

Project 1

Computer Fundamentals

项目要点

- Four Kinds of Computers
- Computer Hardware
- System Software
- Application Software

引言

本项目主要介绍计算机的基本原理，主要包括四类：计算机、计算机硬件、计算机的系统软件以及计算机的应用软件。

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Mission 1: Four Kinds of Computers



Task Description

小王是某计算机杂志编辑，为了给读者提供最新、最权威的计算机知识，他需要经常性地浏览和阅读英文版的计算机相关文章，然后翻译并整理，为杂志提供内容素材。下面是一篇关于计算机分类的英文短文，小王需要阅读并翻译它，从而了解一些国外的计算机分类知识，以作为下期杂志的素材。

Four Kinds of Computers

Computers are electronic devices that can follow instructions to accept input, process that input, and produce information. There are four types of computers: microcomputers, minicomputers, mainframe computers, and supercomputers.

Microcomputers, also known as personal computers, are small computers that can fit on a desktop. Portable microcomputers can fit in a briefcase or even in the palm of your hand. Microcomputers are used in homes, schools, and industry. Today nearly every field uses microcomputers.

One type of microcomputer that is rapidly growing in popularity is the portable computer, which can be easily carried around. There are four categories of portable computers.

Laptops: Laptops, which weigh between 10 and 16 pounds, may be AC-powered, battery-powered, or both. The AC-powered laptop weighs 12 to 16 pounds. The battery-powered laptop weighs 10 to 15 pounds, batteries included, and can be carried on a shoulder strap.

Notebook PCs: Notebook personal computers weigh between 5 and 10 pounds and can fit into most briefcases. It is especially valuable in locations where electrical connections are not available. Notebook computers are the most popular portable computers today.

Subnotebooks: Subnotebooks are for frequent flyers and life-on-the-road types. [1] Subnotebooks users give up a full-sized display screen and keyboard in exchange for less weight. Weighing between 2 and 6 pounds, these computers fit easily into a briefcase.

Personal Digital Assistants: Personal digital assistants (PDAs) are much smaller than even the subnotebooks and weigh from 1 to 4 pounds. The typical PDA combines pen input, writing recognition, personal organizational tools, and communication capabilities in a very small package.

Minicomputers, also known as midrange computers, are desk-sized machines. [2] They

fall into between microcomputers and mainframes in their processing speeds and data-storing capacities. Medium-size companies or departments of large companies typically use them for specific purposes. For example, they might use them to do research or to monitor a particular manufacturing process. Smaller-size companies typically use microcomputers for their general data processing needs, such as accounting.

Mainframe computers are larger computers occupying specially wired, air-conditioned rooms and capable of great processing speeds and data storage. They are used by large organizations—business, banks, universities, government agencies—to handle millions of transactions. For example, insurance companies use mainframes to process information about millions of policyholders.

Supercomputers are special, high-capacity computers used by very large organizations principally for research purposes. Among their uses are oil exploration and worldwide weather forecasting.

In general, a computer's type is determined by the following seven factors.

(1) The type of CPU. Microcomputers use microprocessors. The larger computers tend to use CPUs made up of separate, high-speed, sophisticated components.

(2) The amount of main memory the CPU can use. A computer equipped with a large amount of main memory can support more sophisticated programs and can even hold several different programs in memory at the same time.

(3) The capacity of the storage devices. The larger computer systems tend to be equipped with higher capacity storage devices.

(4) The speed of the output devices. [3]The speed of microcomputer output devices tends to be rated in terms of the number of characters per second (cps) that can be printed—usually in tens and hundreds of cps. Larger computers' output devices are faster and are usually rated at speeds of hundreds or thousands of lines that can be printed per minute.

(5) The processing speed tends to be rated in millions of instructions per second (mips). The term instruction is used here to describe a basic task the software asks the computer to perform while also identifying the data to be affected. The processing speed of the smaller computers ranges from 7 to 40 mips. The speed of large computers can be 30 to 150 mips or more, and supercomputers can process more than 200 mips. In other words, a mainframe computer can process your data a great deal faster than a microcomputer can.

(6) The number of users that can access the computer at one time. Most small computers can support only a single user, some can support as many as two or three at a time. Large

computers can support hundreds of users simultaneously.

(7) The cost of the computer system. Business systems can cost as little as \$ 500 (for a microcomputer) or as much as \$ 10 million (for a mainframe) — and much more for supercomputer.



Task Analysis

计算机是根据指令接收输入数据并进行处理，以产生信息的电子设备。四种类型的计算机分别为微型机、小型机、大型机和巨型机。



Basic Knowledge

Words

access	<i>v.</i>	访问; 存取
accounting	<i>n.</i>	会计学; 统计
agency	<i>n.</i>	机构; 办事处; 代理店
briefcase	<i>n.</i>	公文包; 公事包
exploration	<i>n.</i>	勘探; 发掘; 调查
laptop	<i>n.</i>	膝上电脑; 便携式电脑
mainframe	<i>n.</i>	大型计算机
palm	<i>n.</i>	手掌; 掌状物
policyholder	<i>n.</i>	投保人; 保险客户
portable	<i>adj.</i>	手提的; 可携带的; 轻便的
recognition	<i>n.</i>	认出; 识别; 认可
sophisticated	<i>adj.</i>	复杂的
strap	<i>n.</i>	(皮, 布) 带
supercomputer	<i>n.</i>	巨型计算机
typically	<i>adv.</i>	特有地; 独特地; 典型地

Phrases

fall into	属于
in exchange for	交换; 来代替
mainframe computer	大型计算机
portable computer	便携式计算机

Abbreviations

AC (Alternating Current)	交流电
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CPU (Central Processing Unit)	中央处理器
PC (Personal Computer)	个人计算机
PDA (Personal Digital Assistant)	个人数字助手

Notes

[1] 例句: Subnotebooks users give up a full-sized display screen and keyboard in exchange for less weight.

分析: in exchange for less weight 是介词短语作目的状语, 意为“为了换取较轻的重量”。

译文: 超轻薄笔记本电脑用户为了换取较轻的重量放弃了完整的显示屏幕和键盘的标准尺寸。

[2] 例句: They fall in to between microcomputers and mainframes in their processing speeds and data-storing capacities.

分析: 句中 They 指的是小型计算机, fall into 是短语, 有“介于、属于”的意思, in their processing speeds and data-storing capacities 是介词短语作状语。

译文: 小型计算机的处理速度和数据存储能力介于微型机和大型机之间。

[3] 例句: The speed of microcomputer output devices tends to be rated in terms of the number of characters per second (cps) that can be printed—usually in tens and hundreds of cps.

分析: 句中 tend to 表示“常常、趋向于”, in terms of 有“依据、用……来表示”之意。...that can... 是定语从句, 修饰 characters。

译文: 微机输出设备的速度趋向于用每秒钟能打印的字符数 (cps) 予以度量, 通常为每秒几十个、几百个字符。

Reference Translation

四类计算机

计算机是根据指令接收输入、处理输入数据并产生信息的电子设备。计算机有四种类型: 微型机、小型机、大型机和巨型机。

微型计算机, 亦被称为个人计算机, 是可以放在桌面上的小的计算机。便携式微型机可以放入手提箱, 甚至手掌中。微型机被用于家庭、学校及工业当中。如今几乎每一领域都在使用微型机。

便携式计算机是正在迅速普及的一种微型机, 它易于四处携带。便携式计算机有四种类型。

膝上电脑: 膝上电脑的重量在 10~16 磅之间, 可以交流供电、电池供电或交直流两用。交流供电的膝上电脑重量在 12~16 磅之间。电池供电的膝上电脑的重量 (包括电池) 是 10~15 磅之间, 可以用肩带背起来携带。

笔记本个人电脑: 笔记本个人电脑的重量在 5~10 磅之间, 并且可放入大多数公文

包中，它尤其适用于连接电源不方便的地方。笔记本电脑是如今最流行的便携式电脑。

超轻薄笔记本电脑：超轻薄笔记本电脑适合经常出差在路上的人们使用。超轻薄笔记本电脑用户为了换取较轻的重量放弃了完整的显示屏幕和键盘的标准尺寸。这类电脑重量在 2~6 磅之间，可以很容易地放入公文包中。

个人数字助手：个人数字助手（PDA_s）比超轻薄笔记本电脑还要小得多，其重量在 1~4 磅之间。典型的个人数字助手将笔输入、书写识别、个人编排工具和通信功能结合起来放入小包中。

小型计算机，也被称为中型机，是像书桌大小的机器。它们的处理速度和数据存储能力介于微型机和大型机之间。中型公司或大型公司的部门一般把它们用于特殊用途。例如，可以使用它们做研究或监视某一个生产过程。小型公司一般使用小型机进行日常数据处理，比如说统计。

大型机是较大的计算机，放置在配备专线的空调房中，能够具有很快的处理速度和很大的数据存储量。它们通常是由一些大的组织机构使用，如商业部门、银行、大学、政府机构，以处理数以百万计的事务。例如，保险公司使用大型机以处理数以百万计的保险客户的信息。

巨型机是应用于非常大的机构进行研究的大容量专用计算机。这些应用当中包括石油勘探和世界范围的天气预报。

一般说来，一台计算机的类型是由下列 7 个因素决定的。

(1) CPU 的类型。微型计算机使用微处理器。较大的计算机常使用由独立、高速、复杂的零部件构成的 CPU。

(2) CPU 能够使用的内存的总量。配备有大容量内存的计算机可以支持更复杂的程序，并且能同时运行几个不同的程序。

(3) 存储设备的容量。较大的计算机系统趋向于配置较大容量的存储设备。

(4) 输出设备的速度。微机输出设备的速度趋向于用每秒钟能打印的字符数（cps）予以度量，通常为每秒几十个、几百个字符。较大的计算机的输出设备的速度也较快，通常每分钟可打印几百或几千行。

(5) 处理速度用每秒钟百万条指令（mips）度量。在这里用术语“指令”来描述软件要求计算机完成的基本任务，并且标识受到影响的数据。较小的计算机的处理速度为 7~40 mips。大型计算机的处理速度能达到 30~150 mips 或更多。巨型计算机的处理速度能达到 200 mips 以上。换句话说，大型计算机处理数据的能力要比微机快得多。

(6) 可以同时访问计算机的用户数量。大多数小型计算机只能支持单个用户，有些计算机可以同时支持两个或三个用户，大型计算机则同时可供几百个用户使用。

(7) 计算机系统的价格。商用计算机系统的价格可低到 500 美元（一台微机）或者高达 1 000 万美元（一台大型机），巨型计算机则花费更多。

Exercises

I. Write “T” for true or “F” for false for the following statements according to the passage.

1. () Computers are electronic devices that can perform tasks automatically.
2. () Portable computers can fit in a briefcase or even in the palm of your hand.
3. () Portable computers are AC-powered, battery-powered, or both.
4. () All portable computers can fit in briefcase.
5. () Subnotebooks have a full-sized display screen and keyboard.
6. () The capacity of the storage devices is a main factor that affects the property of computers.
7. () Most microcomputers are single-user systems.
8. () Depending on the passage, supercomputers have the largest capacity storage devices.
9. () The term instruction used in the passage only describe a basic task the software asks the computer to perform.
10. () Ordinary users have chances to contact with supercomputers.

II. Fill in the blanks according to the passage.

1. Computers are _____ devices that can follow _____ to accept input, process that input, and produce information.
2. Portable microcomputers can fit in a _____ or even in the _____ of your hand.
3. There are four types of computers: _____, _____, _____, _____.
4. Minicomputers fall into between microcomputers and mainframes in their _____ speeds and data-storing _____.
5. Mainframe computers are used by large _____.
6. Insurance companies use mainframes to process _____ about millions of _____.
7. Supercomputers are special, _____ computers.
8. Laptops may be _____, _____, or both.
9. The larger computer systems tend to be _____ with higher capacity _____.
10. Large computers can support hundreds of users _____.

III. Translate the following words and expressions into Chinese.

- | | |
|----------------------|------------------------|
| 1. electronic device | 6. portable computer |
| 2. personal computer | 7. writing recognition |
| 3. processing speed | 8. storage device |
| 4. high-capacity | 9. supercomputer |
| 5. battery-powered | 10. mainframe |

Reading Material

Web Harvesting

As the amount of information on the Web grows, the information becomes ever harder to keep track of and to be used. Search engines are a big help, but they can do only part of the work, and they are hard-pressed to keep up with daily changes.

Consider that even when you use a search engine to locate data, you still have to do the following tasks to capture the information you need: scan the content until you find the information, mark the information (usually by highlighting with a mouse), switch to another application (such as a spreadsheet, database or word processor), and paste the information into that application.

A better solution, especially for companies that are aiming to exploit a broad swath of data about markets or competitors, lies with Web harvesting tools.

Web harvesting software automatically extracts information from the Web and picks up where search engines leave off, doing the work the search engine can't. Extraction tools automate the reading, copying and pasting necessary to collect information for analysis, and they have been proved useful for pulling together information on competitors, prices and financial data or all types.

There are three ways in which we can extract more useful information from the Web.

The first technique, Web content harvesting, is concerned directly with the specific content of documents or their descriptions, such as HTML files, images or e-mail messages. Since most text documents are relatively unstructured (at least as far as machine interpretation is concerned), one common approach is to exploit what's already known about the general structure of documents and map this to some data model. The other approach to Web content harvesting involves trying to improve on the content searches that tools like search engines perform. This type of content harvesting goes beyond keyword extraction and the production of simple statistics relating to words and phrases in documents.

Another technique, Web structure harvesting, takes advantage of the fact that Web pages can reveal more information than just their obvious content. Links from other sources that point to a particular Web page indicate the popularity of that page, while links within a Web page that point to other resources may indicate the richness or variety of topics covered in that page. This is like analyzing bibliographical citations—paper that is often cited in bibliographies and other paper is usually considered to be important.

The third technique, Web usage harvesting, uses data recorded by Web servers about users' interactions to help understand users' behavior and evaluate the effectiveness of the Web structure.

General access—pattern tracking analyzes Web logs to understand access patterns and trends in order to identify structural issues and resource groupings.

Customized usage tracking analyzes individual trends so that Web sites can be personalized

to specific users. Over time, based on access patterns, a site can be dynamically customized for a user in terms of the information displayed, the depth of the site structure and the format of the resource presented.

2

Mission 2: Computer Hardware



Task Description

阅读并翻译以下英文文章，了解计算机硬件相关知识。

Computer Hardware

Computer hardware has 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, within the system unit or system cabinet. The CPU itself has two parts: the control unit and the arithmetic-logic unit. In a microcomputer, these are both on the microcomputer chip.

The Control Unit: The control unit tells the rest of the computer system how to carry out a program's instructions. It directs the movement of electronic signals between memory and the arithmetic-logic unit. It also directs these control signals between the CPU and input and output devices.

The Arithmetic-Logic Unit: The arithmetic-logic unit, usually called the ALU, performs two types of operations—arithmetic and logical. Arithmetic operations are, as you might expect, the fundamental math operations: addition, subtraction, multiplication, and division. Logical operations consist of comparisons. That is, two pieces of data are compared to see whether one is equal to, less than, or greater than the other.

Memory: Memory is also known as primary storage or internal storage, and it temporarily holds data, program instructions, and information. One of the most important facts to know about memory is that part of its content is held only temporarily. In other words, the data is stored only as long as the computer is turned on. When you turn the machine off, the content immediately vanishes. The stored contents in memory are volatile and can vanish very quickly.

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Storage Hardware : [1]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. There are four kinds of storage hardware : floppy disks, hard disks, optical disks, and magnetic tape.

Floppy Disks : Floppy disks are also called diskettes, flexible disks, or simply disks. The plastic disk inside the diskette cover is flexible, not rigid. They are flat, circular pieces of mylar plastic that rotate within a jacket. Data and programs are stored as electromagnetic charges on a metal oxide film coating the mylar 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 Disks : Optical disks are used for storing great quantities of data. An optical disk can hold 650 megabytes of data—the equivalent of hundreds of floppy disks. Moreover, an optical disk makes an immense amount of information available on a microcomputer. In optical-disk 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.

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

Keyboard Entry : 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.

Direct Entry Device : Data is made into machine-readable form as it is entered into the computer, no keyboard is used. Direct entry devices may be categorized into three areas : pointing devices (for example, mouse, touch screen, light pen, digitizer are all pointing devices), scanning devices (for example, image scanner, fax machine, bar-code reader are all scanning devices), and voice-input devices.

Output Hardware : Output devices convert machine-readable information into people-readable form. Common output devices are monitors, printers, plotters, and voice output.

Monitors : 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. An LCD does not emit light of its own. Rather, it consists of crystal molecules. [2]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.

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

Dot-Matrix Printer : 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.

Laser Printer : The laser printer creates dotlike images on a drum, using a laser beam light source. [3]The characters are treated with a magnetically charged ink like toner and then are transferred from drum to paper. A heat process is used to make the characters adhere. The laser printer produces images with excellent letter and graphics quality.

Ink-Jet Printer : 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.

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

Plotters : Plotters are special-purposed 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 handle. There are four types of plotters : pen, ink-jet, electrostatic, and direct imaging.

Voice-Output Devices : 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.



Task Analysis

计算机硬件主要包括中央处理器（CPU）、内存、硬盘、输入/输出设备等，它们作为单独元件设在机箱中，构成一台完整的计算机。只有了解了计算机硬件各部分的工作原理，才能更好地理解硬件的作用。



Basic Knowledge

Words

cushion	<i>n.</i>	垫子; 软垫; 衬垫
droplet	<i>n.</i>	小滴; 微滴
duplicate	<i>n.</i>	复制品; 副本
electromagnetic	<i>adj.</i>	电磁的
flexible	<i>adj.</i>	柔韧的; 易曲的
impurity	<i>n.</i>	杂质; 混杂物; 不洁; 不纯
immense	<i>adj.</i>	极广大的; 无边的
megabyte	<i>n.</i>	兆字节
metallic	<i>adj.</i>	金属的
molecule	<i>n.</i>	分子
multiplication	<i>n.</i>	乘法; 增加
mylar	<i>n.</i>	聚酯薄膜
neon	<i>n.</i>	氖
optical	<i>adj.</i>	光学的; 眼的; 视力的
oxide	<i>n.</i>	氧化物

plasma	<i>n.</i>	等离子体; 等离子区
plotter	<i>n.</i>	阴谋者; 计划者; 绘图仪
reinforcement	<i>n.</i>	增援; 加强; 加固; 援军

Notes

[1] 例句: 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.

分析: 句中 means 是“方法”的意思。that is relatively permanent 是定语从句, 修饰 form。

译文: 存储硬件的作用是以一种相对持久的方式提供存储计算机指令和数据的方法, 即当切断电源时数据不会丢失, 且当需要处理时数据又容易恢复。

[2] 例句: An electric field causes the molecules to line up in a way that alters their optical properties.

分析: 句中 line up 是“排成一行”, that alters their optical properties 是定语从句, 修饰 way。

译文: 电场使得这些分子排成一行, 在某种程度上改变着它们的光学特性。

[3] 例句: The characters are treated with a magnetically charged ink like toner and then are transferred from drum to paper.

分析: 句中 treat with 是“用……处理”, then 后面省略了主语 the characters.

译文: 用磁化的带电的像墨一样的碳粉处理这些字符, 然后从硒鼓传送到纸上。

Reference Translation

计算机硬件

计算机硬件有五部分: 中央处理器、内存、存储硬件、输入硬件和输出硬件。

计算机运行程序的部分被称为处理器或中央处理单元。在微型计算机中, CPU 是在一个单独的电子元件上, 即微处理器芯片上, 它在系统单元内或系统机箱内。CPU 本身具有两个部分: 控制单元和算术逻辑单元。在微型计算机中, 这两个部分都在微型机芯片上。

控制单元: 控制单元告诉计算机系统的其他部分如何完成程序指令。它指导着内存和算术逻辑单元之间的电子信号的移动。它也指挥着 CPU 和输入、输出设备之间的控制信号。

算术逻辑单元: 算术逻辑单元通常被称为 ALU, 用来完成两类运算——算术和逻辑。算术运算, 如你所期望的, 是基本的数学运算: 加、减、乘、除。逻辑运算是由比较 (运算) 构成的, 也就是说, 将数据的两部分进行比较, 看其中一个是等于、小于还是大于另外一个。

内存：内存也被称为主存储器或内部存储器，它用于临时存储数据、程序指令和信息。对于内存需要了解的一个最重要的事实是它所保存的内容部分只是临时的。换句话说，数据只在计算机开着时才能保存。当计算机被关闭时，其内容会立即消失。在内存中所存储的信息是易失的并能很快消失。

存储硬件：存储硬件的作用是以一种相对持久的形式提供存储计算机指令和数据的方法，即当切断电源时数据不会丢失——且当需要处理时数据又容易恢复。存储硬件有四种：软盘、硬盘、光盘和磁带。

软盘：软盘又被称为软磁盘、可弯曲磁盘，或简单地称为磁盘。在磁盘表面内部的塑料盘是柔软的，而不是坚硬的。这些塑料盘是平的，装在一个套子内部旋转的圆形聚酯塑料片。程序和数据是以电磁荷的形式存储在聚酯塑料外面包着的金属氧化胶片上。

硬盘：硬盘是由金属盘片而不是塑料盘片组成的。它们被紧紧地密封起来，以防止外界事物进入。硬盘是非常灵敏的设备。读写头浮在一个大约 0.000 001 英寸厚的空气垫上。它是如此的薄，以至于烟粒、指印、灰尘或者人的毛发都可能引起磁头划伤。当读写头的表面或表面上的微粒与磁盘表面接触时就会发生磁头划伤。磁头划伤对于硬盘来讲是灾难，它意味着磁盘上的数据部分或全部丢失。硬盘在无菌条件下装配，并且密封在远离杂质的永久容器内。

光盘：光盘用于存储大量的数据。一个光盘可容纳 650 兆字节的数据——相当于几百个软盘。并且，光盘使得大量的信息用于微机上。在光盘技术中，激光束改变塑料或金属盘的表面来代表数据。为了读取数据，激光扫描这些区域并且将这些数据传送给计算机芯片进行转换。

磁带：磁带是备份，即复制、拷贝程序和数据的有效方法。我们曾提到如果硬盘遭遇磁头划伤就会产生令人担忧的结果，你将会丢失部分或全部的程序或数据。当然，你可以将硬盘上的文件拷贝到软盘上。然而这很耗时，并且需要很多软盘。磁带是顺序访问存储，能够解决上述问题。

输入硬件：输入硬件接收人们能读懂的程序和数据并将其转换为计算机能处理的形式。这就是机器可读的电子信号 0 和 1。输入硬件有两种：键盘输入和直接输入。

键盘输入：数据通过形似打字机键盘但有附加键的键盘输入到计算机。通过这种方式，用户一般读取被称为源文件的初始文件。用户通过在键盘上打字而输入那个文件。

直接输入设备：（这种情况下）数据以机器可读的形式输入到计算机，不需要键盘。直接输入设备可以被分成三类：指针设备（如，鼠标、触摸屏、光笔、数字转换仪都是指针设备）、扫描设备（如，图像扫描仪、传真机、条形码扫描器都是扫描设备）和声音输入设备。

输出硬件：输出设备将机器可读的信息转换为人类可读的形式。常见的输出设备

有显示器、打印机、绘图仪和声音输出设备。

监视器：监视器也被称为显示屏或视频显示终端。大多数放在桌面上的监视器的制作方法同电视一样，被称为阴极射线管（显示器）。另一类监视器是平板显示器，包括液晶显示器、光电发光显示器和气体等离子显示器。液晶显示器自己不发射光，相反，它是由晶体分子组成。电场使得这些分子排成一行，在某种程度上改变着它们的光学特性。遗憾的是，许多液晶显示器在太阳光或其他强光下很难读到。气体等离子显示器是平板显示器中最好的一种，像霓虹灯泡一样，等离子显示器在通电流的情况下使用一种发光的气体。

打印机：有四种流行的打印机：点阵式、激光式、喷墨式和热敏式。

点阵式打印机：点阵式打印机能在不到 10 秒的时间内打印一页文本并且非常清楚。点阵式打印机利用在打印头上的一系列小针来形成字符或图像。这些针击打喷墨的色带并在纸上产生图像。这类打印机有 9 针、18 针和 24 针的，它的一个缺点是噪音过大。

激光打印机：激光打印机使用激光束光源在硒鼓上产生像点一样的图像，用磁化的带电的像墨一样的碳粉处理这些字符，然后从硒鼓传送到纸上，再使用热处理过程将这些字符粘贴上去。激光打印机打印的图像字符清晰，图像质量高。

喷墨式打印机：喷墨式打印机能以很高速度将小点状墨汁喷到纸面上。这一过程不仅能印刷高质量的图像，并且能打印彩色图像。

热敏式打印机：热敏式打印机使用热元素在热感应纸上产生图像。由于价格昂贵以及需要特殊处理的纸张，彩色热敏打印机并不是很普及。热敏式打印机是一种产生逼真输出的特殊打印机。它们被广泛应用在要求高质量彩色输出的专业艺术设计中。

绘图仪：绘图仪是特殊用途的输出设备，用于绘制条形图、地图、建筑制图，甚至三维图表。绘图仪可以输出高质量的多种色彩的文档，以及尺寸超过大多数打印机能处理的范围的文档。绘图仪有四种类型：笔式、喷墨、静电和直接图像。

声音输出设备：声音输出设备可以发出类似于人类说话的声音，但实际上是事先录制的声音。声音输出作为强化工具被用于辅助学习，例如帮助学生学习外语。它被许多超市的收款台用来确认顾客购买。当然，它最强大的功能是用来帮助残障者。

Exercises

I. Write “T” for true or “F” for false for the following statements according to the passage.

1. () The CPU is the processor of a computer.
2. () The memory of a computer can hold data and information permanently.
3. () Diskettes are flexible, flat, circular pieces of mylar plastic that rotate within a jacket, and they can be bent easily.
4. () Hard disks are extremely sensitive instruments to pollution, so magnetic tape

is an effective compensation for making a backup of your programs and data.

5. () Input devices accept people readable data and programs, convert them to machine readable form. Output devices reverse the process.
6. () To input data and information into computer, direct entry doesn't need keyboard.
7. () Mouse, touch screen, light pen, digitizer, and plotter are all direct entry devices.
8. () Thermal printer must use specialized paper.
9. () Laser printer can produce images with excellent letter and graphics quality, and it can also print large size documents.
10. () Voice-output devices can mimic human speech immediately.

II. Fill in the blanks according to the passage.

1. The CPU itself has two parts : _____ and _____.
2. The ALU performs two operations : _____ and _____.
3. The basic math operations are: _____, _____, _____, _____.
4. Image scanner, fax-machine and bar-code reader are all _____.
5. LCD, EL and gas-plasma are all _____ display.
6. Output devices convert _____ information into _____ form.
7. LCDs are difficult to read in _____ or other _____.
8. One disadvantage of dot-matrix printer is _____.
9. Plotters are special-purpose output devices, for producing _____, _____, _____, and even _____ illustrations.
10. Voice-output devices make sounds that resemble human speech but actually are _____.

III. Translate the following words and expressions into Chinese.

- | | |
|----------------------------|--------------------|
| 1. arithmetic-logic unit | 6. direct entry |
| 2. volatile | 7. voice-input |
| 3. optical disk | 8. inked ribbon |
| 4. electromagnetic charges | 9. letter-quality |
| 5. time-consumig | 10. heat sensitive |

Reading Material 1

Information Appliance

An “information appliance (IA)” is any device that can process information, signals,

graphics, animation, video and audio; and can exchange such information with another IA device. Typical devices could be smartphones, smartcard, PDAs, and so on. Digital cameras, ordinary cell phones, set-top boxes, and LCD TVs are not information appliances unless they become capable of communications and information functions. Information appliances may overlap in definition or be sometimes referred to smart devices, mobile devices, wireless devices, internet appliances, web appliances, handhelds, handheld devices or smart handheld devices.

Early appliances for a short while during the middle and late 1980s there were a few models of simple electronic typewriters fitted with screens and some form of memory storage. These devices had some of the attributes of an information appliance. One of these dedicated word processor machines, the Canon Cat was actually designed by Jef Raskin as the forerunner of the idea of the information appliance.

Information appliances tend to be consumer devices that perform only a few targeted tasks and are controlled by a simple touchscreen interface or push buttons on the device's enclosure.

Open standard protocols in an ideal world, any true information appliance would be able to communicate with any other information appliance using open standard protocols and technologies, regardless of the maker of the software or the hardware. The communications aspects and all user interface elements would be designed together so that a user could switch seamlessly from one information appliance to another.

Reading Material 2

Air Floating Displays

Today's display technologies form a field of huge interest as they are evolving with big steps while expanding the range of their applications following the demands of the market. Two new display technologies, which are still in development, impress us mostly for their concept and not so much for their display quality or their potential applications.

FogScreen

FogScreen company suggests a screen created by a thick layer of fog, formed in between two air surfaces of smooth flow. The FogScreen works very much like an ordinary screen in terms of projection properties. It can be used for both back and front projection. This kind of screens allow the projection of very impressive images, while the viewer can walk through the screen, walk directly into the images, and through them!

The fog used is dry, so it doesn't make you wet even if you stay under the FogScreen device for a long time. The fog is made of ordinary water with no chemicals whatsoever. The screen is supported by projectors with brightness of at least 3,000 ANSI Lumens and for the

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best result, a dark background is highly recommended.

The world premiere demonstration of FogScreen was at the Science Fair in Turku, Finland, in October 2002, and its researchers are awarded for their discovery. Its first installations have already been made in museums in France and Finland and it has recently been produced to the U.S.A in the form of interactive screen.

IO2 Technologies

A relevant technology is being developed by the “IO2 Technologies” company. Known by the name “Heliodyisplay”, this technology uses a device that displays on a bed of air above it. Nothing is added to the air so there is not any harmful gas or liquid emitted from the device, and nothing needs to be refilled. The device produces interactive images, which means it can be used as a “floating touch screen”. In the course of developing the technology, Heliodyisplays have been built that display images ranging from 5 to 42 and it is estimated that it can reach 150. Like the FogScreen, Heliodyisplay is best viewed in dark backgrounds. Although Heliodyisplay is plug-and-play compatible with most video sources (TV, DVD, computer, videogame, etc.) and anything can be projected on the FogScreen, both screen technologies are not meant to substitute computer or television screens. Their basic application fields include projections in board meetings and presentations, trade shows, museum, theme parks, etc.

3

Mission 3: System Software



Task Description

阅读并翻译以下英文文章，了解计算机 System Software 系统软件相关知识。

System Software

Software refers to computer programs. Programs are the instructions that tell the computer how to process data into the form you 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 background software and includes programs that help the computer manage its own internal resources.

Application software is a specialized program that enables the user to accomplish specific

tasks.

In this text, we mainly discuss system software. 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 we most concerned with, which helps manage computer resources. Most important operating systems are : Windows, Windows NT, OS/2, Macintosh, and Unix.

Windows : Windows gets its name because of its ability to run multiple applications at the same time, each in its own window. Windows offers graphical user interface (GUI), presents the user with graphic images of computer functions and data. It provides a standard mechanism for copying or moving information from one program to another. This mechanism, called the Clipboard, means that information created in one context is instantly reusable in another, you don't need to reenter information or work with clumsy data-transfer utilities. Windows also has DDE (dynamic data exchange) and OLE (object linking and embedding) functions. In DDE two or more applications can be linked. This way, data created in one application is automatically entered into the others. OLE, like DDE, links data between applications. Additionally, OLE allows the application receiving the data to directly access the application that created the data.

Windows NT : Windows NT is an operating system designed to run on a wide range of powerful computers and microcomputers. It is a very sophisticated and powerful operation system. Developed by Microsoft, Windows NT is not considered a replacement for Windows. [1]Rather, it is an advanced alternative designed for very powerful microcomputers and networks. Windows NT has two major advantages when compared to Windows :

Multiprocessing : It is similar to multitasking except that the applications are running independently at the same time. For instance, you could be printing a word processing document and using a database management program at the same time. [2]With multitasking, the speed at which the document is printed is affected by the demands of the database management program. With multiprocessing, the demands of the database management program do not affect the printing of the document.

Networking : In many business environments, workers often use computer to communicate with one another and to share software using a network. This is made possible and controlled by special system software. Windows NT has network capabilities and security checks built into the operating system. This makes network installation and use relatively easy.

OS/2: OS/2 stands for 'Operating System/2'. It was developed jointly by IBM and Microsoft Corporation. OS/2 has many similarities with Windows NT. It is designed for very powerful microcomputers and has several advanced features. Some of its advantages over Windows NT include :

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Minimum system configuration : Like Windows NT, OS/2 requires significant memory and hard disk space. However, OS/2 requires slightly less.

Windows application : Like Windows NT, OS/2 does not have a large number of application programs written especially for it. OS/2 can also run Windows programs, but it runs these programs slightly faster than Windows NT.

Common user interface : Microcomputer application programs written specifically for Windows NT, as well as for OS/2, have consistent graphics interfaces. Across applications, the user is provided with similar screen displays, menus, and operations. Additionally, OS/2 offers a consistent interface with mainframes, minicomputers, and microcomputers.

Macintosh : The Macintosh Software, which runs only on Macintosh computers, offers a high-quality graphical user interface and is very easy to use. Apple Macintosh System 7.5 designed for Apple computers using Motorola's PowerPC microprocessor, is a significant milestone for Apple. It is a very powerful operating system like Windows NT and OS/2. System 7.5 has network capabilities and can read Windows and OS/2 files. It has several advantages :

Ease of use : The graphical user interface has made the Macintosh popular with many newcomers to computing. This because it is easy to learn.

Quality graphics : Macintosh has established a high standard for graphics processing. This is a principal reason why the Macintosh is popular for desktop publishing. Users are easily able to merge pictorial and text materials to produce nearly professional-looking newsletters, advertisements, and the like.

Consistent interfaces : Macintosh applications have a consistent graphics interface. Across all applications, the user is provided with similar screen displays, menus, and operations.

Multitasking : Like Windows, Windows NT, and OS/2, the Macintosh System enables you to do multitasking. That is, several programs can run at the same time.

Communications between programs : The Macintosh system allows applications programs to share data and commands with other applications programs.

Unix : Unix was originally developed by AT&T for minicomputers and is very good for multitasking. It is also good for networking between computers. Unix initially became popular in industry because for many years AT&T licensed the system to universities for a nominal fee. It is popular among engineers and technical people. With the arrival of very powerful microcomputers, Unix is becoming a larger player in the microcomputer world. Unix can be used with different types of computer systems, that is, it is a portable operating system. It is used with microcomputers, minicomputers, mainframes, and supercomputers. The other

operating systems are designed for microcomputers and are not nearly as portable. It also has the advantages of multitasking, multiprocessing, multiuser, and networking.



Task Analysis

软件是指程序语言，主要由系统软件和应用软件两部分组成。软件系统控制着计算机的运作。作为一名专业的计算机工作者，需要对系统软件有一定的了解。



Basic Knowledge

Words

accomplish	<i>v.</i>	完成；达到；实现
advertisement	<i>n.</i>	广告；启事；宣传
application	<i>n.</i>	请求；应用；应用程序；应用软件
background	<i>n.</i>	背景；后台
bootstrap	<i>n.</i>	引导程序；自展
diagnostic	<i>n.</i>	诊断信息；诊断程序
dynamic	<i>adj.</i>	动态的；动力（学）的
embed	<i>v.</i>	嵌套；装入
graphical	<i>adj.</i>	图形的
initially	<i>adv.</i>	最初地；首先
interface	<i>n.</i>	界面；接口
license	<i>v.</i>	许可；准许
mechanism	<i>n.</i>	机械装置；机构；机制
multiple	<i>adj.</i>	多（倍；路；重；道；次）的
newsletter	<i>n.</i>	通信稿；业务通信；简讯
nominal	<i>adj.</i>	名义上的；有名无实的；名字的
pictorial	<i>adj.</i>	图示的；图像的
refer	<i>v.</i>	提交；谈及；归诸于
security	<i>n.</i>	安全（性）；保密（性）；安全措施
specialized	<i>adj.</i>	专业的；专门的

Notes

[1] 例句: Rather, it is an advanced alternative designed for very powerful microcomputers and networks.

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分析: alternative 在这里意为“另一个可供选择的”, designed for very powerful microcomputers and networks 是过去分词短语作定语, 修饰 alternative。

译文: 而是为给功能非常强大的微型计算机和网络提供一个可供选择的高级操作系统。

[2] 例句: With multitasking, the speed at which the document is printed is affected by the demands of the database management program.

分析: at which the document is printed 是定语从句, 修饰 speed。

译文: 在这种多任务操作情况下, 文件打印的速度会受到数据库管理程序运行需求的影响。

Reference Translation

系统软件

软件指的是计算机程序。程序是告诉计算机如何将数据处理成你想要的形式的指令。软件有两种: 系统软件和应用软件。

系统软件是指能让应用软件在计算机系统硬件设备上运行的程序的集合, 它是后台软件并且包括帮助计算机管理自己内部资源的程序。

应用软件是让用户能够完成特定任务的专门程序。

在这一节中, 我们主要讨论系统软件。系统软件由四种程序组成: 引导装入程序、诊断例行程序、基本输入-输出系统和操作系统。在这四种程序当中, 操作系统是我们最为关心的, 它帮助管理计算机资源。最重要的操作系统有: Windows、Windows NT、OS/2、Macintosh 和 Unix。

Windows: Windows 之所以称为窗口是因为它具有同时运行多个应用程序的能力, 并且每一个程序有其自己的窗口。Windows 提供图形用户界面, 给用户提计算机的功能和数据的图像。它为不同程序间信息的复制或移动提供了标准机制。这个机制被称为剪贴板, 意味着在一个文本中产生的信息可以被另外一个文本立即重新使用, 而用户不需要重新输入信息或使用繁琐的数据传送实用程序。Windows 还具有 DDE (动态数据交换) 和 OLE (对象链接和嵌入) 功能。在 DDE 中两个或更多的应用程序可以被链接。使用这种方法, 在一个应用程序中产生的数据可以自动地进入其他程序。OLE 类似于 DDE, 在应用程序之间链接数据。另外, OLE 允许接收数据的应用程序直接访问建立这个数据的应用程序。

Windows NT: Windows NT 是一种可以在多种功能强大的计算机和微型计算机上运行的操作系统。它是一个非常复杂且功能强大的操作系统。Windows NT 由微软公司

开发，并不是为了替代 Windows，而是为给功能非常强大的微型计算机和网络提供一个可供选择的高级操作系统。与 Windows 相比，Windows NT 具有两个主要的优点。

多道处理：除了应用程序是同时独立运行之外，它类似于多重任务处理。比如，你可能正在打印文字处理文档并且同时在使用数据库管理程序。在这种多任务操作情况下，文件打印的速度会受到数据库管理程序运行需求的影响。使用多道处理，数据库管理程序运行需求就不会影响打印文档。

网络：在许多商业环境中，工作人员经常使用计算机与别人进行交流，并且通过网络共享软件。这可以通过专门的系统软件来实现和控制。Windows NT 具有网络功能和嵌入到操作系统内的安全检测功能，这使得网络安装和使用相对容易。

OS/2：OS/2 代表“操作系统 /2”，它是由 IBM 和微软公司联合开发的。OS/2 和 Windows NT 具有许多相似之处。它是为功能强大的微型计算机设计的，并且具有几个先进的特点。它优于 Windows NT 的一些特点如下：

最小的系统配置：像 Windows NT 一样，OS/2 需要大的内存和硬盘空间。然而，OS/2 需要的略少。

窗口应用：OS/2 和 Windows NT 一样，没有很多专门为它编写的应用程序。OS/2 同样可以运行 Windows 程序，但它运行这些程序的速度比 Windows NT 稍快一些。

共同的用户界面：专门为 Windows NT 以及 OS/2 编写的微型计算机应用程序，具有一致的图形界面。在应用程序里，这两个系统提供给用户类似的显示、菜单和操作。此外，OS/2 为大型机、小型机和微型机提供一致的界面。

Macintosh：Macintosh 操作系统仅运行在 Macintosh 计算机上，可提供高质量的图形用户界面，并且很容易上手。Apple Macintosh System 7.5 是为使用 Motorola 公司的 PowerPC 微处理器的 Apple 计算机设计的，这对于 Apple 机来说是一个重要的里程碑。它像 Windows NT 和 OS/2 一样，是功能强大的操作系统。System 7.5 具有网络功能并能读出 Windows 和 OS/2 系统中的文件。它具有以下几个优点：

容易使用：图形用户界面使得 Macintosh 在许多计算机新用户中普及，这是因为它容易学习。

高质量的图像：Macintosh 已经建立了图像处理的高标准，这就是其在桌面排版系统流行的主要原因。用户可以很容易地将图片和文字材料组织成比较专业的通信稿、广告等。

一致的界面：Macintosh 应用程序具有一致的图形界面。在所有的应用程序中，它提供给用户相似的屏幕显示、菜单和操作。

多任务处理: 像 Windows、Windows NT 和 OS/2 一样, Macintosh 系统使用户可以进行多任务处理, 即几个程序可同时运行。

程序之间的通信: Macintosh 系统允许应用程序之间共享数据和命令。

Unix: Unix 起初是由 AT&T 为微型机开发的, 它非常适于执行多任务处理。它也适合于计算机之间的网络链接。由于多年来 AT&T 一直将此系统以象征性的费用提供给大学使用, 因此 Unix 起初就在工业领域很普及。它在工程师和技术人员中很普及。随着功能强大的微型计算机的到来, Unix 正成为微机世界的大玩家。Unix 可被用于不同类型的计算机系统, 也就是说, 它是便携式的操作系统。它可用在微型机、小型机、大型机和巨型机上。其他的操作系统都是被设计用于微型机, 且几乎不可移植。Unix 也具有多任务并行、多道处理、多用户使用和网络功能的优点。

Exercises

I. Write "T" for true or "F" for false for the following statements according to the passage.

1. () System software is background software, that is, without it, computers can't work.
2. () System software has four kinds of programs: bootstrap loader, diagnostic routines, basic input-output system, and operating system.
3. () One computer can only run one kind of system software.
4. () Windows provides a standard mechanism called Clipboard, which can copy or move data easily.
5. () DDE allows the application receiving the data to directly access the application that created the data.
6. () Windows NT is designed for replacement of Windows.
7. () OS/2 requires the same memory and hard disk space as Windows does.
8. () Macintosh operating system can run on all kinds of computers.
9. () Unix is a portable operating system, that is, it can be used in different kinds of computer systems.
10. () Macintosh computers are designed to use Intel's microprocessor.

II. Fill in the blanks according to the passage.

1. _____ are the instructions that tell the computer how to process data into the form you want.
2. _____ is background software and includes programs that help the computer manage its own _____ resources.

3. System software consists of four kinds of programs : _____ , _____ , _____ , _____ .
4. Windows also has DDE (_____) and OLE (_____) functions.
5. _____ is similar to multitasking except that the applications are run independently and at the same time.
6. OS/2 was developed jointly by _____ and _____ Corporation.
7. The Macintosh Software, which runs only on _____ computers, offers a high-quality _____ and is very easy to use.
8. Unix can be used with different types of computer systems, that is, it is a _____ operating system.
9. _____ is a standard mechanism for copying or moving information from one program to another.
10. Unix can be used with different types of computer systems. It also has the advantages of _____ , _____ , _____ , and _____ .

III. Translate the following words and expressions into Chinese.

- | | |
|--------------------------|----------------------------|
| 1. background software | 6. security checks |
| 2. internal resources | 7. bootstrap loader |
| 3. standard mechanism | 8. diagnostic routines |
| 4. significant milestone | 9. data-transfer utilities |
| 5. network capabilities | 10. advanced alternative |

Reading Material 1

Embedded System

An “embedded system” is a special-purpose computer system, which is completely encapsulated by the device it controls. An embedded system has specific requirements and performs pre-defined tasks, unlike a general-purpose personal computer.

Characteristics: Two major areas of differences are cost and power consumption. Since many embedded systems are produced in the tens of thousands to millions of units range, reducing cost is a major concern. Embedded systems often use a (relatively) slow processor and small memory size to minimize costs. The slowness is not just clock's speed. The whole architecture of the computer is often intentionally simplified to lower costs. For example, embedded systems often use peripherals controlled by synchronous serial interfaces, which are ten to hundreds

of times slower than comparable peripherals used in PCs. Programs on an embedded system often must run with real-time constraints with limited hardware resources: often there is no disk drive, operating system, keyboard or screen. A flash drive may replace rotating media, and a small keypad and LCD screen may be used instead of a PC's keyboard and screen. Firmware is the name for software that is embedded in hardware devices, e.g. in one or more ROM Flash memory IC chips. Embedded systems are routinely expected to maintain 100% reliability while running continuously for long periods of time, sometimes measured in years. Firmware is usually developed and tested to much stricter requirements than is general purpose software (which can usually be easily restarted if a problem occurs). In addition, because the embedded system may be outside the reach of humans (down an oil well borehole, launched into outer space, etc.), embedded firmware must usually be able to self-restart even if some sort of catastrophic data corruption has taken place. This last feature often requires external hardware assistance such as a watchdog timer that can automatically restart the system in the event of a software failure.

Platform: There are many different CPU architectures used in embedded designs. This is contrast to the desktop computer market, which as of this writing (2003) is limited to just a few competing architectures, mainly the Intel/AMD x86, and the Apple/Motorola/IBM PowerPC, used in the Apple Macintosh. One common configuration for embedded systems is the system on a chip, an application-specific integrated circuit, for which the CPU was purchased as intellectual property to add to the IC's design.

Reading Material 2

Real-Time Operating System

A “Real-Time Operating System” or “RTOS” is an operating system that has been developed for real-time applications. It is typically used for embedded applications. Note that this type of operating system does not necessarily have high throughput—the specialized scheduling algorithm and a high clock-interrupt rate can both interfere with throughput. An early example of a large-scale real-time operating system was the so-called “control program” developed by American Airlines and IBM for the Sabre Airline Reservations System. Debate exists about what actually constitutes real-time.

In typical designs, a task has three states: running, ready and blocked. Most tasks are blocked for most of the time. Only one task per CPU is running. The ready list is usually short, two or three tasks at most. The real trick is designing the scheduler. Usually the data structure

of the ready list in the scheduler is designed, so that search, insertion and deletion require locking interrupts only for small periods of time, when looking at precisely defined parts of the list. This means that other tasks can operate on the list asynchronously, while it is being searched. A typical successful schedule is a bidirectional linked list of ready tasks, sorted in order by priority. Although not fast to search, the time taken is deterministic. Most ready lists are only two or three entries long, so a sequential search is usually the fastest, because it requires little set-up time. The critical response time, sometimes called the “flyback time”, is the time it takes to queue a new ready task, and restore the state of the highest priority task. In a well-designed RTOS, readying a new task will take 3-20 instructions per ready queue entry, and restoration of the highest-priority ready task will take 5-30 instructions. On a 20MHz-68,000 processor, task switch times run about 20 microseconds with two tasks ready. 100 MHz ARM CPUs switch in a few microseconds.

4

Mission 4: Application Software



Task Description

阅读并翻译以下英文文章，了解计算机应用软件相关知识。

Application Software

Application software might be described as end-user software. Application software performs useful work on general-purpose tasks such as word processing and cost estimating. There are certain general-purpose programs that are widely used in nearly all career areas. They are : word processing software, spreadsheets software, graphic software and so on. They are also called basic tools and have some common features.

Insert Point : The insert point or cursor shows you where you can enter data next. Typically, it is a blinking vertical bar on the screen. You can move it around using a mouse or the directional arrow keys on many keyboards.

Menus : Almost all software packages have menus. Typically, the menus are displayed in a menu bar at the top of the screen. When one of these is selected, a pull-down menu appears. The pull-down menu is a list of commands associated with the selected menu.

Help : For most applications, one of the menus on the menu bar is Help. When selected,

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Project 5

Project 6

the Help options appear. [1]These options typically include a table of contents, a search feature to locate reference information about specific commands, and key options to move around.

Button Bars : Button bars typically are below the menu bar. They contain icons or graphic representations for commonly used commands. This offers the user a graphic approach to selecting commands. It is an example of a graphic user interface in which graphic objects rather than menus can be used to select commands.

Dialog Box : Dialog boxes frequently appear after selecting a command from a pull-down menu. These boxes are used to specify additional command options.

Scroll Bars : Scroll bars are usually located on the right or the bottom of the screen. They enable you to display additional information not currently visible on the screen.

WYSIWYG : Pronounced “wizzy-wig”, WYSIWYG stands for “What You See Is What You Get”. This means that the image on the screen display looks the same as the final printed document. Application programs without WYSIWYG cannot always display an exact representation of the final printed document. The WYSIWYG feature allows the user to preview the document’s appearance before it is printed out.

Function Keys : Function keys are labeled F1, F2, and so on. These keys are positioned along the left side or along the top of the keyboard. They are used for commands or tasks that are performed frequently, such as underlining. These keys do different things in different software packages.

Now let’s introduce respectively the most common used application software : word processing software and spreadsheets software.

Word processing software is used to create, edit, save, and print documents. Documents can be any kind of text material. With word processing, you view the words you type on a monitor instead of on a piece of paper. After you finish your typing, save your words on diskettes or hard disk, and print the results on paper.

The benefits of this method is that you can make changes or corrections—before printing out the document. Even after your document is printed out, you can easily go back and make changes. You can then print it out again. Want to change a report from double spaced to single spaced ? Alter the width of the margins on the left and right ? Delete some paragraphs and add some others from yet another document ? A word processor allows you to do all these with ease. Indeed, deleting, inserting, and replacing—the principal correcting activities—can be done just by pressing keys on the keyboard. Popular word processing software are Word , WPS and so on. They have some common features.

Word Wrap and the Enter Key : One basic word processing feature is word wrap. When you finish a line, a word processor decides for you and automatically moves the insertion point to the next lines. To begin a new paragraph or leave a blank line, you press the Enter key.

Search and Replace : A search or find command allows you to locate any character, word, or phrase in your document. When you search, the insertion point moves to the first place the item appears. If you want, the program will continue to search for all other locations where the item appears. The replace command automatically replaces the word you search for with another word. The search and replace commands are useful for finding and fixing errors.

Cut, Copy, and Paste : With a word processor software, you can select the portion of text to be moved by highlighting it. Using either the menu or button bar, choose the command to cut the selected text. The selected text disappears from your screen. Then move the insertion point to the new location and choose the paste command to reinsert the text into the document. In a similar manner, you can copy selected portions of text from one location to another.

A spreadsheet is an electronic worksheet used to organize and manipulate numbers and display options for analysis. Spreadsheets are used by financial analysts, accountants, contractors, and others concerned with manipulating numeric data. Spreadsheets allow you to try out various “what-if” kinds of possibilities. That is a powerful feature. You can manipulate numbers by using stored formulas and calculate different outcomes.

A spreadsheet has several parts. The worksheet area of the spreadsheet has letters for column headings across the top. It also has numbers for row headings down the left side. The intersection of a column and row is called a cell. The cell holds a single unit of information. The position of a cell is called the cell address. For example, “A1” is the cell address of the first position on a spreadsheet, the topmost and leftmost position. A cell pointer—also known as the cell selector—indicates where data is to be entered or changed in the spreadsheet. The cell pointer can be moved around in much the same way that you move the insertion pointer in a word processing software. Excel is the most common spreadsheet software. It has some common features of spreadsheet programs.

Format Label is often used to identify information in a worksheet, it is usually a word or symbol. A number in cell is called a value. Labels and values can be displayed or formatted in different ways. A label can be centered in the cell or positioned to the left or right. A value can be displayed to show decimal places, dollars, or percent. The number of decimal positions can be altered, and the width of columns can be changed.

Formulas : One of the benefits of spreadsheets is that you can manipulate data through

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the use of formulas. Formulas are instructions for calculations. They make connections between numbers in particular cells.

Functions : Functions are built-in formulas that perform calculations automatically.

Recalculation : Recalculation or what-if analysis is one of the most important features of spreadsheets. If you change one or more numbers in your spreadsheet, all related formulas will recalculate automatically. Thus you can substitute one value for another in the cells affected by your formula and recalculate the results. For more complex problems, recalculation enables you to store long, complicated formulas and many changing values and quickly produce alternatives.



Task Analysis

应用软件是计算机系统不可缺少的，它构成了计算机系统的主要框架。应用软件的界面因种类不同会有所不同，但都由窗口、菜单栏、对话框等组成。要学习应用软件，首先要了解应用软件类型、界面以及基本操作方法。



Basic Knowledge

Words

accountant	<i>n.</i>	会计员（出纳员）
activity	<i>n.</i>	活动
approach	<i>n.</i>	方法；手段
associate	<i>v.</i>	联合；联系；联想
blink	<i>v.</i>	闪烁
built-in	<i>adj.</i>	内置的；内装的；嵌入的
contractor	<i>n.</i>	订约人；承包者；收缩部分
decimal	<i>adj.</i>	十进位的；小数的
document	<i>n.</i>	文档；文件
end-user	<i>n.</i>	最终用户
estimate	<i>v.</i>	估计；估算
formula	<i>n.</i>	公式
general-purpose	<i>adj.</i>	通用的
graphic	<i>adj.</i>	图形的
highlight	<i>v.</i>	使突出
icon	<i>n.</i>	图标；肖像
intersection	<i>n.</i>	相交

manipulate	<i>v.</i>	操作
margin	<i>n.</i>	页边空白
outcome	<i>n.</i>	结果; 成果
package	<i>n.</i>	(程序)包; (数据)包
reference	<i>n.</i>	参考; 引用
respectively	<i>adv.</i>	各自地; 分别地
spreadsheet	<i>n.</i>	电子制表软件; 电子数据表; 試算表
underline	<i>v.</i>	在……下划线
vertical	<i>adj.</i>	垂直(并排的); 纵向的
word wrap	<i>n.</i>	自动换行

Notes

[1] 例句: These options typically include a table of contents, a search feature to locate reference information about specific commands, and central options to move around.

分析: 句中 about specific commands 是介词短语修饰 information, to move around 是动词不定式作定语修饰 options.

译文: 这些选项一般包含目录, 查询有关特殊命令说明信息的搜索栏和可以到处移动的集中选项。

Reference Translation

应用软件

应用软件可定义为最终用户软件。应用软件在通用任务中完成有用的工作, 例如字处理和价格评估。有些通用程序被广泛用于几乎所有行业领域, 它们是: 字处理软件、电子制表软件和图像处理软件等。它们也被称为基本工具, 具有一些共同的特性。

插入点: 插入点或光标显示标示着用户接下来可以输入数据的地方。一般来说, 它是屏幕上闪动的竖直条。用户可以使用鼠标或键盘上的方向键移动它。

菜单: 几乎所有的软件都有菜单。菜单一般显示在屏幕顶部的菜单栏中。当其中之一被选中时, 就会出现下拉式菜单。下拉式菜单是和所选菜单相关的一系列命令。

帮助: 对于大多数应用程序, 菜单栏中都有一个“帮助”菜单。当其被选中时, 帮助选项出现。这些选项一般包含目录, 查询有关特殊命令说明信息的搜索栏和可以到处移动的集中选项。

工具栏: 工具栏一般位于菜单栏的下面, 它们包含图标或普通命令的图像表示符。这就使得用户可以通过图像符号来选择命令。工具栏就是图形用户界面的一个例子, 在图形用户界面中使用图像目标而不是菜单来选择命令。

对话框: 通常在下拉式菜单中选择一个命令之后就会出现对话框。这些对话框用

来说明附加的命令选项。

滚动条：滚动条通常位于屏幕的右边或底部。它们通常能够显示在当前屏幕上看不到的附加信息。

WYSIWYG：WYSIWYG发“wizzy-wig”音，代表“所见即所得”。这就意味着在屏幕上显示的图像和最终打印出来的文档是一样的。没有WYSIWYG的应用程序，就不能显示最终打印文档的精确表示。WYSIWYG特性允许用户在文档打印之前预览文档的全貌。

功能键：功能键被标为F1、F2等，这些键位于键盘的左边或顶部。它们用于需经常完成的命令或任务，比如下划线。这些键在不同的软件包内完成不同的任务。

现在分别介绍最常使用的应用软件：字处理软件和电子制表软件。

字处理软件用于建立、编辑、保存和打印文档。文档可以是任何类型的文本材料。使用字处理软件，可以浏览打在显示器上而不是纸上的文字。打字完毕后，可以将文字存放在软盘或硬盘上，并且可以将结果打印在纸上。

这种方式的好处在于用户在打印出文档之前可以进行修改，即使文档已打印出来，也可以很容易地返回去并进行修改，然后再打印出来。你想把一个报告的行距从双倍改成单倍吗？你想改变左右边距的宽度吗？你想删除一些段落并插入其他文档的一些段落吗？字处理软件可以很容易地帮你完成这些事情。事实上，删除、插入和替换——这几种主要的（文档）修改任务——只要按键盘上的键就可以完成。流行的字处理软件有Word、WPS等。它们具有一些共同的特性。

自动换行和回车键：字处理的一个基本特点是换行。当完成一行时，字处理器就会替你做决定，自动地将插入点移动到下一行。若要开始一个新段或空一段，可以按回车键。

查找和替换：查找命令允许你在文档中寻找任何字符、词或短语。查找时，插入点就会移动到所查询项目首次出现的位置。如果还想继续查找，程序就会继续寻找所查询项目出现的其他所有地方。替换命令会自动地用另外的字来替换所搜寻的那个字。寻找和替换命令对于发现和修改错误是非常有用的。

剪切、拷贝和粘贴：使用字处理软件，可通过光标选中来选择要移动的文本部分。使用菜单或工具栏，选择（相应的）命令来剪切所选的文本，这样所选择的文本就会在屏幕上消失。然后移动插入点到新的位置，选择粘贴命令，把剪切的内容重新插入到文本。用类似的方法，可以复制选中的文本到另外一个地方。

电子表格是用于组织和操作数字并且提供分析选项的电子工作表。电子表格的用户为金融分析师、会计师、项目承包人以及其他和操作数据有关的人员。电子表格允许用户尝试分析各种假设情况的可能性。这是一个很有用的特性。用户可以通过使用存储的公式处理数字，并且计算出不同的结果。

电子表格具有几个部分。电子表格的工作表区域顶部有列标的字母，左边有行标的数字。行和列相形成的空格，称为单元格。单元格存有单一的信息。单元格的位置称为单元格地址。例如，“A1”就是电子表格的首位置，即同时处于最上部和最左边的位置。单元格指针也被称为是选择器，指示表格中数据在哪里输入或修改。单元格指针可以到处移动，其移动方式非常像在字处理软件中移动插入点的方式。Excel是最常见的电子表格软件，它具有一些电子表格程序的共同特性。

格式标号通常用于标记工作表中的信息，通常是一个字或符号。单元格中的数字称为值。标号和值可以用不同的方式显示和格式化。标号可以在单元格内居中或居左、居右。值可被显示为小数、美元或百分数。小数位数可以改变，列的宽度也可以改变。

公式：电子表格的优点之一是可以通过公式来处理数据。公式是计算的指令，它们能使特定单元格内的数字之间建立联系。

函数：函数是自动完成计算的内置的一系列公式。

重新计算：重新计算或“what-if”分析是电子表格最重要的特性之一。如果改变了表格中的一个或多个数字，所有相关的公式将会自动地重新计算。这样就可以替换受公式影响的单元格内的值，并且重新计算结果。对于更复杂的问题，重新计算让用户能够存储长的复杂的公式和许多变量，并且很快地形成替换。

Exercises

I. Write “T” for true or “F” for false for the following statements according to the passage.

1. () Application software includes some general-purpose programs that are widely used in nearly all career areas and some specialized programs that are used in special fields.
2. () The insert point or cursor indicates where you may enter data next.
3. () Button bars and menus are all methods for users to pick up, with button bars are more directly to users.
4. () With WYSIWYG, users can obtain representation of the exactly final results they want.
5. () Function keys do the same things in different software programs.
6. () Word wrap is a feature common to spreadsheet.
7. () A cell in spreadsheet can hold several units of information.
8. () Users can make connections among numbers in some cells through formulas.
9. () Recalculation makes related formulas alter easy in spreadsheet when one number in a cell is changed.
10. () Spreadsheet programs are typically used to store and retrieve records quickly.

II. Fill in the blanks according to the passage.

1. The insert point or _____ shows you where you can enter data next.
2. _____ menu is a list of commands associated with a selected menu.
3. Button bars typically are below the menu bar and contain _____ or _____ representations for commonly used commands.
4. The _____ feature allows the user to preview the document's appearance before it is printed out.
5. The search and replace commands are useful for _____ and _____ errors.
6. The intersection of a column and row in a spreadsheet is called a _____.
7. _____ are instructions for calculations.
8. The worksheet area of the spreadsheet has letters for column _____.
9. _____ enable you to display additional information not currently visible on the screen.

III. Translate the following words and expressions into Chinese.

- | | |
|----------------------------|-------------------|
| 1. general-purpose | 6. manipulate |
| 2. electronic spreadsheets | 7. recalculation |
| 3. button bars | 8. margin |
| 4. word wrap | 9. text material |
| 5. pull-down menu | 10. paste command |

Reading Material 1

Software Development Kit

A “Software Development Kit”, or “SDK” for short, is typically a set of development tools that allows a software engineer to create applications for a certain software package, software framework, hardware platform, computer system, operating system or similar. It may be something as simple as an application programming interface in the form of some files to interface to a particular programming language, or include sophisticated hardware to communicate with a certain embedded system. Common tools include debugging aids and other utilities. SDKs also frequently include sample code and supporting technical notes or other supporting documentation to help clarify points from the primary reference material. A software engineer typically receives the SDK from the target system developer. Oftentimes, the SDK can be downloaded directly via the Internet. Many SDKs are provided for free to encourage developers to use the system or language. Sometimes this is used as a marketing tool. For example, “Foo Products” might

provide the “Widget SDK” for free to encourage people to use it. Thus, more people will be encouraged to buy more of their widgets since they can program them for free. SDKs may have attached licenses that make them unsuitable for building software intended to be developed under an incompatible license. For example, a proprietary SDK will likely be incompatible with free software development. And a GPL licensed SDK will “likely” be incompatible with proprietary software development. LGPL SDKs are typically safe for proprietary development. An SDK for an operating system add-on (for instance, QuickTime for Mac OS) may include the add-on software itself, to be used for development purposes, if not necessarily for redistribution. An interesting situation arises here between platforms where it is possible to develop applications that can at least start up on a system configuration without the add-on installed, and use a Gestalt-style runtime “environment query” to determine if the add-on is present, and ones where the application will simply fail to start. In other words, it is possible to build a single binary that will run on configurations with and without the add-on present, albeit operating with reduced functionality in the latter situation.

Words

add-on	<i>n.</i>	添加件；外接式附件
albeit	<i>conj.</i>	虽然；即使
embed	<i>v.</i>	放入；嵌入
kit	<i>n.</i>	工具包；成套用具
proprietary	<i>adj.</i>	专利的；有专利权的
widget	<i>n.</i>	(某公司的) 典型小产品

Project Summary

计算机是一种处理数据信息的电子设备，主要由硬件和软件组成，其软件又分为系统软件与应用软件两类。应用软件包含文字处理软件、辅助设计软件等，广泛应用于各个领域，为人们的生活、工作提供了方便。本项目主要介绍了计算机的产生与种类、硬件与软件、系统软件与应用软件的知识。通过学习本项目，读者能够掌握计算机的基本要点，对计算机有初步的了解。

Project
1Project
2Project
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4Project
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Project Appraisal



填空题

1. Computers are electronic devices that can follow _____ to accept input, process that input, and produce information.
2. There are four popular kinds of printers : _____, _____, _____, and _____.
3. On a 20MHz-68,000 processor, task switch times run about _____ with two tasks ready.



判断题

1. Supercomputers are special, high-capacity computers used by very large organizations principally for research purposes. ()
2. FogScreen company suggests a screen created by a thick layer of fog, formed in between three air surfaces of smooth flow. ()
3. Two major areas of differences are cost and power consumption. Since many embedded systems are produced in the tens of thousands to millions of units range, reducing cost is a major concern. ()



简答题

1. 计算机的类型主要由哪几个因素决定?
2. 计算机的内存指的是什么? 主要作用有哪些?
3. 简述系统软件的概念。
4. 简述应用软件的概念。