普通高等教育“十一五”国家级规划教材

高等学校专业英语教材

计算机专业英语教程（第4版）

金志权　张幸儿　主编
张景祥　编

電子工業出版社
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内 容 简 介

本书为普通高等教育“十一五”国家级规划教材。本书旨在使读者掌握计算机专业英语术语，培养和提高读者阅读和笔译专业英语文献资料的能力，并通过课堂英语交流，提高学生英语口语能力。期望通过本教程的学习，巩固和扩大计算机专业知识面。

本书素材取自国外最近几年计算机科学各个领域的最新教材、专著、论文和计算机网络信息，内容新颖、覆盖面广、系统性强、可读性高。为了方便教学，本书另配有电子教案和授课建议，向采纳本书作为教材的教师免费提供。

本书可以作为高等院校计算机专业的专业英语教材，也可供计算机专业人员及其他有兴趣的读者学习参考。

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第 4 版前言

本书为普通高等教育“十一五”国家级规划教材。为了进一步及时反映计算机科学的当前发展，使读者了解计算机科学中当前最热门的术语和基础知识，第 4 版除了在内容上做一定的调整外，还进一步做了如下的补充。

- 硬件方面增加：多核处理器、智能卡、PCI Express 等
- 语言部分增加：Java Script、Web 程序设计等
- 网络部分增加：连接 Internet 的类型、Web 2.0、Internet 2
  无线网络技术（红外、蓝牙、Wi-Fi、WiMAX）
- 数据库部分增加：对象关系数据库
- 多媒体部分增加：MP4 等
- 人工智能部分增加：Game AI
- 应用部分增加：全球定位系统、办公自动化、电子政务等
- 软件开发部分增加：敏捷软件开发方法
- 网络安全部分增加：KMI/PKI
- 另外还增加：嵌入式系统、分布式系统

为了让读者熟悉基本硬件和 OS 的中英文对照，以及一些新缩略语和术语，本版还增加如下内容：

- 常见界面、接口图，如 PC 机主板图、机背后端口图、Windows 的主要界面，浏览器的主要界面、RAID 图等
- 一些缩略语和术语的解释，如 FSB、DDR、cluster、Disk cache、SSD、Modeling language、RFID、Blog、Wiki、DSS、Computer animation、ERP、CRM、CAI、CAT、CAE、CAPP、PLC、MVC、CORBA、Web services、SOA、P2P、Grid、Software agent 等
- 另外还对相近概念，如 E-Business 和 E-Commerce、NAND 和 NOR 闪存等，做了对比解释

第 4 版还增加了关于电子产品说明书的内容，以帮助读者了解这类英文资料的阅读。

本版保持了前三版的编排格式和基本风格。各校教师可根据自己的具体情况，因材施教，在每一主题单元里挑选若干篇课文进行教学。本书每一单元都给出了笔译和口语两种练习题。为了加强学生的英语口语能力，可结合所列题目，组织学生进行课堂小组讨论或讲述。为了方便教学，本书另配有电子教案，若干参考课文和授课建议，向采纳本书作为教材的教师免费提供（获取方式：登录电子工业出版社华信教育资源网 www.hxedu.com.cn 或电话联系 010-88254537 获得）。

本书共分16单元，第1、2、4、5、6、8、10、15、16单元由金志权编写，第3、7、9、11、12、13、14单元由张幸儿编写。彼此进行了互审。本书的电子教案由济南大学张景祥编写制作，新增加的课文参考译文由金志权和张幸儿提供，附在电子教案中。

在此感谢对本书的编写给予帮助的南京大学陈佩佩、李存珠、陆钟楠、张福炎、李宣东、黄皓、宋健建等老师，南京师范大学顾铁成老师，南京大学外国语学院王守成、杨治中、侯焕谬、张子清等老师，同时对丁正全、张万华、韩杰等老师提供的帮助，在此我们一并表示诚挚的谢意。

限于作者水平，书中难免会有不妥和错误之处，敬请读者批评指正。

反馈意见请发邮件至：jinzq@software.nju.edu.cn；zhangxr0@sina.com。

编　　者

于南京大学

CONTENTS

Unit 1 Hardware Ⅰ

1.1 A Closer Look at the Processor and Primary Storage

We have learned that all computers have similar capabilities and perform essentially the same functions, although some might be faster than others. We have also learned that a computer system has input, output, storage, and processing components; that the processor is the"intelligence"of a computer system; and that a single computer system may have several processors. We have discussed how data are represented inside a computer system in electronic states called bits. We are now ready to expose the inner workings of the nucleus of the computer system—the processor.

The internal operation of a computer is interesting, but there really is no mystery to it. The mystery is in the minds of those who listen to hearsay and believe science-fiction writer. The computer is a nonthinking electronic device that has to be plugged into an electrical power source, just like a toaster or a lamp.

Literally hundreds of different types of computers are marketed by scores of manufacturers[1]. The complexity of each type may vary considerably, but in the end each processor, sometimes called the **central processing unit or CPU**, has only two fundamental sections: the control unit and the arithmetic and logic unit. Primary storage also plays an integral part in the internal operation of a processor. These three—primary storage, the control unit, and the arithmetic and logic unit—work together. Let's look at their functions and the relationships between them.

Unlike magnetic secondary storage devices, such as tape and disk, primary storage has no moving parts. With no mechanical movement, data can be accessed from primary storage at electronic speeds, or close to the speed of light. Most of today's computers use DRAM (Dynamic Random-Access Memory) technology for primary storage. A state-of-the-art DRAM chip about one eighth the size of a postage stamp[2] can store about 256,000,000 bits, or over 25,600,000 characters of data!

Primary storage, or main memory, provides the processor with temporary storage for programs and data. All programs and data must be transferred to primary storage from an input device (such as a VDT) or from secondary storage (such as a disk) before programs can be executed or data can be processed. Primary storage space is always at a

premium; therefore, after a program has been executed, the storage space it occupied is reallocated to another program awaiting execution.

Figure 1-1 illustrates how all input/output (I/O) is "read to" or "written from" primary storage. In the figure, an inquiry (input) is made on a VDT. The inquiry, in the form of a message, is routed to primary storage over a channel (such as a coaxial cable). The message is interpreted, and the processor initiates action to retrieve the appropriate program and data from secondary storage[3]. The program and data are "loaded", or moved, to primary storage from secondary storage. This is a nondestructive read process. That is, the program and data that are read reside in both primary storage (temporarily) and secondary storage (permanently). The data are manipulated according to program instructions, and a report is written from primary storage to a printer.

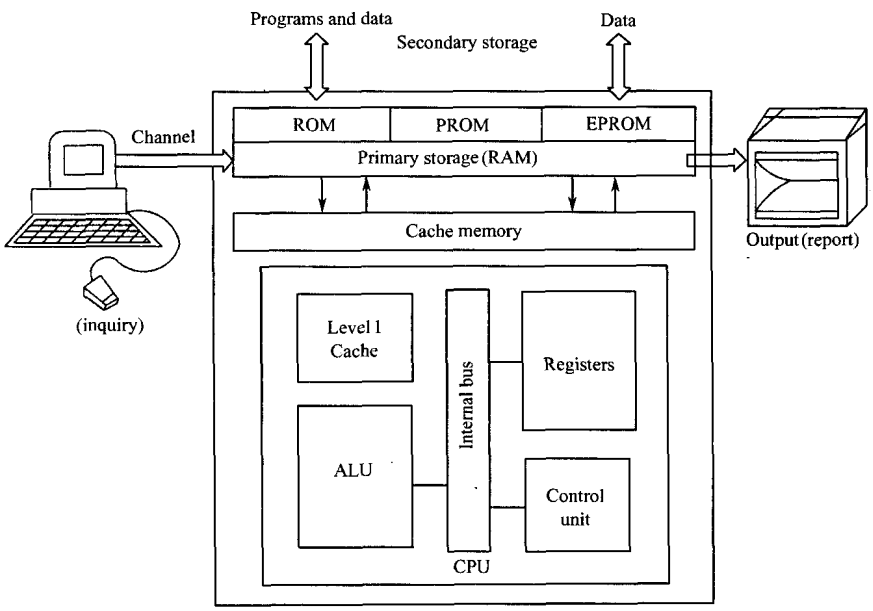

Figure 1-1 Interaction Between Primary Storage and Computer System Components
All programs and data must be transferred from an input device or from secondary storage before programs can be executed and data can be processed. During processing, instructions and data are passed between the various types of internal memories, the control unit, and the arithmetic and logic unit. Output is transferred to the printer from primary storage.

A program instruction or a piece of data is stored in a specific primary storage location called an **address**. Addresses permit program instructions and data to be located, ac-

cessed, and processed. The content of each address is constantly changing as different programs are executed and new data are processed.

Another name for primary storage is random-access memory, or RAM. A special type of primary storage, called **read-only memory (ROM)**, cannot be altered by the programmer. The contents of ROM are "hard-wired" (designed into the logic of the memory chip) by the manufacturer and can be "read only". When you turn on a microcomputer system, a program in ROM automatically readies the computer system for use. Then the ROM program produces the initial display screen prompt.

A variation of ROM is **programmable read-only memory (PROM)**. PROM is ROM into which you, the user, can load "read-only" programs and data. Once a program is loaded to PROM, it is seldom, if ever, changed[4]. However, if you need to be able to revise the contents of PROM, there is **EPROM**, erasable PROM. Before a write operation, all the storage cells must be erased to the same initial state.

A more attractive form of read-mostly memory is **electrically erasable programmable read-only memory (EEPROM)**. It can be written into at any time without erasing prior contents; only the byte or bytes addressed are updated[5].

The EEPROM combines the advantage of nonvolatility with the flexibility of being updatable in place[6], using ordinary bus control, address, and data lines.

Another form of semiconductor memory is **flash memory** (so named because of the speed). Flash memory is intermediate between EPROM and EEPROM in both cost and functionality. Like EEPROM, flash memory uses an electrical erasing technology. An entire flash memory can be erased in one or a few seconds, which is much faster than EPROM. In addition, it is possible to erase just blocks of memory rather than an entire chip. However, flash memory does not provide byte-level erasure[7]. Like EPROM, flash memory uses only one transistor per bit, and so achieves the high density of EPROM.

Cache Memory

Program and data are loaded to RAM from secondary storage because the time required to access a program instruction or piece of data from RAM is significantly less than from secondary storage. Thousands of instructions or pieces of data can be accessed from RAM in the time it would take to access a single piece of data from disk storage[8]. RAM is essentially a high-speed holding area for data and programs. In fact, nothing really happens in a computer system until the program instructions and data are moved to the processor. This transfer of instructions and data to the processor can be time-consuming, even at microsecond speeds. To facilitate an even faster transfer of instructions

and data to the processor, most computers are designed with **cache memory**. Cache memory is employed by computer designers to increase the computer system **throughput** (the rate at which work is performed).

Like RAM, cache is a high-speed holding area for program instructions and data. However, cache memory uses SRAM (Static RAM) technology that is about 10 times faster than RAM and about 100 times more expensive. With only a fraction of the capacity of RAM, cache memory holds only those instructions and data that are likely to be needed next by the processor. Two types of cache memory appear widely in computers. The first is referred to as *internal cache* and is built into the CPU chip. The second, *external cache*, is located on chips placed close to the CPU chip. A computer can have several different levels of cache memory. *Level* 1 *cache* is virtually always built into the chip. *Level* 2 *cache* used to be external cache but is now typically also built into the CPU like level 1 cache.

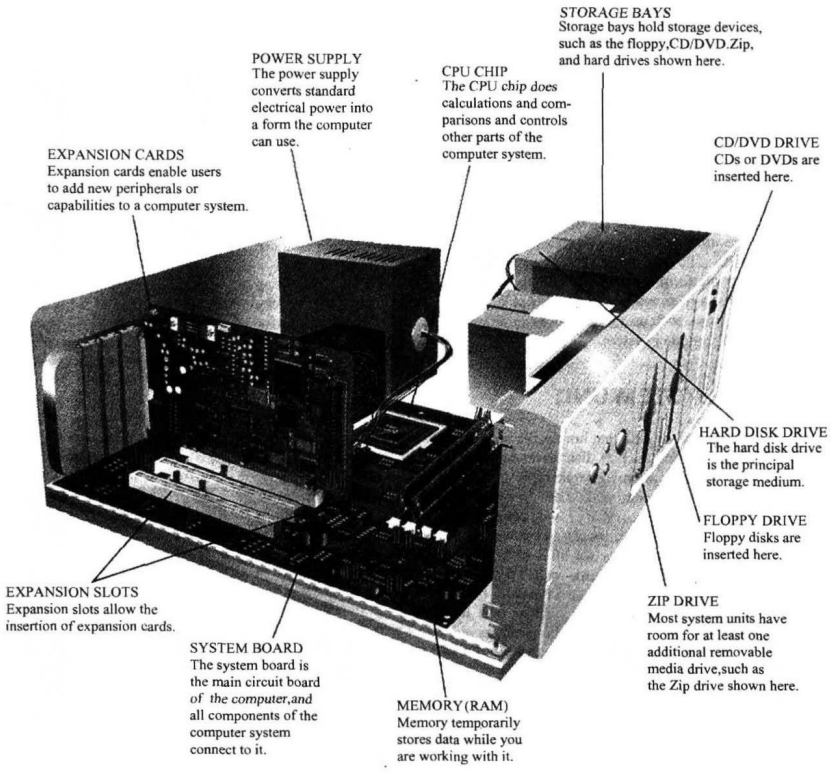

Figure 1-2 Inside a typical PC system unit. The system unit houses the CPU, memory, and other important pieces of hardware.

Words and Expressions

processor [ˈprəusesə] *n.* 处理机
primary storage 主存储器
bit [bit] *n.* 位，二进制位，比特
hearsay [ˈhiəsei] *n.* 传闻，谣传
scores of 许多
CPU 中央处理机
control unit 控制部件
arithmetic and logic unit 算术逻辑部件
integral parts 不可缺的部分，组成部分
tape and disk 这里指磁带和磁盘
DRAM 动态随机存取存储器
SRAM 静态随机存取存储器
register [ˈredʒistə] *n.* 寄存器，记录，登记簿，登记，注册
a state of the art (the state of the art) 目前工艺水平，最新发展水平
chip [tʃip] *n.* 芯片
VDT (Video Display Terminal) 视频显示终端
secondary storage 辅助存储器，二级存储器
at a premium 非常珍贵
reallocate [riːˈæləkeit] *v.* 重新分配
capacity [kəˈpæsiti] *n.* 容量
coaxial cable 同轴电缆
program and data 程序和数据
instruction [inˈstrʌkʃən] *n.* 指令
location [ləuˈkeiʃən] *n.* 单元，位置
RAM 随机存取存储器；ROM 只读存储器
hardwired *adj.* 硬连线，硬件(线路)实现的
EPROM 可擦可编程只读存储器
cache [kæʃ] *n.* 高速缓存，隐藏
throughput [θruːˈput] *n.* 吞吐量，生产量，生产能力
read-mostly *adj.* 以读为主的，大多数为读的
EEPROM 电可擦可编程 ROM
nonvolatility [nɔnˈvɔləˈtiliti] *n.* 非易失性
updatable [ˈʌpˌdeitəbl] *adj.* 可修改的

in place　在适当的地方，存在
semiconductor [semikən'dʌktə] *n.* 半导体
flash memory　闪存
functionality [ˈfʌŋkʃəneiliti] *n.* 功能，功能性，函数性
byte-level　字节级
be referred to as　称做，叫做
virtually ['vəːtjuəli] *adv.* 事实上，实际上
house [haus] *vt.* 存放，给……房子住
expansion [iks'pænʃən] *n.* 扩充，开展
peripheral [pə'rifərəl] *adj.* 外围的；*n.* 外围设备，外设
slot [slɔt] *n.* 插槽，槽
power supply　电源，供电
system board　系统板＝ mother board 主板
storage bay　存储机架
floppy ['flɔpi] *n.* 软盘
Zip drive 见 2.4 节 Notes 2

Notes

1. 这里 are marketed 意为“被销售”，literally 译为“不加夸张地讲，确实地”。全句可译为：不加夸张地讲，市场上有几百种不同类型的计算机在销售。
2. about one eighth the size of a postage stamp 是介词短语，修饰前面的 DRAM chip，即约 1/8 邮票大小(的)。
3. retrieve the appropriate…意为“取出所需的……”，initiate 译为“启动，初始化”。本句译为：消息被解释，处理机从辅助存储器取出所需的程序和数据。
   本句的上一句中 route 译为“发送，路由”。全句译为：查询以消息的形式通过通道（像同轴电缆）发送到主存储器。
4. it is seldom, if ever, changed 中插入的 if ever 是常见用法，可译为“它简直从不改变”。
5. only the byte or bytes addressed 中 addressed 修饰前面的 the byte or bytes。本句可译为：EEPROM 在任何时候都可写入，不需擦除原先内容，且只更新寻址到的字节或多个字节。
6. being updatable in place 是 of 的介词短语。in place 是指需要更新的地方，因此短语的含义是“可更新、需要更新的字节”。本句可译为：EEPROM 把非易失性优点和可更新、需更新的地方的灵活性结合起来，修改时使用普通的总线控制线、地

址线和数据线。

7. 本句说的“闪存不提供字节级的擦除”(flash memory does not provide byte-level erasure) 是针对 EEPROM 可对字节修改,即提供字节级的擦除;而 EPROM 若要修改字节,则必须先擦除整块 EPROM 的原先内容,所以三种存储的擦除单位分别是:

EPROM	整个存储器
Flash memory	块(类似于硬盘)
EEPROM	字节(可能多个字节)

目前的移动 U 盘,数码相机等的闪存卡:CF 卡(Compact Flash),Smart Media 卡,xD 卡(eXtreme Digital),记忆棒(Memory Stick),SD 卡(Secure Digital) 等都用闪存。

8. it would take to access…是定语从句,修饰前面的 the time,其前面省略了关系代词 that。it 是引导词,作形式主语,真实主语是动词不定式 to access…。access 译为“访问,存取”。全句译为:从磁盘存储器上存取单个数据所花的时间,可以从 RAM 中存取几千条指令或数据。

注:本节主要介绍计算机的 CPU,主存及闪存等内容。

1.2 Bus Interconnection

A bus is a communication pathway connecting two or more devices. A key characteristic of a bus is that it is a shared transmission medium[1]. Multiple devices connect to the bus, and a signal transmitted by any one device is available for reception by all other devices attached to the bus. If two devices transmit during the same time period, their signals will overlap and become garbled. Thus, only one device at a time can successfully transmit.

Typically, a bus consists of multiple communication pathways, or lines. Each line is capable of transmitting signals representing binary 1 and binary 0. Over time, a sequence of binary digits can be transmitted across a single line. Taken together[2], several lines of a bus can be used to transmit binary digits simultaneously (in parallel). For example, an 8-bit unit of data can be transmitted over eight bus lines.

Computer systems contain a number of different buses that provide pathways between components at various levels of the computer system hierarchy [3]. A bus that connects major computer components (processor, memory, I/O) is called a *system bus*.

A system bus consists, typically, of from 50 to 100 separate lines. Each line is assigned a particular meaning or function. Although there are many different bus designs, on any bus the lines can be classified into three functional groups (Figure 1-3): data,