（修订版）

“九五”军队级重点教材

九五

科技英语教程

SCIENCE ENGLISH

马新英　孙学涛　编著
罗　兵　林　易
王德军　审

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—合肥—

内 容 简 介

本书是根据《大学英语教学大纲》中关于"理工科院校的英语教学应在两年的基础训练之后，在第五至第七学期开设必修的专业阅读课"的规定，并结合理工科院校的主要专业而编写的一套科技英语教材。全书共分计算机、电信和数学三大部分，各部分由若干单元组成，每个单元均包括课文、生词表、综合练习和补充阅读材料等四项内容，书后附有课文的参考译文。

本教程语言规范、用词新颖、题材广泛，涉及前言、绪论、论文、提要、使用手册、说明书等多种文体；尤其是一些专业知识内容紧跟时代发展，使学生在学习语言的同时也了解本专业领域里的一些最新发展。

本书可用作科技英语课程(专业阅读课)或各类科技英语培训(强化)班的教材，也可供广大科技工作者和英语爱好者自学使用。

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前　言

高等学校理工科本科《大学英语教学大纲》中规定：理工科大学的英语教学应在两年的基础训练之后，在第五至第七学期开设必修的专业阅读课。专业阅读阶段的任务是：指导学生阅读有关专业的英语书刊和文选，使其进一步提高阅读英语科技资料的能力，并能以英语为工具，获取专业所需要的信息。

为了全面贯彻大学英语教学大纲，加强专业阅读阶段教学，国家教委又组织制订了供理工科院校使用的大学英语专业阅读阶段教学基本要求，并在国家教委高教司[1996]56号文件中指出："专业阅读阶段是大学英语教学的重要组成部分。希望各校参照基本要求，结合本校情况，研究和落实加强专业阅读课的措施。"

本书就是依据上述规定和要求，结合理工科院校的主要专业而编写的一套科技英语教材。全书共分三大部分，各部分由若干单元组成，分别对计算机、电信、数学等方面的知识进行了系统的介绍。每个单元均包括课文、生词表、综合练习和补充阅读材料四个部分。综合练习主要包括阅读理解、翻译技巧、写作技能、构词法等方面的内容。补充阅读材料在专业知识方面与课文紧密相联，目的是扩大阅读量，拓宽专业视野。

本书的材料均选自英文原版书刊，语言规范、用词新颖、题材广泛，涉及前言、序论、论文、提要、说明书等多种文体。尤其是一些专业知识内容紧跟时代发展，使学生在学习语言的同时也了解本专业领域里的一些最新发展。

本教程经我院多届学生使用，反应很好，已被列入全军重点建设教材。我们在第一版的基础上，对全书作了进一步的修改，更新了部分内容，使全书更加充实和完善。本书可用作科技英语课程或各类科技英语培训（强化）班的教材，也可供广大科技工作者和英语爱好者自学使用。

本书第一部分由罗兵撰写，第二部分由马新英撰写，第三部分由孙学涛、林易撰写。王德军负责全书的统稿和审订工作。在编写过程中，得到了解放军信息工程大学和训练部领导以及学校基础部和教保处各级领导的大力支持，在此表示衷心的感谢。

由于水平有限，不足之处在所难免，欢迎广大读者给予批评指正。

编　者

一九九九年六月

目　　录

PART ONE　COMPUTER SCIENCE

PART TWO TELECOMMUNICATIONS

PART THREE MATHEMATICS

PART ONE

COMPUTER SCIENCE

Unit One

Text

Computer Systems History

The early history of the development of computing machines is replete with impressive names. The French scientist Blaise Pascal is credited with the invention of the first adding machine in 1642. His machine was mechanical in nature, using gears to store numbers.

The mechanical model was followed up in 1822 by Charles Babbage, professor of mathematics at Cambridge University in England. Babbage used gears and punched cards to produce the first general-purpose digital computer, which he called the analytic engine, but it was never completed or put into use.

Census taking provided the incentive for Herman Hollerith to use punched cards in the first data processing operation. Their successful application to the 1890 U. S. National Census demonstrated the value to be realized from automatic data processing systems. The laborious, time-consuming task of sorting census data by hand was reduced in both time required and effort expended, because punched cards were put into the machine which automatically sorted them.

Howard Aiken of Harvard University combined the mechanical processes of Babbage with the punched-card techniques of Hollerith to develop an electromechanical computer. The Harvard Mark I, as it was called, was capable of multiplying and dividing at rates significantly faster than previously possible. The electromechanical nature of the device, which used punched cards and punched tape for data and control, limited its speed and capability, however.

The first fully electronic computer was developed at the University of Pennsylvania by Dr. John Mauchly and J. Presper Eckert, Jr. The computer used 18,000 electron tubes to make and store its calculations. Called the Electronic Numerical Integrator and Calculator (ENIAC), this device could, in 1946, multiply 300 numbers per second (approximately 1000 times as fast as Aiken's computer). As fast as ENIAC was, however, the lack of external control and the bulk and power consumption resulting from the use of vacuum tubes precluded large-scale production.

The milestone which marked the beginning of the modern age of computers was the development of the transistor. This device was significantly smaller than the electron tube, required much less electrical power to operate, and generated very much less heat. With the

subsequent development of integrated circuits, it became possible to design equipment consisting of hundreds and thousands of transistors but requiring minimal space. This advance has made computers with amazing speed and impressive capability commonplace. Concurrently with the development of smaller, faster, and more sophisticated computers, developments in storage devices were also made.

Computer systems have been classed into three generations. The first generation consisted of vacuum-tube-based machines. They used magnetic drums for internal storage and magnetic tapes for external storage. These computers were slow compared to modern machines and, owing to their bulk, they required data to be brought to them.

Second-generation computers using transistors began to appear in 1959. The internal storage used magnetic cores, with small doughnuts of magnetic material wired into frames that were stacked into large cores. This form of storage represented a tremendous increase in speed and reduction in bulk over previous storage methods. The external storage also added to increased speed and greater 'online' capability as compared to magnetic tape systems.

Beginning in 1964, a third generation of computers began to emerge. These computers utilized integrated circuits to increase capability and decrease size, while integrated technology also provided improved internal storage capability. Solid-state memory, being now totally electronic, greatly increased the speed and capacity of the internal memory while decreasing its cost and complexity. External memory continued to use magnetic disks, which became larger and faster.

It was stated that early computers required data to be brought to them. This data was usually prepared by using punched cards or magnetic tapes. The cards or tapes would then be carried to the computer where they would be processed. The transfer of data in this fashion was called batch processing. Transport might be no farther than from the next room, or again, it might be from the other side of the world. As each batch of data was received, it was placed into line with other batches of data which were processed one after another. Reports were routed to appropriate locations in the form of punched cards or magnetic tapes. The inefficiency of such a system is easily seen in retrospect.

Later-model computers are provided with the capability of handling numerous input devices directly. These multitask computers treat the incoming data in much the same way as the earlier computers did. Incoming data is received from the various input devices and is lined up, or queued by the internal procedures. If the computer reaches a place with one batch of data where it can link the data to storage, printers or other devices, the computer will begin to process another batch. The modern computers are so fast in their operation that they can handle many users without the users even being aware that others are on the system. This capability has made it necessary for computer data to be transported in ways other than by punched cards or magnetic tapes. The ability of the computer to service many input-output devices simultaneously has made data communication essential.

C M and D Johnson

General Engineering, Prentice Hall, 1992

Words and Expressions

batch processing 批处理
concurrently 并行地,并发地
data processing 数据处理
electromechanical 机电的
electron tube 电子管
external 外部的
gear 齿轮
integrated circuit 集成电路
internal 内部的
magnetic core 磁芯
magnetic drum 磁鼓
magnetic tape 磁带
milestone 里程碑
multitask 多任务
online 联机
punched card 穿孔卡片
replete 充满的
simultaneously 同时地
solid-state memory 固态内存
sort 分类,排序
transistor 晶体管
vacuum tube 真空管

Exercises

Reading comprehension

I. Answer the following questions according to the text.

1. Who invented the first mechanical device that could store numbers?
2. What were the problems of the first electronic computers?
3. What was the event that marked the start of the modern computer age?
4. What capability is essential in modern data communications?

Vocabulary

II. Study the use of these words in the text and write the appropriate word into each of the following sentences:

invent develop emerge demonstrate

a. The first steam engine was _____ by James Watt.
b. Computers have now been _____ which respond speech.
c. Isaac Newton _____ the laws of gravity.
d. With the development of integrated circuits, a new generation of microprocessors _____.

Word-building

III. Summarize the following prefixes.

photocell
photodetector
photodiode
magnetometer
microprocessor
microcode
servomotor
servo system

magnetic
teleprocessing
teleconference
telecommunication
macro assembler
macroinstruction
microprogram
pseudo-code
pseudo-offline
stereotelevision
audibility
audiometer
electromagnetic
electromechanical

Translation

IV. Translate the following sentences into Chinese.

1. Multiprogramming means the existence of many programs in different parts of main memory at the same time.

2. By "nested interrupt" is meant the ability to allow interrupts to interrupt previous interrupt service routines safely.

3. Data denote a collection of facts that can serve as operands to a computer program.

4. The semantics of a language is concerned with what happens when the program is executed, that is, with its meaning.

5. A group of related data items treated as a unit by an application program is termed a record.

6. A facility allowing a peripheral device to transfer characters directly to memory without going through the CPU is known as direct memory access (DMA).

7. Task management routines, which operate in the supervisor state and are primarily core-resident, are frequently referred to as the supervisor of the operating system.

8. A computer may be regarded as a set of devices, or resources, which provide a number of services, such as input, processing, storage and output. The operating system of the computer may be regarded as the manager of these resources.

Reading

PC History

In 1952, a major computing company took a decision to get out of the business of making mainframe computers. They believed that there was only a market for four mainframes in the whole world. That company was IBM. The following year they reversed their decision.

In 1980, IBM decided that there was a market for 250,000 PCs, so they set up a special team to develop the first IBM PC. It went on sale in 1981 and set a worldwide standard for IBM-Compatibility which, over the next ten years, was only seriously challenged by one

other company, Apple Computers. Since then, over seventy million PCs made by IBM and other manufacturers have been sold. Over this period, PCs have become commodity items. Since IBM made the design nonproprietary, anyone can make them.

The history of the multi-billion dollar PC industry has been one of mistakes. Xerox Corporation funded the initial research on personal computers in their Palo Alto laboratory in California. However, the company failed to capitalize on this work, and the ideas that they put together went into the operating system developed for Apple's computers. This was a graphical interface: using a mouse, the user clicks on icons which represent the function to be performed.

The first IBM PC was developed using existing available electrical components. With IBM's badge on the box, it became the standard machine for large corporations to purchase. When IBM were looking for an operating system, they went initially to Digital Research, who was the market leader in command-based operating systems (these are operating systems in which the users type in commands to perform a function). When the collaboration between IBM and Digital Research failed, IBM turned to Bill Gates, then 25 years old, to write their operating system.

Bill Gates founded Microsoft on the basis of the development of MS/DOS, the initial operating system for the IBM PC. Digital Research has continued to develop their operating system, DR/DOS, and it is considered by many people to be a better product than Microsoft's. Without an endorsement from IBM, it has become a minor player in the market. Novell, the leader in PC networking, now owns Digital Research, so things may change.

The original IBM PC had a minimum of 16k of memory, but this could be upgraded to 512k if necessary, and ran with a processor speed of 4.77 MHz. Ten years later, in 1991, IBM was making PCs with 16Mb of memory, expandable to 64Mb, running with a processor speed of 33 MHz. The cost of buying the hardware has come down considerably as the machines have become commodity items. Large companies are considering running major applications on PCs, something which, ten years ago, no one would have believed possible of a PC. In contrast, many computers in people's homes are just used to play computer games.

The widespread availability of computers has in all probability changed the world for ever. The microchip technology which made the PC possible has put chips not only into computers, but also into washing-machines and cars. Some books may never be published in paper form, but may only be made available as part of public databases. Networks of computers are already being used to make information available on a world-wide scale.

Keith Boeckner & Charles Brown

Oxford English for Computer, Oxford University, 1993

Notes

capitalize　获利

chip　芯片，晶片

click　点，击(鼠标)，揿击(鼠标)(将鼠标指示针定位在某个对象上，然后按一下并释放鼠标按钮。常见的操作还有 double-click(双击)，right-click(右击)等)

compatibility　兼容性，其形容词形式为 compatible

computer game　计算机游戏

endorsement　认可

graphical interface　图形界面

icon　图符，图标，像标，用来表示一个程序或任务项的图像符号

mainframe computer　大型计算机，主计算机

manufacturer　制造商

mouse　鼠标

network　网络

non-proprietary　非专利的

operating system　操作系统

upgrade　升级

Unit Two

Text

Delete keys — Clipboard Technology

For the last generation, Silicon Valley and Tokyo have been working to design computers that are ever easier to use. There is one thing, however, that has prevented the machines from becoming their user-friendliest: you still have to input data with a keyboard, and that can require you to do a lot of typing and to memorize a lot of elaborate commands.

Enter the clipboard computer, a technology that has been in development for the last 20 years but took hold in the mass market only this year. Clipboard PCs — which, as their name suggests, are not much bigger than an actual clipboard — replace the keyboard with a liquid crystal display (LCD) screen and an electronic stylus. Users input data by printing individual letters directly on the screen.

There are two technologies at work in a clipboard PC: one allows raw data to get into the computer and the other allows the computer to figure out what that data means. The first technology relies principally on hardware and varies depending on the particular computer. In one system, marketed under the name GRIDPad, the computer's LCD screen is covered by a sheet of glass with a transparent conductive coating. Voltage is sent across the glass in horizontal and vertical lines forming a fine grid; at any point on the grid, the voltage is slightly different. When the stylus — which is essentially a voltmeter — touches the screen, it informs the computer of the voltage at that point. The computer uses this information to determine where the stylus is and causes a liquid crystal pixel to appear at those coordinates. The position of the stylus is monitored several hundred times a second, so as the stylus moves across the glass, whole strings of pixels are activated.

"What we do is sort of connect the dots," says Jeff Hawkins, the creator of GRIDPad. "Users can then write whatever they want on the screen with a kind of electronic ink."

Making that writing comprehensible to the computer, however, requires the help of some powerful software. When the stylus is being used, the computer is programmed to look for moments when the tip does not touch the screen for a third of a second or more. Every time this happens — and it happens a lot when somebody is printing — the software assumes that one letter or number has been written. The pixel positions of this fresh character are then passed on to the computer's pattern recognition software, which instantly identifies the

letter or number written.

The software does this by first cleaning up the character — smoothing out crooked lines and removing errant dots. The remaining lines and curves are then compared with a series of templates in the computer's memory that represent hundreds of thousands of different versions of every letter in the English alphabet and all ten numbers. When the computer finds the closest match, it encodes the character in memory and display it on the screen as if it had been typed. The entire process takes just a fraction of a second. To delete a word, you simply draw a line through it. To move to the next page, you flick the stylus at the bottom of the screen as if you're flicking the page of a book.

There are a handful of clipboard computers now on the market, including GRIDPad, which is sold in the US; Penvision, manufactured by NCR and sold around the world; and Sony's Palmtop and Canon's Al Note, both sold only in Japan. IBM and Apple are also pouring millions of dollars into the technology.

In addition to this hardware, a variety of software is also making its way to the market. Depending on the sophistication of the software, clipboard systems can be programmed to understand the particular quirks of a particular user's printing; this is an especially useful feature in Japan, where elaborate kanji characters make up most of the written language. Improvements in software may soon allow machines sold in the US to understand not only printing but continuous script as well.

Given such flexibility, the designers of clipboard computers are predicting big things — and a big market — for their products. "There's no doubt about it," says an optimistic Hawkins. "You're going to own one of these things in the not-too-distant future."

Keith Boeckner & Charles Brown

Oxford English for Computer, Oxford University, 1993

Words and Expressions

delete 删除
electronic stylus 电子笔
electronics 电子学
keyboard 键盘
liquid crystal display(LCD) 液晶显示屏
monitor 监视器，监视
pattern recognition 模式识别
pixel 像素
script 手稿，笔迹
Silicon Valley 硅谷
template 样板，模板
user-friendly 用户友好的

Exercises

Reading comprehension

I. Decide whether the following statements are true (T) or false (F) in relation to the information in the text. If you think a statement is false, change it to make it true.