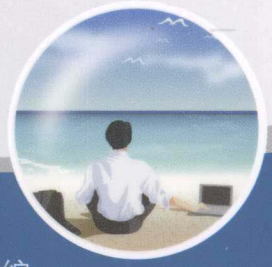
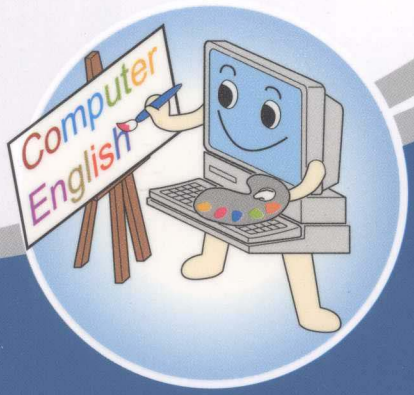
普通高等教育“十一五”国家级规划教材

计算机英语

学生用书

第二版





● 姜同强　主　编
● 苗天顺　副主编

- 计算机系统及其组成
- 计算机体系结构
- 算法与数据结构
- 程序设计与语言
- 操作系统与应用软件
- 数据库系统、软件工程
- 面向对象技术
- 计算机网络与通信
- 信息安全、信息系统
- 人工智能与专家系统
- ERP、客户关系管理
- 电子商务

清华大学出版社

普通高等教育“十一五”国家级规划教材

计 算 机 英 语

学生用书(第二版)

姜同强　主　编
苗天顺　副主编
孔凡航　王　雯　编　著
赵守香　周亦鹏

清华大学出版社

北　京

内 容 简 介

直接阅读外文技术资料和文献是每个计算机技术人员和研究人员必须具备的一种能力。本书旨在使学生及专业人员能够熟悉并掌握计算机方面的基本专业英文词汇，熟悉科技英语的基本规律，并提高在计算机专业英文文献方面的阅读能力。

本书共 20 章，汇集了计算机技术各方面的内容，包括计算机硬件、软件、网络与通信、计算机应用等。本书的特点是内容和专业词汇的涵盖面广，选择的文章具有代表性和新颖性，尤其是阅读材料包括了最近 10 年中产生的一些新技术的介绍，从而使教师在选择教学内容方面有极大的灵活性。

本书适合于计算机科学与技术专业、软件工程专业、信息管理与信息系统专业、电子商务专业以及其他相关专业的本科生、研究生作为计算机专业英语课程的教材，对于从事计算机方面各种工作的专业技术人员提高计算机专业外文文献的阅读能力也有一定的帮助。

图书在版编目(CIP)数据

计算机英语·学生用书(第二版)/姜同强　主编；苗天顺　副主编；孔凡航，王雯，赵守香，周亦鹏　编著. —北京：清华大学出版社，2009.1

(普通高等教育“十一五”国家级规划教材)

ISBN 978-7-302-18921-3

Ⅰ. 计…　Ⅱ. ①姜…　②苗…　③孔…　④王…　⑤赵…　⑥周…　Ⅲ. 电子计算机—英语—高等学校—教材　Ⅳ. H31

中国版本图书馆 CIP 数据核字(2008)第 179497 号

责任编辑：刘金喜
封面设计：久久度文化
版式设计：康　博
责任校对：胡雁翎
责任印制：何　芊

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：010-62776969，c-service@tup.tsinghua.edu.cn
质　量　反　馈：010-62772015，zhiliang@tup.tsinghua.edu.cn

印 刷 者：北京市清华园胶印厂
装 订 者：三河市溧源装订厂
经　　销：全国新华书店
开　　本：185×260　**印　张**：27.25　**字　数**：629 千字
版　　次：2009 年 1 月第 2 版　　**印　　次**：2009 年 1 月第1 次印刷
印　　数：1～4000
定　　价：39.00 元

第一版前言

随着时代的发展，计算机与网络技术已渗透到人们工作和生活的各个方面。计算机英语也随之独立成为一门专业英语，并在计算机应用中作为人机之间交流的媒介。

一个计算机方面的人才除了要掌握计算机理论和技能以外，更重要的是具备快速获取新的计算机方面知识的能力。而计算机英语(尤其是阅读能力)则是体现这种能力的一个重要方面。本书正是在这样的指导思想下编写的。

1. 编写目的

- 使学生熟悉并掌握计算机方面的基本专业英文词汇。
- 提高学生的计算机专业英文文献的阅读能力。

2. 本书特点

- 系统性：本书涵盖了计算机技术各方面的内容，包括计算机硬件、软件、网络与通信、计算机应用等。
- 新颖性：本书反映了20世纪90年代到21世纪初的最新技术。
- 代表性：本书选择的文章在内容上具有一定的代表性，基本体现了计算机硬件、计算机软件、网络与通信和计算机应用方面的典型技术。
- 广泛性：本书专业词汇的涵盖面广。
- 附赠配套教材：凡选用本书作为教材的教师，均可免费获赠《计算机英语(教师用书)》。具体方法请见书后的“《教师用书》需求信息反馈卡”。

3. 本书的结构及内容

本书从内容上可分5篇。第1篇——计算机硬件基础，包括第1章——计算机系统概述，第2章——计算机系统的组成，第3章——计算机体系结构。第2篇——计算机软件基础，包括第4章——算法与数据结构，第5章——程序设计与语言，第6章——操作系统，第7章——应用软件，第8章——文件和文件处理，第9章——数据库系统概论，第10章——软件工程，第11章——面向对象技术。第3篇——计算机网络与通信，包括第12章——计算机网络概述，第13章——OSI参考模型和TCP/IP参考模型，第14章——局域网和城域网，第15章——广域网，第16章——Internet，第17章——网络安全。第4篇——其他计算机技术，包括第18章——多媒体技术，第19章——数字图像处理，第20章——人工智能与专家系统。第5篇——计算机应用，包括第21章——计算机信息系统，第22章——企业资源规划，第23章——电子商务，第24章——CAD/CAM/CIMS。

每章除了正文外，还列举出本章的专业词汇对照表、重点词汇的详细说明，正文后还附有练习题，可作为对学生学习情况的检测。每章最后的阅读材料是对正文内容的补充，反映了最新的技术，可作为学生课后阅读的内容，加深对正文内容的理解。

4. 读者对象

本书主要读者对象是计算机专业及相关专业的高职、高专、本科学生和从事计算机相关工作的专业人员。

本书由姜同强主编。参加编写的人员包括(按章节顺序排列)：王雯、罗代洪编写第1章、第2章、第3章、第4章、第5章和第6章，姜同强、杨冰编写第7章、第8章、第9章、第10章和第11章，孔凡航、吕燕编写第12章、第13章、第14章、第15章、第16章、第17章和第18章，赵守香编写第19章、第20章、第21章、第22章、第23章和第24章。王振玲对全书内容进行了审校。

在本书的编写和出版过程中，清华大学出版社的同志为使本书尽快出版付出了辛勤劳动，在此表示感谢。

由于作者水平有限，加之时间仓促，对于本书中出现的错误，欢迎广大读者批评指正。

编　者

2004年6月

第二版前言

本教材第一版发行后，深受广大计算机专业英语老师和学生的欢迎，好评如潮。甚至参加全国计算机技术与软件专业技术资格(水平)考试的考生都将本教材视为应试必读教材之一。短短4年时间已经多次印刷，印刷量突破几万册。有的老师在来信中说："我们在教学过程中多次使用清华大学出版社出版的《计算机英语》，效果很好。该书内容非常丰富，为教师的教学提供了极大的灵活性；该书提供配套的教师用书，为教师的备课提供了极大的方便。大多数此类教材中都包含课文的中文翻译，这样做既不利于提高学生学习计算机英语的效果，也不利于教师的备课，而且使课文的信息量大大降低，而本书在编排上将课文与翻译分离开来，彻底解决了上述问题，学生的学习效果和教学效果得到了极大的提高。"

另外，学生们反映，该教材中专业术语的解释部分很受欢迎，在某种程度上起到了专业词典的作用，用起来很方便，而且专业术语的解释很详细，既提高了计算机英语的阅读能力，又学到了很多新的知识，可谓一石二鸟。

在吸取各方面意见的基础上，本书第二版针对第一版的内容做了以下几个方面的调整。

(1) 将每一章的课文进一步精练，并适当调整内容，压缩了篇幅。调整比较大的内容包括：

- 删除。将第一版教材中的第8章(Files and File Processing)、第15章(Multimedia Technology)、第19章(Digital Image Processing)和第24章(CAD/CAM and CIMS)删除。
- 合并。将第一版教材中的第12章(Introduction to Computer Network)和第13章(OSI and TCP/IP Reference Model)合并为一章，第14章(Local Area Networks & Metropolitan Area Networks)和第15章(Wide Area Networks)合并为一章。
- 分解。将第一版教材中的第22章(Enterprise Resource Planning)分解为3章，分别是Enterprise Resource Planning，Supply Chain Management和Customer Relationship Management。

(2) 每一章课文前增加了"Pre-reading Questions"内容以方便学生预习。课文后增加了以下几部分内容：Grammatical Notes to the Text，Words Bank to the Text(包括3部分内容，其中新增了Useful new words和Useful phrases and expressions两部分内容)。

(3) 进一步丰富和规范了课后练习。

(4) 精练了课后的阅读材料，并进行了适当的调整和压缩。

(5) 为讲授此课的教师制作了配套的电子课件。

本教材与同类教材相比，有如下几个方面的区别。

- 编写教材的教师队伍是由以下三个方面的人员构成的：计算机相关专业的教师、

从事多年计算机专业英语教学的一线教师、从事多年普通英语教学的一线教师。

- 从教材的结构和内容编排来看，有其独到之处：既有专业词汇的正规解释，又包括了一些常见的语法现象的解释。从事本课程教学的教师无论是从事计算机专业的还是英语专业的，本书都为他们提供了极大的方便。
- 国内的大多数教材在内容选取上都有所侧重：有的计算机英语教材偏重于硬件，有的偏重于软件，还有的教材是信息电子类的计算机英语，侧重于通信电子方面。另外，有的教材侧重于理论，例如数据结构、离散数学；而有的则侧重于应用，例如软件工程、数据库开发。本教材的编写改变了这种状况，在理论和应用上，在硬件、软件、网络、应用等方面均有所体现。

本教材的特色包括如下几个方面。

- 内容丰富，灵活性强。本书的内容非常丰富，涵盖了计算机科学技术专业及其相关专业的一些主要课程内容，包括计算机硬件、软件、网络与通信、计算机应用等，为不同专业教师的教学提供了可选性和极大的灵活性。
- 实用性和专业性相结合。本书的选材在保持原汁原味的同时使学习者更能接触到计算机英语的真实语境和主流思想，虽然有一定的难度，但非常实用和专业。另外，选材与我国大学本科专业教学计划中的专业课程有很好的对应关系。
- 重视教师的教学效果和学生的学习效果。大多数此类教材中都包含课文的中文翻译，这样做既不利于提高学生的学习效果，也不利于教师的备课，而且使课文的信息量大大降低。而本书在编排上将课文与翻译分离开来，彻底解决了上述问题，学生的学习效果和教师的教学效果得到了极大的提高。
- 附赠教师用书：凡选用本书作为教材的教师，均可免费获赠《计算机英语·教师用书(第二版)》。具体方法请参见书后的“《教师用书》需求信息反馈卡”。

本书从内容上可分为5篇。第1篇——计算机硬件基础，包括第1章——计算机系统概述，第2章——计算机系统的组成，第3章——计算机体系结构。第2篇——计算机软件基础，包括第4章——算法与数据结构，第5章——程序设计与语言，第6章——操作系统。第3篇——计算机软件，包括第7章——应用软件，第8章——数据库系统概论，第9章——软件工程，第10章——面向对象技术。第4篇——计算机网络与通信，包括第11章——计算机网络概述，第12章——局域网、城域网和广域网，第13章——Internet，第14章——信息安全。第5篇——计算机应用技术，包括第15章——信息系统，第16章——人工智能与专家系统，第17章——企业资源规划，第18章——供应链管理，第19章——客户关系管理，第20章——电子商务。

本书主要读者对象是计算机科学技术专业、软件工程专业、信息管理与信息系统专业、电子商务专业及其他相关专业的本科生、研究生和从事计算机相关工作的专业人员。

本书由姜同强主编，苗天顺任副主编。姜同强、苗天顺负责全书的统稿。参加编写的人员包括(按章节顺序排列)：王雯编写第1章～第6章，姜同强编写第7章～第10章及各章专业术语的解释，孔凡航、周亦鹏编写第11章～第15章，赵守香编写第16章～第20章。另外，姜同强负责各章中Technical Notes to the Text和Technical terms and proper

names 的编写；苗天顺负责编写各章语法注释和部分课后练习，盖爽编写了部分阅读材料。

在本书的编写和出版过程中，清华大学出版社的同志为使本书尽快出版付出了辛勤劳动，在此表示感谢。另外，还要感谢我们编写团队中的每一位成员，这些成员具有不同的专业背景，没有他们高效率的通力合作，就不可能在短时间内完成这样一本工作量巨大的教材编写。

由于作者水平有限，加之时间仓促，本书中出现的错误在所难免，欢迎广大读者批评指正。

作者的联系方式：jtongqiang@yahoo.com.cn

服务邮箱：wkservice@vip.163.com

编　者

2008 年 9 月于北京

目　录

Chapter 1

Computer System Overview

Pre-reading Questions

1. What is a digital computer?

2. Are there any differences between the binary number system and the common decimal number syetem?

3. How many types of computers do you know? Name at least four of them.

Digital computer is also called electronic computer or computer. Computers surround us. It's hard to find a field in which computers are not being used.[1] In this chapter, we will introduce digital computer, data types, the evolution of computers, and types of computers.

1.1 Digital Computer

The digital computer is a digital system that performs various computational tasks. The word "digital" implies that the information in the computer is represented by variables that take a limited number of discrete values.[2] These values are processed internally by components that can maintain a limited number of discrete states. The decimal digits 0,1,2,⋯ 9, for example, provide 10 discrete values. The first electronic digital computers, developed in the late 1940s, were used primarily for numerical computations. In this case, the discrete elements are the digits. From this application the term digital computer has emerged.[3] In practice, digital computer functions more reliably if only two states are used. Because of the physical restriction of components, and because human logic tends to be binary, digital components that are constrained to take discrete values are further constrained to take only two values and are said to be binary.

Digital computers use the binary number system, which has two digits: 0 and 1.[4] A binary digit is called bit. Information is represented in digital computer in groups of bits. By using various coding techniques, groups of bits can be made to represent not only binary numbers but also other discrete symbols, such as decimal digits or letters of the alphabet.[5] For example, ASCII (American Standard Code for Information Interchange) originally used 7 bits to form a character. By judicious use of binary arrangements and by using various coding techniques, the groups of bits are used to develop complete sets of instructions for performing various types of computations. In contrast to the common decimal numbers that employ the base 10 system, binary numbers use a base 2 system with two digits: 0 and 1.The decimal

equivalent of a binary number can be found by expanding it into a power series with a base of 2.

A computer system consists of hardware system and software system. The hardware system is the physical equipment that you can see and touch, such as the disks and the screen. The software system is the intangible "control" that governs the computer; it is the total of all the programs that can be run on the computer. A program is a list of instructions. Programs tell the hardware what to do. The hardware of the computer is usually divided into three major parts: input and output devices (I/O devices), a central processing unit (CPU), and memory. They are described in more detail in Chapter 2. Software can be classified according to its purpose. Application software is designed to accomplish real-world tasks in fields such as accounting, entertainment, and engineering. If you've ever played a video game or typed a paper on a word processor, you've already had some experience with application software programs. System software, on the other hand, controls the computer system itself. System software includes not only the complex programs used by technicians to create application software in the first place but also the organizational programs needed to start up the computer and govern its use of other programs.[6] They are described in more detail in Chapter 2 and Chapter 6.

1.2 Data Types

Binary information in digital computers is stored in memory or processor registers. Registers contain either data or control information. Control information is a bit or a group of bits used to specify the sequence of command signals needed for manipulation of the data in other registers.[7] Data are numbers and other binary-code information that are operated on to achieve required computational results. Now we present the most common types of data found in digital computers and show how the various data types are represented in binary-code form in computer registers.

The data types found in the registers of digital computers may be classified as being one of the following categories:

- Numeric data can often be represented as integers. In unsigned integers, an n-bit value can range from 0 to 2n - 1. An n-bit signed integer can have any value between - 2n - 1and 2n - 1 - 1, inclusive. Both formats can be used in arithmetic algorithms. Some numeric data cannot be represented as integers. These values, which typically include fractional portions, are represented in floating point format in computers. A computer may have special registers and instructions exclusively for floating point data.
- The Boolean values TRUE and FALSE are used often enough to warrant having their own data type, Boolean, and assembly language instructions.[8] Typically, a data value is set to zero to represent FALSE and any nonzero value for TRUE. Boolean

assembly language instructions can perform logical operations on these values. Unlike logical instructions, which generate one result per bit of the operands, Boolean instructions generate only one result. To illustrate the difference, consider the case in which A=0000 0010 and B=0000 0001. The logical AND of these binary values produces the result 0000 0000. However, if they are Boolean values, A and B are both TRUE, since they are both nonzero. Their Boolean AND must produce a result of TRUE, represented by a nonzero value.

- Computers must also deal with character data. The characters are stored as binary values encoded using ASCII, EBCDIC, UNICODE, or some other character encoding standards. Rather than arithmetically or logically manipulating characters, a computer may concatenate strings of characters, replace some characters with others, or otherwise manipulate character strings.[9] Some assembly language instruction sets include instructions to directly manipulate character data. Others use routines constructed from other instructions to achieve the same result.

1.3 The Evolution of Computer

The first large-scale electronic computer was the Electronic Numerical Integrator and Computer (ENIAC), which became operational in 1946. From that start, computer has developed through four so-called generations, or stages, each one characterized by smaller size, and less expense than its predecessor.[10]

1. First Generation (1944—1958)

In the earliest general-purpose computer, most input and output media were punched cards and magnetic tape. Main memory was almost exclusively made up of hundreds of vacuum tubes—— although one computer used a magnetic drum for main memory. These computers were somewhat unreliable because the vacuum tubes failed frequently. They were also slower than any microcomputer used today, produced a tremendous amount of heat, and were very large. They could run only one program at a time.

2. Second Generation (1959—1963)

By the early 1960s, transistors and some other solid-state devices that were much smaller than vacuum tubes were being used for much of the computer. Magnetic cores, which looked like very small metal washers strung together by wires that carried electricity, became the most widely used type of main memory. Removable magnetic disk packs, stacks of disks connected by a common spindle, were introduced as storage devices. Second-generation machines tended to be smaller, more reliable, and significantly faster than first-generation computers.

3. Third Generation (1964—1970)

In the third period, the integrated circuit (IC)—— a complete electronic circuit that packages transistors and other electronic components on a small silicon chip—— replaced traditional transistorized circuitry. Integrated circuits are cost-effective because individual components don't need to be wired directly to the computer's system board.

The use of magnetic disks for secondary data storage became widespread, and computers began to support such capabilities as multiprogramming (processing several programs simultaneously) and timesharing (people using the same computer simultaneously). Minicomputers were being widely used by the early 1970s and were taking some of the business away from the established mainframe market. Processing that formerly required the processing power of a mainframe could now be done on a minicomputer.

4. Fourth Generation (1971—Now)

Large-scale integrated(LSI) and very-large-scale integrated(VLSI) circuits were developed that contained hundreds to millions of transistors on a tiny chip.[11] In 1971, Ted Hoff of Intel developed the microprocessor, which packaged an entire CPU, complete with memory, logic, and control circuits, on a single chip. The microprocessor and VLSI circuit technology caused radical changes in computers—— in their size, appearance, cost, availability and capability, and they started the process of miniaturization—— the development of smaller and smaller computers.

Also during this time, computer's main memory capacity increased, and its cost decreased, which directly affected the types and usefulness of software that could be used.[12] Software applications like word processing, electronic spreadsheets, database management programs, painting and drawing programs, desktop publishing, and so forth became commercially available, giving more people reasons to use a computer.[13]

1.4 Types of Computers

Computers are usually classified into four broad categories: microcomputers, minicomputers, mainframe computers and supercomputers. It's hard to give a precise definition to each type because computer speeds and storage capacities change rapidly. Nevertheless, the following definitions will suffice.

1. Microcomputers

Microcomputers, also called personal computers (PC), are small computers that can fit next to a desk or on a desktop, or can be carried around. Microcomputers are either used as stand-alone computer or connected to a network, such as a local area network. A local area network (LAN) connects, usually by special cable, a group of desktop personal computers