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通信与电子信息类专业英语

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NEFUP

前　言

　　21世纪中国面临着两大挑战：其一，在信息技术上实现跨越式发展，缩短与发达国家的差距；其二，在经济、政治和军事全球化进程中占据主导地位。在迎接这两大挑战的过程中，高等教育教学中有一个很好的切入点，即通信与电子信息类专业外语的教学研究。

　　本教材基于计算机科学与技术、电子信息工程、通信工程三个专业的基础内容，突出基本概念、基本公式和定理的说明，同时参考近年来大量相关技术资料，挑选内容新、范围广、实践性强的材料编写而成。本教材分通信技术、信息技术、网络多媒体和计算机四大部分，共16单元，每单元的内容主要由一篇主课文、单词、注释和配套练习组成。其中词汇表及注释，主要为帮助读者理解课文内容。每单元又针对学习内容，在专业词组、专业术语和翻译三部分设置了练习，帮助读者提高通信与电子信息专业英语的阅读与理解能力。本书的大部分内容，已在近两年的教学实践中得到了检验且效果良好。

　　本教材适用于高校通信与电子信息类学生专业外语素养的训练，有助于学生缩短其掌握和使用进口设备的时间；有助于增强其阅读和撰写学术论文和科技文章的能力；同时，开设专业外语课程可以在一定程度上弥补大学英语教学在大二学年度之后形成的"真空"，给学生一个接触、学习英语的环境。

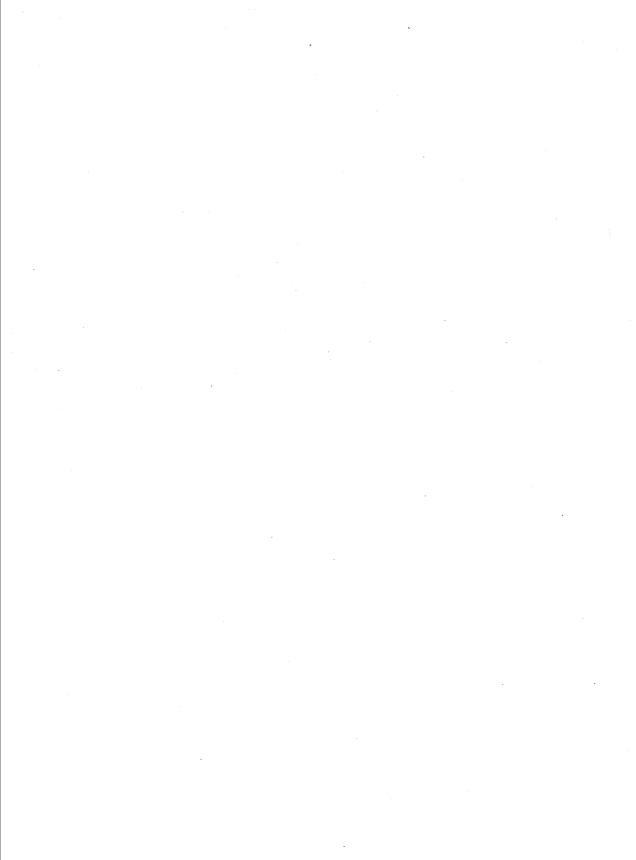　　由于作者水平有限，书中难免会出现一些错误和不足之处，敬请读者批评指正。在此对所有参与本书编写及在编写过程中给予支持的老师们表示感谢！

编　者
2005 年 8 月

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第一篇
计算机

UNIT 1　COMPUTER HARDWARE FUNDAMENTALS

THE CENTRAL PROCESSING UNIT

The central processing unit (CPU) is the heart of the computer systems. Among other things, its configuration determines whether a computer is fast or slow in relation to other computers. The CPU is the most complex computer system component, responsible for directing most of the computer system activities based on the instructions provided. As one computer generation has evolved to the next, the physical size of the CPU has often become smaller and smaller, while its speed and capacity have increased tremendously. Indeed, these changes have resulted in microcomputers that are small enough to fit on your desk or your lap.

The CPU comprises the control unit and the arithmetic/logic unit (ALU).

The control unit is responsible for directing and coordinating most of the computer systems activities. It determines the movement of electronic signals between main memory and the arithmetic/logic unit, as well as the control signals between the CPU and input/output devices.

Just as a car is useless without gas, a computer is not much good without software instructions. When we use software, we are working with high level instructions that are to be carried out by the control unit. These instructions are converted by a language processor into a low level form of instructions that the computer can work with machine language, the only language that the CPU can understand. In machine language, data and instructions are represented in binary form (0 s and 1 s). Once the instructions have been converted into this form, they can be retrieved from main memory and interpreted by the control unit. According to each specific instruction, the control unit issues the necessary signals to other computer system components as needed to satisfy the processing requirements[1]. This could involve, for example, directing that data be retrieved from a disk storage device[2], 'telling' the printer to print the letter you just wrote, or simply directing the arithmetic /logic unit to add two numbers.

Without the arithmetic/logic unit (ALU), computers would not be able to do most

of the tasks that we find useful. The ALU performs all the arithmetic and logical functions that is, it adds, subtracts, multiplies, divides, and does comparisons. These comparisons, which are basically 'less than', 'greater than', and 'equal to', can be combined into several common expressions, such as 'greater than or equal to'. The objective of most instructions that use comparisons is to determine which instruction should be executed next.

The ALU controls the speed of calculations and so receives a great deal of attention from computer users. Older microcomputers' speeds are usually measured in milliseconds 1 thousandth of a second. Newer microcomputers' speeds are measured in nanoseconds 1 billionth of a second. If a nanosecond were equal to one minute, then a minute would be equal to 1 900 years!

COMPUTER HARDWARE

Computer hardware can be divided into four categories:
* Input hardware
* Storage hardware
* Processing hardware
* Output hardware

Input Hardware
The purpose of input hardware is to collect data and convert it into a form suitable for computer processing. The most common input device is a keyboard. It looks very much like a typewriter keyboard. Its keys are arranged in the typical typewriter layout. There are also a number of additional keys. They can be used to enter special computer related codes. Although it isn't the only type of input device available, the computer keyboard is the one that is most generally used by the business community.

Storage Hardware
The purpose of storage hardware is to provide a means of storing computer instructions and data in a form that is relatively permanent, that is, the data is not lost when the power is turned off and easy to retrieve when needed for processing. Storage hardware stores data as electromagnetic signals or laser etched spot, commonly on disk or tape, rather than on paper.

Processing Hardware
The purpose of processing hardware is to retrieve, interpret, and direct the execu-

tion of software instructions provided to the computer. The most common components of processing hardware are the central processing unit and main memory.

The central processing unit (CPU) is the brain of the computer. It reads and interprets software instructions and coordinates the processing coordinate activities that must take place. The design of the CPU affects the processing power and speed of the computer, as well as the amount of main memory it can use effectively. With a well designed CPU in your computer, you can perform highly sophisticated tasks in a very short time.

Main memory (also called internal memory, primary storage, or just memory) can be thought of as an electronic desktop. The more desk surface you have in front of you, the more you can place on it. Similarly, if your computer has a lot of memory, you can place more simple software instruction or sophisticated software; a computer with a large memory is more capable of holding the thousands of instruction that are contained in the more sophisticated software programs. A large memory also allows you to work with and manipulate great amounts of data and information at one manipulate time.

Output Hardware

The purpose of output hardware is to provide the user with the means to view information produced by the computer system. Information is output in either hardcopy or softcopy form. Hardcopy output can be held in your hand examples are paper with text (words or numbers) or graphics printed on it. Softcopy output is displayed on a monitor, a television like screen on which you can read text and graphics.

MONITOR AND SYSTEM UNIT

Monitor

The term monitor is used interchangeably with screen, video display screen, and cathode ray tube (CRT). This output device provides your principal visual contact with the microcomputer system. When you enter commands or data from the keyboard, you see the results on the monitor. A color monitor, often referred to as an RGB (for red, green, blue) monitor, can display text and graphics in various colors. Most of the capabilities of the monitor, including image clarity and the ability to do graphics, are determined by the sophistication of the video display circuit board, if any, contained within the system unit. In any case, the user needs the appropriate software to take advantage of a monitor's capabilities including the ability to display graphics.

System Unit

The main computer system cabinet, called the system unit, usually houses the power supply, the system board, and the storage devices (although some storage devices disk drives, for example are often housed in cabinets outside the system unit). These elements can be defined as follows:

* The power supply provides electrical power to all components housed in the system unit. In some microcomputers, it also provides power to the monitor

* The system board, also known as the motherboard, is the main circuit board of the microcomputer system. It normally includes (1) the microprocessor chip; (2) main memory chips; (3) all related support circuitry, and (4) the expansion slots where additional components can be plugged in

* The storage devices are usually one or more floppy disk drives and high capacity hard disk drives. A floppy disk, or diskette, is a thin plastic disk enclosed in a paper or plastic covering that can be magnetically encoded with data. Hard disks are rigid disks capable of storing much more data than a floppy disk. (And hard disk drives access data faster than floppy disk drives do.) Hard disks are more expensive than floppy disks. Since most hard disks are permanently installed in the system unit, floppy disks, which can be carried around, are often used to move data from one computer to another

* Additional components: The expansion slots on the system board allow users to add new components to their computer system. The most popular add on component includes: (1) a memory card containing main memory chips that give you additional main memory; (2) an internal modem to facilitate data communication between computers over phone lines and similar cables; (3) a battery powered clock and calendar mechanism; (4) additional printer ports that allow you to communicate with several types of output devices; and (5) video display boards

RAM AND ROM

There are two well known types of memory chips. One type is called RAM. The other type is ROM.

RAM

RAM (random access memory) chips hold the program and data that the CPU is presently processing. That is, it is temporary or volatile storage.

The principal function of RAM is to hold: (1) Data for processing; (2) Instructions for processing the data that is, the program; (3) Information that is, processed data waiting to be output or sent to secondary storage such as a floppy disk in a disk drive.

One of the most important facts to know about RAM is that the part of its content is held only temporarily. In other words, it is stored only as long as the microcomputer is turned on. When you turn the machine off, the contents immediately vanish. The stored contents in memory are volatile and can vanish very quickly, as during a power failure[3]. It is therefore a good practice to repeatedly save your work in process to secondary storage medium such as floppy disk or hard disk.

The next important fact to know about memory is that its capacity. The banks of RAM chips[4] (a group of chips, usually nine, arranged in a row) are sometimes on a memory expansion card, which fits inside the system cabinet and sometimes are on the main circuit board. The amount of data that can be stored in RAM is measured in bytes. Most desktop PCs sold today have about 256 MB of RAM and allow the addition of more memory. Two types of memory are used to increase RAM expanded memory and extended memory. The type used is influenced by the sophistication of microprocessor in your machine.

ROM

How does your computer know what to do when you turn it on? How does it know to check out your hardware components (such as the keyboard or the monitor) to see that they have been connected correctly? Instructions to perform such operations, which are critical to the operation of computer, are stored permanently on a read only memory (ROM) chip installed by the manufacturer inside the computer. The ROM chip retains instructions in a permanently accessible, nonvolatile form. When the power in the computer is turned off, the instructions stored in ROM will not be lost.

Certain types of ROM chip give users added flexibility. Programmable read only memory (PROM) chips allow you to put your own data and programs on them. Erasable programmable read only memory (EPROM) chips can be changed by using a special ultraviolet light device; however, you have to take EPROM chips out of the computer to change the data and programs on them. Electrically erasable programmable read only memory EEPROM chips can be changed without taking them out of the computer.

COMPUTER SECONDARY STORAGE

Computer storage is the holding of data in an electromagnetic form for access by a computer processor.

Primary storage holds data in random access memory (RAM) and other 'built in' devices. In addition to RAM, primary storage includes read only memory (ROM).

Secondary storage retains data on hard disks, tapes, and other external devices such as diskettes and CD ROMs.

Primary storage is much faster to access than secondary storage because of the proximity of the storage to the processor or because of the nature of the storage devices. On the other hand, secondary storage can hold much more data than primary storage. The following are examples of secondary storage units found in most computers.

The Hard Disk Drive (HDD) is the mechanism that controls the positioning, reading, and writing of the hard disk. The hard disk is the main secondary storage device used to permanently store information and consists of one or more magnetic disks contained in a box. An important function of a hard disk is to store program files and data files. Today's computers typically come with a hard disk that contains several billion bytes (gigabytes) of storage.

A Floppy Disk Drive (FDD) is a removable storage device that reads and writes information magnetically onto floppy diskettes. The term 'floppy' refers back to the 5.25′ diskette that was actually soft and flexible.

The 3.5′ diskettes that we use today have a hard plastic exterior shell in order to protect the thin, flexible disk inside. A HDD is mounted inside the system unit and only removed for repairs or upgrades. The FDD provides removable storage, giving users the ability to take their files with them. The drawback to the floppy diskette is that it only holds 1.44 Mb of information. This is plenty of space for most text documents (Word and Excel files), but for files containing graphics, a floppy capacity may be insufficient.

A CD ROM Drive is a secondary storage device that reads information stored on a compact disc. While floppy and hard disks are magnetic media, the CD ROM is an optic media. Magnetism can simply fade away in time; however, the life span of optic media is counted in tens of years, which makes CD ROM a very useful tool for archiving data. A CD ROM can hold 640 Mb of data. CD ROM drives can be housed inside

the computer case (internal), or connected to the computer by a cable (exterior).

The most important specification for a CD ROM drive is its speed, how fast the disc will spin. The faster the disc spins, the faster the data can spin be transferred to the computer memory. The CD ROM's speed is indicated with an 'x' after it. For example, a twenty four speed CD ROM is labeled as a 24x. The larger the number, the faster the disc can spin. Most new computer systems today come with a 52x CD ROM drive, and more and more have a DVD option.

Expansion Card

An expansion card is the circuitry designed to provide expanded capability to a computer. It is provided on the surface of a standard size rigid material (fibreboard or something similar) and plugged into one of the computer's expansion slots on its motherboard. Cards may come in one of two sizes designed to match standard slot dimensions.

Video Card

The video card or video adapter is what provides the interface between the computer and the monitor. The video card is installed into one of the expansion slots on the motherboard. The display capabilities of a computer depend on both the logical circuitry (provided on the video card) and the display monitor. There are many different types of video adapters available for PCs. Each adapter offers several different video modes. The two basic modes are text and graphics. In text mode, a monitor can only display ASCII characters. In graphics mode, a monitor can display any bitmapped image. Within the text and graphics mode, some monitors also offer a choice of resolutions.

Most modern video cards contain memory, so that the computer's RAM will not be used for storing displays. In addition, some video cards also have their own graphics coprocessor for performing graphics calculations. These adapters are called graphics accelerators.

Sound Card

A sound card provides the audio capabilities of the computer. Sound cards plug into expansion slots located on the motherboard. Connectors on the sound card consist of microphone input, line input, speakers and joystick.

Modem

A modem is a device that connects a computer to a phone line, which allows the computer to talk to other computers through the phone system. The word MODEM is an

acronym for MOdulator/DEModulator. Modems accept digital data supplied by the local PC, and convert it to a modulated analogue wave form that can be transmitted over a normal analogue phone line.

Conversely, modems also accept a modulated analogue wave from the telephone line, convert it to a digital form, and pass it on to the local PC. Modems can be either internal or external. Internal modems are on a card that plugs into the PC's bus, contain their own serial port onboard, and they use the PC's power supply. External modems are normally selfcontained in their own case, have their own power supply (normally a separate transformer device), and connect to the computer via a serial cable to one of the serial ports on the back of the PC.

Modems have different transfer rates. These rates are 14.4 k, 28.8 k, 33.6 k, and 56 k. A 56 k modem is over twenty times faster than a 14.4 k modem. Faster transfer rates decrease the online time required to download information from the Internet.

Network Card

A Network Interface Card, or NIC, is an expansion board that connects the computer to a network. Most NICs are designed for a particular type of network, protocol, and media, although some can serve multiple networks.

How do you get data to the CPU? How do you get information out? Here we describe the two most important places where the computer interfaces with people. Input and output devices are essentially translators. Input devices translate symbols that people understand into symbols that computers can process[5]. Output devices do the reverse. Now, we look at the devices that perform these translations.

INPUT AND OUTPUT

Input

Input device converts data that humans can understand into a form that the computer can process. Such a device translates the letters, numbers, and other natural language symbols that human conveniently use in reading and writing into the binary 0 s and 1 s that the computer can process. Input devices can also be used to input other types of data, such as photographs, speech, and video. Some types of input devices are discussed next.

Keyboard: Data is input to the computer through a keyboard that looks like a type-

writer keyboard but has additional keys. As characters are typed, they are stored in main memory, and then copied from the memory to the output devices.

Mouse: It is a device that controls the movement of the cursor or pointer on a display screen. A mouse is a small object you can roll along a hard, flat surface. As you move the mouse, the pointer on the display screen moves in the same direction. In a word, a mouse is an economical means of data entry.

Scanner: a scanner is an optical device that breaks down graphics, objectives, and documents into a digital format. By reading a graphic as thousands of individual dots, or pixels, a scanner can convert a picture into digital bits of information. The file of the image can then be enlarged or reduced, stored in a database, or transferred into a word processing or spreadsheet program[6].

Output

Output devices convert the processed 0 s and 1 s back into a form understandable to humans. These devices typically present output on the screen or paper. Output devices produce results in either hardcopy or softcopy form. The main hardcopy output devices are printers and plotters. The main softcopy output devices are monitors.

Printer: it can print characters, symbols, and usually graphics on paper. Four popular kinds of printers used with microcomputers are dot matrix, ink jet, laser, and thermal.

Plotter: it can produce high quality multicolor documents and also documents that are larger in size than most printers can handle. There are four types of plotters: pen, ink jet, electrostatic, and direct imaging.

Monitor: two important characteristics of monitors are the number of colors that can be displayed and the clarity of graphics produced. Graphics are represented on monitors by individual dots pixels. The density of the dots determines the graphics' resolution.

NEW WORDS AND PHRASES

configuration *n*. 构造，结构，配置，外形
component *n*. 成分
　　　　adj. 组成的，构成的
tremendously *adv*. 可怕地，非常地
microcomputer *n*. 微型(电子)计
lap *n*. (坐时的)大腿前部，膝盖，舔声，(水)溅泼声，重叠的部分，(跑道的)

一圈，衣兜，下摆

  vi. 重叠，围住，轻拍，舔

  vt. 包围，抱……在膝上，使重叠，舔食，泼溅，拍打

coordinate *n.* 同等者，同等物，坐标(用复数)

    adj. 同等的，并列的

    vt. 调整，整理

binary *adj.* 二进位的，二元的

subtract *v.* (～from)减去，减

multiply *v.* 繁殖，乘，增加

divide *v.* 分，划分，分开，隔开

receive *vt.* 收到，接到，接收，遭到，受到，接待，接见

millisecond *n.* 毫秒

nanosecond *n.* 十亿分之一秒

typewriter *n.* 打字机

additional *adj.* 另外的，附加的，额外的

community *n.* 公社，团体，社会，(政治)共同体，共有，一致，共同体，(生物)群落

permanent *adj.* 永久的，持久的

laser *n.* 激光

etched 被侵蚀的，被蚀刻的，风化的

spot *n.* 斑点，污点，地点，场所，现场

  v. 玷污，弄脏，侦察

  vt. 认出，发现

manipulate *vt.* (熟练地)操作，使用(机器等)，操纵(人或市价、市场)，利用，应付，假造

    vt. (熟练地)操作，巧妙地处理

interchangeably *adv.* 可交地，可交替地

cathode ray tube 阴极射线管

graphic *adj.* 绘画似的，图解的

motherboard *n.* 底板，母板

microprocessor *n.* [计]微处理器

diskette *n.* 磁盘，磁碟

modem *n.* [计]调制解调器

  n. 调制解调器