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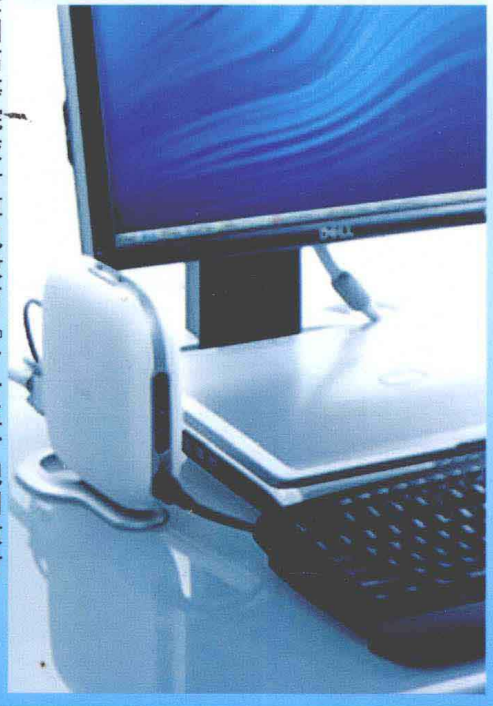

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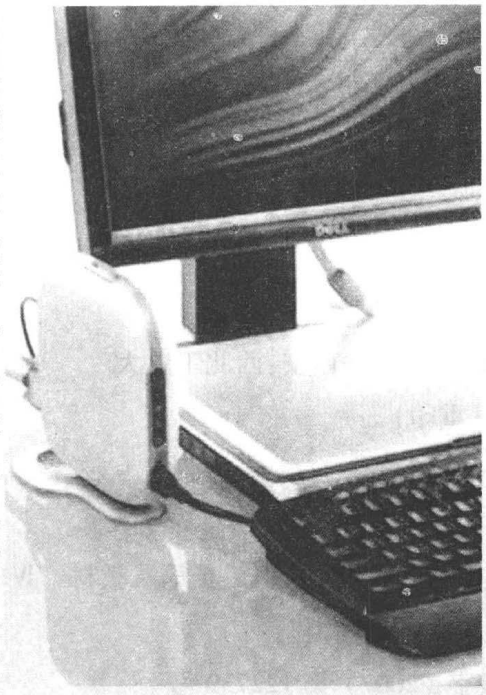

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【内容简介】 本书是一本实用性很强的专业英语教材，采用了全新的编写体系。本书的目的旨在帮助读者掌握一定的计算机英语专业词汇并具备一定的计算机英语阅读及翻译能力，通过对本教材的学习，使读者在学习计算机的过程中能更好地理解相关的英文信息和资料，了解计算机发展的历史和最新趋势，掌握国际前沿的计算机应用知识。

内容覆盖计算机基础、计算机硬件、软件、计算机程序、软件工程、数据通信、网络、多媒体、计算机安全、电子商务等内容。本书每章内容包括课文、词汇、练习、参考译文。这些都有利于提高读者阅读计算机英语文献的水平，同时也帮助读者掌握大量的专业词汇。

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前　言

〈修订版〉

在多年的计算机专业研究与教学工作中，我们认识到计算机的发展非常迅速，以至于计算机工作者要不断地阅读来自网络上的信息以及各种外文资料。为了适应计算机专业人员的需要，计算机专业英语的教材只有不断地更新，不断地补充新内容，才能满足需要。为此我们编写了这本教材。

本书是一本实用性很强的专业英语教材，采用了全新的编写体系，旨在帮助读者掌握一定的计算机英语专业词汇并具备一定的计算机英语阅读及翻译能力，通过对本教材的学习，使读者在学习计算机的过程中能更好地理解相关的英文信息和资料，了解计算机发展的历史和最新趋势，掌握国际前沿的计算机应用知识。

本书内容覆盖计算机基础、计算机硬件、软件、计算机程序、软件工程、数据通信、网络、多媒体、计算机安全、电子商务等内容。本书每章内容包括课文、词汇、练习、参考译文。这些都利于提高读者阅读计算机英语文献的水平，同时也帮助读者掌握大量的专业词汇。

本书由河南工业大学白浩、刘继承任主编，河南工业大学蒋华伟、李琳、张继新、李晓莉任副主编。编写分工如下：白浩编写了第一章、第四章，第十章，刘继承编写了第二章、第三章，蒋华伟编写了第五章、第八章、第十二章，李琳编写了第六章、第十三章、第十四章，张继新编写了第十一章、第十六章，李晓莉编写了第十七章，第十五章，李晓莉、李昕编写了第十八章，河南工业大学李昕编写了第七章等。

本书共十八章，可作为大专院校计算机及 IT 相关专业的专业英语教材使用，也可作为广大 IT 业技术人员的学习参考书。

由于作者水平有限，加之时间仓促，书中定有不少错误和疏漏，恳请各位专家和读者不吝指正。

编者

2009 年 6 月

目 录

Chapter 1 Introduction to Computer Systems

1.1 The Invention of the Computer

It is hard to say exactly when the modern computer was invented. Starting in the 1930s and through the 1940s, a number of machines were developed that were like computers. But most of these machines did not have all the characteristics that we associate with computers today. These characteristics are that the machine is electronic, that it has a stored program, and that it is general purpose.

One of the first computer like devices was developed in Germany by Konrad Zuse in 1941. Called the Z3, it was general – purpose, stored – program machine with many electronic parts, but it had a mechanical memory. Another electromechanical computing machine was developed by Howard Aiken, with financial assistance from IBM, at Harvard University in 1943. It was called the Automatic Sequence Control Calculator Mark I, or simply the Harvard Mark I. Neither of these machines was a true computer, however, because they were not entirely electronic.

1.1.1 The ENIAC

Perhaps the most influential of the early computer like devices was the Electronic Numerical Integrator and Computer, or ENIAC. It was developed by J. Presper Eckert and John Mauchly at the University of Pennsylvania. The project began in 1943 and was completed in 1946. The machine was huge; it weighed 30 tons and contained over 18 000 vacuum tubes.

The ENIAC was a major advancement for its time. It was the first general – purpose, electronic computing machine and was capable of performing thousands of operations per second. It was controlled, however, by switches and plugs that had to be manually set. Thus, although it was a general – purpose electronic device, it did not have a stored program. Therefore, it did not have all the characteristics of a computer .

While working on the ENIAC, Eckert and Mauchly were joined by a brilliant mathematician, John von Neuman. Together, they developed the idea of a stored program computer. This machine, called the Electronic Discrete Variable Automatic Computer, or EDVAC, was the first machine whose design included all the characteristics of a computer. It was not completed, however, until 1951.

Before the EDVAC was finished, several other machines were built that incorporated elements of the EDVAC design of Eckert, Mauchly, and von Neuman. One was the Electronic Delay Storage Automatic Computer, or EDSAC, which was developed in Cambridge, England.

It first operated in May of 1949 and is probably the world's first electronic stored – program, general – purpose computer to become operational. The first computer to operate in the United States was the Binary Automatic Computer, or BINAC, which became operational in August of 1949.

1.1.2 The UNIVAC I

Like other computing pioneers before them, Eckert and Mauchly formed a company in 1947 to develop a commercial computer. The company was called the Eckert – Mauchly Computer Corporation. Their objective was to design and build the Universal Automatic Computer or UNIVAC. Because of difficulties of getting financial support, they had to sell the company to Remington Rand in 1950. Eckert and Mauchly continued to work on the UNIVAC at Remington Rand and completed it in 1951. Known as the UNIVAC I, this machine was the first commercially available computer.

The first UNIVAC I was delivered to the Census Bureau and used for the 1950 census. The second UNIVAC I was used to predict that Dwight Eisenhower would win the 1952 presidential election, less than an hour after the polls closed. The UNIVAC I began the modern of computer use.

1.2 Computer Generations

1.2.1 First – Generation Computers: 1951—1958

First – generation computers were characterized by the use of vacuum tubes as their principal electronic component. Vacuum tubes are bulky and produce a lot of heat, so first – generation computers were large and required extensive air conditioning to keep them cool. In addition, because vacuum tubes do not operate very fast, these computers were relatively slow.

The UNIVAC I was the first commercial computer in this generation. As noted earlier, it was used in the Census Bureau in 1951. It was also the first computer to be used in a business application. In 1954, General Electric took delivery of a UNIVAC I and used it for some of its business data processing.

The UNIVAC I was not the most popular first – generation computer, however. This honor goes to the IBM 650. It was first delivered in 1955 before Remington Rand could come out with a successor to the UNIVAC I. With the IBM 650, IBM captured the majority of the computer market, a position it still holds today.

At the same time that hardware was evolving, software was developing. The first computers were programmed in machine language, but during the first computer generation, the idea of programming language translation and high – level languages occurred. Much of the credit for these ideas goes to Grace Hopper, who, as a Navy lieutenant in 1945, learned to program the Harvard Mark I. In 1952, she developed the first programming language translator, followed by

others in later years. She also developed a language called Flow – matic in 1957, which formed the basis for COBOL, the most commonly used business programming language today.

Other software developments during the first computer generation include the design of the FORTRAN programming language in 1957. This language became the first widely used high – level language. Also, the first simple operating systems became available with first – generation computers.

1.2.2 Second – Generation Computers: 1959—1963

In the second generation of computers, transistors replaced yacuum tubes. Although invented in 1948, the first all – transistor computer did not become available until 1959. Transistors are smaller and less expensive than vacuum tubes, and they operate faster and produce less heat. Hence, with second – generation computers, the size and cost of computers decreased, their speed increased, and their air – conditioning needs were reduced.

Many companies that had not previously sold computer entered the industry with the second generation. One of these companies that still makes computers is Control Data Corporation (CDC). They were noted for making high – speed computers for scientific work.

Remintong Rand, now called Sperr – Rand Corporation, made several second – generation UNIVAC computers. IBM, however, continued to dominate the industry. One of the most popular second – generation computers was the IBM 1401, which was a medium – sized computer used by many businesses.

All computers at this time were mainframe computers costing over a million dollars. The first minicomputer became available in 1960 and cost about $120 000. This was the PDP – 1, manufactured by Digital Equipment Corporation (DEC).

Software also continued to develop during this time. Many new programming languages were designed, including COBOL in 1960. More and more businesses and organizations were beginning to use computers for their data processing needs.

1.2.3 Third – Generation Computers: 1964—1970

The technical development that marks the third generation of computers is the use of integrated circuits or ICs in computers. An integrated circuit is a piece of silicon (a chip) containing numerous transistors. One IC replaces many transistors in a computer; result in a continuation of the trends begun in the second generation. These trends include reduced size, reduced cost, increased speed, and reduced need for air conditioning.

Although integrated circuits were invented in 1958, the first computers to make extensive use of them were not available until 1964. In that year, IBM introduced a line of mainframe computers called the System/360. The computers in this line became the most widely used third – generation machines. There were many models in the System/360 line, ranging from small, relatively slow, and inexpensive ones, to large, very fast, and costly models. All mod-

els, however, were compatible so that programs written for one model could be used on another. This feature of compatibility across many computers in a line was adopted by other manufacturers of third – generation computers.

The third computer generation was also the time when minicomputers became widespread. The most popular model was the PDP – 8, manufactured by DEC. Other companies, including Data General Corporation and Hewlett – Packard Company, introduced minicomputers during the third generation.

The principal software development during the third computer generation was the increased sophistication of operating systems. Although simple operating systems were developed for first – and second – generation computers, many of the features of modern operating systems first appeared during the third generation. These include multiprogramming, virtual memory, and time – sharing. The first operating systems were mainly batch systems, but during the third generation, interactive systems, especially on minicomputers, became common. The BASIC programming language was designed in 1964 and became popular during the third computer generation because of its interactive nature.

1.2.4 Fourth – Generation Computers: 1971—?

The fourth generation of computers is more difficult to define than the other three generations. This generation is characterized by more and more transistors being contained on a silicon chip. First there was Large Scale Integration (LSI), with hundreds and thousands of transistors per chip, then came Very Large Scale Integration (VLSI), with tens of thousands and hundreds of thousands of transistors. The trend continues today.

Although not everyone agrees that there is a fourth computer generation, those that do feel that it began in 1971, when IBM introduced its successors to the System/360 line of computers. These mainframe computers were called the System/370, and current – model IBM computers, although not called System/370s, evolved directly from these computers.

Minicomputers also proliferated during the fourth computer generation. The most popular lines were the DEC PDP – 11 models and the DEC VAX, both of which are available in various models today.

Supercomputers first became prominent in the fourth generation. Although many companies, including IBM and CDC, developed high – speed computers for scientific work, it was not until Cray Research, Inc. introduced the Cray 1 in 1975 that supercomputers became significant. Today, supercomputers are an important computer classification.

Perhaps the most important trend that began in the fourth generation is the proliferation of microcomputers. As more and more transistors were put on silicon chips, it eventually became possible to put an entire computer processor, called a microprocessor, on a chip. The first computer to use microprocessors became available in the mid – 1970s. The first microcomputer designed for personal use was the Altair, which was sold in 1975. The first Apple computer,

marketed with the IBM PC in 1981. Today, microcomputers far outnumber all other types of computers combined.

Software development during the fourth computer generation started off with little change from the third generation. Operating systems were gradually improved, and new languages were designed. Database software became widely used during this time. The most important trend, however, resulted from the microcomputer revolution. Packaged software became widely available for microcomputers so that today most software is purchased, not developed from scratch.

1.2.5 Generationless Computers

We may have defined our last generation of computers and begun the era of generationless computers. Even though computer manufacturers talk of "fifth" and "sixth" - generation computers, this talk is more a marketing play than a reflection of reality.

Advocates of the concept of generationless computers say that even though technological innovations are coming in rapid succession, no single innovation is, or will be, significant enough to characterize another generation of computers.

1.3 Near - future Supercomputer Directions

Some idea of what might be happening in the near future in supercomputer design can be gleaned from a press release issued by the US Department of Energy (DoE). It came out of the SUPERCOMPUTING 2002 Conference held last November in Baltimore, MD. The press release announced that the DoE had awarded IBM a $ 290 (USD) million contract to build the two fastest supercomputers in the world with a combined peak speed of 460 TFlops. To get an idea of the speed computing throughout 460 teraflops represents, the press release states that, "These two systems will have more than one - and - a - half times the combined processing power of all 500 machines on the recently announced TOP 500 List of Supercomputers."

The first system, "ASCI Purple," [apparently the DoE likes colorful names] will be the world's first supercomputer capable of 100 Tflops. ASCI Purple will have a massive cluster of POWER - based IBM eServer systems and IBM storage systems. This supercomputer represents a fifth - generation system under the Advanced Simulation and Computing Initiative (ASCI) Program. It will serve as the primary supercomputer for DoE.

According to the press release, the second system will be a research machine called Blue Gene/L. It will employ advanced IBM semiconductor and system technologies based on new architectures being developed by DoE and IBM. Blue Gene/L is expected to achieve a peak performance of 360 TFlops with 130 000 processors running under the Linux operating system. It will have the capability to process data at a rate of one terabit per second, equivalent to the data transmitted by ten thousand weather satellites. Applications are expected to include the simulation of very complex physical phenomena in areas such as turbulence, biology and high explosives.

The ASCI Purple system will use IBM's next generation microprocessor, the POWER5, employing a total of 12 544 of them. These 12 544 processors will be spread among 196 individual computers. The total memory bandwidth will be 156 000 GBs, the equivalent of simultaneously playing 31 200 DVD movies. A super - fast data highway with a total interconnect bandwidth of 12 500 GB will interconnect the 196 computers. The IBM AIXL operating system will be used to run this configuration. The operating system will contain 50 terabytes of memory, an amount that is 400 000 times the capacity of the average desktop PC. There will also be two petabytes of disk storage or holding the content of approximately one billion books.

Finally, since the UNIVAC - 1's introduction, raw computer speed has increased by about 11 to 12 orders of magnitude in about 50 years, or a factor of 10 every five years. This is a truly remarkable achievement. It's also interesting to contemplate that, if this growth continues over the next 50 years, then by the 100th anniversary of the UNIVAC - 1, computers will be operating at speeds on the order of 1023 Flops!

1.4 The Components of A Computer System

Here comes introducing the components of a typical computer system as an example.

1.4.1 Hardware System

The hardware system of a computer includes five parts: the central processing unit (CPU), memory, storage hardware, input hardware, and output hardware.

The part of the computer that runs the program is known as the processor or central processing unit. In a microcomputer, the CPU is on a single electronic component, the microprocessor chip. The CPU itself includes two parts: the control unit and the arithmetic - logic unit. In a microcomputer, these are both on the microprocessor chip.

Memory: Memory is also known as primary storage, internal storage, it temporarily holds data, program instructions, and information. One of the most important facts to know about memory is that all of its content is held only temporarily. In other words, it is stored only as long as the computer is being turned on.

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 to say, the data is not lost when the power is turned off - and easy to retrieve when needed for processing. There are four kinds of storage hardware: floppy disks, hard disks, optical disc, and magnetic tape.

Input Hardware: Input devices take data and programs people can read or understand and convert them to a form the computer can process, which is the machine - readable electronic signal of 0s or 1s. Input hardware contains keyboard entry and direct entry.

Output Hardware: Output devices display the data from CPU or memory. There are varieties of output devices such as monitors and printers.

1.4.2 Software System

The software is defined as a set of computer programs and their documents. Programs are the instructions that tell the computer how to process data into the form people want. There are two kinds of software: system software and application software.

System software is a collection of programs that enables application software to run on a computer system's hardware devices, it is a background software and includes programs that help the computer manage its own internal resources. System software consists of four kinds of programs: bootstrap loader, diagnostic routines, basic input - output system, and operating system. Among these four parts, the operating system is what we are most concerned with, which helps us manage computer resources. Now most popular operating systems include Windows, OS/2, Macintosh, linux and Unix.

Application software is a specialized program that enables the user to accomplish specific tasks. For example, the official use WPS Office to promote the efficiency of their office work.

Computers are applied in such fields as science calculation, data processing, real - time control, adjuvant design and artificial intelligence.

1.5 The I/O Devices of PCs

PC is a brief call to Personal Computers, while the I/O Devices of PCs mean the input devices/output devices of a computer. They bring the users ways to input and output data with some tools.

1.5.1 The Input Devices of PCs

Computer systems use many devices for input purpose. The keyboard of a computer is an example of a direct input device. Additional direct input devices include the mouse, scanner, joystick, input pen, touch screen, and microphone. Regardless of the type of device used, all are components for interpretation and communication between people and computer systems.

1. Keyboard

Most keyboards follow the standard QWERY layout of typewriter keyboards. Many have a separate numeric keyboard. Data is input to the computer through a keyboard that looks like a typewriter keyboard but has additional keys. In this method, the user typically reads from an original document called the source document. The user enters that document by typing on the keyboard.

2. Mouse

A mouse is a device that you roll on a tabletop to move the cursor on the screen to make selections. For instance, you can move the mouse until its arrow rests over a word you've misspelled in a letter. Then, when you click a button, the word processor's cursor will jump to that word. This can be much quicker than tapping on the cursor keys to move the cursor, line by

line, character by character.

3. Scanner

A scanner works like a photocopier. But instead of producing a duplicate of a sheet of paper, the scanner converts the image to text and stores it on disk. This has two very useful purposes. The first is to scan graphic images for inclusion in documents and for desktop publishing. The second is that software can "read" documents, converting the image into a text for input in the computer.

1.5.2 The Output Devices of PCs

The familiar output devices include monitors, printers, Voice - Output Devices.

1. Monitor

Monitors are also called display screen or video display terminals. Most monitors that sit on desks are built in the same way as television sets, these are called cathode - ray tubes. Another type of monitor is flat - panel display, including liquid - crystal display (LCD), electroluminescent (EL) display and gas - plasma display. A LCD does not emit light of its own. Rather, it consists of crystal molecules. An electric field causes the molecules to line up in a way that alters their optical properties. Unfortunately, many LCDs are difficult to read in sunlight or other strong light. A gas - plasma display is the best type of flat screen. Like a neon light bulb, the plasma display uses a gas that emits light in the presence of an electric current.

2. Printer

There are four popular kinds of printers: dot - matrix, laser, ink - jet and thermal.

Dot - matrix printers can produce a page of text in less than 10 seconds and are highly reliable. They form characters or images using a series of small pins on a print head. The pins strike an inked ribbon and create an image on paper. Printers are available with print heads of 9, 18, or 24 pins. One disadvantage of this type of printer is noise.

The laser printer creates dotlike images on a drum, using a laser beam light source. The characters are treated with a magnetically charged inklike toner and then are transferred from drum to paper. A heat process is used to make the characters adhered. The laser printer produces images with excellent letter and graphics quality.

An ink - jet printer sprays small droplets of ink at high speed onto the surface of the paper. This process not only produces a letter - quality image but also permits printing to be done in a variety of colors.

A thermal printer uses heat elements to produce images on heat - sensitive paper. Color thermal printers are not so popular because of their cost and the requirement of specifically treated paper. They are a more special use printer that produces near photographic output. They are widely used in professional art and design work where very high quality color is essential.

3. Plotter

Plotters are special - purpose output devices for producing bar charts, maps, architectural

drawings, and even three - dimensional illustrations. Plotters can produce high - quality multicolor documents and also documents that are larger in size than most printers can't handle. There are four types of plotters: pen, ink - jet, electrostatic, and direct imaging.

4. Voice - Output Device

Voice - output devices make sounds that resemble human speech but actually are pre - recorded vocalized sounds. Voice output is used as a reinforcement tool for learning, such as to help students study a foreign language. It is used in many supermarkets at the checkout counter to confirm purchases. Of course, one of the most powerful capabilities is to assist the physically challenged.

1.5.3 The Storage Devices of PCs

The Storage Devices of PCs act as both the roles of input devices and output devices. There are four kinds of storage hardware: floppy disks, hard disks, optical disc, and magnetic tape.

Floppy Disks: Floppy disks are also called diskettes, flexible disks, floppies, or simply disks. The plastic disk inside the diskette cover is flexible, not rigid. They are flat, circular pieces of plastic that rotate within a jacket. Data and programs are stored as electromagnetic charges on a metal oxide film coating the plastic.

Hard Disks: Hard disks consist of metallic rather than plastic platters. They are tightly sealed to prevent any foreign matter from getting inside. Hard disks are extremely sensitive instruments. The read - write head rides on a cushion of air about 0.000001 inch thick. It is so thin that a smoke particle, fingerprint, dust, or human hair could cause what is known as a head crash. A head crash happens when the surface of the read - write head or particles on its surface contact the magnetic disk surface. A head crash is a disaster for a hard disk. It means that some or all of the data on the disk is destroyed. Hard disks are assembled under sterile conditions and sealed from impurities within their permanent containers.

Optical Discs: Optical discs are used for storing great quantities of data. An optical disc can hold 650 megabytes of data - the equivalent of hundreds of floppy disks. Moreover, an optical disc makes an immense amount of information available on a microcomputer. In optical - disc technology, a laser beam alters the surface of a plastic or metallic disk to represent data. To read the data, a laser scans these areas and sends the data to a computer chip for conversion.

Magnetic Tape: Magnetic tape is an effective way of making a backup, or duplicate, copy of your programs and data. We mentioned the alarming consequences that can happen if a hard disk suffers a head crash. You will lose some or all of your data or programs. Of course, you can always make copies of your hard - disk files on floppy disks. However, this can be time - consuming and may require many floppy disks. Magnetic tape is sequential access storage and can solve the problem mentioned above.

New Words and Expressions

computerlike *a.* 计算机似的
electromechanical *a.* 机电的，电机的
vacuum tubes *n.* 真空管
Census Bureau 人口普查局
thousands of 成千上万的
known as 通常所说的，以……著称
result in 导致，造成……结果
air conditioning 空调
take delivery of 正式接过……
Navy lieutenant 海军上尉
high - level language 高级语言
mainframe *n.* 主机，大型机
more and more 越来越多的
range from...to... 从……到……
multiprogramming *n.* 多道程序设计
time - share *n.* 分时，时间共享
virtual memory 虚拟内存
from scratch 从头开始
compatible *adj.* 兼容的
compatibility *n.* 兼容性
outnumber *vt.* 数目超过，比……多
proliferate *v.* 增生，扩散
start off *v.* 出发，开始
glean *vt.*，*vi.* 搜集（情报或事实）
MD *abbr.* Maryland（马里兰）
Tflops *abbr.* teraflops 每秒兆兆（10^{12}）次
architecture *n.* 体系机构
terabit *n.* 兆兆位
factor *n.* 阶乘
bandwidth *n.* 带宽
Terabyte *n.* 兆兆（10^{12}）字节
Petabyte *n.* 千兆兆（10^{15}）字节
microprocessor *n.* [计]微处理器
contemplate *v.* 凝视，沉思
order *n.* 阶，次
turbulence *n.* 扰动；湍流