

高等学校计算机教材

计算机专业英语

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内 容 简 介

本书涉及计算机组成原理和应用的基本内容,旨在提高学生阅读、理解和翻译计算机专业书刊资料的能力,以英语为工具获取和交流专业技术信息,同时本书也注意和基础英语的连接。本书所选材料全部来自原版资料,知识覆盖面较宽,并且注意了题材的多样性。本书注重实用,尽量使学生达到学用结合的目的。

本教材适合计算机专业以及相近专业的大学本科和高职高专的学生使用,也可供广大计算机爱好者学习和参考。

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前 言

计算机技术是当今发展最快的技术之一。所谓知识爆炸首先突出地体现在计算机领域的技术书刊、杂志、资料等爆炸性地出版发行上。不断涌现的各种各样的软件几乎都提供英文文档；计算机工作者在屏幕上所看到的也都是英文提示和说明；已经渗透到各行各业，甚至各个家庭的 Internet 上的信息大多数用英文表示；因此，计算机工作者必须具备良好的英语能力才能跟上计算机技术的飞速发展。

专业英语的特点

计算机专业英语是英语在计算机专业领域的应用，因此专业英语以基础英语作为基础。与基础英语相比，为了体现技术资料的客观、科学、精练和准确，专业英语文章的结构有如下一些特点：

- ✦ 长句多，有时甚至一个段落只有一个句子；
- ✦ 大量使用被动语态和非限定动词；
- ✦ 介词短语多；
- ✦ 名词性词组多；
- ✦ 使用虚拟语气的句子多；
- ✦ 专业术语、合成新词及半技术词汇多。

专业英语教学的主要目标

专业英语是在英语教学的第二阶段——专业英语阶段进行的。因此，指导学生阅读计算机专业的英语书刊和文选，提高学生阅读英语科技资料的能力，并能以英语为工具，获取专业所需的信息和交流专业信息是专业英语教学的主要目标。从多年的计算机专业英语教学的实践中我们体会到，学生阅读英文技术资料的主要困难，一是词汇量不够，尤其是专业词汇不熟悉；二是专业资料接触得太少；三是不熟悉英语科技文章的结构和体裁。因此即使是简单的资料，也难以翻译成准确通顺的汉语。所以我们感到，专业英语的教学要紧紧把握教学的主要目标，增加学生的词汇量，剖析专业英语中的疑难问题，介绍专业英语的语言特点，加强翻译练习，着重培养学生阅读和理解与本专业有关的英文资料的能力，从而达到以英语为工具获取专业所需的信息，并能以英语作为工具交流专业信息的目的。

教材编写中体现教学目标的具体措施

1. 拓宽知识面，加大词汇量，但并不追求完整性

学生学完基础英语课程后已经具有较强的阅读能力，一定的词汇量，一定的听、说、写、译

能力;但是从阅读专业书籍和技术资料的角度看,学生的知识面还不够宽、词汇量还不够大,因此专业英语的内容要尽可能地覆盖整个专业面,以便拓宽学生的知识面和词汇量。

为了便于计算机专业学生使用,本书的章节安排类似于“计算机组成原理和应用”这样的教材,以便增加教材的易读性和逻辑性,但是由于本教材重点是学习专业英语,加之课时有限,所以不追求也不可能追求知识的完整性和系统性。

2. 结合专业、边学边用

专业英语的学习是为了学生毕业后能够在本专业工作中熟练地应用英语这个长远目标,但是我们应把长远目标和目前的学用相结合。为了提高学生学习专业英语的兴趣和主动性,本书的编写遵循结合专业、边学边用的原则,培养学生结合专业课程的学习来提高应用英语的能力。例如“程序调试常见错误”一节的学习,可以安排在学生学习第一门“程序设计语言”课程时进行,使学生马上用来提高程序设计及调试能力。又如“程序文档”一节可以教会学生如何写文档,从而提高程序的易读性。“提高程序效率的新方法”一节将会提高学生程序设计的水平。

3. 抓住重点,兼顾其他

要能够准确地理解英语原文的意义,并且翻译成流畅的中文,除了要有足够的词汇量外,必须掌握科技文章所特有的句法结构、文章体裁以及翻译技巧,才能使译文忠于原文、文字通顺。为此,本书以释疑的形式对课文中的语法结构、文章体裁以及翻译技巧诸方面的疑点、难点进行分析和介绍。这是一种结合实际学、带着问题学的学习方法;既保证了教学的重点,又兼顾了专业英语教学的其他方面。

4. 强调实用,通俗易懂

一般来说,专业技术资料比文艺作品浅显易懂,但是仍然有难易之分。为了减少学习的困难,本书的英文资料,基本都选自原版专业课教材,有较好的易读性,便于学习。

计算机专业人员在使用软件或硬件设备时,需要阅读手册、说明书、Readme 及 Help 信息,学生毕业后也要向用户介绍这类资料,因此部分英文资料选自手册、说明书、Readme、Help 信息或者从 Internet 下载,以增加本书的实用性。

5. 贯彻少而精的原则,举一反三、熟能生巧

为了贯彻少而精的原则,本书的课文和练习都比较短小。针对每一篇课文设计了多项选择、是非判断两种形式的练习,多项选择既涉及对课文内容的理解,也加强了语言的练习。要求学生在预习时在不查看生词表和释疑的情况下先进行自我测试,从而提高学生的阅读理解能力。结合每一篇课文还提供了 3 篇生词不超过总词量 4%,内容、题材和课文相近的阅读材料和翻译练习,使学生能获得举一反三、熟能生巧的效果。本书中的阅读材料和翻译练习都没有提供参考译文,目的是给学生一定的思考空间,发挥学生学习的主动性。从多年的教学中我们体会到,如果所有的练习都提供参考答案,对于一部分学习不主动的学生是毫无帮助的。但是,为了减轻学生负担,本书提供了生词表。

✚ 列出的单词和词组为超出大学英语三级要求的单词和词组;或虽然在三级要求之内,但学生不理解其专业意义的单词和词组。

✦ 为了减轻学生的负担,已列出翻译练习中的生词和词组。

适 用 对 象

本书适合本科、高职、高专及成人高校计算机类专业的学生使用。

本书由俞光昀老师负责计算机专业方面的内容,王炜老师负责本书与基础英语的衔接以及解决英语语言问题。本书由南京大学计算机系宋方敏教授主审,他对本书提出了许多宝贵的修改意见;参加本书资料整理、文字录入工作的老师有张念一、罗静成、唐雨章、李拽生、朱光远、许如玉、钱惠生、程斌等特此表示衷心的感谢。由于编者水平有限,不当之处恳请读者批评指正。

编著者

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第 1 章 Introduction to the Digital Computer

1.1 The Digital Computer

As a starting point, let us consider what a computer is, what it can do, and how it does it. A computer is a digital electronic data processing system.¹ Data are input to the computer in one form, processed within the computer, and the information that results is either output or stored for later use.²

Computer cannot think about how to process the data that were input. Instead, the user must tell the computer exactly what to do. The procedure by which a computer is told how to work is called programming³ and the person who writes the program for a computer is known as a programmer. The result of the programmer's work is a set of instructions for the computer to follow.⁴ This is the computer's program. When the computer is operating, the instructions of the program guide it step by step through the task that is to be performed.⁵

For example, a large department store can use a computer to take care of bookkeeping for its customer charge accounts. In this application, data about items purchased by the customer, such as price and department, are entered into the computer by an operator. These data are stored in the computer under the customer's account number. On the next billing date, the data are processed and a tabular record of each customer's account is output by the computer. These statements are mailed to the customers as a bill.

In a computer, the program controls the operation of a large amount of electronic circuitry. It is this circuitry that actually does the processing of data.⁶ Electronic computer first became available in the 1940s.⁷ These early computers were built with vacuum-tube electronic circuits. In the 1950s, a second generation of computers was built. During this period, transistor electronic circuitry, instead of tubes, was used to produce more compact and more reliable computer systems. When the integrated circuit (IC) came into the electronic market during the 1960s, a third generation of computers appeared. With ICs, industry could manufacture more complex, higher-speed, and very reliable computers. Some people prefer to pinpoint the start of the forth generation as 1971, with the introduction of large-scale integration⁸ (more circuits per unit space) of electronic circuitry. However, other computer designers argue that if we accept this premise, then there would probably have been a fifth, a sixth, and may be a seventh generation since 1971.

Today the computer industry is continuing to be revolutionized by the advances made in integrated circuits (LSI) that can form a computer with just a small group of ICs.⁹ In fact, in some cases, a single IC can be used. These new technologies are rapidly advancing the low-performance, low-cost part of the computer marketplace by permitting simpler and more

cost-effective designs.

Choose the best answer for each of the following

1. Why is a computer regarded as a data processing system ?

(A) Because data are input into the computer.

(B) Because data are processed within the computer.

(C) Because the information that results from processing is output or stored for later use.

(D) Because the computer processes the data that are input in one form, and the resulted data are then output or stored to be used later.

2. Why does the user have to tell the computer what to do ?

(A) Because the computer can only do some simple work.

(B) Because the computer cannot think about everything well.

(C) Because the computer cannot think at all about how to process the data that were input to it.

(D) Because the user likes programming.

3. How can a large store deal with accounts of customers by using a computer ?

(A) The computer can be used to hold data about items purchased by the customer, such as price and department.

(B) The computer can process the data about purchases made by customers.

(C) The computer can output a tabular record of each customer's account, which will be sent to the customer as a bill.

(D) All of the above.

4. How does the instruction exactly guide the computer through the data processing task step by step ?

(A) The instruction controls the operation of the overall computer system.

(B) The instruction controls the operation of the input and output devices of the computer.

(C) The instruction controls the operation of a large amount of electronic circuitry, which actually processes the data.

(D) The instruction controls the operation of the CPU.

5. What makes the computer industry continue to be revolutionized ?

(A) The progress made in integrated circuits.

(B) The growing market for the computer.

(C) Simpler and more cost-effective designs.

(D) The low-performance, low-cost part of the computer market places.

Write T(true) or F(false) for each statement

1. According to the passage, a computer is a data processing system. ()

2. A computer can think about how to process the data that were input to it. ()

3. Programs for keeping accounts are written by the customer. ()
4. According to the passage, data are immediately processed by the computer in a large department store after they are input into the computer by an operator. ()
5. The second generation of computers were built with the transistor electronic circuitry. ()

单词和词组

data processing system	数据处理系统
programming	程序设计
think about	思考
bookkeeping	n. 记账
customer charge account	客户应交费用账目
account number	账号
tabular	a. 平板(状)的,片状的;表格式的,列成表的 n. 表(格),表值
billing	n. 开账单
vacuum-tube	n. 真空管
statement	n. 声明;(账户)报表;(程序)语句
circuitry	n. 电路学,线路,电路系统,电路图
compact	a. 紧密的,精辟的,小巧的,结实的
Integrated Circuit (IC)	n. 集成电路
complex	a. 复杂的,综合的,复合的,难以理解的
revolutionize	v. 使革命化,改革
LSI	n. 大规模集成电路
low-performance	低档次,低性能
in some cases	有时候,在某些情况下,在某些场合
marketplace	n. 市场
cost-effective	a. 有成本效益的,合算的
pinpoint	vt. 精确定位;正确地指出 n. 针尖;琐事 a. 精确定位的;极精确的;极细的
premise	n. 前提,根据 v. 作为…的前提,假定
argue	v. 辩(争、讨)论;证明,主张

释疑

1. “A computer is a digital electronic data processing system.” 中有两个不定冠词“a”。不定冠词可以表示“一个”或“某一个”,在译成汉语时,一般都出现“一”字。不定冠词也可以泛指某一个或某一类,译成汉语时“一”字不一定出现。这个句子中的“a”显然是泛指任何一台计算机,所以应该翻译为:“计算机是电子数字处理系统。”

2. “... and the information that results is either output or stored for later use.”中, that results 为定语从句,修饰 the information,result 的词义为“产生”。

3. “The procedure by which a computer is told how to work is called programming.”句子的主要结构为 The procedure is called programming. by which 为“介词+关系代词”引导定语从句,从句的谓语为被动语态,which 指代 procedure。本句意思为“告诉计算机如何工作的过程称为程序设计。”

被动语态是科技文章中常见的一种句子结构。

4. “The result of the programmer’s work is a set of instructions for the computer to follow.”句中“for the computer to follow”为不定式复合结构作定语,修饰“a set of instructions”。

科技英语的特点是客观、精练和准确。因为要求精练,常常希望用尽可能少的单词来表达原意,从而导致了非限定动词的广泛使用,这是科技文章的一个特点。

5. “When the computer is operating, the instructions of the program guide it step by step through the task that is to be performed.”句中 it 指 the computer,that is to be performed 为定语从句,修饰 the task。“is to be performed”为“be+不定式”结构,表示即将要发生的事。

6. 这是一句强调句。

7. 请注意“Electronic computer first became available in the 1940s.”中 available 的含义。available 有“在手边的”、“可获得的”、“可取得联系的”、“有效的”等意思。本句的意思为“电子计算机在 20 世纪 40 年代首次问世。”

8. “with the introduction of large-scale integration”是介词短语,在此处作状语。

9. “Today the computer industry is continuing to be revolutionized by the advances made in integrated circuits (LSI) that can form a computer with just a small group of ICs.”句中 made in integrated circuits(LSI)为过去分词短语作定语修饰 the advances;that 引导定语从句修饰 integrated circuits(LSI)。

参考译文

数字计算机

让我们从计算机是什么机器,它能够做什么工作以及它如何做这些工作来开始我们的讨论。计算机是电子数据处理系统。数据以一种形式输入计算机,在计算机内进行处理,所产生的信息或者输出,或者存储起来供以后使用。

计算机不能思考如何处理输入进来的数据。而必须由用户精确地告诉它要做什么。告诉计算机如何做工作的过程称为程序设计,为计算机编写程序的人称为程序员。程序设计的结果是一系列供计算机执行的指令。这就是计算机程序。当计算机运行的时候,程序指令指导计算机一步一步地执行要完成的任务。

例如,大型百货商店可以利用计算机对顾客的应交费用记账。在该项目中,顾客所购物品的有关数据如价格及部门由操作员录入计算机,这些数据存储在计算机的顾客账号下,在下一个结账日,这些数据得到处理并由计算机输出每一位顾客账单的记录表格,这个报表然后作为账单邮寄给顾客。

在计算机内部,程序控制着大量电子线路的运行,事实上正是这些电子线路在处理数据。电子计算机是在 20 世纪 40 年代首次问世的。这些早期的计算机用真空管电子线路制造。20 世纪 50 年代建成了第二代计算机。这一时期,用晶体管电路取代真空管电路建造了更紧凑、更可靠的计算机系统。当集成电路(IC)在 20 世纪 60 年代投入电子市场以后,第三代电子计算机出现了。使用 IC 电路,计算机工业可以制造出更复杂、更高速的非常可靠的计算机。某些计算机设计师喜欢把第四代计算机的起始时间精确地定位在 1971 年,因为当时引入了大规模集成电路(单位面积上具有更多电路)。然而其他计算机设计师认为,如果我们接受这一种前提,那么自 1971 年以来大约应该有第五、第六甚至第七代计算机了。

如今,计算机工业由于集成电路技术(LSI)的发展而继续得到改革,使用少许这样的集成电路就可以组成一台计算机。事实上,有时候仅仅只使用一片集成电路就可以组成一台计算机。这些新技术正在迅速地发展着低性能、低价位的计算机市场,因为这些新技术允许采用更简单但是更好的性能价格比进行设计。

1.1.1 Reading Material: The ENIAC

The ENIAC cost \$ 500,000, weighed 60,000 pounds, and occupied the floor space of a large single-family house. The vacuum tubes similar to the once in old-fashioned radios handled its communications and formed the key building blocks of its high-speed electronic switches that could be turned “on” and “off” rapidly in response to electronic signals flowing from other parts of the computer.

By the standards of its day the ENIAC was remarkably fast. When it works properly, the ENIAC can add 5,000 pairs of eight-digit numbers in one second. It is more than 1,600 times faster than its nearest competitor—which has been in use for only about two years. By one estimate the ENIAC can do the work of 7,000 engineers.

The ENIAC was a power-hungry machine. Some contemporary accounts indicate that, whenever it was switched on, the street lights in Philadelphia dimmed temporarily. It was also clumsy and unreliable. Once a day, on average, one of its 17,000 vacuum tubes burned out thus spoiling the machine’s computation. When this happened, the technicians had to tear down the computer’s circuits to locate and replace the offending component. A famous scientist of the day once estimated that “If we tried to build a computer 10 times as large, it would never complete a solution before a tube failure would spoil the results.” Actually, machines with large number of tubes did not turned out to be possible, but there were definite limits to their size and complexity.

单词和词组

ENIAC = Electronic Numerical Integrator and Calculator

美国宾夕法尼亚大学的 J. W. Mauchly 和 J. P. Eckert 于 1946 年制造成功的世界上第一台数字电子计算机,它使用了 18,800 个电子管,加法速度为 5000 次/秒。

1.1.2 Reading Material: The 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 numbers of discrete values. 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 computation. In this case the discrete elements are the digits. From this application the term digital computer has emerged. In practice, digital computers function more reliably if only two states are used. Because of the physical restriction of components, and because human logic tends to binary (i. e. , true-or-false, yes-or-no statements), 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. A binary digit is called a bit. Information is represented in digital computers 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. 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.

单词和词组

discrete	a. 不连续的, 离散的, 个别的, 无联系的
numerical	a. 数字(量)的, 用数字表示的, 数值的
constrain	vt. 强制, 约束
judicious	a. 明智的; 敏感的, 审慎

1. 1. 3 Translation Exercise: The Career of Information Technology Graduates

Basically, information technology is the study of digital computer systems and their use in a wide range of areas. In all such applications, the role of the computer is to process data or information and to solve problems. In solving these problems, computers rely on algorithms which are communicated to them through specially designed programming languages. The central core of information technology involves a study of programming languages, algorithms and information structures. Algorithms and programming languages are usually studied separately. However, when combined with the study of systematic methods for the design and implementation of computer programs or software, they form the basis of software engineering. Information structures are the basis of all information processing systems. Large scale information processing systems use databases for the storage, retrieval, updating and protection of information. Information systems analysis and design is concerned with the use of databases to organize and make available the information required on specific applications. It is also concerned with the interaction between these systems and the organizations which use them. Information technology also includes the study of the basic computer operating systems on which applications can be constructed. Operating systems are complex pro-

grams permanently resident in the computer whose function is to control the running of all user programs and to allocate the computer's resources to them. Special purpose programs made available via operating systems include compilers, editors and other tools which enable the construction and use of application software. Computer architecture is concerned with the design of computers and their hardware components such as adders, counters, memory, processors and peripherals. Communication is an increasingly important aspect of computer science. The field of computer networks deals with communication between machines, the human-computer interface deals with communication between machines and people. Finally, the effective use of computer-based systems depends on a clear understanding of their underlying theoretical capabilities and limitations. Information technology therefore includes the theory of computation, programs, programming languages and algorithms, as well as practical organization skills necessary for their use.

In your lifetime they have altered the way we think about education, the way we do business, the way we communicate, the way we view ourselves and the world, and even the way we see our future. Communications and information technology offer you one of the most diverse and flexible career paths of almost any industry. It is one of the fastest growing areas of technology in the world today. Use of computers is now almost universal and society has become dependent on computer-based information systems for a diverse range of critical tasks. These include the storage and distribution of information in industry, commerce and government. Information Technology graduates are employed in the development and maintenance of such systems as programmers, analysts, consultants, and computer systems and software engineers. Honors and higher degree graduates (Masters and PhD) are employed in teaching or the research leading to new application areas and development tools, such as programming languages, operating systems and computers.

说明：这一段摘自国外某大学关于信息技术专业的专业介绍。这是一种简介性文体，主题明确，文字简练。

单词和词组

algorithm	n. 算法
information technology	信息技术
programming language	程序设计语言
information structure	信息结构
software engineering	软件工程
retrieval	a. (可)取回, (可)修补; (数据)检索, (数据)恢复
interaction	n. 交互作用
allocate	vt. 分配, 指定; 定位, 定地址
compiler	n. 编译程序
editor	n. 编辑器, 编辑程序
architecture	n. 体系结构
adder	n. 加法器

counter	n. 计数器
human-computer interface	人机接口
underlying	a. (做)基础的,根本的;打底的;优先的
computation	n. 计算(结果)
diverse	a. 不同的,(各种)各样的,变化多的
commerce	n. 贸易,商业,交际
honor	n. 荣誉;名誉;敬意
honors	n. 优等生

1.2 Hardware Elements of the Digital Computer System

The hardware of a digital computer system is divided into four functional sections. The block diagram of Fig. 1.1 shows the four basic units of a simplified computer: the input unit, central processing unit, memory unit, and output unit. Each section has a special function in terms of overall computer operation.

The central processing unit (CPU) is the heart of the computer system. It is responsible for performing all arithmetic operations and logic decisions initiated by the program. In addition to arithmetic and logic functions, the CPU controls overall system operation.

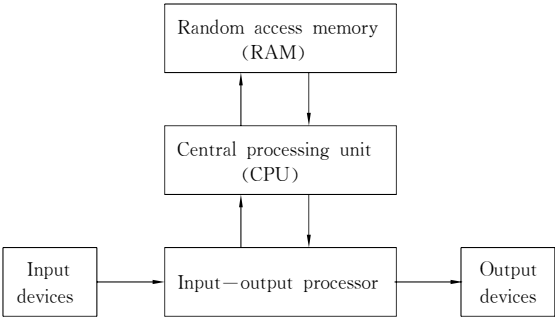


Figure 1.1 Block diagram of a digital computer

On the other hand, the input and output units are the means by which the CPU communicates with the outside world.¹ The input unit is used to input information and commands to the CPU for processing. For instance, a keyboard can be used by the programmer to input a new program.

After processing, the information that results must be output. This output of data from the system is performed under control of the output unit. Ways of outputting information are as printed pages produced by a high-speed printer or displays on the screen of a video display terminal.²

The memory unit of the computer is used to store information such as numbers, names, and addresses. By “store”, we mean that memory has the ability to hold this information for processing or for outputting for later time.³ The programs that define how the computer is to process data also reside in memory.