



普通高等教育“十一五”国家级规划教材
大学专业英语系列教程

计算机

Selected Readings in Computer

专业英语教程

(修订版)

张政主编



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北京大学出版社
PEKING UNIVERSITY PRESS

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总序

辜正坤

西学东渐给东方的外语出版界造成一种奇特的景观：在相当短的时间内，外语出版物的数量扶摇直上，使它种民族语出版物相对汗颜，这是可以理解的。日本明治维新之后，就出现过类似的情形，外语（尤其是英语）原著注释读物动辄一套就是数百本，洋洋大观。毫无疑问，这对推进日本的外语教学起到了非常重要的作用。时至今日，其效应已经明显昭示出来：当今的中国各大学发表的论文为SCI所收录者，最多者一年达500篇，而东京大学一年就达40000篇，两者相距80倍！如果以为日本的论文数量必与其科学水平成正比，因而中国大学的科学研究水平就落后了东大80倍的话，恐怕是一种很大的误解。其中的奥妙之一，就在于日本学者的英语水平普遍较高，许多论文是直接用英文写成，因此容易被世界各地的媒体注意到，其入选SCI的机会也就相对增多。反观中国学者的论文，绝大多数用汉语写成，少量靠懂英语的学者翻译，只有极少量的学者能够自己用英文直接写作。因此，大多数的中国论文是难以进入西方学者的视野的。当然入选SCI的机会也就相对少得多了。当然，这并不是说，中国的科研水平就反过来比日本高，而是说，由于中国学者英语写作水平普遍偏低的原因，其实际的科研水平未能在英语世界的文献中充分显示出来。由此可以明白，提高中国学者的英语能力（尤其是阅读文献与用英语写作的能力）是一件非常迫切的事。

然而，改革开放二十多年来的英语学习大潮虽然使许多中国人在英语学习方面获得了较高的造诣，上了一个较为理想的台阶，但是有更多的人却老在一个水平上徘徊不前：要学的教材已经学了，该考的科目已经通过了，但是，面对英语的殿堂，人们并没有登堂入室的感觉。听说能力未能应付裕如或者情有可原，因为学习者可以抱怨没有相应的可以一试身手的客观条件，但是在阅读方面，例如阅读文史哲数理化的专业文献方面，却仍是磕磕绊绊、跋前疐后，字典不离手，冷汗不离身。这种处于瓶颈地带，欲罢不可、欲进不能的紧迫感，源于一个关键的原因：缺乏专业外语文献阅读训练。学校里使用的基础英语教材编得再好，也只能解决基础问题，不能解决超过基础的专业阅读问题。正如要做游泳健儿的人只在游泳池里按照游泳要领奋力拨拉了一阵池水，自觉亦有劈波斩浪之感，但与真正的河涛海潮相比，终究属于两重洞天。

于是,就产生了这一整套专业英语阅读教程。

它的目标非常明确,无非是要把英语知识与技能的培训和高层次系统知识的灌输二者有机结合起来,达到既学语言又学知识的目的;既温故,又知新。照我看来,这是最有效率的学习与巩固方略。

如前所述可以明白,这套教程不只是对一般想要提高英语实际水平的人有用,对于专家学者或研究人员,也有很大的好处。一个人无论多么博学多才,也不太可能对各个专业的英语经典文献和地道表达都了然于胸,因此,当需要在尽可能短的时间内对某专业的英语经典文献或概念有所把握时,这一整套书无疑不会使人们失望。

这套书的编选思路最初萌发于1991年,当时称作《注释本英文世界文化简明百科文库》。编者当时曾会同北京大学英语系大学英语教研室教师和北京大学出版社若干编辑共商过具体编选事宜,并由北京大学出版社出版。尔后还进行过多次类似的讨论。文库分上、中、下三编,每编含精选名著一百种左右。在编选思路,力求达到雅俗共赏,深入浅出,系统全面。在系统性方面,注意参照《大英百科全书》和《中国大百科全书》的知识框架,用英文把更为完备的知识系统介绍给读者。在实用性方面,亦注意选材的内容与词汇量与现行的英语教材、实际英语教学水平相呼应。

本编为上编,除可供大学英语分科专业阅读选用教材之用外,亦可供社会上一般读者提高英语水平、直接经由阅读原著而掌握某一专业知识之用。基本的编辑方针是1)选目必须系统、广泛,尽可能把大学的重要专业都包容进去(包括人文社会科学和理工科专业);2)选目可大致分三类:A. 简史类;B. 名篇、名著类;C. 比较规范的或经典的西方专业教材类;3)每册书的字数最好在20万字上下(个别可以例外)。至于其他具体事项,则随书说明。

教育部在1999年亦强调大学英语教学不能停留在基础英语教学上,而要逐步过渡到教授专业分科英语,使学生尽可能进入阅读专业英语文献的水平。因此这套教材的产生是适得其时的。

当然,它的具体效果如何,还有待检验。好在这套教材的编注与出版都是一个较长的过程,这期间可望获得有关方面的建议与批评,以期使它精益求精,日臻完善。

是为序。

2001年于北京大学英语系

前 言

自 20 世纪 40 年代第一台计算机问世以来,其发展速度史无前例,硬件每三年更新一次,而软件大约一年更新一次版本。昨天还是陌生的 Email(伊妹儿)、Internet(互联网)、Speech Recognition(语音识别),今天已进入寻常百姓家。无论是在工业、农业、国防和人们的日常生活,还是航天、材料、生化及遗传工程中,计算机无处不在。可以说 21 世纪是计算机的世纪,没有计算机,人们将一事无成。因此,要了解计算机的发展方向,掌握最新的计算机技术,积极发挥计算机的功能,充分利用计算机,就要求人们有较高的外语水平和较强的计算机操作能力,可以毫不夸张地说,外语水平的高低是决定着人们今后成败的因素之一。

为了提高读者的实际使用计算机英语的阅读和表达能力,我们选编了这本《计算机专业英语教程》。选文均出自英美原文,语言地道、规范、新颖,涵盖了计算机基础词汇。全书共分 24 个单元,每单元由课文、注释和练习组成,练习的编写主要是检查读者对课文的理解和掌握,书后附有词汇表和练习参考答案可供读者查阅。

本书可供计算机爱好者和英语爱好者使用,也可作为大、中专学生高年级阶段的英语阅读。极个别单元专业性较强,读者可酌情取舍。由于时间仓促,在编写过程中难免有不当之处,请读者不吝赐教。

修订后的前言

新修订的《计算机专业英语教程》除传承原有的优点外,还具备以下特点:

1. 文本遴选更偏重语言的权威性和趣味性:所有文本均选自英美原文,语言地道,文字优美,文笔流畅,使人乐知、好知;
2. 时效性更强:修订后的教程除保留了计算机科学发展中一些至今仍引人入胜的章节外,还增加了关于该领域发展的部分最新内容,如在计算机及其种类一文中,增加了 DNA 计算机、光子计算机、量子计算机的相关知识;在网络的应用中增加“远程教学”,尽力做到文献内容“引领潮流,高屋建瓴”;
3. 知识性、实用性为教程成功的关键之一:修订后的教材,更是力求覆盖计算机知识的关键领域,从早期的计算机的基本原理到 8 核处理器,使之俨然成为一部计算机英语的小百科;计算机知识、相对应的英语语言、所涉及的短语、词汇……可谓是“教程在手,应有尽有”;
4. 富含计算机文化:相关文化是任何教材都不可或缺的内容之一,因此计算机文化部分在新教程中有所加强,如增加“计算机环保”、“图灵奖与美国计算机学会”的内容,旨在为使用者成为计算机文献中的“文化人”助上一臂之力。

全书共分 30 个单元,每单元由课文、注释和练习组成。书后附有总词汇表和常用短语、练习参考答案,可供读者查阅。由于作者水平、时间等诸多因素的限制,书中难免存在不当之处,敬请读者不吝赐教。

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Unit 1 Computer and Its Kind

计算机及其种类

A computer is an electronic device that can receive a set of instructions, or program, and then carry out this program by performing calculations on numerical data or by compiling and correlating other forms of information.

The modern world of high technology could not have come about except for the development of the computer. Different types and sizes of computers find uses throughout society in the storage and handling of data, from secret governmental files to banking transactions to private household accounts^[1]. Computers have opened up a new era in manufacturing through the techniques of automation, and they have enhanced modern communication systems. They are essential tools in almost every field of research and applied technology, from constructing models of the universe to producing tomorrow's weather reports, and their use has in itself opened up new areas of conjecture. Database services and computer networks make available a great variety of information sources^[2]. The same advanced techniques also make the invasions of privacy and restricted information sources possible, and computer crime has become one of the many risks that society must face if it is to enjoy the benefits of modern technology.

Types of Computers

1. Microcomputer

A microcomputer is a desktop or notebook size computing device that uses a microprocessor as its Central Processing Unit, or CPU. Microcomputers are also called Personal Computers (PCs), home computers, small business computers, and micros. The smallest, most compact are called laptops. When they first appeared, they were considered single user devices, and they were capable of handling only 4, 8, or 16 bits of information at one time. More recently the distinction between microcomputers and large, mainframe computers as well as the smaller mainframe type systems called minicomputers has become blurred, as newer microcomputer models have increased the speed and data handling capabilities of their CPUs into the 256 bit, or even much more bit multiuser range.

Microcomputers are designed for use in homes, schools, and office settings. Within the home, they can serve both as a tool for home management balancing the family

checkbook, structuring the family budget, indexing recipes and as a recreational device playing computer games, cataloging records and books. School children can use microcomputers for doing their homework, and in fact many public schools now employ the devices for programmed learning and computer literacy^[3] courses. Small businesses may purchase microcomputers for word processing, bookkeeping, the storage and handling of mailing lists and so on.

Desktop Computer

A **desktop computer** is a personal computer in a form intended for regular use at a single location, as opposed to a mobile laptop or portable computer. Prior to the wide spread of microprocessors a computer that could fit on a desk was considered remarkably small. Today the phrase usually indicates a particular style of computer case. Desktop computers come in a variety of styles ranging from large vertical tower cases to small form factor models that can be tucked behind an LCD^[4] monitor. In this sense, the term “desktop” refers specifically to a horizontally-oriented case, usually intended to have the display screen placed on top to save space on the desk top. Most modern desktop computers have separate screens and keyboards. A specialized form of desktop case is used for home theater PC systems, incorporating front-panel mounted controls for audio and video.

Personal Digital Assistant (PDA)^[5]

A **personal digital assistant** (PDA) is a handheld computer, also known as a palmtop computer. Newer PDAs also have both color screens and audio capabilities, enabling them to be used as mobile phones, smartphones, web browsers, or portable media players. Many PDAs can access the Internet, intranets or extranets via Wi-Fi^[6], or Wireless Wide-Area Networks (WWANs^[7]). Many PDAs employ touch screen technology.

Tablet^[8] PC

A **Tablet PC** is a laptop mobile computer, equipped with a touchscreen or graphics tablet/screen hybrid technology which allows the user to operate the computer with a stylus or digital pen, or a fingertip, instead of a keyboard or mouse. This form factor offers a more mobile way to interact with a computer. Tablet PCs are often used where normal notebooks are impractical or unwieldy, or do not provide the needed functionality.

Laptop^[9]

A **laptop** (also known as a notebook) is a personal computer designed for mobile use small enough to sit on one’s lap. A laptop includes most of the typical components of a typical desktop computer, including a display, a keyboard, a pointing device, a touchpad, also known as a trackpad, or a pointing stick, as well as a battery, into a single small and light unit. The rechargeable battery required is charged from an AC/DC adapter and typically stores enough energy to run the laptop for several hours.

2. Minicomputer

A minicomputer is a mid-level computer built to perform complex computations while

dealing efficiently with a high level of input and output from users connected via terminals. Minicomputers also frequently connect to other minicomputers on a network and distribute processing among all the attached machines. Minicomputers are used heavily in transaction processing applications and as interfaces between mainframe computer systems and wide area networks.

3. Mainframe Computer

A mainframe computer is a high level computer designed for the most intensive computational tasks. Mainframe computers are often shared by multiple users connected to the computer via terminals. The most powerful mainframes, called supercomputers, perform highly complex and time-consuming computations and are used heavily in both pure and applied research by scientists, large businesses, and the military.

4. Others

- **Servers**

A server usually refers to a computer that is dedicated to providing a service. For example, a computer dedicated to a database may be called a “database server”. “File servers” manage a large collection of computer files. “Web servers” process web pages and web applications. Many smaller servers are actually personal computers that have been dedicated to providing services for other computers.

A server is a computer program that provides services to other computer programs and their users in the same or other computer. The physical computer that runs a server program is also often referred to as server.

Services can be supplied centrally by the use of a server; in other cases all the machines on a network have the same status with no dedicated server, and services are supplied peer-to-peer^[10].

- **Workstation**

Workstations are computers that are intended to serve one user and may contain special hardware enhancements not found on a personal computer.

It is a high-end microcomputer designed for technical or scientific applications. Intended primarily to be used by one person at a time, they are commonly connected to a local area network and run multi-user operating systems. The term workstation has also been used to refer to a mainframe computer terminal or a PC connected up to a network.

Historically, workstations had offered higher performance than personal computers, especially with respect to graphics and CPU power, memory capacity and multitasking ability. They are optimized for display and manipulation of different types of complex data such as 3D mechanical design, engineering simulation (e. g. computational fluid dynamics), animation and rendering of images, and mathematical plots. Consoles consist of a high resolution display, a keyboard and a mouse at a minimum, but also offer multiple

displays, graphics tablets, SpaceBalls, etc. Workstations are the first segment of the computer market to present advanced accessories and collaboration tools.

- **Embedded computers**

Embedded computers are computers that are a part of a machine or device. Embedded computers generally execute a program that is stored in non-volatile memory and is only intended to operate a specific machine or device. Embedded computers are very common. Embedded computers are typically required to operate continuously without being reset or rebooted, and once employed in their task the software usually cannot be modified. An automobile may contain a number of embedded computers; however, a washing machine and a DVD player would contain only one. The central processing units (CPUs) used in embedded computers are often sufficient only for the computational requirements of the specific application and may be slower and less expensive than CPUs found in personal computers.

- **Supercomputer**

In computer science, supercomputers are large, extremely fast, and expensive computers used for complex or sophisticated calculations, typically, machines capable of pipelining instruction execution and providing vector instructions. A supercomputer can, for example, perform the enormous number of calculations required to draw and animate a moving spaceship in a motion picture^[11]. Supercomputers are also used for weather forecasting, large scale scientific modeling, oil exploration and so on and so like.

Future Developments

One ongoing trend in computer development is microminiaturization, the effort to compress more circuit elements into smaller and smaller chip space. Researchers are also trying to speed up circuitry functions through the use of superconductivity, the phenomenon of decreased electrical resistance observed as objects exposed to very low temperatures become increasingly colder^[12]. The fifth-generation computer, the effort to develop computers that can solve complex problems in what might eventually be called creative ways, is another trend in computer development, the ideal goal being true artificial intelligence^[13].

Quantum Computer

A quantum computer^[14], quite different from classical current computers, is a device that harnesses physical phenomenon unique to quantum mechanics to realize a fundamentally new mode of information processing. In a quantum computer, the fundamental unit of information called a quantum bit (or qubit), is not binary but rather more quaternary in nature. A qubit can exist not only in a state corresponding to the logical state 0 or 1 as in a classical bit, but also in states corresponding to a blend or superposition of these classical states. In other words, a qubit can exist as a 0, a 1, or simultaneously as

both 0 and 1, with a numerical coefficient representing the probability for each state.

DNA Computer

DNA computing^[15] is a form of computing which uses DNA, biochemistry and molecular biology, instead of the traditional silicon-based computer technologies. DNA computing, or, more generally, molecular computing, is a fast developing interdisciplinary area and is fundamentally similar to parallel computing in that it takes advantage of the many different molecules of DNA to try many different possibilities at once. And DNA computers are faster and smaller than any other computer built so far.

Optical Computer^[16]

An optical computer is a computer that uses light instead of electricity (i. e. photons rather than electrons) to manipulate, store and transmit data. Optical computer technology is still in the early stages; functional optical computers have been built in the laboratory, but none have progressed past the prototype stage.

Molecule Computer

A **molecular computer** that uses enzymes to perform calculations has been built and it is believed enzyme-powered computers could eventually be implanted into the human body and used to, for example, tailor the release of drugs to a specific person's metabolism.

It used two enzymes to trigger two interconnected chemical reactions. Two chemical components—hydrogen peroxide^[17] and glucose^[18]—were used to represent input values A and B. The presence of each chemical corresponded to a binary 1, while the absence represented a binary 0. The chemical result of the enzyme-powered reaction was determined optically.

Notes

[1] ... from secret governmental files to banking transactions to private household accounts.

① from... to: 从……到。

② banking transactions to: 对……的金融交易 此处指银行转账, 大意为: 从政府的秘密文件到银行对私人家庭账户的账目往来。

[2] ... make available a great variety of information sources. 本句和下一句均为倒装句, 在宾语过长而其补语太短的情况下, 常使用这一结构。原结构应为“to make sth. available/possible”。

[3] computer literacy 计算机扫盲。“literacy”, 原意为“识字, 扫盲, 有读和写的能力”, 这里引申为“使用计算机的基本能力”。

[4] LCD (liquid crystal display) 液晶显示, 通过将具有极性分子结构的液体混合物夹在两个透明的电极间构成的显示方式。

[5] Personal Digital Assistant (PDA) 个人数字助理。它是一种轻便的掌上型计算机, 既有通信功能, 又有个人组织功能, 包括日历、笔记、数据库、计算器等。

[6] Wi-Fi (Wireless Fidelity) 无线保真, 是一种可以将个人电脑、手持设备, 如 PDA、手机

等终端以无线方式互相连接的技术。Wi-Fi 一词由 Wi-Fi 产业联盟(Wi-Fi Alliance)提出。

- [7] WWAN (Wireless Wide-Area Networks) 无线广域网, WWAN 技术是使得笔记本电脑或者其他的设备装置在蜂窝网络覆盖范围内可以在任何地方连接到互联网,其下载速度可以与 DSL 相媲美。
- [8] tablet 图形输入板,在工程、设计和解释类的应用程序中用于输入图形位置信息的设备。
- [9] laptop 便携式计算机,一种为便于旅行时使用而设计的小型手提式计算机,可用电池或交流电源供电。
- [10] peer-to-peer (P2P.) 点对点技术,又称对等互联网络技术,是一种网络新技术,依赖网络中参与者的计算能力和带宽,而不是把依赖都聚集在较少的几台服务器上。P2P 网络通常用于通过 Ad Hoc 连接来连接节点,也被使用在类似 VoIP 等实时媒体业务的数据通信中。纯点对点网络没有客户端或服务器的概念,只有平等的同级节点,同时对网络上的其他节点充当客户端和服务器。也有些专家称 P2P 是点对点技术,但其实它是错的,实应解作群对群(Peer-to-Peer)。在虚拟私人网络 VPN (Virtual Private Network)中,也有 P2P 这个名称,它才应解作点对点(Point-to-Point)。
- [11] motion picture 电影。
- [12] ... , the phenomenon of decreased electrical resistance observed as objects exposed to very low temperatures become increasingly colder. 此处,过去分词“observed”用作定语,修饰名词“the phenomenon”,它所带的状语从句中的过去分词短语“exposed to”修饰名词“objects”。可以翻译成“当暴露于超低温的物体的温度越来越低时,即可观察到电阻值降低的现象”。
- [13] ... ,the ideal goal being true artificial intelligence. 分词独立结构,句中起说明作用,可翻译成“理想的目标是真正的人工智能”。
- [14] quantum computer 量子计算机,由理查德·费曼提出,是从物理现象的模拟而来的。量子电脑能做出对数运算,而且速度远胜传统电脑。这是因为量子不像半导体只能记录 0 与 1,可以同时表示多种状态,一个 40 位元的量子电脑,就能解开 1024 位元电脑花上数十年解决的问题。
- [15] DNA computing, DNA 运算,或译 DNA 计算,是一种电脑运算形式,利用 DNA、生物化学以及分子生物学原理,而非传统上以硅为基础的电脑技术。
- [16] optical computer 光学计算机,利用可见光或红外光而不是电流进行数据处理,从全息存储、激光存储或存储库输入数据的计算器,多用于指纹鉴定和图像清晰化的处理过程。
- [17] hydrogen peroxide 过氧化氢:一种无色、重、具有很强氧化作用的液体 H_2O_2 。
- [18] glucose 葡萄糖:一种单糖, $C_6H_{12}O_6$, 广见于大多数动植物组织。

Exercises

I. Choose the best answer:

- We can learn from the text that a computer can _____.
 - be best used as a calculating device
 - be best used in word processing
 - find uses almost everywhere
 - have intelligence of its own
- How many types of regular computers are introduced in this text?
 - 1
 - 2
 - 3
 - 4
- Which of the following computers is the smallest according to the text?
 - a palmtop
 - A desktop
 - A minicomputer
 - A laptop
- Which of the following is implied but not stated?
 - Pupils can use computers to do their homework.
 - Advanced techniques may bring both benefits and harms to our society.
 - The distinction between micros and mainframes has become blurred.
 - A great variety of information sources are available on computer networks.
- We can infer that _____.
 - there will be no distinction between micros and mainframes in the future
 - a future computer can use several CPUs to work for it at the same time
 - the fifth generation computer will be produced within 2 years
 - electronic computers will soon be out of date
- We can draw a conclusion that _____.
 - to continue to develop and improve computer networks is one of our aims in the near future
 - the development of computers has already reached its peak
 - electronic computers have hindered the development of molecular computers
 - our society would have developed faster without computers
- Microminiaturization of future computers will be realized through the use of _____.
 - superconductivity
 - molecules
 - DNAs
 - smaller chips
- Future computers will be made very fast by employing _____.
 - superconductivity
 - smaller chips
 - more elements
 - networks
- A future computer scientist might also be _____.
 - a geologist
 - a bioengineer
 - a politician
 - a social worker