高等院校计算机专业教材

计算机英语

庞云阶　王文成　主编

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内 容 提 要

本书共 25 个单元。

前 20 个单元包括计算机科学与工程的专业基础课和专业课的各个领域,涉及了这些领域中常用的英语词汇,知识系统性强,为阅读有关英文文献资料与书刊打下了坚实的基础。

后 5 个单元涉及近年来计算机领域的新发展和新技术,内容新颖。

每单元均有参考译文、阅读文选、注释,实用性很强。

本书可作为大学本科二、三年级的教材,也可供非计算机专业的教师、学生、科技人员及广大微机使用者学习计算机英语自学用,对准备参加全国计算机应用软件英语水平考试者也是一本很好的读物。

前　　言

本书包括计算机硬件、软件、各分支领域及最新技术、应用等方面的基础性概念和内容大意,目的是使读者通过阅读此书能够熟悉和掌握计算机方面的英语词汇、术语及各种概念的英语表达、各种计算机技术原理的英语陈述,为阅读各种英语资料、编写英语计算机文字材料打下基础。内容适合计算机专业工作者、程序员、大学生、研究生、对计算机英语有兴趣的读者及在工作上与计算机相关的各类人员使用。

本书第1~5课,主要介绍计算机硬件方面的内容,包括基本部件的功能及最新发展情况;第6~10课是关于计算机软件方面的内容,程序的编写、程序语言及软件工具、计算机安全等方面的内容,包括基础性概念和进展。第11~25课概括性地介绍了计算机各学科分支的内容以及最近一些年内兴起的新技术和新应用。

本书是吉林省教委组织吉林大学、吉林工业大学、东北师范大学、长春地质学院和长春光机学院等院校计算机专业英语的任课教师编写的,根据多年的教学体会和经验,吸取国内已出版的计算机专业英语读物的优点,从几十种英语计算机书籍和刊物中进行选材、编辑而成。其中第1~5课由孙铁利编写;第6~10课由王树明编写;第11、12、15、16、24课由白宝兴编写;第13、14、19、21、23课由庞云阶编写;第17、18、20、22、25课由王文成编写。吴志衡、杨先智、崔享珠、李春阳、龚跃、姜华等分别对各课的译文进行了校核。文中的注释还请了英语专业教师协助编写。

但由于时间仓促、水平所限,错误之处仍在所难免,望广大读者批评指正,内容不足之处也望多提宝贵意见,以便改进。

编　　者
1996 年 8 月

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1 Personal Computer System

Combining the words personal and computer may give you the impression that personal computers are less sophisticated than their larger mainframe and minicomputer relatives. This is a misconception. Advances in technology have almost eliminated the gap that was formerly inherent in size. Personal computer systems are highly evolved descendants of earlier and larger computer systems.

Because of this evolution, most organizations are on the threshold of a new style of computing in which increasing amounts of computer resources are allocated to individual users in the form of personal computer systems. This new style of computing relies on the communication concepts to link groups of computers of different sizes and types so that their users can communicate and share resources.

In fact, all the computer concepts apply to personal computer systems. A good way to understand these abstract concepts is to apply them to the hardware and software components of a personal computer system.

1. 1   Personal Computer Hardware

The basic hardware components of a personal computer system consist of the
- Keyboard.
- Display.
- System unit.
- Disk drives.
- Printer.

These components perform similar functions in computers of all types and sizes. Familiarizing yourself with what they are and what they do will help you make the connection between computer concepts and tangible hardware components.

1. 1. 1   Keyboards

A keyboard is a device that converts keystrokes into special codes that can be electronically manipulated by the computer. It is one input part of the system, and it allows you to enter commands, data, or programs into the computer. The keyboard may contain 70 to 105 keys. A personal computer keyboard includes a typewriter layout and a set of keys marked with arrows that control the movement of a visual aid —a cursor— on the display screen. Some keyboards include a numeric keypad for number-intensive data entry and calculations as well as a set of function

keys. These are general-purpose keys that, depending on the application, can be set to perform different functions. The keyboard may be an integral part of the system unit, as in the case of the Apple I family of computers. But the more popular method is to have a detachable self-contained unit such as that found in IBM's Personal Computers or in Apple's Macintosh[1].

Keyboards are not the only way to communicate with a computer. A variety of alternatives to keyboard-only input exist, including light pens, touch screens, and mice. A mouse is a device used to position the cursor on a display screen in lieu of cursor control keys. A mouse also has buttons for selecting options. The primary advantage to these alternative input devices is the ease with which you can move a cursor around on the screen and execute commands.

1.1.2 Displays

A display, often called a monitor, is one of the output parts of the system. A display is a device that is used to display numbers, letters, some special characters, and graphic information.

The display is typically a CRT (cathode ray tube), the same type of tube that is found in a television set. CRTs can be found with green-phosphor, amber-phosphor, black-on -white displays, or color. Color monitors are common, but more expensive than single-color or monochrome monitors. Also, flat screens, such as LCDs (liquid crystal displays) are commonly used in portable computers.

1.1.3 The System Unit

A system unit houses the processor and memory of a personal computer system. If you were to remove the cover of the system unit and look inside, you would see the parts that make up a system unit. Note, however, that some computers do not come apart easily and that others have a warranty that is invalidated if you take the computer apart. Although it is not necessary to know how each of these parts works, it is useful, from a systems point of view, to know something about the contribution of each part to the whole system.

If you ignore for the moment all the wires and connections that link the various parts together, you will see the fundamental building blocks of all computer systems and subsystems—the integrated circuit chips. Building an integrated circuit requires such components as transistors, resistors, diodes, and capacitors. All the functional hardware parts of the computer—input, processor, storage, and output—can be made from integrated circuits.

You cannot actually see the integrated circuit chips. They are housed in sealed rectangular blocks of black plastic to protect them. One of the most important of these chips is called central processing unit (CPU) or simply the processor. In a personal computer, the CPU is the microprocessor chip. It carries out the processing tasks by interpreting and executing the instructions in a program.

Working in close conjunction with the microprocessor is a form of storage called the computer's memory. It is where the programs, along with the data to be input and the results to be output, are stored. A computer's memory is actually a collection of chips that are functionally

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divided into two types—ROM (read-only memory) and RAM (random -access memory).

ROM (read-only memory) is permanent memory that the microprocessor can read information from, but whose contents can be neither erased nor written over—thus the name, read -only memory. ROM stores the instructions that start up the computer when the power is turned on, as well as some additional programs.

RAM (random-access memory) is temporary memory that is empty until the microprocessor needs to use it, that is, until it loads programs and data into it. RAM is often called read/write memory, meaning that the microprocessor can read its contents and write programs or data into it. Most RAM is temporary, losing its contents when the computer's power is turned off. For long-term storage of information or programs,disk drives (which we will discuss soon) are connected to the system.

Memories for personal computers are rated according to their capacity,which is measured in thousands of bytes. A byte consists of 8 consecutive bits and is the equivalent of one character, such as a letter, a number,or a punctuation mark. A standard abbreviation for thousands of bytes is K, which represents the number 1024 (i. e. , 2^{10}), so the capacity of a memory that is expressed as 64K means 64×1024, or 65,536 bytes. Most personal computers come with 640K or 1024K memories, and their memories are expandable beyond that number.

1. 1. 4　Disks and Disk Drives

Disks have become the most widely used medium for the storage part of the system. A disk is a circular platter to which a recording surface has been applied. It is coated with the same material found on audio tape, and it can be erased and used over and over.

There are two types of magnetic disks: floppy disks and hard disks. Floppy disks are made from thin sheets of flexible plastic; hard disks are made from rigid platters of aluminum. The device that plays the disk is called a disk drive. It contains the mechanical equipment needed to spin or rotate the disk and the read/write head needed to record and retrieve information to and from the disk.

The most common hard disk drives are called Winchester drives, after the code name for the IBM project that developed them. In a Winchester drive, two or more disks, along with the read/write head and the spinning mechanism, are housed in a sealed container[2]. A common size for Winchester drives is 5 1/4 inches. For several technical reasons, hard disks are capable of storing much more information than floppy disks.

1. 1. 5　Printers

Printers are one output part of a computer system. A printer is a device that produces hardcopy output from a computer system by transferring an image to paper. Printers come in a wide variety of shapes, styles, and prices. Most print in one color(black), but technological breakthroughs are making color printing a feasible alternative for graphics applications. The typical printer for a personal computer is a stand-alone device that is connected to the computer by a

cable. It usually accepts continuous-form paper, but some printers will accept single sheets.

Your applications for a personal computer will determine the type of printer to use. One way to classify printers is by the method used to form the printed images. Dot-matrix printers form characters with a pattern of dots. This method can include striking a ribbon with a hammer, spraying ink with a nozzle, or transferring the pattern with heat or a laser. The quality of the output from such printers ranges from a very rough, highly visible, grainy pattern of dots to an extremely fine, high-resolution pattern. The former is quite adequate for printing drafts of documents; the latter is more desirable for printing graphic images.

The printer is connected to the computer through a port—the location through which the computer exchanges information with an external device. A port has a physical connector and an address so that programs know where to send information. The two basic types of ports are serial and parallel, but you need not be concerned with the technical differences here. Some computers come with ports built into the mother board. Others use circuit boards that plug into the computer's expansion slots.

1.2 Personal Computer Software

Personal computer software comes in many different varieties, and the applications number in the thousands, so it is useful to know how individual programs are categorized. The broadest classifications of software are system software and application software.

System software includes
- Operating systems.
- Programming languages.

Programming languages will not be discussed in this text. More information about them will be provided in lesson 7

Application software includes
- Special-purpose programs.
- General-purpose programs.

Using a personal computer involves getting used to the conventions of the user interface and the operating system, and then developing an understanding of what a computer can do by becoming familiar with some of the application software for personal computers.

1.2.1 Operating System

An operating system is a set of programs or modules that manages the overall operation of the computer system. Its primary purpose is to support application programs.

Although in theory all operating systems perform very similar functions, in practice there are many different operating systems. One reason is that different personal computers are built around different CPUs, or microprocessors, each with its own unique characteristics. Another reason is the subjective nature of user-interface design.

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1.2.1.1 MS-DOS

The ancestor of MS-DOS was developed in the early 1970s by Tim Patterson of Seattle Computer Products, Inc. Later, the Microsoft Corporation, under the leadership of William H. Gates, acquired the rights and began licensing it as MS-DOS (Microsoft disk operating system).

When IBM decided to enter the personal computer market in 1981, they licensed MS-DOS from Microsoft and renamed it PC DOS(Personal Computer disk operating system). The IBM Personal Computer quickly became very popular and because of IBM's reputation, the race was on to make computers compatible with the IBM Personal Computer. Manufacturing a computer that was IBM compatible generally meant using MS-DOS as the operating system of choice.

MS-DOS has a command-driven user interface. It prompts the user,who responds by typing a command and pressing the Enter key. Its commands can be used to format disks; copy, rename, delete, and back up files; and organize and manage files on the disk.

1.2.1.2 Macintosh Operating System

Apple's Macintosh operating system is a descendant of research done at Xerox PARC(Palo Alto Research Center) and Apple's Lisa computer,the user interface of which was designed by a team headed by Larry Tesler [3].

The Macintosh operating system uses a graphics-oriented user interface. Icons indicate functions, and a mouse is used to select them. Major modules of the operating system include Quick-Draw for drawing text and graphics on the screen, a Switcher that allows the user to divide memory among up to four different programs, and a hierarchical file system called the Finder that allows the user to group files in a number of different ways and to rearrange the groupings.

1.2.2 Application Software

Almost any kind of application that you would need is already available. It is called application software—programs that are already written and tested and that may be purchased off the shelf in retail computer stores or through mail-order outlets. This packaged software falls into two categories: special purpose and general purpose.

• Special-purpose programs. Dedicated to performing tasks such as payroll, accounting, bookkeeping, education, entertainment,or statistical analysis,the programs contain built-in problem-solving feature specially designed for those particular tasks.

• General-purpose programs. Adaptable to a wide variety of tasks,such as word processing, spreadsheet calculating, record keeping, graphics, or communications.

Words and Expessions

byte [bait] *n.* 字节，二进位组
chip [tʃip] *n.* 芯片，集成电路块

compatible 〔kəˈmpætəbl〕 *a.* 兼容的

cursor 〔ˈkəːsə〕 *n.* 光标

floppy 〔ˈflɔpi〕 *a.* 软的

hardware 〔ˈhɑːdwɛə〕 *n.* 硬件

hierarchical 〔hɑːiə ˈrɑːkikl〕 *a.* 分层的

mainframe 〔ˈmeinfreim〕 *n.* 大型机，主机

minicomputer 〔minicəmˈpjutə〕 *n.* 小型计算机

monochrome 〔ˈmɔnəkroum〕 *a.* 单色的，黑白的

mouse 〔mɑus〕 *n.* 鼠标器

resolution 〔rezəˈljuːʃən〕 *n.* 分辨率

ribbon 〔ˈribən〕 *n.* 色带

software 〔ˈsɔftwɛə〕 *n.* 软件，软设备

cathode ray tube 阴极射线管

command-driven 命令驱动

general-purpose 通用的

hard-copy 硬拷贝

problem-solving 问题求解

RAM = random access memory 随机存取存储器

ROM = read only memory 只读存储器

special-purpose 专用的

spreadsheet 电子表格

Notes

〔1〕Apple：美国苹果公司，是美国最大的微型机公司之一。

　　IBM：美国国际商用机器公司，IBM 是世界上最大的计算机公司。

〔2〕Winchester drive：温彻斯特磁盘驱动器，简称温盘。

〔3〕Xerox：美国施乐公司。

参考译文

1　个人计算机系统

　　把个人与计算机这两个词结合在一起,可能会使你产生这种印象:个人计算机不如其同类大型计算机和小型计算机这样一类的机器复杂。这是错误的概念。技术上的进步几乎已经消

除了以前固有的体积上的差别。个人计算机是较早的大型计算机系统高度发达的后代。

由于这种进步，大多数机构正处于这种新型计算方式的开端。在这种方式下，所增加的大量计算机资源以个人计算机的形式分配给各用户。这种新型计算技术依靠通讯概念连接不同规模和类型的计算机群，以便它们的用户能够相互通讯和共享资源。

实际上，所有的计算机概念都适合个人计算机系统。一种理解这些抽象概念的好方法是把它们应用于个人计算机系统的硬件和软件。

1.1 个人计算机的硬件

个人计算机系统的基本硬件包括：
- 键盘；
- 显示器；
- 系统单元；
- 磁盘驱动器；
- 打印机。

在所有类型和大小的计算机中，这些部件的功能都是相似的。熟悉它们并了解它们的用途，将有助于建立计算机概念和有形的硬部件之间的联系。

1.1.1 键盘

键盘是实现把击键转换成可由计算机进行电子运算的特定代码的设备。它是系统的一个输入部件，允许你把命令、数据或程序输入到计算机。键盘可能具有 70～105 个键。个人计算机键盘包括一个打字键区和一组标有箭头的控制显示器光标运动的光标控制键。一些键盘还包括主要用于数字数据输入和计算的数字小键盘和一组功能键。这些功能键是能够根据应用来设置以实现不同功能的通用键。键盘可能是系统单元的组成部分，如同 Apple 计算机系列那样。但是，更流行的方式是作为独立的齐备的部件，比如像 IBM 的个人计算机或 Apple 公司的 Macintosh。

键盘不是与计算机通讯的唯一工具。有许多替代键盘的输入设备，如光笔、触摸屏和鼠标器。鼠标器是用于代替光标控制键在显示器屏幕上定位光标的设备，它也有选项键。这些替代的输入设备主要优点是利用它们可以很容易地在屏幕上移动光标和执行命令。

1.1.2 显示器

显示器是系统的输出部件之一，经常称为监视器。它是用于显示数字、字母、特殊字符或图形信息。

一般的显示器是 CRT（阴极射线管），它与电视机的显像管相同。CRT 可以是绿色磷光、黄色磷光、黑白显示或彩色显示。彩色监视器是常见的，但比单色或黑白监视器更昂贵。平面显示器如 LCD（液晶显示器）也普遍用于便携式计算机。

1.1.3 系统单元

系统单元包括个人计算机系统的处理机和存贮器。如果你打开系统单元的盖子观其内部，就会看到组成系统单元的各部件。但是，有些计算机不容易打开，而另一些若打开的话，它们的

保修单就会无效。尽管没有必要弄清这些部件如何工作，但从系统观点出发，了解各个部件对整个系统的作用还是有用的。

如果暂且忽略所有导线和连接各个部件的连接器，你就会看到所有计算机系统和子系统的基本构件——集成电路芯片。构成一个集成电路需要晶体管、电阻、二极管以及电容器这样的器件。计算机所有功能硬件部分----输入部件、处理机、存储器和输出部件，都可以由集成电路构成。

实际上你无法看到集成电路，它们被密封在起保护作用的黑色塑料长方体内。这些芯片中最重要的一个叫做中央处理单元(CPU)，或简称为微处理机。在个人计算机中，CPU 是微处理机芯片，它通过解释和执行程序中的指令，执行处理任务。

与微处理机紧密相连配合工作的是叫做计算机存储器的存储机构。它是存储程序、输入数据和输出结果的场所。计算机的存储器实际是芯片的集合，这些芯片按功能可分为两类——ROM(只读存储器)和 RAM(随机存取存储器)。

ROM(只读存储器)是微处理机可以从中读取信息的永久性存储器。但是，它的内容既不能擦除，也不能重写，因而得名只读存储器。当接通电源时，ROM 存储的若干指令能够启动计算机。它还存储一些附加的程序。

RAM(随机存取存储器)是暂时性存储器，直到微处理机需要使用它以前，即在加载程序和数据之前，RAM 是空的。RAM 通常叫做读/写存储器，这表明微处理机可以读取它的内容，并能向它写入程序或数据。多数 RAM 具有暂存性，当计算机电源关闭后就会失去它的信息。为了长期存储信息或程序，需要把磁盘驱动器(我们将在后面讨论它)连接到系统中。

对于个人计算机存储器的评价要根据它们的容量而论。容量以千字为计量单位。字节是由 8 个连续位组成的一个字符(如字母、数字或一个标点符号)。1 千字节的标准缩写是 K，它代表 1024(即 2^{10})。因此，一个存储器容量为 64K 则代表 64×1024，或 65,536 字节，大多数个人计算机具有 640K 或 1024K 存储器，经扩充后，它们的存储器容量可以超过这个值。

1.1.4 磁盘和磁盘驱动器

磁盘已经成为系统的存储部件最广泛使用的介质。磁盘是可以提供记录表面的圆形平面。它的表面覆盖着与录音带上同样的物质，并且可以擦除和反复使用。

有两种磁盘：软盘和硬盘。软盘由软塑料的薄片制成，硬盘由硬金属铝碟制成，控制磁盘的设备叫做磁盘驱动器，它包括用于旋转磁盘的机械装置以及用于向磁盘写信息和从磁盘读信息的读/写磁头。

最常见的硬盘驱动器叫做 Winchester 驱动器，这个名称来源于开发它们的 IBM 项目的代码名。在 Winchester 驱动器中，两片或多片磁盘、读/写磁头和旋转机构安装在一个密封的容器里。Winchester 驱动器的常见尺寸是 5.25 英寸。由于几方面的技术原因，硬盘存储信息的能力比软盘大得多。

1.1.5 打印机

打印机是计算机系统的一个输出部件。打印机是以传送图像到纸上的方式，实现从计算机系统产生硬拷贝输出的设备。打印机有许多不同的形状、种类和价格。大多数以单色(黑色)打印。但是，技术上的惊人进展正在使彩色打印成为图形应用的可行的一种选择方式。对于个人

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计算机,一般的打印机是一个通过电缆与计算机连接的独立的设备。它通常使用连续打印纸,但有些打印机可使用单页纸。

你对个人计算机的应用将决定使用打印机的类型,对打印机分类的一种方法是根据形成的打印图形来确定。点阵打印机根据点的图形形成字符。这种方法可以包括以字锤打击色带、以喷嘴喷墨、以及以热量或激光传送图形。这类打印机输出的质量,其范围从很粗糙、明显可见的颗粒状的点阵图形,到相当细腻的高分辨率的图形,前者很适合打印文件草稿;后者对于打印图像更适合。

打印机通过接口与计算机连接,接口是计算机与外部设备交换信息的场所。接口具有一个物理连接器和地址,以便程序知道向什么地方发送信息。两种典型的接口是串行接口和并行接口,但在这里你不需要顾虑二者技术的差别,有些计算机的接口设计在母板上,另一些则使用插入计算机的扩展槽的线路板。

1.2 个人计算机软件

个人计算机软件有许多种,其应用数量可达几千种。因此,了解各个程序如何分类是有必要的。最主要的软件分类是系统软件和应用软件。

系统软件包括:

· 操作系统;

· 程序设计语言。

程序设计语言不在本课讨论,关于它们的信息将在第7课提供。

应用软件包括:

· 专用程序;

· 通用程序。

使用个人计算机包括适应用户界面和操作系统的规定,并且再通过逐渐熟悉个人计算机的一些应用软件,加深对计算机功能的理解。

1.2.1 操作系统

操作系统是管理计算机系统总体操作的程序或模块的集合。它的主要目标是支持应用程序。

尽管理论上所有的操作系统都实现非常相似的功能,但实际上有许多不同的操作系统。原因之一是不同的个人计算机基于不同的CPU或微处理机,每一种都有其自身的特点。另一个原因是用户界面设计的主观特性。

1.2.1.1 MS-DOS

70年代初期,Seattle Computer Products公司的Tim Patterson开发出了MS-DOS的前身。在William H. Gates领导下的Microsoft公司获得开发权,并且以MS-DOS(微软磁盘操作系统)之名发放许可。

1981年,当IBM决定进入个人计算机市场时,他们从Microsoft获准使用MS—DOS,并且重新命名为PC—DOS(个人计算机磁盘操作系统)。IBM个人计算机很快变得非常流行,由于IBM的声望,出现了制造与IBM个人计算机兼容的计算机的竞赛。制造一台IBM兼容机通常

意味着选择 MS—DOS 作为其操作系统。

MS—DOS 具有命令驱动的用户界面。它提示用户,用户通过键入一个命令并按回车键响应。它的命令用于格式化磁盘;拷贝、更名、删除和备份文件;并且可以组织和管理磁盘上的文件。

1.2.1.2 Macintosh 操作系统

Apple 公司的 Macintosh 操作系统是在 Xerox PARC 和 Apple Lisa 计算机所开展的研究基础上产生的,它的用户界面是以 Larry Tesler 为首的研究组织设计的。

Macintosh 操作系统使用面向图形的用户界面。图标指示各种功能,可以使用鼠标器选择它们。该操作系统中主要模块包括用于屏幕上绘制文件和图形的 QuickDraw、允许用户能够把存储器分给四个不同程序的 Switcher 以及允许用户以一些不同方式对文件分组和重新安排这些分组的 Finder 分级文件系统。

1.2.2 应用软件

几乎你可以得到所需要的任何应用程序,这种程序称为应用软件,即已经编制、测试并可能从计算机零售商店的货架上买到或通过邮购的程序。这类包装的软件分为两种:专用程序和通用程序。

·专用程序:它们致力于完成以下任务:工资表、会计、记帐、教育、娱乐或统计分析。这种程序包含为那些特定任务专门设计的内部问题求解性能。

·通用程序:它们适用于很广泛的任务,例如字处理、电子表格计算、记录保存、图形或通讯。

<div align="right">(孙铁利译   姜华校)</div>

Reading Materials

What Is a Computer

The basic job of computers is the processing of information. For this reason, computers can be defined as very-high-speed electronic device which accept information in the form of instructions called a program and characters called data, perform mathematical and/or logical operations on the information, and then supply results of these operations. The program, or part of it, which tells the computers what to do and the data, which provide the information needed to solve the problem, are kept inside the computer in a place called memory.

Computers are thought to have many remarkable powers. However, most computers, whether large or small have three basic capabilities. First, computers have circuits for performing arithmetic operations, such as: addition, subtraction, multiplication, division and exponentiation. Second, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines wouldn't be of much use. However, certain

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