备。

3. The analog processors obviously perform important specialized tasks. But theoverwhelming majority of all computers currently in use are digital ones.

显然,模拟计算机能完成很重要的专业化的任务。但是,目前绝大多数正在使用的计算机是数字计算机。

4. The design of digital computers is based on a logical methodology called Boolean Algebra which uses three basic operations…

数字计算机的设计是基于称为布尔代数的逻辑方法学,它采用三种基本运算……。

句中,which 引导的定语从句修饰 Boolean Algebra。

5. Obviously, an inverter has one input and one output while a gate has at least two inputs and one output.

尽管逻辑门至少有两个输入一个输出,但显然反相器只有单入单出。

这里的 while 是“虽然,尽管”的意思。

Exercises

1. Answer the following questions:

(1) How many parts does a computer system include?

(2) What is a digital computer?

(3) How many basic logic circuits have been developed?

(4) What are the three basic logic operations?

(5) What is the inverter?

2. Translate the following words and phrases:

A. From Chinese into English:

(1) 误导 ______________________

(2) 分类,归类 ______________________

(3) 离散的,不连续的 ______________________

(4) 在内部,在……之内

____

(5) 肯定的 ______________________

(6) 否定的 ______________________

(7) 一般,通常 ______________________

(8) 组织 ______________________

B. From English into Chinese:

(1) undertake ______________________

(2) accuracy ______________________

(3) by means of ______________________

(4) gate ______________________

(5) variable ______________________

(6) ideally ______________________

(7) inverter ______________________

(8) analog processor ______________________

3. Translate the passage into Chinese:

A system means a group of related parts working together. A digital computer system is mainly composed of four parts: Input devices, Output devices, Memory and Central processing unit (CPU) which can accept, store and process data or symbols and yield output results fast under the indication of a series of instructions. After the CPU processing the information accepted by the input devices, the output devices give out the results users need.

Users hardly touch CPUs, but all of them have used the input devices. In PC systems, users often touch keyboards, mouse, input pens, touch screens, microphones and others for direct input. Regardless of their differences, they are components that make interpretation and communication between users and computer systems. The storage devices, floppy disk drives and hard disk drives, are commonly used for indirect input. Users have also employed a variety of output devices such as monitors, printers and plotters which get the outcomes from the CPU in machine – coded form and change them into the forms users can understand. Hard disk drives or floppy disk drives often record the results on disks for next or another machine input. Some people prefer to call input/output devices and floppy and hard disk drives, monitors, printers, plotters, etc, peripheral devices.

Traditionally, people accept that there are two kinds of computers: digital computers and analog computers. The digital computers deal with numbers and symbols; the analog computers are only concerned with quantities such as electrical currents or voltages. But nowadays, the former will be more powerful and occupy the positions of the latter.

In the history of computers, there are a few development stages. Therefore, several computer generations occur in the history.

The first electronic digital computer was borne in America in 1946 and its basic elements were vacuum tubes. Through the 1950s, several others were built. They were the first generation of computers, huge, heavy, expensive and slow, as well as using much more power than today's but they still made great contributions to computer science, such as the concepts of stored programs, random access. They made a basic model of modern electronic computers.

The invention of transistors not only produced small portable radios, but also bore the second generation of computers. They became small, light, less expensive, but they were not yet small and cheap enough to enter families.

In 1960s, integrated circuits came. Integrated circuits meant that huge complicated circuits and millions of their elements were only made on a small semiconductor chip, they were introduced into the third generation of computers. Their typical models were the system 360 line of IBM computers. Specially, large scale integrated circuits made digital computers so popular that most middle class families could easily afford them. It is why you can see PCs everywhere.

With the development of science and technology, biological computers and quantum computers will emerge out in near future. New generations of computers will be borne.

Lesson 2 Central Processing Unit(CPU)

The CPU means the Central Processing Unit. It is the heart of a computer system. The CPU in a microcomputer is actually one relatively small integrated circuit or chip. Although most CPU chips are smaller than a lens of a pair of glasses, the electronic components they contain would have filled a room a few decades ago. Using advanced microelectronic techniques, manufacturers can cram tens of thousands of circuits into tiny layered silicon chips that work dependably and use less power.

The CPU coordinates all the activities of the various components of the computer. It determines which operations should be carried out and in what order. The CPU can also retrieve information from memory and can store the results of manipulations back into the memory unit for later reference.

The operations of computer system are controlled by CPU, which can be divided into two functional units called the control unit(CU)and the arithmetic – logical unit(ALU). The CPU can perform only one operation at a time. Essentially, numerically coded instructions are stored in the computer's high – speed storage, or primary storage. The CPU takes the instructions one at a time and executes them. The numerical coding of the instruction tells the CPU which operation to perform and where the data upon which the operation is to take place is stored.

The function of the control unit within the central processor is to transmit coordinating control signals and commands. The control unit is that portion of the computer that directs the sequence or step – by – step operations of the system, selects instructions and data from memory, interprets the program instructions, and controls the flow between main storage and the arithmetic – logical unit.

A control unit has the following components:

- A counter that selects the instructions, one at a time, from memory.
- A register that temporarily holds the instruction read from memory while it is being executed.
- A decoder that takes the coded instruction and breaks it down into the individual commands necessary to carry out.
- A clock, while not a clock in the sense of a time – keeping device, dose produce marks at regular intervals. These timing marks are electronic and very rapid.

Binary arithmetic(the kind of arithmetic the computer uses), the logical operations and some special functions are performed by the arithmetic – logical unit. The arithmetic – logical unit is that portion of the computer in which the actual arithmetic operations, namely, addition, subtraction, multiplication, division and exponentiation, called for in the instructions are performed. It also performs some kinds of logical operations such as comparing or selecting information. All the operations of the ALU are under the direction of the control unit. The primary components of the ALU are banks of bistable devices, which are called registers. Their purpose is to hold the numbers involved in the calculation and to hold the results, temporarily until they can be transferred to memory. At the core of the arithmetic – logical unit is a very high – speed binary adder, which is used to carry out at least the four basic arithmetic functions (addition, subtraction, multiplication, and division). Typical modern computers can perform as many as one hundred thousand additions of pairs of thirty – two – bit binary numbers within a second. The logical unit consists of electronic circuitry which compares information and makes decisions based upon the results of the comparison. The decisions that can be made are whether a number is greater than(>), equal to(=), or less than(<) another.

Programs and the data on which the control unit and the ALU operate, must be in internal memory in order to be processed. Thus, if located on secondary memory devices such as disks or tapes, programs and data are first loaded into internal memory.

The CPU executes each instruction in a series of small steps:

1. Fetch the next instruction from memory into the instruction register.
2. Change the program counter to point to the following instruction.
3. Determine the type of instruction just fetched.
4. If the instruction uses data in memory, determine where they are.
5. Fetch the data, if any, into internal CPU registers. 6. Execute the instruction.
7. Store the results in the proper place.
8. Go to step 1 and begin executing the following instruction.

This sequence of steps is frequently referred to as the fetch – decode – execute cycle. It is central to the operation of all computers.

The other component in the CPU is the high – speed storage. Though some atypical machines can only perform manipulations on data residing in memory(e. g. to add two numbers, both must be brought directly from memory to the two inputs of the adder circuit and their sum sent back and stored in memory), most machines provide a limited amount of high – speed storage for those items of data being processed. Data have to be loaded initially into these high – speed CPU stores, but once there, they are available for subsequent manipulation. Calculations can be performed with the intermediate results placed in the high – speed storage. Only the final result needs to be stored back into memory. These high – speed stores are called registers.

Some CPUs have only a single register; most machines have 8 or 16. Data in registers can be accessed much faster than data in memory.

Apart from the registers used for program data, the CPU contains other high – speed registers. There are anonymous registers in the arithmetic logic unit which hold data during manipulation and there are also registers in the control unit.

Most CPUs have a flags(or condition codes) register usually comprised of a number of 1 – bit flags that encode various status information. Thus, there may be one bit that indicates whether or not the last datum brought from memory, or generated by a data – manipulation operation, was equal to zero. Another 1 – bit flag, if set, may indicate that the last arithmetic operation generated a carry(just like doing addition when in school, sometimes a carry is generated from one column to the next). Another 1 – bit flag may indicate that the CPU is running a program in user mode in which there are some restrictions on the range of allowed instructions. These various 1 – bit flags are collected together into a flag register. There will be instructions that can test the settings of chosen flags.

Several manufacturers make CPU chips today. Intel makes the 8086, 80286, 80386 and so on; and Motorola makes MC68020, MC68030, MC68040 and so on. Though different in several ways, all the CPU chips do the actual processing inside the computer. The CPU also sends signals which synchronize the operation of each component in the computer system. This synchronization permits the system to perform thousands of operations a second. These operations are fairly simple (e.g. , adding two numbers together) but the speed at which they are performed allows the computer breaks down complicated jobs into hundreds of simple steps.

Key Words

microelectronic	微电子的
determine	决定
manipulation	处理
essentially	本质上,本来
decoder	译码器
circuitry	电路系统
chip	芯片
synchronize	同步,使同步,同时发生
bistable	双稳态的
a series of	一连串,一系列
atypical	非典型的
intermediate	中间的
apart from	除……之外,此外
anonymous	无名的,无特色的,隐含的
control unit(CU)	控制器
arithmetic – logical unit	算术逻辑单元

Notes

1. The control unit is that portion of the computer that directs the sequence or step – by – step operations of the system, selects instructions and data from memory, interprets the program instructions, and controls the flow between main storage and the arithmetic – logical unit.

作为计算机的一部分,控制器用来控制系统操作顺序或步骤,从存储器里选择指令和数据,解释程序指令,控制主存与算术逻辑部件之间的信息流。

这里第一个 that 作定语,修饰 portion,意思是"那个部分";第二个 that 是关系代词,引导定语从句。