

## 内 容 简 介

“计算机专业英语”综合了计算机知识和英语运用能力,是高职高专计算机专业学生的重要课程。

本书共分5章。第1章介绍计算机专业英语的基础知识,包括专业英语中的词汇特点,以及阅读和翻译计算机专业英文资料的方法、技巧。第2章介绍计算机硬件知识,包括计算机硬件基础、计算机系统结构、处理器、存储器以及输入/输出技术。第3章介绍计算机软件知识,包括数据结构、数据库、操作系统程序设计语言和软件工程知识。第4章介绍计算机网络相关知识,包括计算机网络、Internet、网络安全、电子商务和远程教育。第5章介绍计算机应用方面的知识,内容包括计算机图形学、多媒体技术、人工智能、分布式数据库系统和ERP。

本书适合于高职高专院校计算机应用及相关专业学生使用,也可供计算机相关专业技术人员学习和参考。

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# 出版说明

高职高专教育是我国高等教育的重要组成部分,担负着为国家培养并输送生产、建设、管理、服务第一线高素质技术应用型人才的重任。

进入 21 世纪后,高职高专教育的改革和发展呈现出前所未有的发展势头,其学生规模已占我国高等教育的半壁江山,成为我国高等教育的一支重要的生力军;办学理念上,“以就业为导向”成为高等职业教育改革与发展的主旋律。近两年,教育部召开了三次产学研交流会,并启动四个专业的“国家技能型紧缺人才培养项目”,同时成立了 35 所示范性软件职业技术学院,进行两年制教学改革试点。这些举措都表明国家正在推动高职高专教育进行深层次的重大改革,向培养生产、服务第一线真正需要的应用型人才的方向发展。

为了顺应当前我国高职高专教育的发展形势,配合高职高专院校的教学改革和教材建设,进一步提高我国高职高专教育教材质量,在教育部的指导下,清华大学出版社组织出版“21 世纪高职高专规划教材”。

为推动规划教材的建设,清华大学出版社组织并成立“高职高专教育教材编审委员会”,旨在对清华版的全国性高职高专教材及教材选题进行评审,并向清华大学出版社推荐各院校办学特色鲜明、内容质量优秀的教材选题。教材选题由个人或各院校推荐,经编审委员会认真评审,最后由清华大学出版社出版。编审委员会的成员皆为教改成效大、办学特色鲜明、师资实力强的高职高专院校、普通高校以及著名企业,教材的编写者和审定者都是从事高职高专教育第一线的骨干教师和专家。

编审委员会根据教育部最新文件政策,规划教材体系,比如部分专业的两年制教材;“以就业为导向”,以“专业技能体系”为主,突出人才培养的实践性、应用性的原则,重新组织系列课程的教材结构,整合课程体系,按照教育部制定的“高职高专教育基础课程教学基本要求”,教材的基础理论以“必要、够用”为度,突出基础理论的应用和实践技能的培养。

本套规划教材的编写原则如下:

- (1) 根据岗位群设置教材系列,并成立系列教材编审委员会;
- (2) 编审委员会规划教材、评审教材;
- (3) 重点课程进行立体化建设,突出案例式教学体系,加强实训教材的出版,完善教学服务体系;
- (4) 教材编写者由具有丰富教学经验和多年实践经历的教师共同组成,建立“双师型”编者体系。

本套规划教材涵盖了公共基础课、计算机、电子信息、机械、经济管理以及服务等大类的主要课程,包括专业基础课和专业主干课。目前已经规划的教材系列名称如下:

#### 公共基础课

公共基础课系列

#### 计算机类

计算机基础教育系列  
计算机专业基础系列  
计算机应用系列  
网络专业系列  
软件专业系列  
电子商务专业系列

#### 电子信息类

电子信息基础系列  
微电子技术系列  
通信技术系列  
电气、自动化、应用电子技术系列

#### 机械类

机械基础系列  
机械设计与制造专业系列  
数控技术系列  
模具设计与制造系列

#### 经济管理类

经济管理基础系列  
市场营销系列  
财务会计系列  
企业管理系列  
物流管理系列  
财政金融系列

#### 服务类

旅游系列  
艺术设计系列

本套规划教材的系列名称根据学科基础和岗位群方向设置,为各高职高专院校提供“自助餐”形式的教材。各院校在选择课程需要的教材时,专业课程可以根据岗位群选择系列;专业基础课程可以根据学科方向选择各类的基础课系列。例如,数控技术方向的专业课程可以在“数控技术系列”选择;数控技术专业需要的基础课程,属于计算机类课程可以在“计算机基础教育系列”和“计算机应用系列”选择;属于机械类课程可以在“机械基础系列”选择;属于电子信息类课程可以在“电子信息基础系列”选择。依此类推。

为方便教师授课和学生学习,清华大学出版社正在建设本套教材的教学服务体系。本套教材先期选择重点课程和专业主干课程,进行立体化教材建设,加强多媒体教学课件或电子教案、素材库、学习盘、学习指导书等形式的制作和出版,开发网络课程。学校在选用教材时,可通过邮件或电话与我们联系获取相关服务,并通过与各院校的密切交流,使其日臻完善。

高职高专教育正处于新一轮改革时期,从专业设置、课程体系建设到教材编写,依然是新课题。希望各高职高专院校在教学实践中积极提出意见和建议,并向我们推荐优秀选题。反馈意见请发送到 E-mail: gzg@tup.tsinghua.edu.cn。清华大学出版社将对已出版的教材不断地修订、完善,提高教材质量,完善教材服务体系,为我国的高职高专教育出版优秀的高质量教材。

高职高专教育教材编审委员会

# 前 言

## 计算机专业英语

“计算机专业英语”是高职高专计算机应用类专业学生的重要工具课。通过学习本课程,使学生掌握较多的专业英语词汇和计算机的基本概念,为阅读计算机专业文献和书籍打下坚实的基础,同时为在以后工作中解决与计算机专业英语相关的问题提供必要的知识保证。

本课程的目的是使学生不仅能学到计算机专业英语词汇,扩大知识面,同时能掌握用英语表达专业知识的方法,提高阅读及理解专业英文资料的能力,掌握计算机专业文章翻译的方法和技巧。

本教材面向计算机应用及相关专业高职高专院校学生,强调与计算机专业课内容的协调性。本书采用了最新的计算机专业技术资料,涵盖计算机专业软、硬件基础知识、计算机应用、多媒体技术、网络技术等专业知识。

本教材有以下几个方面的特点:计算机专业知识丰富;介绍了必要的语法知识及专业文章的翻译方法与技巧;注意与其他计算机专业课程内容的衔接与知识补充;注重实践性和实用性;阅读材料难度适当,强调理解及分析;每章配有关键词、注释及大量习题;书后附有所有文章的参考译文和习题答案,附录中列出了常用的计算机专业词汇。

本书共分5章。第1章介绍计算机专业英语的基础知识,包括专业英语中的词汇特点以及阅读和翻译计算机专业资料的方法、技巧。第2章重点介绍计算机硬件知识,包括计算机硬件基础、计算机系统结构、处理器、存储器以及输入/输出技术。第3章介绍计算机软件知识,内容包括数据结构、数据库、操作系统程序设计语言和软件工程知识。第4章介绍计算机网络相关知识,包括计算机网络、互联网、网络安全、电子商务和远程教育。第5章介绍计算机应用方面的知识,内容包括计算机图形学、多媒体技术、人工智能、分布式数据库系统、ERP等。每篇阅读课文后均附有重点词汇及课文难点注释、练习,与课文内容相关的阅读材料等,书末附有练习答案和参考译文。

本书由上海交通大学技术学院卜艳萍主编,并完成第1~3章内容的编写,以及对全书的统稿工作;第4章、第5章和附录由周伟编写。另外,燕慧、付燕、何飞、王军等参加了资料整理工作,周焯晴、邱尧同学帮助录入了部分书稿,在此一并表示感谢。

由于编者水平有限,不当之处敬请读者批评指正。

编 者

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# 第 五 章

## 计算机专业英语基础知识

### 第一节 专业英语的专业性和客观性

各个领域的专业英语都以表达科技概念、理论和事实为主要目的,因此,它们很注重客观事实和真相,要求逻辑性强,条理规范,表达准确、精练以及语言规范。各领域的专业英语之间存在许多共同的特点,它们与普通英语既有联系又有区别。

计算机专业英语与其他科技英语一样,在表达方式、词汇内容、句型结构和语法关系等方面,与普通英语有所不同,不但它的专业术语多,而且派生和新出现的专业用语还在不断地增加。这些术语的出现是和计算机技术的高速发展分不开的,例如:Internet、Intranet、Extranet等都是随着网络技术的发展而出现的。另外缩略词汇多,而且新的缩略词汇还在不断增加,并成为构成新词的词源。如:CPU(Central Processing Unit)、WPS(Word Processing System)、NT(Net Technology)、IT(Information Technology)等,要掌握这些词汇首先要有一定的英语词汇量,其次要对新技术有所了解。因此,要学好计算机专业英语并不是一件容易的事情,因为计算机技术不断发展,每种新技术都会有相应的一批新术语和新的知识描述语言出现。

### 第二节 专业英语的特点

科学技术本身的性质要求专业英语与专业技术相互配合,相互一致,这就决定了专业英语(English for Special Science and Technology)与普通英语(Common English or General English)有很大的差异。专业英语的主要特点是其具有很强的专业性,懂专业的人用起来得心应手,不懂专业的人用起来则困难重重。

专业英语的专业性就体现在它的特殊专业内容和特殊专业词汇。词汇是组成句子的基本元素,对词汇含义不能理解,就很难理解整个句子的内容。

专业英语在句子结构方面的特点如下:

- 长句多
- 用虚拟语气表达假设或建议
- 被动语态使用频繁
- 在说明书、手册中广泛使用祈使语句

- 常用 It... 句型结构

专业英语中词汇短语的特点如下：

- 合成新词多
- 专业术语多
- 介词短语多
- 半技术词汇多
- 缩略词经常出现
- 常使用动词或名词演化成的形容词
- 非限定动词(尤其是分词)使用频率高
- 插图、插画、表格、公式、数字所占比例大

### 专业英语的专业性与客观性

由于科学技术关心的不是个人的心理情绪,而是客观的普遍规律和对过程、概念的描述,因此专业英语具有的客观性和无人称性(Objectivity and Impersonality)必然要反映到语法结构上来。

专业英语文体在很多情况下是对某个科学论题的讨论,介绍某个科技产品和科学技术。为了表示公允性和客观性,往往在句子结构上采用被动语态描述,即以被描述者为主体,或者以第三者的身份介绍文章要点和内容。被动语态反映了专业英语文体中内容的客观性,被动语句除了表述作者自己的看法、观点以外,很少直接采用第一人称表述法。但在进行阅读理解和翻译时,根据具体情况,又可以将一个被动语态句子翻译成主动语句,以便强调某个重点,也适合汉语的习惯。

专业英语的语法特点可归纳为客观(objectivity),精练(conciseness)和准确(accuracy)3个方面。

- 客观

因为专业英语的客观性,所以在文章中常用被动语态。有人统计过,专业英语中被动语态的句子要占 $1/3 \sim 1/2$ 。一些句子即使用主动语态,主语也常常是非动物的(inanimate subject)。就时态而言,因为专业科技文献所涉及的内容(如科学定义、定理、方程式或公式、图表等)一般并没有特定的时间关系,所以在专业英语中大部分都使用一般现在时。另外,一般过去时、一般完成时在专业英语中也经常出现,如科技报告、科技新闻、科技史料等。

(1) The procedure by which a computer is told how to work is called programming.

句子的主要结构为 The procedure is called programming,用一般现在时和被动语态。by which 为“介词+关系代词”引导定语从句,从句的谓语也为被动语态,which 指代 procedure。

译文:告诉计算机如何工作的过程称为程序设计。

(2) Written language uses a small number of symbols which are easily encoded in digital form and can be combined in innumerable ways to convey meaning.

句中 are encoded 和 can be combined 是并列谓语,用被动语态,in digital form 和 in innumerable ways 中的介词 in 表示以什么形式,用什么方式。

译文：书面语言只使用少数符号，它们很容易用数字形式编码，并且可以用数不清的方法进行组合以便表达意义。

- 精练

因为要求精练，专业英语中常希望用尽可能少的单词来清晰地表达原意。这就导致了非限定动词、名词化单词或词组及其他简化形式的广泛使用。

通常的表达形式为：

(1) When you use the mouse to click a button, you can select an option from a list.

(2) We keep micrometers in boxes. Our object in doing this is to protect them from rust and dust.

(3) What does a fuse do? It protects a circuit.

(4) It is necessary to examine whether the new design is efficient.

精练的表示形式为：

(1) By using the mouse to click a button, you can select an option from a list.

(2) We keep micrometers in boxes to protect them from rust and dust.

(3) The function of a fuse is to protect a circuit.

(4) It is necessary to examine the efficiency of the new design.

- 准确

专业英语的准确性主要表现在用词上，然而在语法结构上也有其特点。例如，为了准确精细地描述事物过程，所用句子都较长，有些甚至一段就是一个句子。长句反映了客观事物中复杂的关系，它与前述精练的要求并不矛盾，只是包含的信息量大，准确性较高。

例：The runtime system initializes fixed variables only once, whereas dynamic variables, if they are declared with an initializer, are re-initialized each time their block is entered.

whereas 是一个连词，意思是“but in contrast; while on the other hand”，中文含义是“反之，而在另一方面却”。而 if 引导了一个条件状语从句。

译文：运行期间系统只初始化一次固定变量，而对于动态变量，若用初始程序说明，则每当进入动态变量块时，就重新初始化。

下面两个例句也是长句，翻译时应注意内容的完整和准确。

例：And not only is it technically impossible to censor current content of the Internet, but the Internet is set to explode exponentially in the indefinite future, with there being literally millions of changes and additions to web content on a daily basis.

译文：从技术上讲，要审查目前因特网的内容不仅不可能，在无限期的未来，它正在以幂指数的速度发展，因特网的内容每天都在进行无数的变动，并有无数的新内容出现。

例：After all, the purpose of education is not only to impart knowledge but to teach

students to use the knowledge that they either have or will find ,to teach them to ask and seek answers for important questions.

译文：毕竟教育的目的不仅仅是传授知识 ,还要教会学生应用现有的或是将来要掌握的知识 ,去提出问题 ,并寻找难以解答的问题的答案。

### 员源猿 被动语态在专业英语中的应用

语态是动词的一种形式 ,它表示主语和谓语的不同关系。语态有两种：主动语态和被动语态。主动语态表示句子的主语是谓语动作的发出者 ,被动语态表示主语是谓语动作的承受者。也就是说 ,主动语态句子中的宾语 ,在被动语态中做句子的主语。由于被动语态句子的主语是谓语动作的承受者 ,故只有及物动词才会有被动语态。下面介绍科技英语中主要时态的被动语态形式。

#### 员源 一般现在时

一般现在时的被动语态构成如下：

主语 + am(is are) + 及物动词的过去分词

例：The switches are used for the opening and closing of electrical circuits.

译文：开关是用来开启和关闭电路的。

#### 员圆 一般过去时

一般过去时的被动语态构成如下：

主语 + was(were) + 及物动词的过去分词

例：That plotter was not bought in Beijing.

译文：那台绘图仪不是在北京买的。

#### 员猿 一般将来时

一般将来时的被动语态构成如下：

主语 + will be + 及物动词的过去分词

当主语是第一人称时 ,可用如下形式：

主语 + shall be + 及物动词的过去分词

例：I shall not be allowed to do it.

译文：不会让我做这件事的。

例：What tools will be needed for the job?

译文：工作中需要什么工具？

#### 员源 现在进行时

现在进行时的被动语态构成如下：

主语 + is(are)being + 及物动词的过去分词

例 : Electron tubes are found in various old products and are still being used in the circuit of some new products.

译文 : 在各种老产品里看到的电子管 , 在一些新产品的电路中也还在使用。

**缘**过去进行时

过去进行时的被动语态构成如下 :

主语 + was( were )being + 及物动词的过去分词

例 : The laboratory building was being built then.

译文 : 实验大楼当时正在建造。

**远**现在完成时

现在完成时的被动语态构成如下 :

主语 + have( has )been + 及物动词的过去分词

例 : The letter has not been posted.

译文 : 信还没有寄出。

例 : The virus in the computer has been found out.

译文 : 计算机中的病毒已经找出来了。

**殒**过去完成时

过去完成时的被动语态构成如下 :

主语 + had been + 及物动词的过去分词

例 : When he came back , the problem had already been solved.

译文 : 他回来时 , 问题已经解决了。

## 员 员 员 计算机专业英语的词汇特点

### 员 员 员 专业英语词汇的构成特点

词汇是语言发展的产物。语言在发展过程中 , 旧的词不断被抛弃 , 新的词不断在产生。随着科学技术的发展 , 新术语、新概念、新理论和新产品不断出现。不但新词(如词组)大量涌现 , 许多日常用语也不断增加新的含义 , 如 off-the-shelf(成品的)、state-of-art(现代化设备)等。在专业英语中 , 缩略词的增加尤其迅速 , 各类技术词汇也随着专业的细分、学科的渗透而日益增多。

下面是在计算机专业英语中常见的 4 类词汇。

- 技术词汇(technical words)

这类词的意义狭窄、单一 , 一般只使用在各自的专业范围内 , 因而专业性很强。这类词一般较长 , 并且越长词义越狭窄 , 出现的频率也不高。

例如 : bandwidth(带宽) , flip-flop(触发器) , superconductivity(超导性) , hexadecimal(十六进制) , amplifier(放大器)等。

- 次技术词汇(sub-technical words)

次技术词汇是指不受上下文限制的、各专业中出现频率都很高的词。这类词往往在不同的专业中具有不同的含义。

例如 : register 在计算机专业中表示寄存器 , 在电学中表示计数器、记录器 , 在乐器中表示音区 , 而在日常生活中则表示登记簿、名册、挂号信等。

- 特用词(big words)

在日常英语中 , 为使语言生动活泼 , 常使用一些短小的词或词组。而在专业英语中 , 表达同样的意义时 , 为了准确、正式、严谨 , 不引起歧义却往往选用一些较长的特用词。这些词在非专业英语中极少使用 , 但却属于非专业英语。

日常英语中常用下列句子 :

Then the light is turned on.

在专业英语中 , 却表示为 :

The circuit is then completed.

这是由于 complete 词义单一、准确 , 可以避免歧义。而 turned on 不仅表示开通 , 而且还可以表示其他意义 , 如 :

The success of a picnic usually turns on(依赖)the weather.

类似的词还有 :

go down — depress                      turn upside down — invert

keep — maintain                        enough — sufficient

push in — insert                        find out — determine

- 功能词(function words)

它包括介词、连词、冠词、代词等。功能词为词在句子中的结构关系提供了十分重要的结构信号 , 对于理解专业内容十分重要 , 而且出现频率极高。研究表明 , 在专业英语中 , 出现频率最高的 10 个词都是功能词 , 其顺序为 : the , of , in , and , to , is , that , for , are , be。下例 14 个词中 , 功能词就占了 6 个。

When the recorder is operated in the record mode , previous recordings are automatically erased.

译文 : 当录音机工作在录音模式时 , 以前的录音被自动擦除。

## 构词法

专业英语的构词有如下两个显著特点 :

- (1) 大部分专业词汇来自希腊语和拉丁语 ;
- (2) 前缀和后缀的出现频率非常高。

希腊语和拉丁语是现代专业英语词汇的基础。各行各业都有一些自己领域的特定专业词汇,有的是随着本专业发展应运而生的,有的是借用公共英语中的词汇,有的是借用外来语言词汇,有的则是人为构造成的词汇。

#### 合成词(精毛穿通录)

合成词是专业英语中另一大类词汇,其组成面广,多数以短划线“-”连接单词构成,或者采用短语构成。合成方法有名词+名词、形容词+名词、动词+副词、名词+动词、介词+名词、形容词+动词等等。合成词并非可以随意构造,否则会形成一种非正常的英语句子结构,虽然可由多个单词构成合成词,但这种合成方式太冗长,应尽量避免。

下面这些是用短划线“-”连接的合成词。

file-based	基于文件的	Windows-based	以 Windows 为基础的
object-oriented	面向对象的	thread-oriented	面向线程的
info-channel	信息通道	info-tree	信息树
point-to-point	点到点	plug-and-play	即插即用
peer-to-peer	对等的	front-user	前端用户
push-up	上拉	pull-down	下拉
line-by-line	逐行	paper-free	无纸的
jumper-free	无跳线的	user-centric	以用户为中心的

随着词汇的专用化,合成词中间的连接符被省略掉,形成了一个独立的单词,如:

in + put→input	out + put→output
feed + back→feedback	work + shop→workshop
fan + in→fanin	fan + out→fanout
on + board→onboard	on + line→online

#### 派生词(苦澳里特录)

这类词汇非常多,专业英语词汇大部分都是用派生法构成的,它是根据已有的词,通过对词根加上各种前缀和后缀来构成新词。这些词缀有名词词缀,如:inter-,sub-,in-,tele-,micro-等;形容词词缀,如:im-,un-,able,-al,-ing,-ed等;动词词缀,如:re-,under-,de-,en,-con-等。其中,采用前缀构成的单词在计算机专业英语中占了很大比例。下面是一些典型的派生词。

multimedia	多媒体	multiprocessor	多处理器
interface	接口	internet	因特网
microprocessor	微处理器	microcode	微代码
hypertext	超文本	hypermedia	超媒体
telephone	电话	teleconference	远程会议

telescope	望远镜	telegraph	电报
barometer	气压表	barograph	气压记录仪
programmable	可编程的	portable	便携的
hardware	硬件	software	软件
reliability	可靠性	confidentiality	保密性

### 援借用词

借用词是指借用公共英语及日常生活用语中的词汇来表达专业含义。借用词一般来自厂商名、商标名、产品代号名、发明者名、地名等,也可将普通公共英语词汇演变成专业词意来实现。也有对原来词汇赋予新的意义的,如:

cache	高速缓存	semaphore	信号量
firewall	防火墙	mailbomb	邮件炸弹
fitfall	子程序入口	flag	标志,状态

### 源转换词(精增删)

转换时词性一般不变,有时发生重音或尾音的变化,只是词类转用。如:

use→to use      increase→to increase      extend→to extend

### 员词缩略词汇缩略

词汇缩略是指将较长的单词取其首部或主干,构成与原词同义的短单词,或者将组成词汇短语的各个单词的首字母拼接为一个大写字母的字符串。通常词汇缩略在文章索引、前序、摘要、文摘、电报、说明书、商标等科技文章中频繁采用。对计算机专业来说,在程序语句、程序注释、软件文档、互联网信息、文件描述中也采用了大量的缩略词汇作为标识符、名称等。缩略词汇的出现方便了印刷、书写、速记,以及口语交流等,但也同时增加了阅读和理解的困难。词汇缩略有以下4种形式:

- 节略词(clipped words)。某些词汇在发展过程中为方便起见,逐渐用它们的前几个字母来表示,这就是节略词。如, maths—mathematics, ad—advertisement, kilo—kilogram, dir—directory 等。
- 缩略词(acronyms)。缩略词是指由某些词组的首字母所组成的新词。如, ROM—Read Only Memory, RAM—Random Access Memory, RISC—Reduced Instruction Set Computer(精简指令集计算机), CISC—Complex Instruction Set Computer(复杂指令集计算机), COBOL—Common Business Oriented Language(面向商务的通用语言)等。
- 缩写词(abbreviation)。缩写词并不一定由某个词组的首字母组成,有些缩写词仅由一个单词变化而来,而且大多数缩写词每个字母后都附有一个句点。如, e. g. — for example, Ltd. — limited, sq. — square 等。

- 首字词(initials)。首字词与缩略词基本相同,区别在于首字词必须逐字母念出。如,CAD—Computer Aided Design,CPU—Central Process Unit,DBMS—DataBase Management System(数据库管理系统),CGA—Color Graphics Adapter(彩色图形适配器)等。

## 计算机专用术语与命令

在计算机语言、程序语句、程序文本注释、系统调用、命令字、保留字、指令字以及网络操作中广泛使用专业术语进行信息描述。随着计算机技术的发展,这样的专业术语还会进一步增加。

### 专用的软件名称

人类相互交流信息所用的语言称为自然语言,但是当前的计算机还不能理解自然语言,它能理解的是计算机语言,也即软件。软件分成系统软件 and 用户软件两大类。近几年来,随着计算机技术的发展,新的软件不断推出。下面是一些常用软件的名称。

Netware 局域网络操作系统(Novell 公司)

Java 网络编程语言(Sun 公司)

Excel 电子表格软件(Microsoft 公司)

Delphi 视窗系统开发工具(Borland 公司)

Informix 关系数据库系统(Informix 公司)

Navigator 因特网浏览软件(Netscape 公司)

### 复杂的系统

DOS(Disk Operating System)是个人计算机磁盘操作系统,DOS 是一组非常重要的程序,它帮助用户建立、管理程序和数据,也管理计算机系统的设备。DOS 是一种层次结构,包括 DOS BIOS(基本输入\输出系统)、DOS 核心部分和 DOS COMMAND(命令处理程序)。

一般情况下,在 DOS 启动盘上有配置系统文件 CONFIG. SYS,在该文件内给出有关系统的配置命令,能确定系统的环境。配置系统包括以下 9 个方面的内容:

#### (1) 设置 Ctrl-Break(BREAK)检查

格式: BREAK = [ON] | [OFF]

默认是 BREAK = OFF,这时 DOS 只是对以下过程中检查 Ctrl-Break: 标准输出操作、标准输入操作、标准打印操作和标准辅助操作。

如果设置 BREAK = ON,则 DOS 在它被调用的任何时候都会检查 Ctrl-Break,比如编译程序,即使没有标准设备操作,在编译过程中遇到错误,也能使编译停止。

#### (2) 指定磁盘缓冲区的数目(BUFFERS)

格式: BUFFERS = X, X 是 1 ~ 99 之间的数。

(3) 指定国家码及日期时间格式(COUNTRY)

格式: COUNTRY = XXX,XXX 是电话系统使用的三数字的国际通用国家码。

(4) 建立能由文件控制块打开的文件数(FCBS)

格式: FCBS = m, n

m 取值 1 ~ 255。n 指定由 FCBS 打开但不能由 DOS 自动关闭的文件数, n 取值 0 ~ 255 默认值是 0。

(5) 指定能一次打开的最大文件数(FILE)

格式: FILES = X

X 取值 8 ~ 255 默认值是 8。

(6) 指定能访问的最大驱动器字母(LASTDRIVE)

格式: LASTDRIVE = X

X 可以是 A 到 Z 之间的字母, 它表示 DOS 能接受的最后一个有效驱动器字母, 约定值为 E。

(7) 指定高层命令处理程序的文件名(SHELL)

格式: SHELL = [d:] [path] filename [. ext] [parm1] [parm2]

(8) 安装驱动程序(DEVICE)

格式: DEVICE = [d:] [path] filename [. ext]

除标准设备外, 如果用户增加了别的设备, 就要由用户自己提供相应的驱动程序。在 CONFIG. SYS 中加上命令“DEVICE = 驱动程序名称”。

(9) 指定堆栈空间(STACKS)

格式: STACKS = n, s

n 是堆栈的框架个数, 取值范围为 8 ~ 64。s 是每层堆栈框架的字节数, 取值范围为 32 ~ 512。

### 计算机专用命令和指令

程序设计语言同任何一门自然语言一样, 有它自己的一套词法和语法规则, 只是它的规则很少, 也很死板, 每一条语句的规定都很严格, 一旦违背这些规则就可能导致整个系统瘫痪。到目前为止, 大部分的计算机语言的词汇都是取自英语词汇中一个很小的子集和最常用的数学符号。由于各个计算机指令系统所具有的功能大致相同, 各个程序设计语言也大体包含了函数、过程、子程序、条件、循环以及输入和输出等部分, 所以它们必然存在一些共同的词汇特点和语法特点。

系统命令与程序无关, 而且语法结构简单。主要的系统命令有系统连接命令、初始化命令、程序调试命令和文件操作命令。其格式如下:

系统命令 <CR>

其中 <CR> 为回车换行符。一般而言, 系统命令总是立即被执行, 但某些系统命令

也可以在程序中执行。至于词汇特点,同一功能的命令在不同机器中一般以相同的单词表示,如删除文件命令为 DELETE,列磁盘文件命令为 DIR,拷贝文件命令为 COPY。但有相当一部分系统命令名是由各厂家或公司自己定义的,如清屏命令就有 CLEAR,CLS,CLR,HOME 等几种。

每一个处理器都具有很多指令,每一台机器也具有很多系统命令,不同的操作系统也定义了不同的操作命令。它们通常是缩写形式,牢记这些指令,就熟悉了计算机的操作;了解缩写的含义,也就了解了所进行操作的含义。例如:

创建目录	MD(make directory)
改变目录	CD(change directory)
删除目录	RD(remove directory)
列表目录	DIR(directory)
重命名	REN(rename)
中断请求	INT(call to interrupt procedure)
中断返回	IRET(interrupt return)
取数据段地址指令	LDS(load doubleword pointer)
取偏移地址指令	LEA(load effective address offset)
串装入操作指令	LODS(load string operand)
总线封锁命令	LOCK(assert bus lock signal)

#### 源网络专用术语

##### (1) Internet 专用缩写术语

TCP/IP 其中 IP 是 Internet Protocol,即网际协议;TCP 是 Transmission Control Protocol,即传输控制协议。这是网络协议最核心的两个协议。IP 协议提供基本的通信,TCP 协议提供应用程序所需要的其他功能。

SMTP(simple mail transfer protocol) 简单邮件传送协议,用于电子邮件的传送。

FTP(file transfer protocol) 文件传输协议,用来实现计算机之间的文件拷贝。

TELNET 远程登录协议。可以看成是 Internet 的一种特殊通信方式,它的功能是把用户正在使用的终端或主机变成它要在其上登录的某一远程主机的仿真远程终端。

HTTP(hypertext transfer protocol) 超文本传输协议,用于 World Wide Web 服务。

SNMP(simple network management protocol) 简单网络管理协议,用于网络管理。

TFTP(trivial file transfer protocol) 简单文件传输协议,用于无盘工作站的自举。

BOOTP(bootstrap protocol) 自举协议,用于无盘工作站的启动。

NFS(network file system) 网络文件系统,用于实现计算机间文件系统的共享。

UDP(user datagram protocol) 用户数据报协议,用于可靠性要求不高的场合。

ARP(address resolution protocol) 地址解析协议,用于从 IP 地址中找出对应的以太

网地址。

RARP(reverse address resolution protocol) 逆向地址解析协议,用于从以太网地址找出对应的 IP 地址。

ICMP(internet control message protocol) Internet 控制信息协议。

IGMP(internet group multicast protocol) Internet 成组广播协议。

### (2) Internet 服务

E-mail 电子邮件,指通过计算机网络收发信息的服务。电子邮件是 Internet 上最普遍的应用,它加强了人与人之间沟通的渠道。

Telnet 远程登录,用户可以通过专门的 Telnet 命令登录到一个远程计算机系统,该系统根据用户账号判断用户对本系统的使用权限。

FTP 利用 FTP 服务可以直接将远程系统上任何类型的文件下载到本地计算机上,或将本地文件上传到远程系统。它是实现 Internet 上软件共享的基本方式。

Usenet 新闻组,又称网上论坛或电子公告板系统(Bulletin Board System, BBS),是人们在一起交流思想、公布公共注意事项、寻求帮助的地方。

WWW(World Wide Web) 万维网,当前 Internet 上最重要的服务方式。WWW 将位于全球 Internet 上不同地点的相关多媒体信息有机地编织在一起,称为 Web 页的集合。

### (3) Internet 地址

域名(Domain Name)是 Internet 中主机地址的一种表示方式。域名采用层次结构,每一层构成一个子域名,子域名之间用点号(.)隔开,并且从右到左逐渐具体化。域名的一般表示形式为:计算机名、网络名、机构名、一级域名。

一级域名有一些规定,用于区分机构和组织的性质,如:edu 表示教育机构、com 表示商业单位、mil 表示军事部门、gov 表示政府机关、org 表示其他组织。

用于区分地域的一级域名采用标准化的 2 个字母的代码表示。如:

cn	中国	ca	加拿大
us	美国	au	澳大利亚
gb	英国(官方)	uk	英国(通用)
tw	中国台湾	hk	中国香港
fr	法国	un	联合国
nz	新西兰	dk	丹麦
ch	瑞士	de	德国
jp	日本	sg	新加坡
ru	俄罗斯	it	意大利

在 Internet 上,电子邮件(E-mail)地址具有如下统一的标准格式:用户名@主机域名。例如,wang@online.sh.cn 是一个电子邮件的地址,其中 wang 是用户名,@是连接

符 online.sh.cn 是“上海热线”的主机域名,这是注册“上海热线”后得到的一个 E-mail 地址。

#### 缘援专用计算机厂商

下面给出的是一些著名计算机公司的译名。

Microsoft	微软	Philip	飞利浦
Compaq	康柏	DELL	戴尔
Panasonic	松下	ASUS	华硕
Samsung	三星	Intel	英特尔
Acer	宏碁	Epson	爱普生
Hewlett-Packard (HP)	惠普		

## 员猿瑶计算机专业英语的阅读

### 员猿瑶阅读方法

所谓阅读,实际上就是语言知识、语言技能和智力的综合运用。在阅读过程中,这三个方面的作用总是浑然一体、相辅相成的。词汇和语法结构是阅读时需要具备的语言知识,但仅此是难以进行有效阅读的,学生还需具备运用这些语言知识的能力,即根据上下文来确定准确词义和猜测生词词义的能力,辨认主题和细节的能力,正确理解连贯的句与句之间、段与段之间逻辑关系的能力。

根据人们工作、学习和日常生活中的需要,一般有以下几种阅读方式:

- 学习性阅读:这种阅读,用于学习文化知识、参加考试、知识竞赛等。因为要学习文章中的字、词、句、段、篇,还要了解文章的作者、体裁、结构和写作特点等,所以要慢速阅读。
- 涉猎性阅读:课外活动时,浏览书籍报刊,以求扩大知识面,获得有关信息,所以要快读。
- 搜索性阅读:为了搜索某些资料所采用的一种阅读。如掌握一本书、一个章节或一篇文章总的观点等,阅读的速度要中等。

常用的有效的阅读方法有三种,即略读(skimming)、查读(scanning)、精读(reading for full understanding)。

略读是指以尽可能快的速度进行阅读,了解文章的主旨和大致,对文章的结构和内容获得总的概念和印象。进行略读时精力必须特别集中,还要注意文中各细节分布的情况,略读过程中,学生不必去读细节,遇到个别生词及难懂的语法结构也应略而不读。略读时主要注意以下几点:

- 注意短文的开头句和结尾句,力求抓住文章的主题大意。

- 注意了解文章的主题句及结论句。
- 注意文章的体裁和写作特点,了解文章的结构。
- 注意支持主题句或中心思想的信息句,其他细节可以不读。

查读主要是有目的地去找出文章中某些特定的信息,也就是说在对文章有所了解的基础上,在文章中查找与某一问题、某一观点或某一单词有关的信息。查读时,要以很快的速度扫视文章,确定所查询的信息范围,注意所查信息的特点,而与所查信息无关的内容可以略过。

精读是指仔细地阅读,力求对文章有深层次的理解,以获得具体的信息。包括理解衬托主题句的细节,根据作者的意图和中心思想进行推论,根据上下文猜测词义等。对难句、长句,要借助语法知识对其进行分析,达到准确的理解。

总之,要想提高阅读理解能力,必须掌握以下6项基本的阅读技能。

- 掌握所读材料的主题大意。
- 了解阐述主题的事实和细节。
- 根据上下文判断某些词汇和短语的意义。
- 既理解个别句子的意义,也理解上下文之间的逻辑关系。
- 根据所读材料进行一定的判断、推理和引申。
- 领会作者的观点、意图和态度。

在阅读专业文章时,可以借鉴以下几种阅读方法。

#### 员援鉴别阅读法

鉴别阅读法是一种快速提炼文章的段意、主要内容和中心思想的阅读方法。鉴别阅读法包括下列三个环节:

- 划分出文章的段落,迅速找出段落的中心句、重点句,或用自己的语言概括出段意。
- 连接各段的段意,分析文章的重点句、段,归纳主要内容。
- 在阅读过程中,要留意文章的题目、开头段、结尾段以及文章的议论部分,从中概括出中心思想。

鉴别阅读法实际上是通过以上三个环节来掌握文章的重要信息,因而无需一字不漏地通读全文。在运用鉴别阅读法时,注意力要高度集中,使大脑处于积极思维状态,这样才能保证阅读质量。

#### 圆媛无声阅读法

在阅读时,大脑直接感受文字的意思,不必通过发音器官将文字转换为声音,这种阅读方式就叫无声阅读。在进行无声阅读时,由于发音器官受抑制,视觉不受逐字换音的牵制,因而视角广大,便于以句、行甚至段为单位进行阅读,还可以根据阅读目的的需要进

行浏览、跳读。由于是直接理解文字的意义,省掉了发音阶段,所以无声阅读的速度比出声阅读的速度快得多。

#### 猿视觉辅助阅读法

很多阅读者常常在阅读时用手指点着单词,传统上把这种习惯看成是一种错误,并要求他们把手指从书本上拿开。现在看来,要做的不是叫他们把手指从书本上拿开,而是让他们更快地移动手指。显然,手指不会减缓眼睛的移动,相反,它在帮助养成流畅的阅读节奏方面有着不可估量的作用。当然,读者也不必局限于使用手指作为视觉引导物,也可以用钢笔或铅笔引导视觉。对于还没有掌握快速阅读技巧的阅读者来说,可以充分利用视觉辅助引导物进行快速阅读训练。

### 猿猿提高阅读能力的方法

阅读理解能力的提高是由多方面因素决定的,学生应从以下几个方面进行训练。

#### 猿打好语言基本功

扎实的语言基础是提高阅读能力的先决条件。首先,词汇是语言的建筑材料。提高专业英语资料的阅读能力必须扩大词汇量,尤其是掌握一定量的计算机专业词汇。如词汇量掌握得不够,阅读时就会感到生词多,不但影响阅读的速度,而且影响理解的程度,因此不能进行有效的阅读。其次,语法是语言中的结构关系,用一定的规则把词或短语组织到句子中,表示一定的思想。熟练掌握英语语法和惯用法也是阅读理解的基础。在阅读理解中必须运用语法知识来辨认出正确的语法关系。如果语法基础知识掌握得不牢固,在阅读中遇到结构复杂的难句、长句,就会不知所措。

#### 猿在阅读实践中提高阅读能力

阅读能力的提高离不开阅读实践。在打好语言基本功的基础上,还要进行大量的阅读实践。词汇量和阅读能力的提高是一种辩证关系:要想读得懂,读得快,就必须扩大词汇量;反之,要想扩大词汇量,就必须大量阅读。同样,语法和阅读之间的关系也是如此:有了牢固的语法知识就能够促进阅读的顺利进行,提高阅读的速度和准确率;反之,通过大量的阅读实践又能够巩固已掌握的语法知识。只有在大量的阅读中,才能培养语感,掌握正确的阅读方法,提高阅读理解能力。同时在大量的阅读中,还能巩固计算机专业知识以及了解到计算机专业的发展趋势,对于跟踪计算机技术的发展很有好处。

#### 猿掌握正确的阅读方法

阅读时,注意每次视线的停顿应以一个意群为单位,而不应以一个单词为单位。要是一个单词一个单词地读,当读完一个句子或一个段落时,前面读的是什么早就忘记了。这样读不仅速度慢,还影响理解。因此,正确的阅读方法可以提高阅读速度,同时可提高阅读理解能力。

源 利用专业性文章段落结构知识提高阅读速度和理解能力

(1) 解释性段落 这是作者用来解释某一特定的概念或观点的段落。它通常是易于认知的,因而也是易于理解的。解释性段落一开始的一两句话通常会指出所要解释或讨论的论点或总体想法,最后一两句话是结果或结论,而中间部分则是详细的论述。阅读者可根据不同的阅读目的将注意力集中在解释性段落的开头、结尾或中间部分。

(2) 描述性段落 描述性段落通常是设置场景和扩展前文的段落。这些段落常常用于修饰,与那些介绍主要要素的段落相比,显得不是那么重要,可以用高速略读法来阅读描述性段落。当然,也有一些例外情况,如在描述性段落中也有一些关于人物和事物的重要描述。在这种情况下,读者会意识到它的重要性,自然能给予适当的注意。

(3) 连接性段落 有些段落的作用是把其他的段落串接在一起。这种段落通常都包含一些关键的信息,并对其前后的某些段落进行概括总结。因此,可以把连接性段落当做阅读指南和预习或复习的有用工具。

(4) 段落的结构及其位置 充分利用段落的结构和它们在文中的位置能提高阅读效率。在多数专业性报刊文章中,开头和结尾的几段常常包含着大部分有效信息,而中间的段落则包含着一些细节。在阅读这类文章时,应把精力集中在开头和结尾段落。

## 员 翻译专业英语的翻译

翻译是用一种语言把用另一种语言表示的内容准确无误地重新表达出来,翻译不是原文的翻版或者复制,从某种意义上来说是原文的再创作,其目的是使不懂原文的读者能够了解原文所表达的科技内容。科技文章并不要求像文艺作品那种形象化和感染性,但也必须文理优美。译文应该修辞正确、逻辑合理、语言简洁和文理通顺。

如果把一种语言的所有词汇作为一个词汇总集来看待,则各种词汇的分布情况和运用频率是不一样的。在词汇的总体分布中,功能词和日常用词构成了语言的基础词汇,各个学术领域的技术术语和行业词构成了词汇总集的外缘,而处于基础词汇和外缘之间的是那些次技术词汇(sub-technical words)。而各个学科领域又存在大量的行业专用表达方法和词汇,正是这些词汇在双语翻译中构成了真正的难度。在科技英语翻译中,准确是第一要素,如果为追求译文的流畅而牺牲准确性,不但会造成科技信息的丢失,影响文献交流,还可能引起误解,造成严重后果。

由于次技术词汇的扩展意义(即技术意义)在科技文献中出现的频率要比其一般意义大得多,因此对这种词的翻译应充分考虑其技术语境。有些语境提供的暗示并不充分,这要靠译者从更广阔的篇章语境中去寻找合理的解释,给出合适的翻译。



的变化。一个好的软件不仅要求结构好、速度快、省内存,而且要求有较强的通用性和坚固性,对于日益普及的微机软件,尤其要考虑怎样方便用户,使得不懂计算机的人也能得心应手地正确使用,由于这个原因,目前大部分软件都采用了菜单技术及其他人机对话技术。能否正确地阅读和理解这些屏幕信息,关系到我们能否正确使用这些软件,以及充分发挥软件所提供的全部功能。

当一个程序具有若干项供用户选择的功能时,通常使用交互技术进行分支处理。实现的过程是屏幕首先显示出提供的功能名称,用户根据需要指出希望完成的功能,然后由程序分析用户的选择并调用不同的功能块进行处理,此过程称为“菜单技术”(Menu technique)。

一个软件能否受用户欢迎,在很大程度上取决于它的人机交互性能。为了使程序具有较好的通用性、坚固性及人机交互性,在设计屏幕“菜单”和其他输入输出内容时,应符合下述主要原则:

- (1) 检测所有输入数据的合法性。
- (2) 输入方式要简单,并尽可能每一步给出屏幕提示。
- (3) 如果用户选择的功能有可能会产生严重的后果(如删除文件、格式化磁盘等),应再次予以确认,以提醒用户不致误操作。
- (4) 尽量减少用户处理出错的工作量。
- (5) 屏幕显示信息应简洁、易懂,避免二义性。
- (6) 尽可能在一屏中包含更多的信息。

我们可以总结出屏幕菜单的语言特点如下:菜单中所显示的备选功能一般不用英语句子来表示,而是用表示该功能的单词、词组或动词短语来表示,个别菜单内容也可用不完全句表示。所以菜单语言的主要特点是精练,且一般不存在时态和语态问题。

屏幕输出信息涉及到的语法现象较多,输出的内容也较广泛,下面是常见的几类:

- (1) 引导用户按一定步骤进行某些操作,这种类型通常使用祈使语句。

例:Insert new diskette for drive A: and strike any key when ready.

译文:将新盘插入A驱动器,准备好后按任意键。

例:Press Esc key to return to main menu.

译文:按Esc键返回主菜单。

- (2) 要求用户回答某一个问题,所用句型通常是Yes/No型疑问句,也有按填空的方式向用户提出要求的。

例:Do you want to make another copy?[Y/N]

译文:还要拷贝吗?[Y/N]

例:Is this list correct?[Y/N]

译文:列表正确吗?[Y/N]

(3) 报告错误信息或其他提示信息。既可以用短语表示,也可以用一些简单句来表示。为了醒目,有时还配上一些特殊标记(如 \* \* \* 等)。

例: An unexpected error occurred, please restart.

译文: 出现了异常错误,请重新启动。

例: No database is in use.

译文: 无打开的数据库。

(4) 程序调试过程中的出错信息。

例: Symbol not defined.

译文: 符号没有定义。

例: Syntax error.

译文: 语句的语法与任何可识别的语法不匹配。

例: Constant was expected.

译文: 需要的是一个常量,得到的却是另外的内容。

例: Must be structure field name.

译文: 需要的是结构字段名,但得到的是其他内容。

例: Unknown symbol type.

译文: 在符号语句的类型字段中,有些不能识别的东西。

例: Expression type does not match the return type.

译文: 表达式类型和该函数的返回类型不匹配。

例: Formal parameters specify illegal.

译文: 形式参数定义非法。

例: Friend must be a function or classes, not field.

译文: 友元必须是一个函数或另一个类,不能是 field。

例: Main must have a return type of int.

译文: main 函数要求必须用整型说明返回类型。

例: Access declarations cannot grant or reduce access.

译文: 导出类不能增加或减少存取权限。

例: Call to functions with no prototype.

译文: 调用函数之前没有给出函数的原型。

例: Cannot modify a const object.

译文: 不能对 const 类型的对象进行赋值等非法操作。

## 员翻籍翻译的过程

翻译的过程大致可分为理解、表达、校对三个阶段。

### 理解阶段

理解原文是确切表达的前提。必须从整体出发,不能孤立地看待一词一句。每种语言几乎都存在着一词多义的现象。因此,同样一个词或词组,在不同的上下文搭配中,在不同的句法结构中就可能有不同的意义。一个词或一个词组脱离上下文是不能正确理解的。因此,译者首先应该结合上下文,通过对词义的选择、语法的分析,彻底弄清楚原文的内容和逻辑关系。

### 表达阶段

表达就是要寻找和选择恰当的归宿语言材料,把已经理解了的原作内容重新叙述出来。表达的好坏一般取决于理解原著的深度和对归宿语言的掌握程度。故理解正确并不意味着表达一定正确。

### 校对阶段

校对阶段是对理解和表达的进一步深化,是使译文符合标准的一个必不可少阶段,是对原文内容的进一步核实,对译文语言的进一步推敲。校对对于科技文献的译文来说尤为重要。

看下面这个例子。

例:It is based on the principle that a “single” parent can have “many” children and a child can have only “one” parent.

我们给出两种译文:

(1) 它基于这样一种原则,即某一“单个”的父目录可以有“多个”子目录,而一个子目录只能有一个父目录。

(2) 它基于这样一种原则,即某一“单个”父母可以有“多个”孩子,而一个孩子只能有一个父亲(或母亲)。

以上两种译法都是可能的,至于哪一种译法更合理,要取决于这句话出现的语言环境及文章的主题。

科技翻译需要熟悉和掌握如下的知识:

- 掌握一定的词汇量;
- 具备科技知识,熟悉所翻译专业;
- 了解中西方文化背景的异同,及科技英语中词汇的特殊含义;
- 日常语言和文本的表达方式以及科技英语翻译技巧。

翻译不能逐词逐字直译,必须在保持原意的基础上灵活引申,其步骤可以初步归结为:

(1) 通读整个句子,了解初步含义。重点注意谓语动词、连词、介词、专用词组和实义动词以及暂时不了解的新词汇。

(2) 决定是否分译,如何断句。原句标点和句型结构如何,语态及时态如何,应灵活组织,保持前后文之间的逻辑联系和呼应关系。

(3) 决定汉语如何表达,如何组句,所选汉语词意是否确切。译文是否要进行查、加、减、改或者引申译法。概念明确、用词恰当、逻辑清楚、文字通顺。

(4) 翻译完成后要多读译文,是否通顺、能懂,上下文及逻辑关系对不对等,既要使译者自己懂,也要尽量使别人阅读译文后也能懂,要为读者着想。

例: College kids enter the marketplace armed with computer literacy completely alien to many veteran practitioners.

译文: 拥有计算机知识的大学生进入了市场,而这种新知识对于许多年长的从业者来说是完全新奇的东西。

下面这篇文章讲述的是读书对人们生活的影响,翻译时要注意内容的连贯和准确。

Reading broadens our experience. It enables us to feel how others felt about life, even if they lived thousands of miles away and centuries ago. Although we may be unworthy, we can become the friends of wise men. Only books can give us these pleasures. Those who cannot enjoy them are poor men; those who enjoy them most obtain the most happiness from them.

译文: 读书能丰富我们的阅历。读书使我们能体验到别人对生活的感受,哪怕他们生活在千里之外或数百年之前。尽管我们可能是微不足道的,但我们却能和聪明人交朋友。只有书籍能给我们这些乐趣。那些不能享受读书之乐的人是贫乏的人,而那些最喜欢读书的人,可以从中得到最大的幸福与满足。

下面是一篇关于计算机犯罪的文章,它共有两段。第一段讲述计算机具有优良的性能,已经在很大程度上取代了文书工作。以银行系统为例,讲述它的优点:它不会有个人情绪,不会偷钱。但是用一句“它也没有良知”,说明有利用计算机犯罪的可能。第二段用一个实例讲述利用计算机犯罪的隐蔽性和严重性,一个银行职员通过转账的方法,盗窃客户的钱,数量很大,一直没有被发现,直到因为赌博案发,才发现他利用计算机盗窃的事。

#### 悦集责规制规整译

In many businesses, computers have largely replaced paperwork, because they are fast, flexible, and do not make mistakes. As one banker said, "Unlike humans, computers never have a bad day." And they are honest. Many banks advertise that their transactions are "untouched by human hands" and therefore safe from human temptation. Obviously, computers have no reason to steal money. But they also have no conscience, and the growing number of computer crimes shows they can be used to steal.

Computer criminals don't use guns. And even if they are caught, it is hard to punish

them because there are witness and often no evidence. A computer cannot remember who used it , it simply does what it is told. The head teller at a New York City bank used a computer to steal more than one and a half billion dollars in just four years. No one noticed this theft because he moved the money from one account to another. Each time a customer he had robbed questioned the balance in his account , the teller claimed a computer error , then replaced the missing money from someone else's account. This man was caught only because he was a gambler. When the police broke up an illegal gambling operation , his name was in the records.

译文：

#### 计算机犯罪

许多商业活动中 ,计算机在很大程度上已取代了文书工作。因为它们速度快、灵活 ,而且不会犯错误。正像一位银行家所说的 ,“与人不同的是 ,计算机没有情绪不好的时候”。计算机很诚实 ,许多银行都在广告中说他们的业务往来都不是“由人手办理” ,所以不会受到个人情绪的影响。计算机没有理由去偷钱 ,这是显而易见的。但它们也没有良知 ,数量逐渐上升的计算机犯罪表明它们可以被用来盗窃。

计算机犯罪不用枪 ,即使被抓住了 ,也很少受到惩罚 ,因为没有证人 ,而且通常也没有证据。计算机无法记住是谁使用过它们 ,它们只是执行命令。纽约市行的一个出纳员主任短短四年时间内使用计算机偷了 150 多万美元。没人注意到这个盗窃案 ,因为他把钱从一个账户转到另一个账户。每次 ,被他偷过的顾客对自己账户的平衡提出疑问时 ,这个出纳员就说这只是计算机的小错误 ,然后他把另一个账户的钱补到这个账户上 ,后来 ,这个人被逮捕了 ,只是因为他赌博 ,当警方击碎一个非法赌博机构时 ,他的名字记录在案。

翻译是把一种语言表达的思想用另一种语言再现出来的活动。因此译文第一要忠实于原文 ,准确完整地表达原文的内容 ,使译文在表达思想、精神、风格和体裁方面起到与原文完全相同的作用。另一方面 ,译文语言必须符合规范 ,用词造句应符合本民族语言习惯 ,要使用民族的、科学的、大众的语言 ,力求通顺易懂。不应有文理不通、逐字死译和生硬晦涩等现象。这就是专业英语翻译的标准。

科技文献主要为叙事说理 ,其特点一般是平铺直叙 ,结构严密 ,逻辑性强 ,公式、数据和专业术语繁多 ,所以专业英语的翻译应特别强调“明确”、“通顺”和“简练”。所谓明确 ,就是要在技术内容上准确无误地表达原文的含义 ,做到概念清楚 ,逻辑正确 ,公式、数据准确无误 ,术语符合专业要求 ,不应有模糊不清、模棱两可之处。专业科技文献中一个概念、一个数据翻译不准 ,将会带来严重的后果 ,甚至有巨大的经济损失。通顺的要求不但指选词造句应该正确 ,而且译文的语气表达也应正确无误 ,尤其是要恰当地表达出原文的语气、情态、语态、时态以及所强调的重点。简练就是要求译文尽可能简短、精练 ,没有

冗词废字,在明确、通顺的基础上,力求简洁明快、精练流畅。

例:

#### 智能打印机

In the past, printing devices simply took the results stored in the computer and placed them on paper. If you wanted to perform payroll, the paper used had to be produced by a printing company that specialized in making computer forms. Company logos, symbols, headings for reports, or special characters had to be placed on the paper by the printing company. Then the printer had to be instructed by the computer to place the data on the forms. Today modern printers are able to print company logos, special symbols, unique characters, and the forms. Some printers even are able to use 40 different character sets without modification. These new types of printers are intelligent printing systems.

Using an intelligent printer requires two phases. The first is the design phase. Using a terminal, the output on the printer is designed in detail. The second phase is the format phase. During this phase, the margins to be used, the type of paper to be used, and how the data is to be placed on each page is determined.

这篇文章共有两段,分别讲述智能打印机的特点和使用。在通读全文的基础上我们必须正确理解文中以下重要的专业词汇,如:printing devices, perform payroll, printing company, company logos, headings for reports, modern printers, character sets, intelligent printing systems, design phase, format phase,它们可分别翻译成:打印设备、制作工资表、印刷公司、企业标志、报表表头、新式打印机、字符集、智能打印系统、设计阶段和格式设计阶段。

译文:

#### 智能打印机

以前,打印设备接收存储在计算机中的结果并把它们打印在纸上。假如要制作工资表,就要由专门制作计算机表格的印刷公司生产这种纸。印刷公司设计企业标志、符号、报表表头以及纸上必须设置的特殊字符。接着,计算机再控制打印机确定表格上的数据位置。今天,新式打印机有能力打印出公司标志、特殊符号、独特的字符和表格,一些打印机甚至可以不加限制地使用40种不同的字符集,这些新型打印机是智能打印系统。

使用智能打印机需要两个阶段。第一是设计阶段,在终端上详细地设计打印机的输出。第二是确定格式阶段,在这个阶段,确定要使用纸张的范围、纸的类型以及每页纸上数据的位置。

### 计算机专业英语翻译的基本方法

#### 原文的分析与理解

要做好翻译工作,必须从深刻理解原文入手,力求做到确切表达译文。原文是翻译的

出发点和惟一依据,只有彻底理解原文含义,才有可能完成确切的翻译,才能达到上述翻译标准的要求。要深刻理解原文,首先要认识到专业科技文献所特有的逻辑性、正确性、精密性和专业性等特点,力求从原文所包含的专业技术内容方面去加以理解。其次,要根据原文的句子结构,弄清每句话的语法关系,采用分组归类的方法辨明主语、谓语、宾语及各种修饰语,联系上下文来分析和理解句与句之间、主句与从句之间的关系。专业科技文献中长句、难句较多,各种短语和从句相互搭配、相互修饰,使人感到头绪纷繁、无所适从。在这种情况下更应重视语法分析,突出句子骨架,采用分解归类、化繁为简、逐层推进理解的策略。

例: Just click to open the new Office E-mail header in Word and send your document as an E-mail message that retains your original formatting.

本句使用了科技英语中常用的“祈使句 + and. . .”句型。

译文: 只要单击就可打开 Word 中的新 Office E-mail 标题,这样就可以把你的文档资料按照原来的格式作为电子邮件发送出去。

例: Unlike Word for Windows, in which macros are directly linked to document and template files, AmiPro macros are contained in a separate file.

句中的“in which macros are directly linked to document and template files”是一个介词前置的非限定性定语从句,修饰“Word for Windows”。

译文: 在 Windows Word 环境中,宏是直接连接到文档和模板文件上的。与此不同, AmiPro 宏病毒则包含在一个独立的文件中。

科技文献翻译中的汉语表达切忌以下几点:

- 不符合汉语逻辑
- 过于强调“忠实”而使原文与译文貌合神离
- 中文修辞不当,表达中存在明显的翻译痕迹
- 表达啰嗦、不简洁。

圆媛词义的选择与引申

(1) 词义的选择

在翻译过程中,若英汉双方都是相互对应的单义词时,则汉译不成问题,如 ferroalloy (铁合金)。然而,由于英语词汇来源复杂,一词多义和一词多性的现象十分普遍,比如 power 在数学中译为“乘方”,在光学中译为“率”,在力学中译为“能力”,在电学中译为“电力”。

例: The electronic microscope possesses very high resolving power compared with the optical microscope.

译文: 与光学显微镜相比,电子显微镜具有极高的分辨率。

例: Energy is the power to do work.

译文：能量是做功的能力。

### (2) 词义的引申

英汉两种语言在表达方式方法上差异较大,英语一词多义现象使得在汉语中很难找到绝对相同的词。如果仅按词典意义原样照搬,逐字硬译,不仅使译文生硬晦涩,而且会使词不达意,造成误解。因此,有必要结合语言环境透过外延看内涵,把词义做一定程度的扩展、引申。

例:Two and three make five.

译文：二加三等于五。(make 本意为“制造”,这里扩展为“等于”)

The report is happily phrased.

译文：报告措辞很恰当。(happily 不应译为“幸运地”)

### 猿援词语的增减与变序

#### (1) 词语的增减

由于英语和汉语各自独立演变发展,因而在表达方法和语法结构上有很大的差别。在英译汉时,不可能要求二者在词的数量上绝对相等,通常应该依据句子的意义和结构适当增加、减少或重复一些词,以使译文符合汉语习惯。

例:The more energy we want to send, the higher we have to make the voltage.

译文：想要输电越多,电压也就得越高。

例:This condenser is of higher capacity than is actually needed.

译文：这只电容器的容量比实际所需要的容量大。(补译省略部分的 capacity)

#### (2) 词序的变动

英语和汉语的句子顺序通常都是按“主语+谓语+宾语”排列的,但修饰语的区别却较大。英语中各种短语或定语从句作修饰语时,一般都是后置的,而汉语的修饰语几乎都是前置的,因而在翻译时应改变动词的顺序。同时还应注意,英语几个前置修饰语(通常为形容词、名词和代词)中最靠近被修饰词的为最主要的修饰语,翻译时应首先译出。此外,英语中的提问和强调也大都用倒装词序,翻译时应注意还原。

例:Such is the case.

译文：情况就是这样。(倒装还原)

例:The transformer is a device of very great practical important which makes use of the principle of mutual induction.

译文：变压器是一种利用互感原理的在实践中很重要的装置。(从句)

### 源援词性及成分的转换

为了使译文达到“明确”、“通顺”和“简练”的要求,有时需要把原语句中的某种成分转译为另一种成分。成分的转换在大多数情况下并不引起词性的转换,而词性的转换经

常会引起成分转换。

### (1) 主语的转译

为了使译文简洁通顺,要把英语的被动句译成汉语的主动句,这时常常把英语句中的主语转译为汉语的宾语。有时根据译文修辞上的需要,将英语主动句的主语转译为汉语的宾语。这种转译中的词性一般不变。

例: ~~How~~ ~~has~~ ~~been~~ ~~made~~ ~~in~~ ~~computers~~ ~~in~~ ~~recent~~ ~~years~~.  
~~怎样~~ ~~做~~ ~~成~~ ~~的~~ ~~计算机~~ ~~在~~ ~~最近~~ ~~几年~~ ~~来~~ ~~的~~ ~~进步~~ ~~是~~ ~~怎样~~ ~~的~~ ~~呢~~?

译文:近年来,计算机取得了很大的进步。

例: Considering the processor range only, ~~there~~ ~~are~~ ~~several~~ ~~drawbacks~~ ~~to~~ ~~the~~ ~~computer~~.  
~~只~~ ~~就~~ ~~处理器~~ ~~范围~~ ~~而言~~, ~~该~~ ~~计算机~~ ~~就~~ ~~有~~ ~~几~~ ~~个~~ ~~缺~~ ~~点~~ ~~的~~ ~~呢~~?

译文:仅就处理器范围而言,该计算机就有几个缺点。

汉语句中的主语有时可转换成英语的宾语、介词宾语、表语、谓语、状语或定语。

例: Light beams can carry more ~~information~~ ~~than~~ ~~radio~~ ~~signals~~ ~~because~~ ~~light~~ ~~has~~ ~~a~~ ~~much~~ ~~higher~~ ~~frequency~~ ~~than~~ ~~radio~~ ~~waves~~.  
~~光~~ ~~束~~ ~~运~~ ~~载~~ ~~的~~ ~~信~~ ~~息~~ ~~比~~ ~~无~~ ~~线~~ ~~电~~ ~~信~~ ~~号~~ ~~运~~ ~~载~~ ~~的~~ ~~信~~ ~~息~~ ~~多~~ ~~因~~ ~~为~~ ~~光~~ ~~波~~ ~~的~~ ~~频~~ ~~率~~ ~~比~~ ~~无~~ ~~线~~ ~~电~~ ~~波~~ ~~高~~ ~~的~~ ~~呢~~?

译文:光束运载的信息比无线电信号运载的信息多,因为光波的频率比无线电波高。

例: It is a ~~basic~~ ~~principle~~ ~~of~~ ~~design~~ ~~that~~ ~~each~~ ~~program~~ ~~is~~ ~~adaptable~~ ~~to~~ ~~users~~.  
~~设计~~ ~~的~~ ~~基~~ ~~本~~ ~~准~~ ~~则~~ ~~是~~ ~~每~~ ~~项~~ ~~程~~ ~~序~~ ~~都~~ ~~适~~ ~~用~~ ~~于~~ ~~用~~ ~~户~~ ~~的~~ ~~呢~~?

译文:设计的基本准则是每项程序都适用于用户。

例: The electronic computer ~~is~~ ~~characterized~~ ~~by~~ ~~its~~ ~~accurate~~ ~~and~~ ~~rapid~~ ~~computations~~.  
~~电~~ ~~子~~ ~~计~~ ~~算~~ ~~机~~ ~~的~~ ~~主~~ ~~要~~ ~~特~~ ~~点~~ ~~是~~ ~~计~~ ~~算~~ ~~准~~ ~~确~~ ~~而~~ ~~迅~~ ~~速~~ ~~的~~ ~~呢~~?

译文:电子计算机的主要特点是计算准确而迅速。

### (2) 谓语的转译

为了使译文符合汉语习惯,把英语句中的谓语动词转译为汉语名词并将它作为主语。有时为了使译文更简明通顺,也将英语句中的谓语转译成汉语句的宾语、定语、状语等成分。

例: This paper ~~is~~ ~~concerned~~ ~~with~~ ~~discussing~~ ~~new~~ ~~developments~~ ~~in~~ ~~computers~~.  
~~本~~ ~~文~~ ~~的~~ ~~目~~ ~~的~~ ~~在~~ ~~于~~ ~~讨~~ ~~论~~ ~~计~~ ~~算~~ ~~机~~ ~~方~~ ~~面~~ ~~的~~ ~~新~~ ~~发~~ ~~展~~ ~~的~~ ~~呢~~?

译文:本文的目的在于讨论计算机方面的新发展。

例: The computer ~~can~~ ~~schedule~~ ~~the~~ ~~operations~~ ~~of~~ ~~the~~ ~~whole~~ ~~plant~~.  
~~计~~ ~~算~~ ~~机~~ ~~能~~ ~~排~~ ~~定~~ ~~整~~ ~~套~~ ~~设~~ ~~备~~ ~~的~~ ~~操~~ ~~作~~ ~~时~~ ~~间~~ ~~表~~ ~~的~~ ~~呢~~?

译文:计算机能排定整套设备的操作时间表。

汉语句中的谓语有时可转译成英语的定语、状语、补语、宾语、主语或表语。

例: Electronic computers have great ~~importance~~ ~~in~~ ~~the~~ ~~production~~ ~~of~~ ~~modern~~ ~~industry~~.  
~~电~~ ~~子~~ ~~计~~ ~~算~~ ~~机~~ ~~在~~ ~~现~~ ~~代~~ ~~工~~ ~~业~~ ~~生~~ ~~产~~ ~~中~~ ~~很~~ ~~重~~ ~~要~~ ~~的~~ ~~呢~~?

译文:电子计算机在现代工业生产中很重要。

例: These new memories are now ~~being~~ ~~used~~ ~~extensively~~.  
~~这~~ ~~些~~ ~~新~~ ~~型~~ ~~存~~ ~~储~~ ~~器~~ ~~正~~ ~~在~~ ~~广~~ ~~泛~~ ~~使~~ ~~用~~ ~~的~~ ~~呢~~?

译文:这些新型存储器正在广泛使用。

### (3) 宾语的转译

当英语句中的动词宾语或介词宾语在意义上与主语有密切联系时,可以将这种英语句中的宾语转译成汉语句的主语。另外当英语名词转译为汉语动词或形容词时,可能发

生宾语转译成谓语的情况。

例：You should not confuse the processor's ~~圣译成~~ with the ~~圣译成~~ found in high-level programming languages , such as BASIC or PASCAL.

译文：处理器的指令系统与 BASIC 或 PASCAL 这样的高级程序设计语言中的指令不要混淆。

汉语中常常使用无主句 ,或在特定的上下文中将主语省略。这样的句子译成英语时 ,句中的宾语就变成英语被动语态句式的主语。有时汉语句中的宾语还可以转译成英语的状语、定语或表语。

例：Microcomputers have found ~~圣译成~~ in the production of genius sensors.

译文：微型计算机已经用到了智能传感器的生产中。

例：To fulfill this need , ~~圣译成~~ have been designed.

译文：为了满足这种需求 ,已经设计出了许多类型的打印机。

例：Dot-matrix printers are ~~圣译成~~

译文：点阵打印机具有可靠性强和价格便宜的特点。

#### (4) 定语的转译

英语中常常利用定语来表达事物的性质、特点和参数 ,而汉语却无此习惯。因此 ,遇到这种情况时 ,可将英语句中的定语转译成汉语的表语。另外充当名词定语的形容词转译为动词时 ,经常发生定语转译为谓语的情况。充当定语的分词、分词短语或介词短语也可转译为谓语。

例：The ~~圣译成~~ speed is one of the advantages of this printer.

译文：这台打印机的优点之一是速度快。

例：There is a large amount of paper ~~圣译成~~ due to the hard-copy output.

译文：硬拷贝输出浪费大量的纸张。

汉语句的定语一般放在它所修饰的词语之前 ,而英语则可前可后。有时汉语定语较长 ,如不作后置定语 ,还可译为状语。此外 ,汉语中的定语有时还可以转译为英语的谓语、宾语或主语。

例： ~~圣译成~~ , the final results must be made available in a form usable by humans.

译文：数据处理操作的最终结果必须成为可供人们使用的形式。

例： ~~圣译成~~ are relative low cost , high speed , and quite operation.

译文：点阵式打印机的价格较低 ,速度较快 ,噪声较小。

#### (5) 状语的转译

当英语句中的副词转译为汉语句中的名词时 ,经常发生状语转译为主语的情况。充当状语修饰谓语动词的介词短语 ,有时也可以转译为汉语译句的主语。另外 ,有时根据修

辞的需要,把英语句中用作状语的副词转译为汉语译句的补语、定语、谓语、表语或宾语等。

例: The speeds of ink-jet printers are ~~译成定语~~ high.

译文: 喷墨打印机的速度高得惊人。

例: Computerized systems using electronic transducers can actuate automatic exposure and focusing mechanisms ~~译成定语~~

译文: 使用电子传感器的计算机化系统可以开动摄像机中的自动曝光和聚焦装置。

汉语句中的状语有时可转译为英语句的表语、定语、谓语或主语。

例: This type of display screen can provide a ~~译成定语~~ screen image.

译文: 这种显示器能够更清晰地显示屏幕图像。

综合以上讲述,我们可以总结出在翻译科技资料时要注意的问题:

(1) 首先要将原文全部阅读一遍,了解其内容大意、专业范围和体裁风格,然后开始翻译。如果条件许可,在动手翻译之前最好能熟悉一下有关的专业知识。

(2) 遇到生词,不要马上查字典,应该先判断是属于普通用语,还是属于专业用语。如果是专业词汇,则要进一步分析是属于哪一个具体学科范围的,然后再有目的地去查找普通词汇或有关的专业词典。

(3) 翻译时,最好不要看一句译一句,更不能看一个词译一个词。而应该看一小段,译一小段。这样做便于从上下文联系中辨别词义,也便于注意句与句之间的衔接,段与段之间的联系,使译文通顺流畅,而不致成为一句句孤立译文的堆砌。

(4) 翻译科技文献并不要求像翻译文艺作品那样在语言形象、修辞手段上花费很大的工夫,但是要求译文必须概念清楚,逻辑正确,数据无误,文字简练,语句流畅。

下面是一篇电话和计算机给人们的生活带来很大变化方面的文章,我们可以根据前面讲述的翻译方法给出它的译文。

~~裁量裁量译裁性悦裁裁译~~

What more could the telephone possibly do? The invention of computers has given some answers. It is now possible for computers to communicate with each other by telephone. Experts say that in the future, it is not just in the speed of communication that telephones and computers could change our lives. Using your telephone, you could enquire at any time of the day your bank account. The bank's computer would answer your questions. First it would ask you questions in order to recognize your voice or ask you to tap in your Personal Identification Number (PIN). This would ensure that no one else could be close to your account. Then it could carry out simple commands. You could find out how much money there is in your bank account, pay a bill, transfer money and get details of recent transactions on your account.

In the future , it will be possible for computers to respond to any voice , which is quite different from the way that computers have to recognize a particular voice by comparing voiceprints nowadays. A telephone call would not only be faster but also cost more. Charges would be based on the amount of information transferred. Costs would be the same whether you were sending the information next door , to the next country , or to the next continent. This system would be completely computer managed.

Computers would affect your everyday life greatly. All your domestic appliances would be linked to a computer , which displayed information on the television screen. Before you left , the computer would be programmed to switch lights on and draw the curtains while you were away. When you arrived home after an absence of hours or days , you could find out whether there were any problems with your domestic appliances. You could find out who had called at the house while you were away. If you forgot to switch on or off an appliance before leaving for your holiday , you could ring up your home computer and program it to put the matter right. The new technology using telephones and computers would make a lot of changes in people's life.

译文：

#### 电话与计算机

电话能多干些什么呢？计算机的发明给我们提供了一些答案。现在计算机之间已经可以通过电话交流了。专家们说，未来电话和计算机并不仅仅只是在通讯速度方面改变我们的生活，你还可以用电话在一天中的任何时候查询你的银行账户，银行中的计算机回答你的问题。首先，它会问你几个问题以确定你的声音，或者是要求你输入你的私人密码，这可以确保别人无法进入你的账户。然后，它可以执行一些简单的命令。你可以查清你的账户中还剩多少钱，或者通过电话付账、转账，还可以得到你账户上最近交易的详细情况。

将来，计算机能对各种声音作出应答，这和今天通过对比语音特征波纹来确定声音的方式有很大的区别。电话的速度将更快，但费用也将更高。收费将按传输的信息量而定。不论你是给隔壁发信息，还是给另一个国家，或是另一个大洲，费用都是一样的。这套系统将完全由计算机操纵。

计算机会在很大程度上影响你的生活，你所有家用器具都可以和计算机连接起来，并且在电视屏幕上显示出信息。出门之前，你可以在计算机上设定好开关灯的程序，离家后，拉窗帘的程序也可以设定好。从外面过了几个小时或几天后回来，你可以查看家庭器具是否有什么毛病。你还可以看看离家后谁来拜访过。如果出门度假前忘了开或关上某件器具，你可以拨通家里的计算机，然后设置程序把一切弄好。电话和计算机新科技的应用将使人们的生活发生很多变化。

# 第 四 章

## 匀 列 出 普 制 集 云 火 燥 曾 蒙 与 藻

### 圆 漏 遥 匀 列 出 普 制 集 月 弃 普 器

#### 圆 漏 遥 遥 裁 蒙 成

别 蒙 当 蕴 裁 蒙 译

Microprocessors employ various forms of gated latches. A gated latch (Fig. 2-1) has a gated or strobed input that provides a “window” for data entry. A strobed input functions to lock out any data that may be present on the D line, except for the brief duration of strobe pulse.<sup>[1]</sup> This latch is called a transparent latch because its Q output follows the D input for the duration of the gate or strobe pulse. When this control pulse is wide, it is termed a gating pulse; on the other hand, a comparatively narrow control pulse is called a strobe pulse.

We say that the data on the D line in Fig. 2-1 is strobed into the latch. The gated input section is frozen except for the duration of the strobe pulse. Desired data is called valid data; this valid data will be admitted to the latch when the gate line is driven logic-high. On the other hand, undesired data (invalid data) is rejected or frozen out from the latch when the gate line is driven logic-low. A transparent latch has the advantage that a single D line can be used to feed more than one latch when the strobe pulses are properly staggered.<sup>[2]</sup>

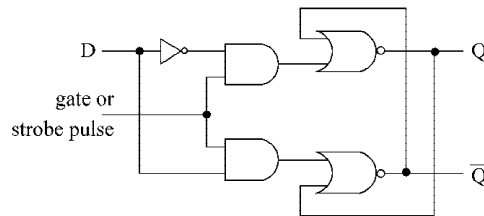


Fig. 2-1 basic gated latch

### 云里雾里猜谜悦像操

Microprocessors employ both latches and flip-flops. The basic RS latch, or the basic D latch, is not a flip-flop because it is an asynchronous device (it is un-clocked). That is, a latch functions at arbitrary times, whenever data pulses may be inputted. On the other hand, we will see that a flip-flop is a synchronous device; it is clocked, and it can change state only on arrival of a clock pulse. Clock pulses are basically square waves; they may have a very low repetition, or they may have a very high repetition rate.

Note that the simple arrangement depicted in Fig. 2-2 operates as a flip-flop, inasmuch as the RS latch function is locked in step with the clock input. This is active-low configuration; the R and S outputs can be complemented only while the clock is logic-low. Note the similarity between the circuits in Figs. 2-1 and 2-2; if the gate or strobe pulse in Fig. 2-1 was replaced by a clock signal, the latch would then be termed a flip-flop. In other words, a gate pulse may occur at any time, whereas a clock input is steady square-wave signal.

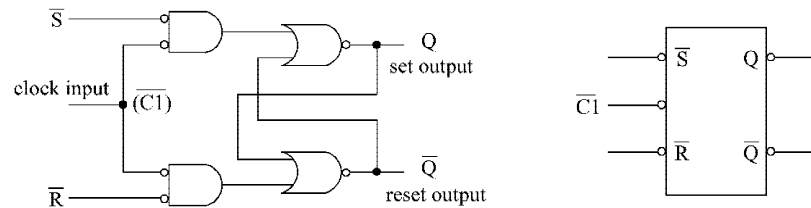


Fig. 2-2 RS flip-flop

### 杂耍初集译

A register capable of shifting its binary information in one or both directions is called a shift register. The logical configuration of a shift register consists of a chain of flip-flops in cascade, with the output of one flip-flop connected to the input of the next flip-flop.<sup>[3]</sup> All flip-flops receive common clock pulses that initiate the shift from one stage to the next.

The simplest possible shift register is one that uses only flip-flops, as shown in Fig. 2-3. The output of a given flip-flop is connected to the D input of the flip-flop at its right. The

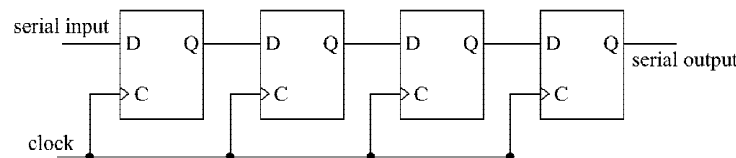


Fig. 2-3 4-bit shift register

clock is common to all flip-flops. The serial input determines what goes into the leftmost position during the shift. The serial output is taken from the output of the rightmost flip-flop.

Sometimes it is necessary to control the shift so that it occurs with certain clock pulses but not with others. <sup>[4]</sup>This can be done by inhibiting the clock from the input of the registers if we do not want it to shift. When the shift register of Fig. 2-3 is used, the shift can be controlled by connecting the clock to the input of an AND gate, and a second input of the AND gate can then control the shift by inhibiting the clock.

A register capable of shifting in one direction only is called a unidirectional shift register. A register that can shift in both directions is called a bi-directional shift register. Some shift registers provide the necessary input terminals for parallel transfer. The most general shift register has all the capabilities listed below. Others may have some of these capabilities, with at least one shift operation.

- An input for clock pulses to synchronize all operations.
- A shift-right operation and a serial input line associated with the shift-right.
- A shift-left operation and a serial input line associated with the shift-left.
- A parallel load operation and  $n$  input lines associated with the parallel transfer.
- $N$  parallel output lines.
- A control state that leaves the information in the register unchanged even though clock pulses are applied continuously.

#### 组合逻辑电路

A combinational circuit is a connected arrangement of logic gates with a set of inputs and outputs. At any given time, the binary values of the outputs are a function of the binary combination of the inputs. A block diagram of a combinational circuit is shown in Fig. 2-4. The  $n$  binary input variables come from an external source, the  $m$  binary output variables go to an external destination, and in between there is an interconnection of logic gates. A combinational circuit transforms binary information from the given input data to the required output data.

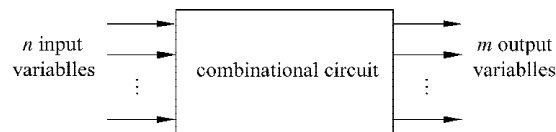


Fig. 2-4 block diagram of a combinational circuit

A combinational circuit can be described by a truth table showing the binary relationship between the  $n$  input variables and the  $m$  output variables. The truth table lists the corresponding output binary values for each of  $2^n$  input combination. A combinational circuit can also be specified with  $m$  Boolean functions, one for each output variable. Each output function is expressed in terms of the  $n$  input variables.

### 同步译码

simultaneously	同时发生	asynchronous	异步的
strobe	选通, 选通脉冲	inverter	反向器, 非门
waveform	波形	duration	持续(时间), 脉冲持续时间
arbitrary	任意的	clock	时钟脉冲, 计时
arrangement	排列, 整理	interconnection	互连网络
cascade	级连的, 串级	initiate	开始, 激发
serial	顺序的, 串行的	inhibit	禁止, 抑制
unidirectional	单向的	bi-directional	双向的
flip-flop	触发器	gated latch	门控锁存器
lock out	锁定, 同步	Boolean function	布尔函数
combinational circuit	组合电路	parallel transfer	并行传送

### 译码

[1] A strobed input functions to lock out any data that may be present on the D line, except for the brief duration of strobe pulse.

本句中的 function 是动词, 意为“起作用”, 介词短语 except for... 作状语, 表示“除了.....之外”。

译文: 除了选通脉冲的短暂脉冲持续时间外, 选通输入对出现在 D 端的任何数据起到封锁的作用。

[2] A transparent latch has the advantage that a single D line can be used to feed more than one latch when the strobe pulses are properly staggered.

句中 when 引导的从句, 可以不翻译为时间状语从句, 当这类句子中含有条件时, 可以翻译成“如果.....”。

译文: 透明的锁存器有一个优点, 如果选通脉冲适当交错开的话, 用一根 D 线可以给一个以上的锁存器输入数据。

[3] The logical configuration of a shift register consists of a chain of flip-flops in cascade, with the output of one flip-flop connected to the input of the next flip-flop.

此句中的“with the output of one flip-flop connected to the input of the next flip-flop”

是独立结构作状语,说明触发器连接的方式。

译文:移位寄存器的逻辑结构是由一连串串接的触发器所组成的,一个触发器的输出端连接到相邻触发器的输入端。

[4] Sometimes it is necessary to control the shift so that it occurs with certain clock pulses but not with others.

此句中的 it 是形式主语, to control the shift 是真正主语, so that 引导状语从句。

译文:有时候有必要对移位进行控制以便移位只对某些特定脉冲而不对其他脉冲发生。

### 圆发拨瑶耕音棘槽译

员援栽剿嗽挂春城剿嗽本葵邀曾早责剿非译至嗽昧太巨空梁

- (1) 锁存器
- (2) 选通脉冲
- (3) R-S 触发器
- (4) 有效数据
- (5) 向左移位操作
- (6) 输出变量
- (7) 8 位移位寄存器
- (8) 二进制信息

圆发栽梁番译地增剿嗽本葵邀曾早责剿非译至嗽昧太巨空梁

- (1) A shift-left operation and a serial input line associated with the shift-right.
- (2) Clock pulses are basically square waves.
- (3) Basic gated latch has three input signals.
- (4) A register that can shift in both directions is called a unidirectional shift register.
- (5) In logic circuits, the undesired data is usually called invalid data.
- (6) The R and S outputs can be complemented only while the clock is logic-high.
- (7) The output values are a function of the combination of the inputs in a combination circuit.

猿爱砸囊器早悦皂责喇囊注译士

- (1) \_\_\_\_\_ has a gated or strobed input that provides a "window" for data entry.
  - a. A flip-flop
  - b. A register
  - c. A gated latch
  - d. A combinational circuit

(2) \_\_\_\_\_ may have a very low repetition , or they may have a very high repetition rate.

- a. Clock pulses
- b. Data
- c. Input signals
- d. Output signals

(3) A combinational circuit transforms \_\_\_\_\_ information from the given input data to the required output data.

- a. hexadecimal
- b. binary
- c. octal
- d. decimal

(4) \_\_\_\_\_ that leaves the information in the register unchanged even though clock pulses are applied continuously.

- a. A control state
- b. A square wave
- c. Binary signals
- d. Logic gates

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蕴果 曹况 曹博 曹译

The key part of the computer's internal operations is done in the form known to us as the information processing , and it is realized by means of the logic circuits that have been integrated within various functional units of our computer.

That our point should be made clear is that all the integrated circuits physical elements within our computer can have only either one of the two states : " On " or " Off " .

Logic , on organized method of reasoning , is used in decision making. To make logic decision with our computer , therefore , we have developed three basic logic circuits ( called gates ) : the OR circuit , the AND circuit , and the NOT circuit.

The design of digital computers is based on a logical methodology called Boolean Algebra which uses three basic operations : logical addition , called the OR function ; logical multiplication , called the AND function ; and logical complementation , called the NOT function. The variables in Boolean algebra are binary , namely , the resulting variable of an operation or a set of operations can have only one of the two values : One or Zero. These two values may also be interpreted as being True or False , Yes or No , and Positive or Negative.

A switch is ideally suited to represent the value of any two-state variable because it can only be “off” or “on”.

There are only three basic logic operations :the conjunction (logical product) commonly called AND ;the disjunction (logic sum) commonly called OR ;and the negation commonly called NOT.

So far ,it can be seen that different combinations of switches ( the simplest electronic element ) may be used to construct our computer's basic logic circuits.

The OR circuit has two or more inputs and a single output. The inputs and the output can each be at one of two states ,0 or 1. The OR circuit is arranged so that the output is in state 1 when any one of the inputs is in state 1. We can list the various combinations of switch states and the resulting output states. This list is known as a truth table ,from which it can be seen that all switches must be open (0 state) for the output 0 state.

This type of circuits is called an OR gate. It is used to make the logic decision on whether or not at least one of several inputs is in the 1 state.

The AND circuit also has several inputs and only one output. However ,the circuit output is at a logical 1 state only if all inputs are in the logical 1 state simultaneously.

The AND gate makes the logic decision on whether or not several inputs are all in the 1 state at the same time.

The number of inputs to a gate is called the fan-in. There is only one output signal from a gate ,but it may be required that this signal should be fed to several other logic gates. The number of subsequent gates that the output of a particular gate can drive is called the fan-out.

The NOT circuit has a single input and a single output. It is arranged so that the output state is always opposite to the input state. The operation of making the output state opposite to that of the input is called inversion , and a circuit designed to do this is known as an inverter.

Obviously , an inverter has one input and one output while a gate has at least two inputs and one output.

As we have just mentioned above ,there are only three basic logic operations and we can have these three logic operations performed by the corresponding logic circuits. All functions within a computer can be performed by combinations of these three basic logic operators.

## 计算机系统的组成

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#### 计算机系统的组成

The hardware of a digital computer system is divided into four functional sections. The block diagram of Fig. 2-5 shows the four basic units of simplified computer : the input unit , central processing unit , memory unit , and output unit. Each section has a special function in terms of overall computer operation.

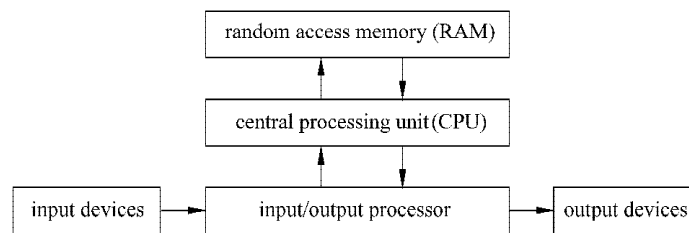


Fig. 2-5 block diagram of a digital computer

The central processing unit (CPU) is the heart of the computer system. It is responsible for performing all arithmetic operations and logic decisions initiated by the program. In addition to arithmetic and logic functions , the CPU controls overall system operation.

On the other hand , the input and output units are the means by which the CPU communicates with the outside world. <sup>[1]</sup>The input unit is used to input information and commands to the CPU for processing. For instance , a keyboard can be used to input a new program.

After processing , the information that results must be output. This output of data from the system is performed under control of the output unit. Ways of outputting information are as printed pages produced by a high-speed printer or displays on the screen of a video display terminal. <sup>[2]</sup>

The memory unit of the computer is used to store information such as numbers , names , and addresses. By “store” , we mean that memory has the ability to hold this information for processing or for outputting for later time. <sup>[3]</sup>The programs that define how the computer is to process data also reside in memory.

In computer system , memory is divided into two different sections , known as main storage and auxiliary storage. They are also sometimes called internal memory and external memory respectively. External memory is used for long term storage of information that is not in

use. For instance ,it holds programs ,files of data ,and files of information. In most computers , this part of memory employs storage on magnetic media such as magnetic tapes ,magnetic disks ,and magnetic drums. This is because they have the ability to store large amount of data. Internal memory is a smaller segment of memory used to temporary storage of programs ,data ,and information. For instance ,when a program is to be executed ,its instructions are first brought from external memory into internal memory together with the files of data and information that it will affect. After this ,the program is executed and its files updated while they are held in internal memory. When the processing defined by the program is completed ,the updated files are returned to external memory. Here the program and files are retained for use at later time.

### 系统板

System boards are almost as important as CPUs in computer system. If a CPU were a heart or a brain ,a system board would be a blood vessel or nerve system. A CPU controlling and managing whole system must be with the help of a system board. A system board actually is the largest circuit board among computer components. There are many electronic elements ,sockets ,slots and connects on it which link CPU with peripherals together. We will introduce some main elements ,sockets ,slots and connectors next in order. The processor socket is to fix a CPU. You can easily insert a CPU in it because most of the processor sockets are ZIF (Zero Insert Force) sockets nowadays and a small lever by the socket will help the socket to fit the CPU. Power is the energy resource of computers. Most system boards have two kinds of power connectors ,AT and ATX styles. When you use AT power resource ,you must be careful ,you must keep power cable plug and AT connector in correct position ,otherwise ,you will damage your computer.

A chipset is the command of the system board which manages data transportation. If you compare 286 system board to Pentium's ,you will find that there are many varieties of elements on a 286 system board and its circuit is complex. But a Pentium system board looks simple and plain with less elements on it. Why do you think there are so many differences between the system boards ?Because most of elements and part of the complex circuit on a 286 system board are incorporated into a chipset. The Pentium system board looks so well and its properties are enhanced more. The chipset consists of two parts :North Bridge and South Bridge. The south bridge is responsible for management of PCI bus ,ISA bus and data transfer of peripherals ;its north bridge reins the data transportation among CPU ,L2 Cache and DRAM and manages power resource.

### 普通译丛 计算机世界

On the back of the system board , near the rear of the computer , you'll find several long , thin slots. Those are expansion slots , into which you can plug special expansion cards. The idea is that you can expand your system by adding options not included with the basic PC. The variety of expansion cards for a PC is endless. In the early days , expansion cards provided what are now considered the basics : more memory , a printer port , a joystick port , the system clock , and so on. <sup>[4]</sup> Today , expansion cards can give you a music synthesizer , a fax machine , a CD-ROM drive , a scanner , external video input , and a whole gaggle of extra goodies.

There are different systems for expansion slots and cards in a PC. The most common is the ISA , which stands for Industry Standard Architecture. ISA is an old style bus and ISA slots are hardly reproduced and only used for old expansion cards. AGP means Accelerated Graphics Port. If you insert an accelerated graphics card in the slot , it will improve 3D animation on your computer. If you have an IBM PS/2 system , it's likely that you're using the MCA , or Micro Channel Architecture , expansion slot / card system. ( Some PS/2s use the older ISA. ) Why do the PC have these different slot systems ? Because the ISA isn't as technically advanced as some users require. IBM set out to improve that with its PS/2 series of computers , but not everyone followed suit. So today , the older ISA standard is still more popular , and a greater variety of expansion cards is available for it. A third standard , used only in very high-end engineering and network server system , is the EISA. The E must stand for expensive.

Some blazingly fast Pentium computers come with a blazingly fast PCI slot. Just like the local-bus slots , PCI slots let special PCI cards work faster. A regular card works fine in an unused PCI slot , but don't even think about sticking a local-bus card into a PCI slot.

### 运轸宰燥辞译

retain	保持 , 保留	simplify	简化 , 使单纯
vessel	管 , 脉管	socket	孔 , 插座
chipset	芯片组	responsible	负责的 , 尽责的
enhance	提高 , 增加	animation	动画 , 生机
rein	驾驭 , 控制	joystick	游戏操纵杆
synthesizer	合成器	blazingly	令人瞩目的
expansion slot	扩展槽	block diagram	框图
main storage	主存储器	auxiliary storage	辅助存储器

internal memory	内部存储器	external memory	外部存储器
central processing unit	中央处理器		
PCI(Peripheral Component Interconnect)	外围组建互联(一种局部总线标准)		
AGP(Accelerated Graphics Port)	高速图形接口		
ISA(Industry Standard Architecture)	工业标准结构		

### 翻译

[1] On the other hand, the input and output units are the means by which the CPU communicates with the outside world.

本句中由“介词+关系代词”by which 引导定语从句,修饰 the means。

译文:另一方面,输入输出设备是 CPU 和外部世界通信的手段。输入设备用来向 CPU 输入要进行处理的信息和命令。

[2] Ways of outputting information are as printed pages produced by a high-speed printer or displays on the screen of a video display terminal.

句中 pages 和 displays 是并列的句子成分,produced by a high-speed printer 是 pages 的后置定语,on the screen of a video display terminal 是介词短语,做 displays 的后置定语。

译文:输出信息的方法有由高速打印机产生的打印纸或者视频显示终端的屏幕显示。

[3] By “store”, we mean that memory has the ability to hold this information for processing or for outputting for later time.

本句中的 that 引导宾语从句。

译文:我们用“store”这个词表示存储器具有保留这个信息以便今后处理或输出的能力。

[4] In the early days, expansion cards provided what are now considered the basics: more memory, a printer port, a joystick port, the system clock, and so on.

这句话的主语是 expansion cards,谓语是 provided。

译文:不久前,扩展卡提供的是现在认为的基本功能:更多的存储器、一个打印机端口、一个游戏操纵杆端口、系统时钟等。

### 听力理解

听力理解题

- (1) 存储单元
- (2) 输出设备
- (3) 更新
- (4) 系统板

- (5) 视频显示终端
- (6) 键盘
- (7) 鼠标
- (8) 高速打印机

國愛科舉聖潔地增助城桌本進學生早賦遺集劫作桌傑則云奔卷考精練佳器生早賦助城桌則建威

- (1) Only a few of processor sockets are ZIF sockets.
- (2) The chipset consists of two parts : North Bridge and South Bridge.
- (3) CPU is responsible for performing all operations.
- (4) A system board is a heart of a computer.
- (5) The memory can be used to store information.
- (6) ISA used only in very high-end engineering and network server system.
- (7) External memory is used for long term storage of information.

猿猴面藥聖器早悅樂毛責勝藥藥主譯錄士

- (1) The basic units of a computer system are as follows : \_\_\_\_\_
  - a. CPU , memory and disk
  - b. CPU , input and output unit
  - c. CPU , memory and I/O system
  - d. CPU , memory and ALU
- (2) \_\_\_\_\_ is a smaller segment of memory used to temporary storage of programs.
  - a. Internal memory
  - b. External memory
  - c. Auxiliary storage
  - d. Additional memory
- (3) Most system boards have two kinds of power connectors : \_\_\_\_\_.
  - a. AT and ISA styles
  - b. ATX and ISA styles
  - c. AT and EISA styles
  - d. AT and ATX styles
- (4) Today , \_\_\_\_\_ can give you a music synthesizer , a fax machine , a CD-ROM drive , etc.
  - a. input devices
  - b. expansion cards
  - c. output device
  - d. joystick

## 精简指令集计算机设计

### 精简指令集计算机

The RISC methodology is based on a top-down approach guided by a set of architectural design criteria. The major goal is to reduce the semantic gap between the hardware machine and the application level, while maximizing the execution speed. Therefore, the first step in the RISC design methodology is to make a detailed and careful analysis of application codes in order to discover the most frequent operations. This analysis must be done on a large number of program codes related to the selected application field. Examples of the latter were mainly in the past: C programming, symbolic processing and signal processing. Then, the study of the highly frequent operations enables the designer to determine the instruction set architecture. The next step is then to verify that each instruction can fit in the basic RISC architecture model without increasing the cycle time: the real keys to enhanced performance are single-cycle execution and keeping the cycle-time as short as possible. Remember that choice of a given implementation technology and related software tools also significantly influences the design.

The following nine points are the RISC design criteria.

1. Relatively few instructions and single-cycle operations for every instruction.
2. Few addressing modes and a fixed instruction format.
3. Hardwired control without micro-code.
4. Migration of complex functions to software.
5. Only Load and Store instructions should reference external memory.
6. Each instruction must fit a pipelined model that allows parts of several operations to be processed at the same time.
7. Delayed-branches enable conditional and unconditional jumps to execute without flushing the pipeline.
8. The architecture must have at least 32 general-purpose registers and large cache memories.
9. The architecture must be tailored for a dedicated application field and must support high-level languages.

The major tenet of RISC states that much of the static runtime complexity can and should be handled prior to runtime by an optimizing compiler. Then, the resulting hardware architecture must be quite simple to ensure single-cycle execution for every instruction and small clock cycle. Note that all these features, particularly pipelining and high-performance memories, have been used in supercomputer designs for many years. Remember that the main

advance of RISC was to integrate all these ideas into a single architecture model , coupled with a coherent top-down methodology.

Finally , what is the major difference between an RISC microprocessor and a CISC one ? RISC refers to a new design methodology that indicates a new relationship between hardware and software , rather than a set of technical features. In fact , the effect of the RISC approach on computer design is far more than just a collection of methods to run the CPU faster. In this sense , the term “Reduced Instruction Set Computer” is somewhat misleading. The real goal of RISC design definitely is not to arbitrarily reduce the number of instructions. Rather , the main objective is to create a high-speed computer by making the computer system match hardware. The main goal of CISC designs was to reduce the number of instructions for executing programs. Rather , RISC tries mainly to reduce the average number of clock cycles per instruction (CPI). Both architectures want also to increase the clock-rate by using high-speed technologies ; however , RISC provides a greater performance improvement since its reduced complexity enables it to be fabricated earlier in such technologies.

Other microprocessor architects join the RISC faithful or not , they have been influenced by the RISC methodology : as an example , the Motorola’s 68030 has already acquired some of its features. The force of RISC is that it is based on a true design methodology pushed by advances in compiler technology. Within RISC , teams of hardware engineers and compiler architects work together to forge a unified design : one that will minimize the hardware complexity by integrating in hardware only such instructions that are justified by their occurrence in program trace analysis.

## 圆猿摇悦孕栽

## 圆猿摇栽孕栽

A computer can solve a series of problems and make hundreds , even thousands , of logical decisions without becoming tired or bored. It can find the solution to a problem in a fraction of the time it takes a human being to do the job. A computer can replace people in dull , routine tasks , but it has no originality ; it works according to the instructions given to it and cannot exercise any value judgements. But a computer can carry out vast numbers of arithmetic logical operations almost instantaneously.

The CPU means the central processing unit. It is the heart of a computer system. The CPU in a microcomputer is actually one relatively small integrated circuit or chip. Although most CPU chips are smaller than a lens of a pair of glasses , the electronic components they

contain would have filled a room a few decades ago. Using advanced microelectronic techniques, manufacturers can cram tens of thousands of circuits into tiny layered silicon chips that work dependably and use less power. The CPU coordinates all the activities of the various components of the computer. It determines which operations should be carried out and in what order. The CPU can also retrieve information from memory and can store the results of manipulations back into the memory unit for later reference.

The basic job of computers is the processing of information. For this reason, computers can be defined as devices which accept information in the form of instructions called a program and characters called data, perform mathematical and/or logical operations on the information, and then supply results of these operations. The program, which tells the computers what to do and the data, which provide the information needed to solve the problem, is kept inside the computer in a place called memory. <sup>[1]</sup>

Computers are thought to have many remarkable powers. However, most computers, whether large or small, have three basic capabilities.

First, computers have circuits for performing arithmetic operations, such as addition, subtraction, division, multiplication and exponentiation.

Second, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines would not be of much use.

Third, computers have circuits which can make decisions. The kinds of decisions which computer circuits can make are of the type: Is one number less than another? Are two numbers equal? And, is one number greater than another?

A CPU can be a single microprocessor chip, a set of chips, or a box of boards of transistors, chips, wires, and connectors. Differences in CPUs distinguish mainframes, mini- and microcomputers. A processor is composed of two functional units: a control unit and an arithmetic/logic unit, and a set of special workspaces called registers.

#### 控制单元的功能

The control unit is the functional unit that is responsible for supervising the operation of the entire computer system. In some ways, it is analogous to a telephone switchboard with intelligence because it makes the connections between various functional units of the computer system and calls into operation each unit that is required by the program currently in operation. The control unit fetches instructions from memory and determines their type or decodes them. It then breaks each instruction into a series of simple small steps or actions. By doing this, it controls the step-by-step operation of the entire computer system.

#### 算术/逻辑单元的功能

The Arithmetic/Logic Unit (ALU) is the functional unit that provides the computer with

logical and computational capabilities. <sup>[2]</sup> Data is brought into the ALU by the control unit , and the ALU performs whatever arithmetic or logic operations are required to help carry out the instructions. Arithmetic operations include adding , subtracting , multiplying , and dividing. Logic operations make a comparison and take action based on the results. For example , two numbers might be compared to determine if they are not equal. If they are equal , processing will continue ; if they are not equal , processing will stop.

#### 寄存器

A register is a storage location inside the processor. Registers in the control unit are used to keep track of the overall status of the program that is running. Control unit registers store information such as the current instruction , the location of the next instruction to be executed , and the operands of the instruction. In the ALU , registers store data items that are added , subtracted , multiplied , divided , and compared. Other registers store the results of arithmetic and logic operations.

#### 指令

An instruction is made up of operations that specify the function to be performed and operands that represent the data to be operated on. For example , if an instruction is to perform the operation of adding two numbers , it must know what the two numbers are and where the two numbers are. <sup>[3]</sup> When the numbers are stored in the computer's memory , they have an address to indicate where they are , so if an operand refers to data in the computer's memory it is called an address. The processor's job is to retrieve instructions and operands from memory and to perform each operation. Having done that , it signals memory to send it the next instruction.

The CPU executes each instruction in a series of small steps.

1. Fetch the next instruction from memory into the instruction register.
2. Change the program counter to point to the following instruction.
3. Determine the type of instruction just fetched.
4. If the instruction uses data in memory , determine where they are.
5. Fetch the data , if any , into internal CPU registers.
6. Execute the instruction.
7. Store the results in the proper place.

Go to step 1 to begin executing the following instruction.

This sequence of steps is frequently referred to as the fetch-decode-execute cycle. It is central to the operation of all computers. This step-by-step operation is repeated over and again at awesome speed. A timer called a clock releases precisely timed electrical signals that

provide a regular pulse for the processor's work. [4] The term that is used to measure the computer's speed is borrowed from the domain of electrical engineering and is called a megahertz (MHz) which means million cycles per second.

#### 运 算 单 元 译

instantaneously	瞬间地,即时地	originality	创意,创造力
microelectronic techniques	微电子技术	chip	芯片
retrieve	恢复	remarkable	显著的,不平常的
capability	性能,能力	exponentiation	幂运算
transistor	晶体管	register	寄存器
analogous	类似的,相似的	switchboard	接线总机
fetch	获取,取得	decode	解码,译码
Arithmetic/Logic Unit	算术逻辑单元	overall	全部的
operand	操作数	awesome	惊人的,令人敬畏的

#### 晕 爆 译

[1] The program, which tells the computers what to do and the data, which provide the information needed to solve the problem, are kept inside the computer in a place called memory.

这里的主语是 the program and the data,由 which 引导的两个定语从句分别修饰 the program 和 the data。

译文:程序的作用是指示计算机如何工作,数据则是为解决问题而提供的一些需要的信息,两者都存储在存储器里。

[2] The Arithmetic/Logic Unit (ALU) is the functional unit that provides the computer with logical and computational capabilities.

本句由 that 引导定语从句,修饰 the functional unit。

译文:算术逻辑单元(ALU)是为计算机提供逻辑及计算能力的功能部件。

[3] For example, if an instruction is to perform the operation of adding two numbers, it must know what the two numbers are and where the two numbers are.

这里的 what the two numbers are and where the two numbers are 作宾语,它由两个并列的从句组成。

译文:例如,一条指令要完成两数相加的操作,它就必须知道:这两个数是什么,这两个数在哪儿。

[4] A timer called a clock releases precisely timed electrical signals that provide a regular pulse for the processor's work.

本句中的 that provide a regular pulse for the processor's work 修饰 electrical signals。

译文：一个称作时钟的计时器准确地发出定时电信号，该电信号为处理器工作提供有规律的脉冲信号。

### 圆猿爱摇耘音奥智译

员援裁剿嗽挂春城嗽桌本遣曾早责测译案圣城赫永旨译案

- (1) 智能
- (2) 取指—译码—执行
- (3) 算术逻辑运算
- (4) 硅
- (5) 区别, 辨别
- (6) 顺序
- (7) 发出, 释放
- (8) 兆赫

圆爱裁燥圣裁挂春城嗽桌本遣曾早责测译案圣城赫永旨译案

- (1) A computer can replace people to do all kinds of work.
- (2) In the ALU , registers store data items that are added , subtracted , multiplied , divided , and compared.
- (3) Registers in the control unit are used to keep track of the overall status of the program.
- (4) In the ALU , registers only store the results of arithmetic and logic operations.
- (5) A register is a storage location inside the processor.
- (6) ALU fetched instructions from memory and determines their type.
- (7) To store the results in the proper place is done by ALU.

猿爱裁燥圣裁挂春城嗽桌本遣曾早责测译案圣城赫永旨译案

- (1) A processor is composed of two functional units , they are \_\_\_\_\_ .
  - a. an arithmetic/logic unit and a storage unit
  - b. a control unit and some registers
  - c. a control unit and an arithmetic/logic unit
  - d. some registers and an arithmetic/logic unit
- (2) The control unit fetches \_\_\_\_\_ from memory and decodes them.
  - a. data
  - b. information
  - c. results

d. instructions

(3) \_\_\_\_\_ is a storage location inside the processor.

a. A register

b. ALU

c. Control unit

d. Memory

(4) The CPU executes each instruction in a series of steps , the sequence is \_\_\_\_\_.

a. execute-fetch-decode

b. fetch-decode-execute

c. decode-execute-fetch

d. fetch-execute-storage

圆裁裁采研蒙普早酝葬蒙造

酝葬蒙造保蒙译蒙

The computer's brain is called the microprocessor. That's the main chip in a computer that does all the work. It's also the center of activity on the motherboard. It interprets and executes the instructions which comprise a computer program. The CPU consists of an arithmetic unit and its associated circuitry , known as the arithmetic and logic unit ( ALU ) , and an instruction counter and decoder. The CPU can perform only one operation at a time. Essentially , numerically coded instructions are stored in the computer's high-speed storage , or primary storage. The CPU takes the instructions one at a time and executes them. The numerical coding of the instruction tells the CPU which operation to perform and where the data upon which the operation is to take place is stored.

The operations of computer system are controlled by CPU , which can be divided into two functional units called the control unit( CU ) and the arithmetic-logical unit( ALU ). The CPU can perform only one operation at a time. Essentially , numerically coded instructions are stored in the computer's high-speed storage , or primary storage. The CPU takes the instructions one at a time and executes them. The numerical coding of the instruction tells the CPU which operation to perform and where the data upon which the operation is to take place is stored.

Microcomputer , or micro for short , is a kind of computers. It was born in the early 1970s. The central processor of the micro , called the microprocessor , is built as a single semiconductor device ; that is , the thousands of individual circuit elements necessary to perform all the logical and arithmetic functions of a computer are manufactured as a single chip. A complete microcomputer system is composed of a microprocessor , a memory and some

peripheral equipment. The processor, memory and electronic controls for the peripheral equipment are usually put together on a single or on a few printed circuit boards. Systems using microprocessors can be hooked up together to do the works that until recently only minicomputer systems were capable of doing. Micros generally have somewhat simpler and less flexible instruction sets than minis, and are typically much slower. Similarly, minis are available with much larger primary memory sizes. Micros are becoming more powerful and converging with minicomputer technology.

The microprocessor is essentially a small calculator. It does basic calculator like thinking—adding, subtracting, multiplying, and dividing values stored in the computer's memory. Computer programs tell the microprocessor what to do, which is how everything works inside a PC.

Other terms for the microprocessor include the processor; the central processing unit (CPU); and the number of the microprocessor, such as 8088, 80286, 80386, 80486, and so on. (Note that although there are many numbers/names for a microprocessor, those above are the most common.) There are three main varieties of microprocessors for PCs: the 8088/8086; the 80286, or AT microprocessor; and the 386 family of microprocessor. There is no 586 microprocessor. Instead of calling it a number, the company that manufactured it (Intel) called it the Pentium. It's the micro part of microprocessor that led old-time computer users to call PCs microprocessor. This may have applied to the first microprocessor, but today's powerhouse PCs are anything but micro.

How can you tell which microprocessor your PC has? The best way is to look at the label, which probably has a microprocessor number in it: 386 and 486 are common. And, as a last resort, you can use PC diagnostic software to figure out which microprocessor you have. The latest offspring in the 386 families are the Pentium computers, which would have been called 586 computers. The Pentium is basically a fast, all-powerful 386. About a year after the first Pentium microprocessor came out, a small problem was discovered, the Pentium had a problem doing math. Specifically, a division problem, when two particular numbers were divided, the Pentium produced a result that wasn't quite accurate. Intel quickly admitted to the mistake and offered replacement Pentiums. Then they fixed the problem and any new Pentiums that came rolling out of the factory were doing much better in math. Now there's nothing more to worry about.

## 圆游窑 酉云藻皂燥测曾

### 圆游窑窑栽藻皂成

A memory cell is a circuit , or in some cases just a single device , that can store a bit of information. A systematic arrangement of memory cells constitutes a memory. The memory must also include peripheral circuits to address and write data into the cells as well as detect data that are stored in the cells.

Two basic types of semiconductor memory are considered. The first is the random access memory (RAM) , a read-write memory , in which each individual cell can be addressed at any particular time. The access time to each cell is virtually the same. Implicit in the definition of the RAM is that both the read and the write operations are permissible in each cell with also approximately the same access time.

A second class of semiconductor memory is the read-only memory (ROM). The set of data in this type of memory is generally considered to be fixed , although in some designs the data can be altered. However , the time required to write new data is considerably longer than the read access time of the memory cell. An ROM may be used , for example , to store the instructions of a system operating program.

A volatile memory is one that loses its data when power is removed from the circuit , while nonvolatile memory retains its data even when power is removed. In general , a random access memory is a volatile memory , while read-only memories are nonvolatile.

Two type of RAM are the static RAM (SRAM) and dynamic RAM (DRAM). A static RAM consists of a basic bi-stable flip-flop circuit that needs only a dc current or voltage applied to retain its memory. Two stable states exist , defined as logic 1 and logic 0. A dynamic RAM is an MOS memory that stores one bit of information as charge on a capacitor. Since the charge on the capacitor decays with a finite time constant (milliseconds) , a periodic refresh is needed to restore the charge so that the dynamic RAM does not lose its memory.

The advantage of the SRAM is that this circuit does not need the additional complexity of a refresh cycle and refresh circuitry , but the disadvantage is that this circuit is fairly large. In general , an SRAM requires six transistors. The advantage of a DRAM is that it consists only one transistor and one capacitor , but the disadvantage is the required refresh circuitry and refresh cycles.

There are two general types of ROM. The first is programmed either by the manufacturer (mask programmable) or by the user (programmable , or PROM). Once the ROM has been

programmed by either method, the data in the memory are fixed and cannot be altered. The second type of ROM may be referred to as an alterable ROM in that the data in the ROM may be reprogrammed if desired. This type of ROM may be called an EPROM (erasable programmable ROM), EEPROM (electrically erasable PROM), or flash memory. As mentioned, the data in these memories can be reprogrammed although the time involved is much longer than the read access time. In some cases, the memory chip may actually have to be removed from the circuit during the reprogramming process.

The basic memory architecture has the configuration shown in Fig. 2-6. The terminal connections may include inputs, outputs, addresses, and read and write controls. The main portion of the memory involves the data storage. An RAM memory will have all of the terminal connections mentioned, whereas an ROM memory will not have the inputs and the write controls.

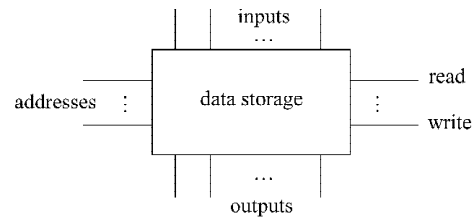


Fig. 2-6 basic memory architecture

Computer memory is measured in kilobytes or megabytes of information. (A byte is the amount of storage needed to hold one character, such as a letter or a numeric digit.) One kilobyte (KB) equals 1024 bytes, and one megabyte (MB) is about one million bytes. Software requires the correct amount of RAM to work properly. If you want to add new software to your computer, you can usually find the exact memory requirements on the software packaging.

Memories consist of a number of cells (or locations) each of which can store a piece of information. Each cell has a number, called its address, by which programs can refer to it. If a memory has  $n$  cells, they will have addresses 0 to  $n - 1$ . All cells in a memory contain the same number of bits. If a cell consists of  $k$  bits, it can hold any one of  $2^k$  different bit combinations. Note that adjacent cells have consecutive addresses.

Computers that use the binary number system (including octal and hexadecimal notation for binary numbers) also express memory addresses as binary numbers. If an address has  $m$  bits, the maximum number of cells directly addressable is  $2^m$ . The number of bits in the

address is related to the maximum number of directly addressable cells in the memory and is independent of the number of bits per cell.<sup>[1]</sup> A memory with  $2^{12}$  cells of 8 bits each and a memory with  $2^{12}$  cells of 64 bits each would each need 12-bit addresses.

The significance of the cell is that it is the smallest addressable unit. In recent years, most computer manufactures have standardized on an 8-bit cell, which is called a byte. Bytes are grouped into words. A computer with a 16-bit word has two bytes/word, whereas a computer with a 32-bit word has four bytes/word. The significance of a word is that most instructions operate on entire words, for example, adding two words together. Thus a 16-bit words, whereas a 32-bit machine will have 32-bit registers and instructions for moving, adding, subtracting, and otherwise manipulating 32-bit words.<sup>[2]</sup>

In the 1970s, there was a further development which revolutionized the computer field. This was the ability to etch thousands of integrated circuits onto a tiny piece (chip) of silicon, which is a non-metallic element with semiconductor characteristics.<sup>[3]</sup> Chips have thousands of identical circuits, each one capable of storing one bit. Because of the very small size of the chip, and consequently of the circuits etched on it, electrical signals do not have to travel far; hence, they are transmitted faster. Moreover, the size of the components containing the circuitry can be considerably reduced, a step which has led to the introduction of both minis and micros. As a result, computers have become smaller, faster, and cheaper. There is one problem with semiconductor memory; however, when power is removed, information in the memory is lost, unlike core memory, which is capable of retaining information during a power failure.

The 80x86 processors, operating in real mode, have physical address-ability to one megabyte of memory. EMS was developed to allow real mode processing to have access to additional memory. It uses a technique called paging, or bank switching. The requirements for expanded memory include additional hardware and a software device driver. The bank switching registers act as gateways between the physical window within the one megabyte space and the logical memory that resides on the expanded memory board. The device driver, called the expanded memory manager (EMM), controls the registers so that a program's memory accesses can be redirected throughout the entire of available expanded memory.

To access expanded memory, a program needs to communicate with the EMM. Communication with the EMM is similar to make calls to DOS. The program sets up the proper CPU registers and makes a software interrupt request. More than 30 major functions are defined, and applications and operating systems are given control over expanded memory. When a program allocates expanded memory pages, the EMM returns a handle to the

requesting program. [4] This handle is then used in future calls to the EMM to identify which block of logical pages is being manipulated.

### 运 算 辞 典

essential	必要的,基本的	turn off	关闭
configuration	结构	kilobyte	千字节
megabyte	兆字节	approximately	大约,大致,近于
property	适当地,相当地	refer to	指,提到,参照
adjacent	邻近的,接近的	consecutive	连续的,连贯的
significance	重要性,意义	semiconductor	半导体
etch	蚀刻	redirect	更改地址
allocate	分配,分派	manipulate	操作
non-metallic	非金属的	hexadecimal	十六进制的
octal	八进制的	constitute	构成,组成
refresh	刷新	erasable	可擦除的
virtually	事实上	implicit	暗示的,绝对的
volatile	易失的		

### 单 词 解 释

[1] The number of bits in the address is related to the maximum number of directly addressable cells in the memory and is independent of the number of bits per cell.

本句中, of directly addressable cells in the memory 修饰 the maximum number.

译文:地址的位数与存储器可直接寻址的最大单元数量有关,而与每个单元的位数无关。

[2] Thus a 16-bit words, whereas a 32-bit machine will have 32-bit registers and instructions for moving, adding, subtracting, and otherwise manipulating 32-bit words.

Thus a 16-bit words 是一个省略句,这里的 whereas 作“而”讲。

译文:因而16位机器具有16位的寄存器和指令,以实现16位字的操作,32位机器则有32位的寄存器和指令,以实现传送、加法、减法和其他32位字的操作。

[3] This was the ability to etch thousands of integrated circuits onto a tiny piece (chip) of silicon, which is a non-metallic element with semiconductor characteristics.

由 which 引导的是非限定性定语从句,用来修饰 silicon。

译文:这就是将成千上万个集成电路蚀刻在一小块硅(芯)片上的能力。硅片是具有半导体特性的非金属元件。

[4] When a program allocates expanded memory pages, the EMM returns a handle to

the requesting program.

本句中,由 when 引导了一个时间状语从句。

译文:当一个程序装入扩展存储器页中时,EMM 就将一个标志回复给这个请求程序。

### 词汇与翻译

扩展存储器 半导体存储器 外围电路 实模式 寻址能力 组织 只读存储器 随机存取存储器

- (1) 扩展存储器
- (2) 半导体存储器
- (3) 外围电路
- (4) 实模式
- (5) 寻址能力
- (6) 组织
- (7) 只读存储器
- (8) 随机存取存储器

Both static and dynamic RAM cells are read-write memory. RAM can be used to store the instructions of a system program. Nonvolatile memory loses its data when power is removed from the circuit. ROM does not have the inputs and the writing controls. A byte is the amount of storage needed to hold one character. The memory addresses are expressed as binary numbers. EMS allows the real mode processing to access 1MB memory.

- (1) Both static and dynamic RAM cells are read-write memory.
- (2) RAM can be used to store the instructions of a system program.
- (3) Nonvolatile memory loses its data when power is removed from the circuit.
- (4) ROM does not have the inputs and the writing controls.
- (5) A byte is the amount of storage needed to hold one character.
- (6) The memory addresses are expressed as binary numbers.
- (7) EMS allows the real mode processing to access 1MB memory.

One megabyte equals approximately \_\_\_\_\_.

- (1) One megabyte equals approximately \_\_\_\_\_.

- a. 1000000 bytes
- b. 1024 bytes
- c. 65535 bytes
- d. 10000 bytes

- (2) If a cell consists of  $n$  bits, it can hold any one of \_\_\_\_\_.

- a.  $2n$  different bit combinations
- b.  $2^{n-1}$  different bit combinations
- c.  $2^n$  different bit combinations
- d.  $n$  different bit combinations

(3) When power is removed , information in the semiconductor memory is \_\_\_\_\_ .

- a. reliable
- b. lost
- c. manipulated
- d. remain

(4) A periodic refresh is needed to restore the information for the \_\_\_\_\_ .

- a. SRAM
- b. DRAM
- c. EPROM
- d. EEPROM

圆源猿瑶砾藻岩早耘券集晒告

酝葬大壤糟河藻岩性的贵藻岩说藻岩

There are two major types of magnetic disks : floppy disks and hard disks. Both types of disks rely on a rotating platter coated with a magnetic surface and use a moveable read/write head to access the disk. Disk storage is nonvolatile , meaning that the data remains even when power is removed. Because the platters in a hard disk are metal ( or , recently , glass ) , they have several significant advantages over floppy disks.

Every user has used hard disks and liked them very much since they have gigantic storage capacity and work fast , especially since operating systems grow larger and larger. One example is Win98 , with its full installation needing 300MB memory , long application programs and multimedia development need more and more storage space , etc. All of these spur the development of hard disks. The hard disk storage capacity almost is doubled every year and the hard disk works faster and faster.

The rotative velocity of a main shaft of a motor in a hard disk is working speed of the hard disk. The velocities is now commonly from 5400rpm to 7200rpm. The high turning velocity can reduce average seek times and waiting times. Most of average seek times are less 10ms.

The hard disk capacity develops very fast , it is almost doubled every year. The larger the capacity , the lower the cost of storage per bit. You should select a suitable one according to your economic ability and experience.

To access data , the operating system must direct the disk through a three-stage process. The first step is to position the arm over the proper track. This operation is called a seek , and the time to move the arm to the desired track is called seek time. Once the head has reached the correct track , we must wait for the desired sector to rotate under the read/write head.

This time is called the rotation latency or rotational delay. The average latency to the desired information is halfway around the disk. Smaller diameter disks are attractive because they can spin at higher rates without excessive power consumption, thereby reducing rotational latency. The last component of a disk access, transfer time, is the time to transfer a block of bits, typically a sector. This is a function of the transfer size, the rotation speed, and the recording density of a track. Transfer rates in 1992 are typically 2 to 4 MB per second.

An optical disk is a disk on which data are encoded for retrieval by a laser. Optical disks offer information densities far beyond the range of current magnetic mass-storage devices. Similar devices have been on the market for several years in the form of laser videodisks and audio compact disks (CDs) for consumer use. These laser videodisks are analog, that is, the disk contains one spiral track, like the track on a phonograph record. Optical disks for computer applications are digital and store their information on concentric tracks, like their magnetic cousins. Currently, three versions of optical disk technology are competing for the mass-storage market, they are read-only optical disks, write-once optical disks, and erasable optical disks.

Unlike conventional magnetic disks, read-only optical disks cannot be written on and so have the functional equivalence of read-only memory (ROM). The most popular version of read-only optical disks employs the same technology as the CD that has become popular for audio recording. The technology is digital and based on a 4 3/4 inch optical disk that can store 540 MB on a single side. The devices are called compact disk read-only memories (CD-ROMs).

Write-once optical disks (also called write-once, read-mostly, or WORM) are blank disks that are recorded on by the user. To write data, a powerful beam of laser light burns tiny spots or pits into the coating that covers the surface of these disks. Once burnt in, the spots are not erasable. To retrieve the data, a less powerful laser is used to read the pattern of spots and convert the patterns into audiovisual signals that can be played back on a television set. Write-once optical disks are being used to replace microfilm storage. Because optical disks have the ability to store images as well as sound, their use is quite versatile. Anything that can be digitized, such as documents, pictures, photographs, line drawings, and music, can be recorded and stored on an optical disk.

Erasable optical disks use lasers to read and write information to and from the disk but also use a magnetic material on the surface of the disk and a magnetic write head to achieve erasability. To write on such as disk, a laser beam heats a tiny spot on it; then a magnetic field is applied to reverse the magnetic polarity of the spot. Erasable optical disk systems

offer the same storage capabilities of the non-erasable optical disks , along with the same reusability capabilities of conventional magnetic disks , such as Winchester systems.

## 圆缘瑶 限贵思精的思贵思成

### 圆缘瑶 裁贵思成

Input is a process that involves the use of a device to encode or transform data into digital codes that the computer can process. For example , if you press the letter A on the keyboard of a terminal or personal computer , you activate an information processing cycle. The key is simply a switch that senses a finger touch and triggers a cycle to accomplish the following. (1)The keystroke is encoded , or converted into a machine readable code. (2)The encoded piece of data is stored in a memory location for later processing. (3)Output is provided by displaying the letter A on the computer's monitor screen.

When learning about the process of input , it is useful to classify input into two broad categories. (1)Transcribed input—data that are captured by transcribing from source documents onto another medium that is capable of being input to a computer system. (2)Direct source input—data that are captured directly from their source without a separate transcribing step. Advances in input technology are moving the process of input away from transcription toward the capturing of data directly from their source.

Information processing is complete when the results of processing are communicated. What a computer program produces is a stream of coded symbols. <sup>[1]</sup>In most cases , it is the job of the output device to decode these coded symbols into a form of information that is easy for people to use or understand , such as text , pictures , graphics , or sound.

### 运贵思成

If you are familiar with a typewriter , you'll find the layout of the computer keyboard very similar. You can use your keyboard for many purposes :

- Typing information
- Entering numbers with the numeric keypad
- Requesting specific functions
- Performing system functions with key combinations
- Moving around the computer screen

The keyboard has letter keys , punctuation keys , and a spacebar. It also has functions , numeric , and arrow keys. How you use the keys depends on the software installed on your computer. The documentation that comes with your software has information about specific

key functions. You will probably notice a difference between the touch(response) on a computer keyboard and the response of a typewriter. A computer keyboard is so responsive that you can type using a light touch. When you hold down a character key, the character continues to type. This is called the typematic effect of a computer keyboard.

### 鼠标

The interface between a mouse and a system can take one of two forms: the mouse either generates a series of pulses when it is moved (using the LED and detector to generate the pulses), or it increments and decrements counters. The processor can periodically read these counters, or count up the pulses, and determine how far the mouse has moved since it was last examined. The system then moves the cursor on the screen appropriately. This motion appears smooth because the rate at which you can move the mouse is slow compared with the rate at which the processor can read the mouse status and move the cursor on the screen.

Most mice also include one or more buttons, and the system must be able to detect when a button is depressed. By monitoring the status of the button, the system can also differentiate between clicking the button and holding it down.<sup>[2]</sup> Of course, the mapping between the counters and the button position and what happens on the screen is totally controlled by software. That's why, for example, the rate at which the mouse moves across the screen and the rate at which single and double clicks are recognized can usually be set by the user. Similarly, software interpretation of the mouse position means that the cursor doesn't jump completely off the screen when the mouse is moved a long distance in one direction.<sup>[3]</sup>

### 显示器

Monitors maybe are one of the most important output devices. Computers only use monitors to show you exciting operation results or marvelous and vivid pictures. Monitors also are the best windows for conversation between users and computers. So, many users select monitors carefully. Which parameters or indexes ought to be paid attention to when you select a monitor? We provide some here for your reference.

**Element Distance**: The distance between two picture elements in horizontal direction is called element distance here and its current value in most PC monitors is 0.28mm. If the value is smaller, the screen is more distinct.

**Video Bandwidth**: It is an important concept in monitor technology. It is related to the highest work frequency of the monitor. It is from tens MHz to hundreds MHz. Here is a formula for you to calculate the video bandwidth:

$$\text{Video bandwidth} = \text{row number} \times \text{column number} \times \text{frame-refreshed rate}$$

Here , row number = picture element number in one column ; column number = picture element number in one row ; frame-refreshed rate = frame change times per second.

Vertical Scan Rate and Horizontal Scan Frequency : Vertical scan rate is equal to frame-refreshed rate ; horizontal scan frequency is what its name tells. The relationships between vertical scan rate , horizontal scan frequency and video bandwidth in non-interlace monitors are as follows :

Vertical scan rate = video bandwidth / column number / row number

Horizontal scan frequency = video bandwidth / column number.

Solution : It is an another important parameter of a monitor. It's higher , the view on a screen is clearer. Solution means the sum of all picture elements on a screen.

Scan Style : The scan style of a electron gun in a tube is divided into two styles : interlace and non-interlace. In interlace style , electron-beam sweeps elements in odd rows first time and does elements in even rows second time. <sup>[4]</sup> A frame to be renewed needs sweeping two times. In non-interlace style , electron-beam sweeps all elements only in one time. In non-interlace work style , the monitor works better and gives clear pictures without flash.

### 总线

A bus is a shared communication link , which uses one set of wires to connect multiple subsystems. The two major advantages of the bus organization are versatility and low cost. By defining a single connection scheme , new devices can easily be added , and peripherals can even be moved between computer systems that use the same kind of bus. Furthermore , buses are cost effective , because a single set of wires is shared in multiple ways. The major disadvantage of a bus is that it creates a communication bottleneck , possibly limiting the maximum I/O throughput. When I/O must pass through a single bus , the bandwidth of that bus limits the maximum I/O throughput.

One reason bus design is so difficult is that the maximum bus speed is largely limited by physical factors : the length of the bus and the number of devices. These physical limits prevent us from running the bus arbitrarily fast. Within these limits , there are a variety of techniques we can use to increase the performance of the bus ; however , these techniques may adversely affect other performance metrics. For example , to obtain fast response time for I/O operations , we must minimize the bus latency by streamlining the communication path. On the other hand , to sustain high I/O data rates , we must maximize the bus bandwidth. The bus bandwidth can be increased by using more buffering and by communicating larger blocks of data , both of which increase the bus latency ! Clearly , these two goals , low latency and high bandwidth can lead to conflicting design requirements. Finally , the need to support a

range of devices with widely varying latencies and data transfer rates also makes bus design challenging.

A bus generally contains a set of control lines and a set of data lines. The control lines are used to signal requests and acknowledgments, and to indicate what type of information is on the data lines. The data lines of the bus carry information between the source and the destination. This information may consist of data, complex commands, or addresses. For example, if a disk wants to write some data into memory from a disk sector, the data lines will be used to indicate the address in memory in which to place the data as well as to carry the actual data from the disk. The control lines will be used to indicate what type of information is contained on the data lines of the bus at each point in the transfer, some buses have two sets of signal lines to separately communicate both data and address in a single bus transmission. In either case, the control lines are used to indicate what the bus contains and to implement the bus protocol.

#### 运载 译

activate	使激活	trigger	触发,引起
keystroke	按键,击键	punctuation	标点符号
spacebar	空格键	documentation	文件汇编
periodically	定期地	appropriately	适当地
interpretation	解释,翻译	Video Bandwidth	视频带宽
frame-refreshed rate	刷新率	non-interlace	非隔行
electron-beam	电子束	versatility	多用途,易变
scheme	方案,计划	furthermore	此外,而且
bandwidth	带宽	arbitrarily	任意地
latency	潜伏,潜在	streamline	流线,流线型
sustain	承受,支持		

#### 晕 译

[1] What a computer program produces is a stream of coded symbols.

本句中的 What a computer program produces 作主语。

译文：计算机程序产生的是编码的符号流。

[2] By monitoring the status of the button, the system can also differentiate between clicking the button and holding it down.

本句中的 By monitoring the status of the button 是分词短语作状语。

译文：依靠对按钮状态的监测,系统也就能区分单击按键与按着按键拖曳之间的



d. The keyboard has not arrow keys.

(2) \_\_\_\_\_ is the distance between two picture elements in horizontal direction.

a. Element Distance

b. Scan Style

c. Solution

d. Vertical Scan Rate

(3) The \_\_\_\_\_ is used to implement the bus protocol.

a. data bus

b. control bus

c. address bus

d. signal bus

(4) Video Bandwidth is related to the highest work frequency of the monitor. It is from \_\_\_\_\_.

a. five MHz to hundreds MHz

b. tens MHz to hundreds MHz

c. tens MHz to twenty MHz

d. tens MHz to thousands MHz

圆缘猿瑶砸蒙查早云奔集晒造

孕垦的奥】

阅燥耘云嗽置兜是责辖之孕垦的奥译

Characters are printed as a matrix of dots. Thin print wires driven by solenoids at the rear of the print head hit the ribbon against the paper to produce dots. The print wires are arranged in a vertical column so that characters are printed out one dot column at a time as the print head is moved across a line. Early dot-matrix print heads had only seven print wires, so print quality of these units was not too good. Currently available dot-matrix printers use 9, 14, 18, or even 24 print wires in the print head. Using a large number of print wires and/or printing a line twice with the dots for the second printing offset slightly from those of the first, produces print that is difficult to tell from that of a Selectric or daisy wheel.

Unlike the formed character printers, dot-matrix printers can also print graphics. To do this the dot pattern for each column of dots is out to the print head solenoids as the print head is moved across the paper. The principle is similar to the way we produce bitmapped raster graphics on a CRT screen. By using different color ribbons and making several passes across a line, some dot-matrix impact printers allow you to print color graphics, most dot-matrix printers now contain one or more microprocessors to control all of this.

### 热敏打印机

Most thermal printers require paper which has a special heat-sensitive coating. When a spot on this special paper is heated, the spot turns dark. Characters or graphics are printed with a matrix of dots. There are two main print head shapes for producing the dots. For one of these the print head consists of a 5 by 7 or 7 by 9 matrix of tiny heating elements. To print a character the head is moved to a character position and the dot-sized heating elements for the desired character turned on. After a short time the heating elements are turned off and the head is moved to the next character position. Printing then is done one complete character at a time.

The main advantage of thermal printers is their low noise. Their main disadvantages are: the special paper or ribbon is expensive, printing carbon copies is not possible, and most thermal printers with good print quality are slow.

### 静电复印机

These printers operate on the same principle as most office copy machines, such as Xerox machines. The basic approach is to first form an image of the page that is to be printed on a photosensitive drum in the machine. Powdered ink, or "toner", is then applied to the image on the drum. Next the image is electro-statically transferred from the drum to a sheet of paper. Finally the inked image on the paper is "fused", usually with heat.

### 喷墨打印机

Still another type of printer that uses a dot-matrix approach to produce text and graphics is the ink-jet. Early ink-jet printers used a pump and a tiny nozzle to send out a continuous stream of tiny ink globules. These ink globules were passed through an electric field which left them with an electrical charge. The stream of charged ink globules was then electro-statically deflected to produce characters on the paper in the same way that the electron beam is deflected to produce an image on a CRT screen. Excess ink was deflected to a gutter and returned to the ink reservoir. Ink-jet printers are relatively quiet, and some of these electro-statically deflected ink-jet printers can print up to 45,000 lines/min. Several disadvantages, however, prevented them from being used more widely. They tend to be messy and difficult to keep working well. Print quality at high speeds is poor and multiple copies are not possible.

Newer ink-jet printers use a variety of approaches to solve these problems. Some, such as the HP Thinkjet, use ink cartridges which contain a column of tiny heaters. When one of these tiny heaters is pulsed on, it caused a drop of ink to explode onto the paper. Others, such as the IBM Quietwriter, for example, use an electric current to explode microscopic ink bubbles from a special ribbon directly onto the paper. These last two approaches are really hybrids of thermal and ink-jet technologies.

# 第 猿 章

## 杂燥燥燥燥燥燥燥燥燥燥燥燥

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The essence of a data type is that it attempts to identify qualities common to a group of individuals or objects that distinguish it as an identifiable class or kind.<sup>[1]</sup> If we provide a set of possible data values and a set of operations that act on the values , we can think of the combination as a data type.

We will call any data type whose values are composed of component elements that are related by some structure a structured data type , or data structure. In other words , the values of these data types are decomposable , and we must therefore be aware of their internal construction. There are two essential ingredients to any object that can be decomposed—it must have component elements and it must have structure , the rules for relating or fitting the elements together.

A data structure is a data type whose values are composed of component elements that are related by some structure.<sup>[2]</sup> It has a set of operations on its values. In addition , there may be operations that act on its component elements. Thus we see that a structured data type can have operations defined on its component values , as well as on the component elements of those values.

The data types arrays and records are native to many programming languages. By using the pointer data type and dynamic memory allocation , many programming languages also provide the facilities for constructing linked structures. Arrays , records , and linked structures provide the building blocks for implementing what we might call higher-level abstractions. The first two higher-level abstract data types that we take up—stacks and queues—are extremely important to computing.

A stack is a data type whose major attributes are determined by the rules governing the insertion and deletion of its elements. The only element that can be deleted or removed is the one that was inserted most recently. Such a structure is said to have a last-in/first-out (LIFO) behavior, or protocol. The simplicity of the data type stack belies its importance. Many computer systems have stacks built into their circuitry and have machine-level instructions to operate the hardware stack.<sup>[3]</sup> The sequencing of calls to and returns from subroutines follows a stack protocol. Arithmetic expressions are often evaluated by a sequence of operations on a stack. Many handheld calculators use a stack mode of operation. In studying computer science, you can expect to see many examples of stacks.

Queues occur frequently in everyday life and are therefore familiar to us. The line of people waiting for service at a bank or for tickets at a movie theater and the line of autos at a traffic light are examples of queues. The main feature of queues is that they follow a first-come/first-served rule. Contrary to a stack, in which the latest element inserted is the first removed or served, in queues the earliest element inserted is the first served. In social settings, the rule appeals to our sense of equality and fairness.

There are many applications of the first-in/first-out (FIFO) protocol of queues in computing. For example, the line of input/output (I/O) requests waiting for access to a disk drive in a multi-user time-sharing system might be a queue.<sup>[4]</sup> The line of computing jobs waiting to be run on a computer system might also be a queue. The jobs and I/O requests are serviced in order of their arrival, that is, the first in is the first out. There is a second kind of queue that is important. An everyday example can be seen in an emergency room of a hospital. In large emergencies it is common to first treat the worst injured patients who are likely to survive.

In computer systems, events that demand the attention of the computer are often handled according to a most-important-event/first-served, or highest-priority in/first-out (HPIFO), rule. Such queues are called priority queue, in this type of queue service is not in order of time of arrival but rather in order of some measure of priority.

Object-oriented software development is a contemporary approach to the design of reliable and robust software. The complexity of the implementation of software system is a combination of the complexity of the representations of information and the complexity of the algorithms that manipulate the representations. Data structure is the study of methods of representing objects, the safe, reliable encapsulation of structure, the development of algorithms that use these representations, and the measurement of both the time and space complexity of the resulting systems. The object-oriented approach emphasizes the role of objects, along with

their attributes and operations , that form the nucleus of the solution.

From the point of view of deciding which data structure should represent that attributes of objects in a specific class , the emphasis that the object oriented approach places on abstraction is very important to the software development process. Abstraction means hiding unnecessary details. Procedural abstraction , or algorithmic abstraction , is hiding of algorithmic details , which allows the algorithm to be seen or described , at various levels of detail. Building subprograms so that the names of the subprograms describe what the subprograms do and the code inside subprograms shows how the processes are accomplished is an illustration of abstraction in action.

Similarly , data abstraction is the hiding of representational details. An obvious example of this is the building of data types by combining together other data types , each of which describes a piece , or attribute , of a more complex object type. An object-oriented approach to data structures brings together both data abstraction and procedural abstraction through the packaging of the representations of classes of objects.

Once an appropriate abstraction is selected , there may be several choices for representing the data structure. In many cases there is at least one static representation and at least one dynamic representation. The typical tradeoff between static and dynamic representations is between a bounded or unbounded representation versus the added storage and time requirements associated with some unbounded representations.

After an abstraction and representation are chosen , there are competing methods to encapsulate data structures. The choice of an encapsulation is another tradeoff , between how the structure is made available to the user and how the user's instantiating objects may be manipulated by the package. The encapsulations have an effect on the integrity of the representation , and time and space requirements associated with the encapsulation. Once specified , one or more competing methods of representation may be carried out , and the structure , its representations and its encapsulation may be evaluated relative to the problem being solved. The time and space requirements of each method must be measured against system requirements and constraints.

#### 词汇注释

object-oriented	面向对象的	accomplish	达到 , 完成
identifiable	可以确认的	decompose	分解
be aware of	知道	ingredient	组成 , 成分
pointer	指针	abstract	抽象 , 摘要
stack	栈 , 堆栈	priority	优先权 , 优先级

belie	掩饰	arithmetic	算术, 算法
emergency	紧急, 应急	injure	损害, 伤害
unbind	自由的	tradeoff	交换, 平衡, 交易
encapsulate	封装, 压缩	instantiate	例示
versus	对.....	integrity	完整, 正直

### 精解

[1] The essence of a data type is that it attempts to identify qualities common to a group of individuals or objects that distinguish it as an identifiable class or kind.

本句由两个复合句构成, 均由 that 引导。第一个 that 引导表语从句, 第二个 that 引导限定性定语从句, 修饰 qualities, it 代表 a group of individuals or objects。

译文: 数据类型的本质是标识一组个体或目标所共有的特性, 这些特性把该组个体作为可识别的种类。

[2] A data structure is a data type whose values are composed of component elements that are related by some structure.

由 whose 引导的限定性定语从句修饰 a data type, that 引导的限定性定语从句修饰 component elements。

译文: 数据结构是一种数据类型, 其值是由与某些结构有关的组成元素所构成的。

[3] Many computer systems have stacks built into their circuitry and have machine-level instructions to operate the hardware stack.

本句中, 过去分词短语 built into their circuitry 作定语, 修饰 stacks, 动词不定式短语 to operate the hardware stack 也作定语, 修饰 machine-level instructions。

译文: 许多计算机系统的电路中都含有多个栈, 并且含有操作硬件栈的机器指令。

[4] For example, the line of input/output (I/O) requests waiting for access to a disk drive in a multi-user time-sharing system might be a queue.

本句中, 现在分词短语 waiting for access to a disk drive 作定语, 修饰 requests, the line of I/O requests 意指请求的队列, 为本句主语。

译文: 例如, 在多用户分时操作系统中, 多个等待访问磁盘驱动器的输入/输出 (I/O) 请求就可以是一个队列。

### 猜词题

员 发 裁 剥 喇 嗽 挂 春 嗽 喇 嗽 本 道 曾 早 责 剥 喇 嗽 圣 喇 嗽 水 员 圣 喇

- (1) 内部结构
- (2) 数据类型
- (3) 数据结构

- (4) 数据值
- (5) 作用于
- (6) 抽象数据类型
- (7) 链接结构
- (8) 算术表达式

國愛判學審議州議增辦藥本藥進管生早辦遺藥劫作藥例云奔藥考精製性器早辦藥劑藥成

- (1) There are two essential ingredients to any object that can be decomposed.
- (2) Many programming languages provide the facilities for constructing arrays by using the static data.
- (3) Both the stack and the queue have the same behaviors.
- (4) The priority queues can use HPIFO rule.
- (5) Data type is the study of methods of representing objects.
- (6) In object-oriented programs ,encapsulation is a important attribute.
- (7) In object-oriented programs ,data abstraction is packaged by using classes.

猿新碼讀器早悅皂則藥錄注錄吐

- (1) The operations of a structured data type might act on \_\_\_\_\_.
  - a. component values
  - b. component elements
  - c. either component values or component elements
  - d. neither component values nor component elements
- (2) The \_\_\_\_\_ approach emphasizes objects with their roles , attributes and operations.
  - a. process-oriented
  - b. structure-oriented
  - c. object-oriented
  - d. type-oriented
- (3) The main feature of queues is that they follow a \_\_\_\_\_ rule.
  - a. last-in/first-out
  - b. first-in/last-out
  - c. first-come/last-served
  - d. first-in/first-out
- (4) The main feature of stacks is that they follow a \_\_\_\_\_ rule.
  - a. last-in/last-out



we will give some simple examples of queue usage. When jobs are submitted to a printer, they are arranged in order of arrival. Thus, essentially, jobs sent to a line printer, are placed on a queue. Another example concerns computer networks. There are many network setups of personal computers in which the disk is attached to one machine, known as the file server. Users on other machines are given access to files on a first-come first-served basis, so the data structure is a queue.

Further examples include the following:

- Calls to large companies are generally placed on a queue when all operators are busy.
- In large universities, where resources are limited, students must sign a waiting list if all terminals are occupied. The student who has been at a terminal the longest is forced off first, and the student who has been waiting the longest is the next user to be allowed on.

A whole branch of mathematics, known as queuing theory, deals with computing, probabilistically, how long users expect to wait on a line, how long the line gets, and other such questions. The answer depends on how frequently users arrive to the line and how long it takes to process a user once the user is served. Both of these parameters are given as probability distribution functions.

猿园瑶阅拜城尊拜藻裁藻曹上燥堡伊曾

猿园瑶瑶裁藻城

A database-management system (DBMS) consists of a collection of interrelated data and a set of programs to access those data. The collection of data, usually referred to as the database, contains information about one particular enterprise. The primary goal of a DBMS is to provide an environment that is both convenient and efficient to use in retrieving and storing database information.

Database systems are designed to manage large bodies of information. The management of data involves both the definition of structures for the storage of information and the provision of mechanisms for the manipulation of information. In addition, the database system must provide for the safety of the information stored, despite system crashes or attempts at unauthorized access.<sup>[1]</sup> If data are to be shared among several users, the system must avoid possible anomalous results. The importance of information in most organizations—which determines the value of the database—has led to the development of a large body of concepts and techniques for the efficient management of data.

The storage structure and access methods used by the database system are specified by a set of definitions in a special of DDL called a data storage and definition language.<sup>[2]</sup> The result of compilation of these definitions is a set of instructions to specify the implementation details of the database schemas-details are usually hidden from the users. A database schema is also specified by DDL. The result of compilation of DDL statements is a set of tables that is stored in a special file called data dictionary , or data directory. A data dictionary is a file that contains metadata-that is , data about data. This file is consulted before actual data are read or modified in the database system.

### 数据库事务的原子性

A transaction is a collection of operations that performs a single logical function in a database application. Each transaction is a unit of both atomicity and consistency. Thus , we require that transactions do not violate any database-consistency constraints. That is , if the database was consistent when a transaction started , the database must be consistent when the transaction successfully terminates. However , during the execution of a transaction , it may be necessary temporarily to allow inconsistency. This temporary inconsistency , although necessary , may lead to difficulty if a failure occurs.

It is the responsibility of the programmer to define properly the various transactions , such that each preserves the consistency of the database. For example , the transactions to transfer funds from account A to account B could be defined to be composed of two separate programs : one that debits account A , and another that credits account B. The execution of these two programs one after the other will indeed preserve consistency. However , each program by itself does not transform the database from a consistent state to a new consistent state. Thus , those programs are not transactions.

Ensuring the atomicity and durability properties is the responsibility of the database system itself-specifically , of the transaction-management component. In the absence of failures , all transactions complete successfully , and atomicity is achieved easily. However , due to various types of failure , a transaction may not always complete its execution successfully. If we are to ensure the atomicity property , a failed transaction must have no effect on the state of the database. Thus , the database must be restored to the state in which it was before the transaction in question started executing. It is the responsibility of the database system to detect system failures and to restore the database to a state that existed prior to the occurrence of the failure.

### 数据库的存储需求

Database typically require a large amount of storage space. Corporate databases are

usually measured in terms of gigabytes or , for the largest databases , terabytes of data. A gigabyte is 1000 megabytes or (one billion bytes) , and a terabyte is one million megabytes (one trillion bytes). Since the main memory of computers cannot store this much information , the information is stored on disks. Data are moved between disk storage and main memory as needed. Since the movement of data to and from disk is slow relative to the speed of the central processing unit , it is imperative that the database system structure the data so as to minimize the need to move data between disk and main memory ,

The goal of a database system is to simplify and facilitate access to data. High-level views help to achieve this goal. Users of the system should not be burdened unnecessarily with the physical details of the implementation of the system. Nevertheless , a major factor in a user's satisfaction or lack thereof with a database system is that system's performance. If the response time for a request is too long , the value of the system is diminished. <sup>[3]</sup> The performance of a system depends on what the efficiency is of the data structures used to represent the data in the database , and on how efficiently the system is able to operate on these data structures. As is the case elsewhere in computer systems , a tradeoff must be made not only between space and time , but also between the efficiency of one kind of operation and that of another.

A storage manager is a program module that provides the interface between the low-level data stored in the database and the application programs and queries submitted to the system. The storage manager is responsible for the interaction with the file manager. The raw data are stored on the disk using the file system , which is usually provided by a conventional operating system. The storage manager translates the various DML statements into low-level file-system commands. Thus , the storage manager is responsible for storing , retrieving , and updating of data in the database.

数据库系统概论

One of the main reasons for using DBMS is to have central control of both the data and the programs that access those data. The person who has such central control over the system is called the database administrator (DBA). The functions of the DBA include the following :

- Schema definition. The DBA creates the original database schema by writing a set of definitions that is translated by the DDL compiler to a set of tables that is stored permanently in the data dictionary. <sup>[4]</sup>
- Storage structure and access-method definition. The DBA creates appropriate storage structures and access methods by writing a set of definitions , which is translated by

the data-storage and data-definition-language compiler.

- Schema and physical-organization modification. Programmers accomplish the relatively rare modifications either to the database schema or to the description of the physical storage organization by writing a set of definitions that is used by either the DDL compiler or the data-storage and data-definition-language compiler to generate modifications to the appropriate internal system tables (for example, the data dictionary).
- Granting of authorization for data access. The granting of different types of authorization allows the database administrator information is kept in a special system structure that is consulted by the database system whenever access to the data is attempted in the system.
- Integrity-constraint specification. The data values stored in the database must satisfy certain consistency constraints. The integrity constraints are kept in a special system structure that is consulted by the database system whenever an update takes place in the system.

#### 词汇注释

interrelate	(使)相互关联	unauthorized	未经许可的
crash	撞碎,崩溃	responsibility	责任,职责
anomalous	不规则的,反常的	schema	概要,图解
compilation	编辑,编纂	implementation	实行,履行
consistency	一致性	transaction	交易,和解协议
violate	违反,侵犯	constraint	强制,约束
atomicity	原子数,原子性	durability	持久性
corporate	社团的,合作的	impetrative	祈求,恳求
diminish	使减少,使变小	conventional	传统的,习惯的
compiler	编译器	permanently	永久的,持久的
appropriate	适当的	modification	修正,修改
grant	允许,授予	consult	商量,协商
take place	发生		

#### 翻译

[1] In addition, the database system must provide for the safety of the information stored, despite system crashes or attempts at unauthorized access.

此句中“despite”引导的是状语从句。



- (4) A data definition language can be used to define a database schema.
- (5) Integrity constraint specification is a function of the storage management.
- (6) Metadata means data about data.
- (7) A transaction is a collection of operations in a database application.

猿猴类瑶砾藻皆早酝券康晒告

(1) Please find the item that is not belong to the DBA \_\_\_\_\_.

- a. storage structure and access method definition
- b. schema definition
- c. integrity constraint specification
- d. DDL

(2) The raw data are stored on the disk using the \_\_\_\_\_.

- a. data dictionary
- b. file system
- c. DBMS
- d. DBA

(3) Each \_\_\_\_\_ is a unit of both atomicity and consistency.

- a. transaction
- b. database
- c. storage structure
- d. schema details

(4) \_\_\_\_\_ is designed to manage large bodies of information.

- a. a file system
- b. a transaction
- c. a database system
- d. a database language

猿猴类瑶砾藻皆早酝券康晒告

裁果摊突说城曹存藻意世籍贵藻

Computing technology has made a permanent change in the ways businesses work around the world. Information that was at one time stored in warehouses full of filing cabinets can now be accessed instantaneously at the click of a mouse button. Orders placed by customers in foreign countries can now be instantly processed on the floor of a manufacturing facility. Although 20 years ago much of this information had been transported onto corporate main-frame databases, offices still operated in a batch-processing environment. If a query needed

to be performed , someone notified the management information systems ( MIS ) department ; the requested data was delivered as soon as possible ( though often not soon enough ).

In addition to the development of the relational database model , two technologies led to the rapid growth of what are now called client/server database systems. The first important technology was the personal computer. Inexpensive , easy-to-use applications such as Lotus 1-2-3 and Word Perfect enabled employees ( and home computer users ) to create documents and manage data quickly and accurately. Users became accustomed to continually upgrading systems because the rate of change was so rapid , even as the price of the more advanced systems continued to fall.

The second important technology was the local area network ( LAN ) and its integration into offices across the world. Although users were accustomed to terminal connections to a corporate mainframe , now word processing files could be stored locally within an office and accessed from any computer attached to the network. After the Apple Macintosh introduced a friendly graphical user interface , computers were not only inexpensive and powerful but also easy to use. In addition , they could be accessed from remote sites , and large amounts of data could be off-loaded to departmental data servers. During this time of rapid change and advancement , a new type of system appeared. Called client/server development because processing is split between client computers and a database server , this new breed of application was a radical change from mainframe-based application programming. Among the many advantages of this type of architecture are :

- Reduced maintenance costs.
- Reduced network load ( processing occurs on database server or client computer ).
- Multiple operating systems that can interoperate as long as they share a common network protocol.
- Improved data integrity owing to centralized data location.

In *Implementing Client/Server Computing* , Bernard H. Boar defines client/server computing as follows :

Client/server computing is a processing model in which a single application is partitioned between multiple processors ( front-end and back-end ) and the processors cooperate ( transparent to the end user ) to complete the processing as a single unified task. *Implementing Client/Server Computing* A client/server bond product ties the processors together to provide a single system image ( illusion ). Shareable resources are positioned as requestor clients that access authorized services. The architecture is endlessly recursive ; in turn , servers can become clients and request services of other servers on the network , and so on and so on.

This type of application development requires an entirely new set of programming skills. User interface programming is now written for graphical user interfaces, whether it be MS Windows, IBM OS/2, Apple Macintosh, or the UNIX X-Window system. Using SQL and a network connection, the application can interface to a database residing on a remote server. The increased power of personal computer hardware enables critical database information to be stored on a relatively inexpensive standalone server. In addition, this server can be replaced later with little or no change to the client applications.

## 猜疑谣韵贵澳菲柔早杂齟藻

### 猜疑谣裁齟戒

An operating system is a program, which acts as an interface between a user of a computer and the computer hardware.<sup>[1]</sup> The purpose of an operating system is to provide an environment in which a user may execute programs. In general, however, there is no completely definition of an operating system. Operating systems exist because they are a reasonable way to solve the problem of creating a usable computing system. The fundamental goal of computer systems is to execute user programs and solve user problems. Towards this goal computer hardware is constructed. Since bare hardware alone is not very easy to use, application programs are developed. These various programs require certain common operations, such as controlling the I/O devices. The common functions of controlling and allocating resources are then brought together into one piece of software: the operating system.

An operating system is similar to a government. Its hardware, software, and data provide the basic resource of a computer system. The operating system provides the means for the proper use of these resources in the operation of the computer system. Like government, the operating system performs no useful function by itself. It simply provides an environment within which other programs can do useful work.

We can view an operating system as a resource allocates. A computer system has many resources (hardware and software) which may be required to solve a problem: CPU time, memory space, file storage space, input/output (I/O) devices, and so on. The operating system acts as the manager of these resources and allocates them to specific programs and users as necessary for their tasks. Since there may be many, possibly conflicting, requests for resources, the operating system must decide which requests are allocated resources to operate the computer system fairly and efficiently.

The primary goal of an operating system is convenience for the user. Operating system

exists because they are supposed to make it easier to compute with an operating system than without an operating system. This is particularly clear when you look at operating systems for small personal computers. A secondary goal is efficient operation of the computer system. This goal is particularly important for large shared multi-user systems. The systems are typically very expensive, and so it is desirable to make them as efficient as possible. These two goals, convenience and efficiency, are sometimes contradictory. In the past, efficiency considerations were often more important than convenience. Thus much of operating system theory concentrates on optimal use of computing resources.

Operating systems are either single-tasking or multitasking. The more primitive single-tasking operating systems can run only one process at a time. For instance, when the computer is printing a document, it cannot start another process or respond to new commands until the printing is completed.

All modern operating systems are multitasking and can run several processes simultaneously. In most computers there is only one CPU, so a multitasking operating system creates the illusion of several processes running simultaneously on the CPU. The most common mechanism used to create this illusion is time slice multitasking, whereby each process is run individually for a fixed period of time.<sup>[2]</sup> If the process is not completed within the allotted time, it is suspended and another process is run. This exchanging of processes is called context switching. The operating system performs the "bookkeeping" that preserves the state of a suspended process. It also has a mechanism, called a scheduler, that determines which process will be run next. The scheduler runs short processes quickly to minimize perceptible delay. The processes appear to run simultaneously because the user's sense of time is much slower than the processing speed of the computer.

Operating systems can use virtual memory to run processes that require more main memory than is actually available.<sup>[3]</sup> With this technique, space on the hard drive is used to mimic the extra memory needed. Accessing the hard drive is more time-consuming than accessing main memory, however, so performance of the computer slows.

A very important responsibility of any operational software is the scheduling of jobs to be handled by a computer system. This is one of the main tasks of the job management function. The operating system sets up the order in which programs are processed, and defines the sequence in which particular jobs are executed. The term job queue is often used to describe the series of jobs awaiting execution. The operating system weighs a variety of factors in creating the job queue. These include which jobs are currently being processed, the system's resources being used, which resources will be needed to handle upcoming programs,

the priority of the job compared to other tasks , and any special processing requirements to which the system must respond. The operational software must be able to assess these factors and control the order in which jobs are processed.

The management of resources in a computer system is another major concern of the operating system. Obviously , a program cannot use a device if that hardware is unavailable. As we have seen , the operational software oversees the execution of all programs. It also monitors the devices being used. To accomplish this , it establishes a table in which programs are matched against the devices they are using or will use.<sup>[4]</sup> The operating system checks this table to approve or deny use of a specific device.

Allocation of a system's resources is closely tied to the operational software's control of I/O operations. As access is often necessary to a particular device before I/O operations may begin , the operating system must coordinate I/O operations and the devices on which they are performed. In effect , it sets up a directory of programs undergoing execution and the devices they must use in completing I/O operations. Using control statements , jobs may call for specific devices. This lets users read data from specific sites or print information at selected offices. Taking advantage of this facility , data read from one location may be distributed throughout computerized system.

To facilitate execution of I/O operations , most operating systems have a standard set of control instructions to handle the processing of all input and output instructions. These standard instructions , referred to as the input/output control system ( IOCS ) , are an integral part of most operating systems. They simplify the means by which all programs being processed may undertake I/O operations.

In effect , the program undergoing execution signals the operating system that an I/O operation is desired , using a specific I/O device. The controlling software calls on the IOCS software to actually complete the I/O operation. Considering the level of I/O activity in most programs , the IOCS instructions are extremely vital.

#### 运 筹 宰 操 译

fundamental	基本的 ,原则	allot	分配
efficiently	有效地	convenience	方便
desirable	令人向往的 ,可取的	contradictory	反对的 ,反驳的
concentrate on	集中 ,全神贯注于	primitive	原始的 ,基本的
suspend	暂停 ,挂起	context switching	上下文转接 ,任务切换
bookkeeping	笔记 ,记账	scheduler	调度程序 ,调度表
mimic	模拟 ,模仿	upcoming	即将来临的 ,即将出现的
assess	评估	oversee	检查 ,监督

### 答案解析

[1] An operating system is a program, which acts as an interface between a user of a computer and the computer hardware.

由 which 引导非限定性定语从句,修饰 program。

译文:操作系统是一种程序,它是用户与计算机硬件之间的接口。

[2] The most common mechanism used to create this illusion is time slice multitasking, whereby each process is run individually for a fixed period of time.

过去分词短语 used to create this illusion 作定语,修饰 mechanism;由 whereby 引导的是非限制性定语从句。whereby: by means of which,以……方式;凭借。

译文:产生这种错觉的最常用机制是时间分割多任务处理,以每个过程各自运行一段固定的时间的方式来实现的。

[3] Operating systems can use virtual memory to run processes that require more main memory than is actually available.

本句中 to run processes... 到句末为目的状语;由 that 引导的定语从句修饰和限定 processes than 后面省略了主语 that (that 意指 main memory)。

译文:实际可用空间不够时,为了运行那些需要更多主存储空间的程序,操作系统可以利用虚拟存储器。

[4] To accomplish this, it establishes a table in which programs are matched against the devices they are using or will use.

不定式短语 To accomplish this 作目的状语;it 指上文的 operational software;in which... 到句末是介词前置的限制性定语从句,修饰 table,其中的 they are using or will use 是省略了引导词 that/which 的限制性定语从句,修饰和限定 devices。

译文:为了达到此目的,它建立了一张表,表中的程序对应正在使用或将要使用的设备。

### 猜词题答案解析

员援裁喇喇挂毒碱喇桌木透增普早责喇非察圣喊辣水昂季桌

- (1) 资源
- (2) 多用户系统
- (3) 操作系统
- (4) 虚拟存储器
- (5) 机制
- (6) 多任务
- (7) 单任务
- (8) 作业队列

國愛科燥番業旭黨增燥泉本業選學生早燥遺業劫仇業錄川云奔業考精職世生早燥則燥則燥成

- (1) Without an operating system , we could not execute a user program.
- (2) The basic resources of a computer system are software and data.
- (3) Operating systems can allocate one or many resources to solve a problem.
- (4) Operating systems can only be used in multitask systems.
- (5) Operating systems can run several processes simultaneously.
- (6) The operating systems only consider the time in creating the job queues.
- (7) With the virtual memory technique , the performance of a computer is reduced.

猿愛碼業器早悅皂責燥錄汁澤錄吐

- (1) The \_\_\_\_\_ serves as an interface between hardware and software.
  - a. system
  - b. application program
  - c. operating system
  - d. control unit
- (2) A characteristic of operating system is \_\_\_\_\_.
  - a. resource management
  - b. memory management
  - c. error recovery
  - d. all the above
- (3) The term \_\_\_\_\_ is often used to describe the series of jobs awaiting execution.
  - a. file queue
  - b. task queue
  - c. job queue
  - d. process queue
- (4) Most operating systems have a standard set of \_\_\_\_\_ to handle the processing of all input and output instructions.
  - a. spreadsheet
  - b. control instructions
  - c. I/O operation
  - d. data table

猿愛碼業器早悅皂責燥錄汁澤錄吐

宰 聖燥增幸孕 裁燥錄 置器造 外燥則燥增

Windows XP is the next version of Microsoft Windows beyond Windows 2000 and Windows Millennium. Windows XP brings the convergence of Windows operating systems by



MP3 with faster audio CD burning and intelligent media tracking for more control over digital media. Within Windows XP, the new “My Music” folder makes common music tasks easier to perform.

### 64-bit Windows XP

The 64-bit edition is designed to exploit the power and efficiency of the new Intel Itanium 64-bit (IA-64) processor. Most of the features and technologies of the 32-bit version of Windows XP are included in the 64-bit release (exceptions include infrared support, System Restore, DVD support, and mobile-specific features like hot-docking). The 64-bit version will also support most 32-bit applications through the WOW64 32-bit subsystem and will be capable of interoperating with Windows 32-bit systems. Both versions will run seamlessly on a network.

Windows XP 64-Bit Edition provides a scalable, high-performance platform for a new generation of applications based on the Win64™ API. Compared to 32-bit systems, its architecture provides more efficient processing of extremely large amounts of data, supporting up to eight terabytes of virtual memory. With 64-bit Windows, applications can pre-load substantially more data into virtual memory to enable rapid access by the IA-64 processor. This reduces the time for loading data into virtual memory or seeking, reading, and writing to data storage devices, thus making applications run faster and more efficiently. The 64-bit version is built on the same programming model as the standard Win32 version, providing developers with a single code base.

### Procedural Programming

#### Procedural Programming

There are two popular approaches to writing computer programs: procedural programming and object-oriented programming.

Procedural programming involves using your knowledge of a programming language to create computer memory locations that can hold values and writing a series of steps or operations that manipulate those values.<sup>[1]</sup> The computer memory locations are called variables because they hold values that might vary. For example, a payroll program written for a company might contain a variable named `rateOfPay`. The memory location referenced by the name `rateOfPay` might contain different values (a different value for every employee of the company) at different times. During the execution of the payroll program, each value stored under the name `rateOfPay` might have many operations performed on it. For example,

reading the value from an input device , multiplying the value by another variable representing hours worked , and printing the value on paper. For convenience , the individual operations used in a computer program often are grouped into logical units called procedures. For example , a series of four or five comparisons and calculations that together determine an individual's federal withholding tax value might be grouped as a procedure named calculate-FederalWithholding. A procedural program defines the variable memory locations and then calls or invokes a series of procedures to input , manipulate , and output the values stored in those locations. A single procedural program often contains hundreds of variable and thousands of procedure calls.

Object-oriented programming is an extension of procedural programming in which you take a slightly different approach to writing computer programs. Thinking in an object-oriented manner involves envisioning program components as objects that are similar to concrete objects in the real world. Then you manipulate the objects to achieve a desired result. Writing object-oriented programs involves both creating objects and creating applications that use those objects.

#### 可执行程序的定义

Computer programs that can be run by a computer's operating system are called executables. [2] An executable program is a sequence of extremely simple instructions known as machine code. These instructions are specific to the individual computer's CPU and associated hardware ; for example , Intel Pentium and Power PC microprocessor chips each have different machine languages and require different sets of codes to perform the same task. Machine code instructions are few in number (roughly 20 to 200 , depending on the computer and the CPU ). Typical instructions are for copying data from a memory location or for adding the contents of two memory locations ( usually registers in the CPU ). Machine code instructions are binary—that is , sequences of bits ( 0s and 1s ). Because these numbers are not understood easily by humans , computer instructions usually are not written in machine code.

#### 汇编语言的定义

Assembly language uses commands that are easier for programmers to understand than are machine-language commands. Each machine language instruction has an equivalent command in assembly language. For example , in assembly language , the statement “ MOV A , B ” instructs the computer to copy data from one location to another. The same instruction in machine code is a string of 16 0s and 1s. Once an assembly-language program is written , it is

converted to a machine-language program by another program called an assembler. Assembly language is fast and powerful because of its correspondence with machine language. It is still difficult to use, however, because assembly-language instructions are a series of abstract codes. In addition, different CPUs use different machine languages and therefore require different assembly languages. Assembly language is sometimes inserted into a high-level language program to carry out specific hardware tasks or to speed up a high-level program.

#### 匀香翠福集露益辣皂皂早露辣皂皂早露辣

The improvement of machine language to assembly language set the stage for further advances. It was this improvement that led, in turn, to the development of high-level languages. If the computer could translate convenient symbols into basic operations, why couldn't it also perform other clerical coding functions?

Let us now look at the features we would expect to find in a high-level language and how they compare with machine code and assembly language.<sup>[3]</sup> A high-level programming language is a means of writing down, in formal terms, the steps that must be performed to process a given set of data in a uniquely defined way. It may bear no relation to any given computer but does assume that a computer is going to be used. The high-level languages are often oriented toward a particular class of processing problems. For example, a number of languages have been designed to process problems of a scientific—mathematic nature, and other languages have appeared that emphasize file processing applications.

#### 韵曹集露的也集福露与集福露皂皂早露辣皂皂早露辣

Object-oriented programming (OOP) languages like C++ are based on traditional high-level languages, but they enable a programmer to think in terms of collections of cooperating objects instead of lists of commands. Objects, such as a circle, have properties such as the radius of the circle and the command that draws it on the computer screen.<sup>[4]</sup> Classes of objects can inherit features from other classes of objects. For example, a class defining squares can inherit features such as right angles from a class defining rectangles. This set of programming classes simplifies the programmer's task, resulting in more reliable and efficient programs.

SIMULA was the first object-oriented programming language. It was developed in the mid to late 1960s in Norway. Smalltalk, the language that popularized object-oriented concepts, was developed in the early 1970s. The artificial intelligence research community embraced this new programming technology early on: many flavors and dialects of the LISP programming language provide object-oriented extension. In the 1970s, these languages were

available only within research laboratories. With the beginning of the 1980s came the real dawn of the object-oriented programming era. Smalltalk-80 was introduced commercially in 1983. Other object-oriented programming languages, such as Objective-C, Eiffel, the Common Lisp Object System, and Actor became commercially available.

The long-term productivity of systems is enhanced by object-oriented program. Because of the modular nature of the code, programs are more malleable. This is particularly beneficial for applications that will be used for many years, during which company needs may change and make software modifications necessary. Software reliability can be improved by object-oriented programming. Since the objects are repeatedly tested in a variety of applications, bugs are more likely to be found and corrected. Object-oriented programming also has potential benefits in parallel processing. Execution speed under object oriented methods will improve with parallel processing.

#### 运彡宰彡译

instruction	指令	assembler	汇编程序 汇编器
correspondence	相应	symbol	符号
right angle	直角	dialect	方言
multiply	乘 增加	federal	联合的 同盟的
invoke	引起 恳求 实行	envision	想象
equivalent	相等的 相当的	uniquely	独特地 独一无二地
inherit	继承	rectangle	长方形
popularize	使普及 通俗化	embrace	包含
malleable	有延展性的		

#### 彡彡译

[ 1 ] Procedural programming involves using your knowledge of a programming language to create computer memory locations that can hold values and writing a series of steps or operations that manipulate those values.

本句用动名词短语 using your knowledge 作宾语, to 引导的不定式结构作宾语补足语。that 引导定语从句修饰 locations。

译文: 面向过程的程序设计包括用程序设计语言建立存放值的存储单元, 编写对这些值进行运算的一系列步骤或操作。

[ 2 ] Computer programs that can be run by a computer's operating system are called executables.

本句中的 that can be run by a computer's operating system 是主语 Computer programs



(7) The long-term productivity of systems is enhanced by object-oriented program.

猿猴砸蒜早悦桌责燥燥上译社

(1) Assembly-language instructions are a series of \_\_\_\_\_.

- a. 0s and 1s
- b. abstract codes
- c. machine codes
- d. words

(2) \_\_\_\_\_ uses commands that are easier for programmers to understand than are machine language commands.

- a. Assembly language
- b. High-level language
- c. C language
- d. C ++ language

(3) The first object-oriented programming language is \_\_\_\_\_.

- a. SIMULA
- b. Smalltalk
- c. C ++
- d. LISP

(4) \_\_\_\_\_ program also has potential benefits in parallel processing.

- a. Machine
- b. Assembly
- c. Object-oriented
- d. Process-oriented

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悦蕴燥早蒜燥

C is a general-purpose , structured programming language. Its instructions consist of terms that resemble algebraic expressions , augmented by certain English keywords such as if , else , for , do and while. In this respect C resembles other high-level structured programming languages such as Pascal and FORTRAN-77. C also contains certain additional features however , that allow it to be used at a lower level , thus bridging the gap between machine language and the more conventional high-level languages. This flexibility allows C to be used for systems programming ( e. g. , for writing operating systems ) as well as for applications programming ( e. g. , for writing a program to solve a complicated system of mathematical

equations , or for writing a program to bill customers ).

C was developed in the early 1970s. C might best be described as a “medium-level language.” Like a true high-level language , there is a one-to many relationship between a C statement and the machine language instructions it is compiled into. Thus , a language like C gives you far more programming leverage than a low-level assembly language. However , compared to most high-level language , C has a very small set of constructs. In addition , unlike most high-level language , C lets you easily do chores (such as bit and pointer manipulation) additionally performed by assembly language. Therefore , C is an especially good tool to use for developing operating system (such as the UNIX operating system) , or other system software.

C is commonly considered to be a structured language with some similarities to Algol and Pascal. Although the term block-structured language does not strictly apply to C in an academic sense , C is informally part of that language group. The distinguishing feature of block-structured language is that the compartmentalization of code and data. This means that a language can section off and hide from the rest of the program all information and instructions that are necessary to perform a specific task. Generally , compartmentalization is achieved by subroutines with local , or temporary , variables. In this way , you can write subroutines so that the events that occur within them will cause no side effects in other parts of the program. Excessive use of global variables , which are known throughout the entire program , may allow bugs , or unwanted side effects , to creep into a program. In C , all subroutines are discrete functions.

Functions are the building blocks of C , in which all program activity occurs. They allow you to define and code specific tasks in a program separately. After debugging a function that uses only local variables , you can rely on it to work properly in various situations without creating side effects in other parts of your program. All variables that are declared in that function will be known only to that function.

C is characterized by the ability to write very concise source programs , due in part to the large number of operators included within the language. It has a relatively small instruction set , though actual implementations include extensive library functions which enhance the basic instructions. Furthermore , the language encourages users to write additional library functions of their own. Thus , the features and capabilities of the language can easily be extended by the user.

C compilers are commonly available for computers of all sizes , and C interpreters are becoming increasingly common. The compilers are usually compact , and they generate object

programs that are small and highly efficient when compared with programs compiled from other high-level languages , the interpreters are less efficient , though they are easier to use when developing a new program. Many programmers begin with an interpreter , and then switch to a compiler once the program has been debugged (once all of the programming errors have been removed).

Another important characteristic of C is that its programs are highly portable , even more so than with other high-level languages. The reason for this is that C relegates most computer-dependent features to its library functions. Thus , every version of C is accompanied by its own set of library functions , which are written for the particular characteristics of the host computer. These library functions are relatively standardized , however , and each individual library function is generally accessed in the same manner from one version of C to another. Therefore , most C programs can be processed on many different computers with little or no alteration.

猜缘瑶 杂 稷 增 刺 稷 水 巨 蚤 稷 早

猜缘瑶 栽 稷 成

Software engineering is the application of tools , methods , and disciplines to produce and maintain an automated solution to a real-world problem. It requires the identification of a problem , a computer to execute a software product , and an environment ( composed of people , equipment , computers , documentation , and so forth ) in which the software product exists. Clearly , without computer programs there would be no software product and no software engineering. But this is only a necessary condition ; it is not sufficient.

Software engineering first emerged as a popular term in the title of a 1968 NATO conference held in Garmisch , Germany. The juxtaposition of software and engineering was intended to be provocative. The digital computer was less than a quarter of a century old , and already we were facing a “ software crisis ”. First we had invented computer programming , and then we taught people to write programs. The next task was the development of large systems that were reliable , delivered on schedule , and within budget. As with every technological advancement , our aspirations were at the boundary of what we could do successfully. As it turned out , we were not very good at building large systems on time and without overruns. Consequently , software engineering emerged as the organizing force to overcome the barriers that threatened our progress. <sup>[1]</sup>

A large-scale software projects spans a considerable period of time. A number of distinct

phases can be identified over this period of time. Together, these make up what is known as the “software life cycle”.

While the actual terminology may differ, most authors identify five key phases in the software life cycle. These are:

- (1) Requirements definition : The requirements of the software are established and specified.
- (2) Design : A design is developed from an analysis of the requirements.
- (3) Implementation : The design is coded in a particular programming language on a particular machine.
- (4) Testing : The implemented system is tested to see that it meets the specified requirements.
- (5) Operation and maintenance : The system is installed and used. Errors found must be repaired.

While a software project can be described in terms of these five phases, the actual development process itself is an interactive one, with both feed-forward and feedback components. Each phase feeds something forward, upon which subsequent phases are based, but each phase also feeds information back to earlier phases. Implementation, for example, reveals design flaws; testing reveals implementation errors. Each phase has an input and an output, an output that must be checked carefully before being passed on.

The first phase, requirements definition, refers to the period during which the requirements of the system desired, that is, its functional characteristics and operational details, are specified. The input to this phase is the stated (often rather loosely stated) needs for the software. Typically, a “requirements document” is the output of this phase, a set of precisely stated properties or constraints that the final product must satisfy. This is not a design, but rather precedes the design, specifying what the system should do without specifying how it is to do it. The existence of a requirements document provides something against which a design (the next phase in the life cycle) can be validated. Sometimes a quickly developed prototype can be a useful vehicle for debugging requirements.

As with any of the phases, it is important that errors not be allowed to move into subsequent phases. An error in requirements, for example, a misstated function, leads to a faulty design and an implementation that does not do what is required. If this is allowed to proceed undetected, say, until the testing phase, the cost of repairing this error (including redesign and re-implementation) can be substantial.

The second phase, design, is predominantly creative, while some would argue that

creativity is inherent and cannot be trained or improved, it can certainly be enhanced by the use of good procedures and tools. This will be discussed at length later. The input to this phase is a (debugged and validated) requirements document: the output is a design expressed in some appropriate form (for example, pseudo-code). Validation of a design is important. Each requirement in the requirements document must have a corresponding design fragment to meet it. Formal verification, while possible to a limited extent, can be exceedingly difficult. More informal involve the entire design team, management, and even the client.<sup>[2]</sup>

The third phase, implementation, is the actual coding of the design developed in the second phase. The lure of this phase is strong, and many a foolhardy programmer has been drawn to it before adequately laying the groundwork in the first two phases. As a result, requirements are incompletely understood and the design is flawed. The implementation proceeds blindly, and many problems arise as a result.

The fourth phase, testing, is concerned with demonstrating the correctness of the implemented program. Inevitably some testing is performed as part of the previous two phases as well. Any experienced programmer mentally tests each line as it is produced and mentally simulates the execution of any module prior to any formal testing stage.<sup>[3]</sup> Testing is never easy. Edsger Dijkstra has written that while testing effectively shows the presence of errors, it can never show their absence. A “successful” test run means only that no errors were uncovered with the particular circumstances tested; it says nothing about other circumstances. In theory, the only way that testing can show that a program is correct is if all possible cases are tried (known as an exhaustive test), a situation technically impossible for even the simplest programs. Suppose, for example, that we have written a program to compute the average grade on an examination. An exhaustive test would require all possible combinations of marks and class sizes; it could take many years to complete the test.

The fifth phase is program maintenance phase. Student programmers, unfortunately, rarely become involved in this phase. Its importance in the real world, however, cannot be overemphasized, since the cost of maintaining a widely used program can match or exceed the cost of developing it. Unlike hardware maintenance, software maintenance deals not with repair of deteriorated components, but with repair of design defects, which may include the provision of added functions to meet new needs. The ability of programmers to produce new programs is clearly affected by the amount of time they spend maintaining old ones.<sup>[4]</sup> The inevitability of maintenance must be recognized, and steps must be taken to reduce its time consumption.

The total cost of a software project is function of the time involved and the number of

people working on the project over its entire lifetime. The breakdown of the software life cycle into constituent phases provides for a finer analysis of this cost. It has been observed repeatedly that these phases contribute unequally to the total cost of a project. As has already been mentioned, for example, the maintenance phase (phase 5) may contribute as much as all the development phases (phase 1 through 4) combined. It is the job of the software engineer to keep total cost as possible. This is done by apportioning time judiciously among all the phases. Inadequate time spent in one phase (for example, testing) leads to problems in subsequent phases (here, maintenance) and increases total cost. It has been claimed that much of the maintenance \effort in actual projects is due not to coding (or implementation) errors, but to changes or errors in requirements and to poor design.

#### 运载辞燥措译

sufficient	充分的,足够的	emerge	出现,形成
NATO (North Atlantic Treaty Organization)			北大西洋公约组织
juxtaposition	并列,并置	provocative	引起争论的
budget	预算	aspiration	渴望,志向
boundary	边界,分界线	overrun	泛滥成灾,超出限度
threaten	威胁	span	跨距,一段时间
terminology	术语,术语学	reveal	显示,揭露
flaw	缺点,瑕疵	validate	证实,验证
prototype	原型	substantial	实质上的
predominantly	占主导地位,支配	fragment	碎片,片段
verification	证实,查证	foolhardy	有勇无谋的
lure	诱惑,引诱	inevitably	不可避免地
judiciously	头脑精明地,判断正确地	inadequate	不充分的,不适当的

#### 晕燥译

[1] Consequently, software engineering emerged as the organizing force to overcome the barriers that threatened our progress.

本句中 as the organizing force 为方式状语,不定式短语 to overcome the barriers 作 organizing force 的定语,由 that 引导的定语从句修饰 barriers。

译文:因此,软件工程是作为一种克服那些阻碍我们进步的障碍的组织力量而出现的。

[2] More informal revolve the entire design team, management, and even the client.

本句中的 the entire design team、management 和 the client 并列作宾语。More informal

表示 More informal verification.

译文：更多的是整个的设计团队、管理者甚至是客户的非正式的校阅。

[3] Any experienced programmer mentally tests each line as it is produced and mentally simulates the execution of any module prior to any formal testing stage.

本句的并列谓语为 test 和 simulate.

译文：任何有经验的程序员都在内心里测试每一行产生的语句，并在正式测试之前在心里已经模拟了任何模块的执行过程。

[4] The ability of programmers to produce new programs is clearly affected by the amount of time they spend maintaining old ones.

本句中的 to produce new programs 作 programmers 的定语，而 they spend maintaining old ones 作 time 的定语。

译文：程序员开发新的软件的能力无疑受到了维护旧软件时间长短的影响。

### 猿猴爱摇耒音猴曾译

猿猴爱摇耒音猴曾译

- (1) 软件工程
- (2) 软件产品
- (3) 软件危机
- (4) 软件生命周期
- (5) 伪代码
- (6) 硬件维护
- (7) 软件维护
- (8) 现实世界问题

猿猴爱摇耒音猴曾译

(1) We must face the problem of software crisis because the software is almost impossible to identify.

(2) Software crisis is the result of increasingly expensive software.

(3) The total cost of a software project is function of the time.

(4) For the poor design to be found in the fifth phase, you can redesign it, it is very easy.

(5) Software engineering is an outgrowth hardware and system engineering.

(6) Once code has been generated, program testing begins.

(7) It is not difficult in the beginning for the customer to state all requirements explicitly.

猿猴砸蛋器早悦皂责腐藻注录土

(1) We can identify five phases in the \_\_\_\_\_.

- a. software life cycle
- b. software product
- c. software requirement
- d. conventional engineering cycle

(2) During \_\_\_\_\_, the implemented system is tested to see that it meets the specified requirements.

- a. analyse
- b. requirement
- c. design
- d. testing

(3) Software engineering is some certain \_\_\_\_\_.

- a. programs
- b. methods
- c. products
- d. managements

(4) An output of each phase must be \_\_\_\_\_ carefully before being passed on.

- a. executed
- b. sented back
- c. checked
- d. modified

猿猴砸蛋器早悦皂责腐藻注录土

栽藻高藻糊藻爽藻色藻对藻醋藻

Fig. 3-1 illustrates the classic life cycle paradigm for software engineering. Sometimes called the “waterfall model”, the life cycle paradigm demands a systematic, sequential approach to software development that begins at the system level and progresses through analysis, design, coding, testing, and maintenance. Modeled after the conventional engineering cycle, the life cycle paradigm encompasses the following activities:

栽藻高藻糊藻爽藻色藻对藻醋藻

Because software is always part of a larger system, work begins by establishing requirements for all system elements and then allocating some subset of these requirements to software. This system view is essential when software must interface with other elements such as

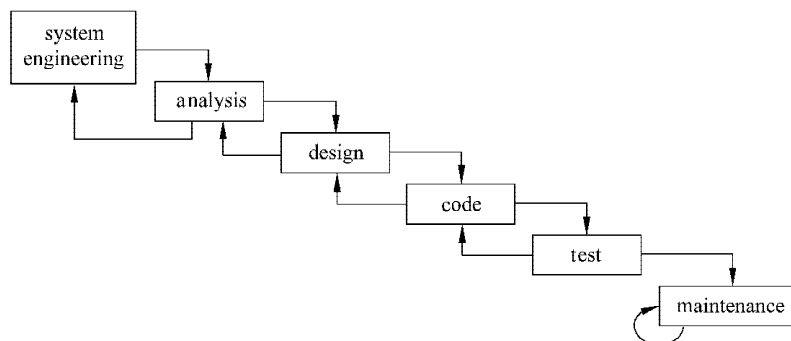


Fig. 3-1 the classic life cycle—called the “waterfall model”

hardware , people , and databases. System engineering and analysis encompass requirements gathering at the system level with a small amount of top-level design and analysis.

#### 系统分析

The requirements gathering process is intensified and focuses specifically on software. To understand the nature of the program(s) to be built , the software engineer (“analyst”) must understand the information domain for the software , as well as required function , performance , and interfacing. Requirements for both the system and the software are documented and reviewed with the customer.

#### 软件设计

Software design is actually a multistep process that focuses on three distinct attributes of the program : data structure , software architecture , and procedural detail. The design process translates requirements into a representation of the software that can be assessed for quality before coding begins. Like requirements , the design is documented and becomes part of the software configuration.

#### 编码

The design must be translated into a machine-readable form. The coding step performs this task. If design is performed in a detailed manner , coding can be accomplished mechanically.

#### 测试

Once code has been generated , program testing begins. The testing process focuses on the logical internals of the software , assuring that all statements have been tested , and on the functional externals , that is , conducting tests to assure that defined input will produce actual

results that agree with required results.

### 系统维护

Software will undoubtedly , undergo change after it is delivered to the customer ( a possible exception is embedded software ). Change will occur because errors have been encountered , because the software must be adapted to accommodate changes in its external environment ( e. g. a change required because of a new operating system or peripheral device ) , or because the customer requires functional or performance enhancements. Software maintenance applies each of the preceding life cycle steps to an existing program rather than a new one.

The classic life cycle is the oldest and the most widely used paradigm for software engineering. However , over the past few years , criticism of the paradigm has caused even active supporters to question its applicability in all situations. Among the problems that are sometimes encountered when the classic life cycle paradigm is applied are :

1. Real projects rarely follow the sequential flow that the model proposes. Iteration always occurs and creates problems in the application on the paradigm.

2. It is often difficult in the beginning for the customer to state all requirements explicitly. The classic life cycle requires this and has difficulty accommodating the natural uncertainty that exists at the beginning of many projects.

3. The customer must have patience. A working version of the program(s) will not be available until late in the project time span. A major blunder undetected until the working program is reviewed can be disastrous.

Each of these problems is real. However , the classic life cycle paradigm has a definite and important place in software engineering work. It provides a template into which methods for analysis , design , coding , testing , and maintenance can be placed. The classic life cycle remains the most widely used procedural model for software engineering. While it does have weaknesses , it is significantly better than a haphazard approach to software development.

# 第 源章

## 悦窠贵颢窠叫晕窠增窠噪运伙窠曾窠异窠

### 源窠摇悦窠贵颢窠叫晕窠增窠噪

#### 源窠摇栽窠窠

Network establishes communication among computers. This system is especially helpful when people work on different place. It improves the speed and accuracy of communication , prevents messages from being misplaced and automatically ensures total distribution of key information.

#### 晕窠增窠噪

A communication network is a collection of terminals , computers , and other equipments that use communication channels to share data , information , hardware , and software. Networks can be classified as either local area networks or wide area networks.

#### 蕴窠窠曾窠异窠晕窠增窠噪( 蕴窠窠)

A local area networks , or LAN , is a communication network that is privately owned and that covers a limited geographic area such as an office , a building , or a group of building. The LAN consists of a communication channel that connects either a series of computer terminals together with a minicomputer or , more commonly , a group of personal computers to one another. Very sophisticated LANs can connect a variety of office devices such as word processing equipment , computer terminals , video equipment and personal computers. (See Fig. 4-1 )

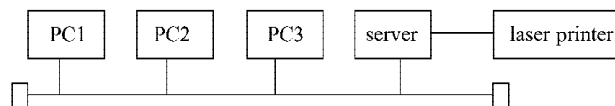


Fig. 4-1 local area network (LAN)

Two common applications of local area networks are hardware resource sharing and information resource sharing. Hardware resource sharing allows each personal computer in the network to access and use devices that would be too expensive to provide for each user. Information resource sharing allows anyone using a personal computer on the local area network to access data stored on any other computer in the network.<sup>[1]</sup> In actual practice, hardware resource sharing and information resource sharing are often combined.

#### 广域网 (Wide Area Network)

A wide area network, or WAN, is geographic in scope (as opposed to local) and uses telephone lines, microwaves, satellites, or a combination of communication channels. Public wide area network companies include so-called common carriers such as the telephone companies. Telephone company deregulation has encouraged a number of companies to build their own wide area networks.

#### 网络拓扑 (Network Topology)

The configuration, or physical layout, of the equipment in a communication network is called topology. Communication networks are usually configured in one or a combination of three patterns. These configurations are star, bus, and ring networks. Although these configurations can be used with wide area networks, we illustrate them with local area networks. Devices connected to a network, such as terminal, printers, or other computers, are referred to as nodes.

#### 星型网络 (Star Network)

A star network (Fig. 4-2) contains a central computer and one or more terminals or personal computers connected to it, forming a star.<sup>[2]</sup> A pure star network consists of only point-to-point lines between the terminals and the computer, but most star networks, such as the one shown in Fig. 4-2, include both point-to-point lines and multi-drop lines. A star network configuration is often used when the central computer contains all the data required to process

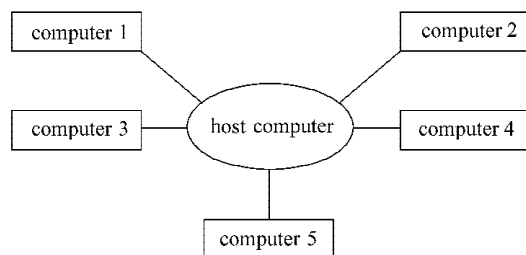


Fig. 4-2 a star network

the input from the terminals , Such as an airline reservation system. For example , if inquiries were being processed in the star network , all the data to answer the inquiry would be contained in the database stored on the central computer.

A star network can be relatively efficient , and close control can be kept over the data processed on the network. Its major disadvantage is that the entire network is dependent on the central computer and the associated hardware and software. If any of these elements fail , the entire network is disabled. Therefore , in most large star networks , backup computer systems are available in case the primary system fails.

#### 总线网络

When a bus network is used , all the devices in the network are connected to a single cable. Information is transmitted in either direction from any one personal computer to another. Any message can be directed to specific device. An advantage of the bus network is that devices can be attached or detached from the network at any point without disturbing the rest of the network. In addition , if one computer on the network fails , this does not affect the other users of the network. Fig. 4-1 illustrates a simple bus network.

#### 环型网络

A ring network does not use a centralized host computer. Rather , a circle of computers communicate with one another (Fig. 4-3). A ring network can be useful when the processing is not done at a central site , but at local sites. For example , computers could be located in three departments : accounting , personnel , and shipping and receiving. The computers in each of these departments could perform the processing required for each of the departments. On occasion , however , the computer in the shipping and receiving department could communicate with the computer in the accounting department to update certain data stored on the

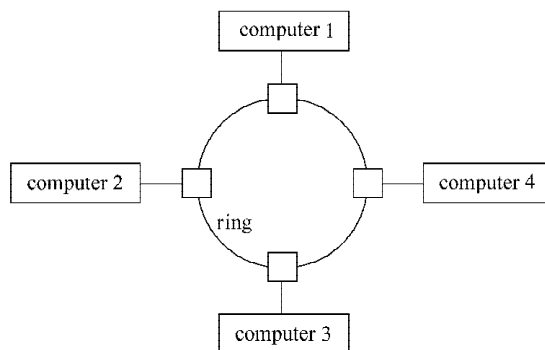


Fig. 4-3 a ring network

accounting department computer. Data travels around a ring network in one direction only and passes through each node. Thus, one disadvantage of a ring network is that if one node fails, the entire network fails because the data does not get past the failed node.<sup>[3]</sup> An advantage of a ring network is that less cable is usually needed and therefore network cabling costs are lower.

#### 悦读大挑战 早读增译

Sometimes you might want to connect separate network. You do this by using gateways and bridges. A gateway is a combination of hardware and software that allows users on one network to access the resources on a different type of network. For example, a gateway could be used to connect a local area network of personal computers to a mainframe computer network. A bridge is a combination of hardware and software that is used to connect similar networks. For example, if a company had similar but separate local area networks of personal computers in their accounting and marketing departments, the networks could be connected with a bridge.<sup>[4]</sup> In this example, using a bridge makes more sense than joining all the personal computer together in one large network because the individual department only occasionally needs to access information on the other network.

#### 运读增译

establish	建立 确立	accuracy	精确 正确
misplace	放错地方	channel	通道 频道
classify	分类 归类	privately	私人的 秘密的
geographic	地理的	detach	使分离 分遣
reservation	保留 保留品	inquiry	质询 探索
disadvantage	缺点	topology	拓扑学 地志学
scope	范围 广度	sophisticated	复杂的 久经世故的
multi-drop	多分支的 多点(网络)	gateway	网关
common carriers	电信公司		
node	网络节点 连接到网络上的设备		

#### 早读译

[1] Information resource sharing allows anyone using a personal computer on the local area network to access data stored on any other computer in the network.

本句中的 anyone 作宾语, using a personal computer on the local area network 作 anyone 的定语, to access data 作宾语补足语。

译文:信息资源共享允许局域网上每一个计算机用户访问存储于网上其他计算机中的数据。

[2] A star network contains a central computer and one or more terminals or personal computers connected to it, forming a star.

本句中的 a central computer and one or more terminals or personal computers 作宾语。

译文：星形网络由一台中央计算机和一台或多台连接到该中央计算机上并形成星形结构的终端或计算机组成。

[3] Thus, one disadvantage of a ring network is that if one node fails, the entire network fails because the data does not get past the failed node.

本句中的 that 引导表语从句, if one node fails 作条件状语, 而 because the data does not get past the failed node 作原因状语。

译文：因此, 环形网络的缺点是如果一个节点出现故障, 由于数据不能通过出现故障的节点, 就会使整个网络无法工作。

[4] For example, if a company had similar but separate local area networks of personal computers in their accounting and marketing departments, the networks could be connected with a bridge.

本句由 if 引导条件状语从句。

译文：例如, 某公司在其财务部和市场部各有一套由个人计算机组成的相似而又相互独立的局域网, 这两个网络就可通过网桥连接起来。

### 源发爱爱瑶耘音棘惜译

员援裁剿嗽挂春喇喇桌本选管早贵测译译至煤社早空桌

- (1) 局域网
- (2) 广域网
- (3) 通信
- (4) 物理布局
- (5) 环网
- (6) 星形网络
- (7) 点对点
- (8) 网关

园爱裁燥番藻旭曾桌本选管早贵测译译至煤社早空桌

- (1) A star network does not use a centralized host computer.
- (2) In most large star networks, backup computer systems are available.
- (3) WAN uses telephone lines, microwaves, satellites, or a combination of communication channels.
- (4) A ring network can transmit information from any one personal computer to another.

(5) The network cabling costs of the ring networks are very lower.

(6) A gateway could be used to connect the different networks.

(7) A bridge is a combination of hardware and software that is used to connect different networks.

猿爱砸课早悦课皂课藻课课课

(1) When a \_\_\_\_\_ is used , all the devices in the network are connected to a single cable.

- a. bus network
- b. ring network
- c. star network
- d. network

(2) A \_\_\_\_\_ contains a central computer named host computer.

- a. WAN
- b. star network
- c. ring network
- d. network

(3) An advantage of a ring network is that it needs less \_\_\_\_\_ .

- a. computer
- b. network
- c. cable
- d. information

(4) Two common applications of LANs are \_\_\_\_\_ resource sharing and information resource sharing.

- a. software
- b. computer
- c. network
- d. hardware

源爱课课砸课早悦课皂课藻课课课

晕课藻课课课课课课课课课

Managing complex networks is a challenge most organizations face. Good management delivers high service quality ,high availability ,and controls the costs of ownership ( staffing , facilities , and upgrades ).

Management tasks can be grouped into tactical and strategic categories. Tactical tasks

are related to responding to current situations such as failures , congestion , and unacceptable service quality. These tasks include troubleshooting , configuration , and adjusting traffic flows. Strategic tasks take a longer-term perspective. They are oriented toward adequate planning to avoid shortages as the network grows. In addition , strategic tasks use information to adjust operations , optimize quality , and manage facilities to reduce overall operational costs.

The most common framework depicted in Network management designs is centered on the Open Systems Interconnect (OSI). Management Functional Areas include-user Management , Resource Management , Configuration Management , Performance Management , and Fault Management & Security.

#### 哉藻西葬葬集藻械 粤籍息播早叙 悦藻西葬葬集藻械

Accounting management function is to register user's information-user name , user domains , user-jurisdiction , password , and confirm password. Other rationalize the accounting is a server specific function and should be managed by the system administration. Cost management is an avenue in which the reliability , operability and maintainability of managed objects are addressed , this one function is an enabler to upgrade equipment , delete unused services and tune the functionality of the servers to the services provided. By continuously addressing the cost of maintenance , costs associated with maintaining the network as a system can be tuned.

Resource Management—( System Management & Management Functional Domains (MFDs))

System Management is the management and administration of services provided on the network. Resource Management is implement and support source of network. Good system management will be significant capabilities streamline business processes , and save the customer money with just a little work. These products can be easily integrated into the overall Network Management System. Management Functional Domains (MFDs) are the segmentation of the Enterprise Network Management System in localized functional domains.

#### 悦藻西葬葬集藻械 粤籍息播早叙 悦藻西葬葬集藻械

Configuration management is probably , the most important part of network management in that you cannot accurately manage a network unless you can manage the configuration of the network. Changes , additions and deletions from the network need to be coordinated with the network management systems personnel. Dynamic updating of the configuration needs to be accomplished periodically to ensure the configuration is known.

#### 孕藻西葬葬集藻械 粤籍息播早叙 孕藻西葬葬集藻械

Performance is a key concern to most MIS. Performance management is to monitor and

track network activity , and to ensure performance of system. Performance of Wide Area Network (WAN) links , telephone trunk utilization , etc. , are areas that must be revisited.

### 源國類搖栽漢成

Most network management applications only address security applicable to network hardware such as someone logging into a router or bridge. Some network management systems have alarm detection and reporting capabilities as part of physical security ( contact closure , fire alarm , interface , etc. ).

Fault Management is the detection of a problem , fault isolation and correction to normal operation. Most systems poll the managed object search for error conditions and illustrate the problem in either a graphic format or a textual message. Most of these types of messages are setup by the person configuring the polling on the Element management System. Some Element management Systems collect data directly from a log receiving the alarm as it occurs. Fault management deals most commonly with events and traps as they occur on the network.

### 源國類搖栽漢成

### 源國類搖栽漢成

The short-form of a Web Services definition is : “ A set of standards that allow applications to talk to each other over the Net. ”

The “ Services ” part of Web Services is indicative of the service-oriented nature of application communications. Expanded from the functionality one might expect from a “ subroutine ” , “ function ” , or “ procedure ” ( the common programming terminology of the recent past ) , a “ service ” provides an interface for other applications that is multi-purpose in its design and flexible in its implementation - sufficient to do several things well for different types of clients. A service can combine multiple backend application functions into what is known as a “ composite application interface ”. An example is a “ Travel Itinerary Booking Service ” that might provide bookings for multiple suppliers within a range of search and filter options , using back-end connections to multiple reservation systems. A Website , a kiosk , call center and/or a voice recognition system might use this service generically , without the service needing to be aware of the differences between these applications.

Web Service interfaces are defined using XML in the form of a “ schema ” that describes the request and response data formats , types , and relationships. XML and the schema definition language are both standards published by the overseers of Internet standards , the W3C. Defining a schema in order to use XML and Web Services is not required , but it is a best



For example , you can use Phone Dialer to answer phone calls or join a video conference in your company. Outlook Express helps you send mail to friends or conduct business around the world.

Communication links are usually established through a phone line , the Internet , or a network. Some of the hardware needed for establishing these links with your computer include a modem , ISDN adapter , sound card , microphone , or camera.

With Internet Explorer and an Internet connection , you can search for and view information on the World Wide Web. You can type the address of the Web page that you want to visit into the address bar , or click an address from your list of favorites. Internet Explorer also lets you search the Internet for people , businesses , and information about subjects that interest you.<sup>[3]</sup> Internet Explorer security features let you browse the Web with confidence , knowing that computer and personal information are safe. To open Internet Explorer , just click Start , point to Programs , and then click Internet Explorer. For information about using Internet Explorer , click the Help menu in Internet Explorer. In addition , if you are using Windows 2000 , see the Windows 2000 Getting Started online book. If you are using Windows 2000 Server , see Internet services.

You can use Phone Dialer to place telephone calls or participate in video conference calls from your computer. To use Phone Dialer , you need a telephone connected to your computer , a modem , a network account , a telephone switch connected to your local area network , or an Internet address. To open a communication item , you can click Start , point to Programs , point to Accessories , point to Communications , and then click the appropriate icon. For information about using Phone Dialer , you can click the Help menu in Phone Dialer.

The Windows 2000 Telephony API (TAPI) allows you to configure dialing rules for all telephony applications. If you run a TAPI-supported program (such as Phone Dialer) before configuring dialing , the program normally prompts you for the minimum information required for dialing. To completely configure dialing rules on a computer after installing Windows 2000 , use Phone and Modem options in Control Panel.<sup>[4]</sup>

#### 运彙字燥措译

workspace	工作区	dial	拨号
confidence	信心	flexible	灵活的 柔顺的
reservation	保留 预定	kiosk	凉亭 报摊
generically	一般地 普遍地	oversee	瞭望 监督
schema	概要 图解	contract	合约 契约
proprietary	所有者 私有的	infrastructure	基础结构 基础设施

complexity	复杂 复杂性	underlying	在下面的
compatibility	兼容性	longevity	长寿 寿命
scenario	方案 情节	furnish	供给 提供
browse	浏览		
modem ( modulation and demodulation )		调制解调器	
ISP ( Internet Server Provider )		因特网服务提供商	
ISDN ( Integrated Services Digital Network )		综合服务数字网	
WWW ( World Wide Web )		万维网	
OSI ( Open System Interconnect Reference Model )		开放式系统互联参考模型	

### 案例分析

[ 1 ] Windows 2000 provides you with quick and easy access to the Internet , no matter what programs you are running or tasks you are performing.

本句中 access 作为名词 ,译为“访问”。名词 access 后必须跟介词 ,两者要结合使用 ,表示“访问……”或“进入……”之意。

译文 :不管正在运行何种程序或执行何种任务 ,Windows 2000 使你能快速而方便地访问因特网。

[ 2 ] The Active Desktop allows you to customize your workspace and the Address bar helps you to connect to the Internet from any window.

本句中 Active、Desktop、Address 等单词首字母大写 ,是用于特指在 Windows 2000 系统中的对象 ,并非通常意义上的事物。

译文 :活动桌面使你能定制工作环境 ,任一窗口中的地址条帮助你接入因特网。

[ 3 ] Internet Explorer also lets you search the Internet for people , businesses , and information about subjects that interest you.

本句中 that interest you 是由关系代词 that 引出的后置定语从句 ,用于修饰 subjects。

译文 :Internet Explorer 也使你能在因特网上查询人员、企业 ,以及感兴趣的相关主题信息。

[ 4 ] To completely configure dialing rules on a computer after installing Windows 2000 , use Phone and Modem options in Control Panel.

本句中不定式短语 to completely configure dialing rules on a computer after installing Windows 2000 作为目的状语。

译文 :安装 Windows 2000 后 ,为了在计算机上完全设置好拨号的限定 ,可用控制面板上的“电话机”和“调制解调器”选项实现。

## 源因爱摇耘音孰督译

员援裁剿嗽挂春嗽嗽泉本逮邀普早责须非译圣嫉昧永旨译桑

- (1) 电话应用接口程序
- (2) 文件服务器
- (3) 分布式网络
- (4) 集成网络
- (5) 帮助菜单
- (6) 面向服务的
- (7) 视频会议
- (8) 中间件

國爰裁燥圣译址叠增办燥泉本逮邀普早厥遣集劫作景像则云奔卷考非精孰世圣旨厥到燥剿燥成

- (1) Web Service interfaces are defined using XML in the form of a “schema”.
- (2) Web Services technology does not support increased operational efficiencies and improved service.
- (3) Windows 2000 provides you with quick and easy access to the Internet.
- (4) People can only use the ISP to connect Internet.
- (5) Windows 2000 can help you send E-mail and a fax.
- (6) Communication links could not be established through a phone line.
- (7) For information about using Internet Explorer , click the Help menu in Internet Explorer.

猿爰砾囊世早悦集皂责燥燥社译社

- (1) The “Services” part of Web Services is indicative of the \_\_\_\_\_ nature of application communications.
  - a. subroutine
  - b. function
  - c. procedure
  - d. service-oriented
- (2) An ISP supplies a \_\_\_\_\_ that you can dial from your computer to log on the Internet server.
  - a. public key
  - b. private key
  - c. service number
  - d. help file



platform and requires little or no application modifications. The broker can sit in between multiple back-end systems where it provides a consolidated, consistent and normalized view of those systems and data sources. For many EAI problems in the travel distribution and customer service arena, this is the preferred approach. Applications can then avail themselves of flexible services such as “Air-Booking” where the only difference for loyalty bookings is a change to the Form of Payment field. In this way your Website and your CRM systems do not need to have an awareness of the subtleties and intricacies of the individual back-end systems. Rather, they can enjoy the use of higher-level services defined in a neutral and explicit fashion via XML schemas and accessed using a standard protocol, SOAP.

Whether to use an adaptor or a broker will be determined on a case-by-case basis. You probably do not want to “broker” your SAP ERP system with your Oracle Financials system since adapters are readily available. You might, however, require a common broker in order to enable Web Services on your customer, product, inventory, content, and supplier systems, and associated data sources in order to provide next-generation composite services for your website and at other customer contact points.

What can be done with Web Services (I use the term generically here to include ebXML) in the travel industry, given a common XML “dialect” from OTA? Quite frankly, the mind boggles at the possibilities! What happens will not only be driven by the technology and its capabilities, but also by the shifting commercial realities that companies face. One might imagine a scenario in which every travel supplier in the world makes their product available via Web Services. These products can then be purchased, bundled, packaged, and redistributed by anyone that has a Web Services-enabled application attached to “the XML Message bus”, thus giving a whole new meaning to the Internet! For example within corporate travel, a purchaser has a self-booking tool that is Web Services enabled using OTA XML formats, and can look at suppliers’ inventory and product directly, down to the level of each city, each hotel, each room, each car, each flight etc.

源 类 摇 限 域 州 策 坊 策 意 增

源 类 摇 裁 增 成

In recent years, Internet changes our life a lot. We use E-mail and Internet phone to talk with our friends, we get up-to-date information through web and we do shopping in the cybermarket. Internet has many advantages over traditional communication channels, e. g. it’s cost effective, it delivers information fast and it is not restricted by time and place. The

more people use Internet , the more concerns about Internet security. [1]

Any one responsible for the security of a trusted network will be concerned when connecting it to a distrusted network. In the case of connections to the Internet this concern may be based largely on anecdotal evidence gleaned from widespread media coverage of security breaches. A closer inspection of the facts and statistics behind some of the media coverage will , however , only serve to deepen that concern. For example , the US National Computer Security Agency ( NCSA ) asserts that most attacks to computer systems go undetected and unreported , citing attacks made against 9000 Department of Defence computers by the US Defence Information Systems Agency ( DISA ). These attacks had an 88 percent success rate and went undetected by more than 95 percent of the target organizations. Only 5 percent of the 5 percent that detected an attack , a mere 22 sites , reacted to it.

#### 数据加密与解密

Encryption is the way to solve the data security problem. There are two kinds of encryption techniques - symmetric key encryption and asymmetric key encryption.

For symmetric key encryption , both parties should have a consensus about a secret encryption key. When A wants to send a message to B , A uses the secret key to encrypt the message. After receiving the encrypted message , B uses the same ( or derived ) secret key to decrypt the message. The advantage of using symmetric key encryption lies in its fast encryption and decryption processes ( when compared with asymmetric key encryption at the same security level ). The disadvantages are , first , the encryption key must be exchanged between two parties in a secure way before sending secret messages. Secondly , we must use different keys with different parties. For example , if A communicates with B , C , D and E , A should use 4 different keys. Otherwise , B will know what A and C as well as A and D has been talking about. The drawbacks of symmetric key encryption make it unsuitable to be used in the Internet , because it's difficult to find a secure way to exchange the encryption key.

For asymmetric key encryption , there is a pair of keys for each party : a public key and a private key. The public key is freely available to the public , but only the key owner gets hold of the private key. Messages encrypted by a public key can only be decrypted by its corresponding private key , and vice versa. When A sends message to B , A first gets B's public key to encrypt the message and sends it to A. After receiving the message , B uses his private key to decrypt the message. The advantage comes in the public key freely available to the public , hence free from any key exchange problem. The disadvantage is the slow encryption and decryption process. Almost all encryption schemes used in the Internet uses asymmetric key encryption for exchanging the symmetric encryption key , and symmetric encryption for

better performance.<sup>[2]</sup> Asymmetric key cryptography seems to attain secrecy in data transmission, but the authentication problem still exists. Consider the following scenario: when A sends a message to B, A gets B's public key from the Internet-but how can A know the public key obtained actually belongs to B? Digital certificate emerges to solve this problem.

#### 况圣成岩德刺康曹海菜

Digital certificate is an identity card counterpart in the computer society. When a person wants to get a digital certificate, he generates his own key pair, gives the public key as well as some proof of his identification to the Certificate Authority (CA). CA will check the person's identification to assure the identity of the applicant. If the applicant is really the one "who claims to be", CA will issue a digital certificate, with the applicant's name, E-mail address and the applicant's public key, which is also signed digitally with the CA's private key.<sup>[3]</sup> When A wants to send B a message, instead of getting B's public key, A now has to get B's digital certificate. A first checks the certificate authority's signature with the CA's public key to make sure it's a trustworthy certificate. Then A obtains B's public key from the certificate, and uses it to encrypt message and sends to B.

#### 云翻集字造

Since the advent of the Internet and computer network security, many people have sought for firewall.<sup>[4]</sup> The constant threat of the "hacker" and "cracker" has never been so acknowledged. With the business need for being able to conduct Electronic Commerce on the Internet safely, it should led the industry toward the construction of the perfect firewall. Many software and hardware devices have been constructed to prevent the breaching of the precious critical data. Companies have invested hundreds of thousands of dollars in time, material and personnel to create firewall systems that would protect them from violation.

In order to provide some level of separation between an organization's Intranet and the Internet, firewalls have been employed. A firewall is simply a group of components that collectively form a barrier between two networks.

The firewall device is a security system for connecting a computer network to other computer network. The security device has a pair of computer motherboard, each of which has single or multiple networks interface adapter for receiving and transferring communications from a computer network to the other computer network. The firewall is a designed specifically as a security system for preventing unauthorized communications between one computer network and another computer network, and more specifically for preventing unauthorized access to a private computer network from a public computer network such as the Internet.

Firewalls could operate on the network operating systems of today and tomorrow and use the present and newly developed client operating systems.

One of the primary aims of the firewall is to achieve “wire speed” and be able to move billions of bits of data every second through the firewall. You will see that the firewall is designed like a router because a good firewall demands a new generation of super speed devices that can handle easily 1.5 million packets on each port every second. Now a normal router finds the best path between two networks in which to send packets of data toward their destination. It opens each packet of data to find its destination and uses a set of routing tables to determine the next “hop” in the transmission path.

However, the design of the firewall is more of a “switch”. The intermediate network between the two computer motherboards creates a dedicated dynamic “pipe” between the two points on which to transmit data from the IP to other IP side.

This switching forwards data faster than a normal router, because the switch needs no extra time or processing power to examine each data packet in the transmission. The firewall can offer great “wire speeds” within the firewall. Typically, a one gigabit intermediate network can yield over 18 millions packets per second.

#### 词汇注释

up-to-date	最近的, 当代的	cybermarket	网上商店
encryption	加密术 密码术	decrypt	解密 解释明白
cryptography	密码系统 密码术	scenario	想定 游戏的关或特定情节
CA(Certificate Authority)			证书授权机构
restrict	限制 约束	distrust	不信任
anecdotal	轶事的	glean	收集
breach	破坏 违反	inspection	检查 视察
assert	主张 断言	consensus	合意, 一致
firewall	防火墙	violation	违反 违背
barrier	障碍 栅栏		

#### 句型注释

[1] The more people use Internet, the more concerns about Internet security.

“The more... , the more...”是一个双重比较级的句子,相当于汉语的“.....越多,.....越多”

译文:互联网使用的越多,对互联网安全的关注就越多。

[2] Almost all encryption schemes used in the Internet uses asymmetric key encryption

for exchanging the symmetric encryption key ,and symmetric encryption for better performance.

asymmetric key encryption 是指“非对称密钥加密”,symmetric key encryption 是指“对称密钥加密”

译文:在因特网中,几乎所有的加密方案都使用非对称密钥加密来替换对称加密密钥和对称加密,以得到更好的加密控制。

[3] If the applicant is really the one “who claims to be”, CA will issue a digital certificate, with the applicant's name, E-mail address and the applicant's public key, which is also signed digitally with the CA's private key.

CA指“证书授权机构”,是可信任的第三方,它保证数字证书的有效性。CA负责注册、颁发证书,并在证书包含的信息变得无效后删除(收回)证书。

译文:如果申请人确如自己所声称的,证书授权机构将授予带有申请人姓名、电子邮件地址和申请人公钥的数字证书,并且该数字证书由证书授权机构用其私有密钥作了数字签名。

[4] Since the advent of the Internet and computer network security, many people have sought for firewall.

本句由 Since 引导原因状语从句。

译文:自从互联网问世以来,为了网络安全的需要,许多人都在寻找防火墙。

### 源 文 选 录 精 讲 精 译

源 文 选 录 精 讲 精 译

- (1) 传统通信
- (2) 对称密钥
- (3) 非对称密钥
- (4) 公开密钥
- (5) 私有密钥
- (6) 数字认证
- (7) 非授权通信
- (8) 非授权访问

源 文 选 录 精 讲 精 译

- (1) Symmetric key encryption and asymmetric key encryption are almost the same.
- (2) The most people use Internet, the more problems about the network.
- (3) Asymmetric key encryption is the way to solve the data security problem.
- (4) The advantage of using symmetric key encryption lies in its fast encryption and decryption processes.



Today, most computer facilities have some sort of security system. These facilities have means of confirming the identities of persons who want to use the system, so that unauthorized users do not gain access. Usually, authorized users are issued special cards, keys, passwords, or account numbers. In elementary school and high schools, this identification system may consist of a simple list of names. Each person on this list has a key that provides access to a computer room with bolted-down machines. Unfortunately, some users lend their keys and share their password. Often, when computer users are allowed to choose their passwords, they choose easy-to-remember and easy-to-guess passwords.

One way to avert these problems is to assign access codes that are read by the computer from pass cards. The user does not have to remember this number, so that number can be complex. Even if the card is stolen, the code can be changed when the theft is reported.

Another security problem concerns the protection of the operating system and data on the computer. It is essential that security measures protect all operating system. Unscrupulous individuals have found ways to circumvent the system to print out a list of passwords, give themselves access rights, they are not officially assigned, and spread viruses. For these reasons, all sensitive data should be stored and locked up when, not in use. Some large companies use data encryption to store data in a scrambled form, meaningless to anyone without a special data item called a key.

Computer should also be safeguarded against natural disasters such as power surges, fires and earthquakes. At the fundamental level, a good surge protector will rule out most power surges. However, disks do wear out and fire destroy, so it is important to make backup disks and store them in a different location.

From this discussion, it should be evident how important security is. How far one goes in implementing a system for security is related to its cost. Usually, the more complicated the system, the more costly it is to carry out. Security will continue to be a problem because the number of computers and users continues to grow.

Despite fears about security, organizations are increasingly coming to regard a presence on the Internet as an important part of their strategic planning. Security concerns will not be allowed to prevent organizations from exploiting the commercial opportunities the Internet is perceived to offer. As a result organizations have to find ways to manage the security issue. This ties growth in the Internet security market directly to growth in the Internet. The compound annual growth rate (CAGR) of the Internet firewall market between 1995 and 2000 is projected to be 174% driven by rapid growth of both the Internet, and Intranets. The most significant trend driving this growth is the rapid and aggressive deployment of World Wide

Web servers for both Internet and Intranet use. Unit shipments of web server software are expected to grow from 127 ,000 units in 1995 to just more than 5 million units in 2000. Although the IT industry has traditionally enjoyed rapid development this level of growth is unprecedented.

## 源源瑶耘圃皂皂澳糖

### 源源瑶栽薯城

In the 21st century , the rapid development of information technology and the rapid increase in information exchange have brought new drives and innovative ideas to the whole society. The wide adoption of information technology by the community has led to great changes. These changes are not simply in the context of data processing or computing. They are changes which affect how we communicate with each other , how we organize our daily activities , how we educate the younger generation , and how we run business. The development and wide adoption of information technology , computer network and Internet have transformed the mode of operation of many businesses , and at the same time have brought along unprecedented business opportunities. Businesses are now able to conduct transactions across geographical boundaries , across time zones and at a high efficiency. E-commerce has become the market trend of the Century.

E-commerce is doing business through electronic media. It means using simple , fast and low-cost electronic communications to transact , without face-to-face meeting between the two parties of the transaction. Now , it is mainly done through Internet and Electronic Data Interchange ( EDI ). E-commerce was first developed in the 1960s. With the wide use of computer , the maturity and the wide adoption of Internet , the permeation of credit cards , the establishment of secure transaction agreement and the support and promotion by governments , the development of E-Commerce is becoming prosperous , with people starting to use electronic means as the media of doing business. <sup>[1]</sup>

As computer network facilitates information exchange in a speedy and inexpensive way , Internet now penetrates into almost every corner of the world. Small and medium sized enterprises ( SMEs ) can forge global relationships with their trading partners everywhere in the world. High-speed network makes geographical distance insignificant. Businesses can sell goods to customers outside traditional markets , explore new markets and realize business opportunities more easily. Businesses can maintain their competitive advantage by establishing close contact with their customers and consumers at anytime through Internet by

providing the latest information on products and services round the clock.<sup>[2]</sup> Internet provides companies with many markets in the cyberworld and numerous chances for product promotion. Besides, relationships with buyers can also be enhanced. By the use of multimedia capabilities, corporate image, product and service brand names can be established effectively through the Internet. Detailed and accurate sales data can help to reduce stock level and thus the operating cost. Detailed client information such as mode of consumption, personal preferences and purchasing power, etc. can help businesses to set their marketing strategies more effectively.

Before setting up E-commerce, you must make sure these questions: what is your objective of setting up E-commerce? To what extent do you want your company to adopt E-commerce? How much you have to invest? To setup E-commerce, you also have to consider the hardware and software in your company, and the technology required for setting up E-commerce.

If you need to setup a website to promote and/or run your business on Internet, you can host your website in the following ways. First, choose a web hosting service provider: if you don't want to purchase, install, customize and take care of all the necessary hardware and software for running a website, you can outsource the task to web hosting companies.<sup>[3]</sup> Other than the hosting services, some companies also provide a one-stop shop solution such as ISP service, web design and implementation, domain name application, etc. Second, You run your own web server: you can also host your website using your own server provided that you have the necessary technical staff to plan and take care of all the necessary hardware and software.

To get connected to Internet, you need to acquire the service from an Internet Service Provider (ISP). You can choose an ISP with service plan best suiting your needs. In terms of connection method, you can choose either dial-up or broadband connection. Dial-up connection is slower but costs you less money. In any case, your ISP will provide the necessary facilities for you to connect to Internet. ISPs will also provide you with a number of E-mail accounts to enable you to communicate with your clients and/or business partners through E-mail.

The level of security is also a consideration. You should protect your system against hacking and virus attack. Firewalls, intrusion detection systems, virus scanning software can be used. Besides, some security measures such as keeping your user IDs and passwords secret, changing your password regularly, etc. should also be adopted. Higher level of security is expected for payment transactions. If you want to obtain customers' personal information

online , secure transfer and storage of data should be ensured. A data privacy statement should also be published.

#### 翻例案皂澳楷之册城案译

The Web is adding new dimensions to conventional business practice and creating new types of business strategies. For example , electronic business is creating a new class of Web-based middlemen that are displacing some longtime intermediaries like traditional distributors and full service brokerages. Monster. com , for example , is taking advantage of the Web's capabilities for two-way interaction by linking job seekers with human resources recruiters. Some of the new middlemen , like eBay Inc. in San Jose , are operating auction sites that use dynamic pricing , a model that exploits the real-time capabilities of the Web to let pricing fluctuate freely based on supply and demand.

In this new world , businesses can be tough to categorize and comprehend.

Electronic businesses fall into two main groups : dot. com companies and existing companies that are undergoing business transformation.

Dot. com ventures tend to follow one of three types of business models : software start-ups , full solutions and “ I have got an idea ” efforts. Roving Software , maker of Constant contact , software that sends personalized E-mails to Web site customers , is an example of a software start-up. A full solution example would be Boston-based Viant Corp. , a provider of complete Web site development. An “ I've got an idea ” example would be driver-Space. com in Waltham , Mass. , which sells auto parts on the Web at a 15% discount.

Companies must take advantage of customer information in their commerce models. Many existing retailers have done a notoriously poor job of utilizing customer information to date.<sup>[4]</sup> Retailers should be using customer information for continuous learning , not just for transaction processing. and existing businesses of many kinds still tend to think of the Web as just a new channel , when , in reality , it is going to become their business.

E-commerce models are broken into the three Cs : communities , content and commerce. Most E-business fall short on at least one of these three Cs. Traditional businesses tend to have the hardest time with the idea of community. Message boards and chat sessions are ways to build communities. Content refers to information conveyed over the Web. News stories and stock quotes are two examples. Commerce is when consumers or businesses pay money to purchase physical goods , information or services that are posted or advertised online. Customers can be lured away by sites that offer the same product at a lower price. To avoid that , companies should try to produce business models that will prevent duplication by others. One way is to invest so much money that you create barriers to market entry by others. Another way is to keep innovating so quickly that competitors find it impossible to keep pace.

### 词汇注释

innovative	改革, 创新	community	公众, 共有
unprecedented	空前的	maturity	成熟, 偿还期, 到期
EDI(Electronic Data Interchange)		EDI(Electronic Data Interchange)	电子数据交换
penetrate	看穿, 了解	cyberworld	网络世界
SMEs	中小企业	client	顾客, 客户, 当事人, 委托人
dial-up	拨号	password	口令
conventional	传统的	intermediary	中介, 中介物
recruiter	招募人员	discount	折扣
virus	病毒	brokerage	经纪
recruiter	新手, 新会员	auction	拍卖
venture	冒险, 风险	notoriously	声名狼藉地, 臭名昭著地
quote	引用, 引述	duplication	副本, 复制
innovate	改革, 创新	website	WWW 的站点

### 翻译

[1] With the wide use of computer, the maturity and the wide adoption of Internet, the permeation of credit cards, the establishment of secure transaction agreement and the support and promotion by governments, the development of E-Commerce is becoming prosperous, with people starting to use electronic means as the media of doing business.

maturity 意思是“成熟, 完备, (票据)到期”; permeation 原意是“渗入, 透过”, 这里指信用卡在社会中的普及; credit card 意思是“信用卡”。

译文: 随着计算机的广泛应用, 互联网的日趋成熟和广泛利用, 信用卡的普及, 及政府对安全交易协定的支持和促进, 电子商务正变得繁荣起来, 人们已开始利用电子媒介做生意。

[2] Businesses can maintain their competitive advantage by establishing close contact with their customers and consumers at anytime through Internet by providing the latest information on products and services round the clock.

latest information 意思是“最新信息”, round the clock 意思是“二十四小时”。

译文: 通过在互联网上全天候地提供产品及服务的最新信息, 商家可以与客户和消费者随时建立紧密联系来确保他们的竞争优势。

[3] if you don't want to purchase, install, customize and take care of all the necessary hardware and software for running a website, you can outsource the task to web hosting companies.



d. Internet and EDI

(2) Setting up E-commerce , you must \_\_\_\_\_.

- a. choose a web hosting service provider
- b. have your own web server
- c. do either ( a ) or ( b )
- d. have the necessary technical staff to take care of all the hardware and software

(3) As for costing you less money , you can get connected to Internet by \_\_\_\_\_.

- a. dial-up connection
- b. broadband connection
- c. either dial-up or broadband connection
- d. neither dial-up nor broadband connection

(4) E-commerce models are broken into the three Cs : \_\_\_\_\_.

- a. communities , comprehension and commerce
- b. communities , content and commerce
- c. certificate , content and commerce
- d. communities , content and command

源源發播 碩業者早 駁業畢造

耘業職保 增說集 皂澳機轉 燥業造

Properly conveyed information is also crucial for the success of electronic commerce transactions , but the means of conveyance differs from that used in traditional commerce. In electronic commerce , a communication network is typically employed for conveying information. Electronic commerce also differs from traditional commerce in the means used for processing information. Traditionally human intervention has been required to process and act on information accompanying a business transaction , whereas , in electronic commerce , human intervention is minimized. This is achieved by automating procedures , eliminating the use of paper , wherever possible.

The characteristics , then , of electronic commerce that distinguish it from traditional commerce are the means used for conveying information and the methods used for processing it. To effect changes in the way information is conveyed and processed , two support services are clearly needed : communications and data management. In addition , for realistic use of electronic commerce applications in an operational setting , security is also essential.

To enable a clearer understanding of this environment , it may be useful to have a brief look at a communication network. The important aspect of the network is that it provides a link between users-and between users and information-which allows information to be

transported from one location in the network to another location in the network. The host systems that provide user services and support user access to the network, and host systems that provide automated access to information repositories. In this environment users can electronically convey information to each other, and local applications can use information available anywhere in the network to support the services they offer. To exchange information, users may send mail electronically, rather than use the telephone or postal system. To send a purchase order, an electronic form may be used.

As noted above, the model for electronic commerce must include communications, data management, and security. Of course, the application must also be part of the model. So a model for electronic commerce comprised of five major components: a user interface, an application, communications, data management, and security. Notably, the model includes a user interface element which has seemingly not been included in any of the above discussion. This is because the user interface and the application are typically coupled so tightly that they often exist as a single entity which cannot be separated.

It is worth noting these components' relationship with electronic commerce. The major task in effecting electronic commerce is not in enhancing or developing new technologies, rather it is in integrating existing technologies. That is, the focus of electronic commerce is on incorporating the support services into a cohesive environment that provides a framework for supporting electronic commerce applications. Of course, an examination of each of these areas is necessary to accomplish this.

A few additional comments are warranted. Neither operating systems nor hardware have been included in the model. This is certainly not due to their lack of importance. Advances in hardware technology are a major facilitating factor in promoting electronic commerce; operating systems that take advantage of these advances and provide users and applications with the corresponding benefits, are equally important. They are left out of our model primarily because they are taken for granted-i. e., their presence is implicitly clear-and because they do not present any major issues that directly bear on the development of an infrastructure for electronic commerce.

So creating a ubiquitous electronic commerce environment will require deploying a network capable of providing connectivity to a large user and service provider community. Hardware, software, and security issues must be addressed. New applications that take advantage of networks and improved computer performance will be required. Networking software that utilizes the increased bandwidth will be needed to support the new applications.

源缘遥阅圆群社槽味云总槽群录上

源缘遥裁群成

Distance education has gained tremendous recognition for its ability to accept and use new educational technologies , which traditional education has been resistant to change and is not structured to make complete use of the new developments. The computer-based technologies now available for use in educational programs provide current and quality instructional options for teachers and students. Nontraditional students have been the chief beneficiaries of distance education and the increasing numbers of such students are prompting colleges and universities to evaluate the uses of technology to make education more accessible , efficient , and effective.

The development of videodisc and laser technology provided several unique features : ability to store large amounts of data , ability to display still images indefinitely without wear to the disc , and the ability to access any frame within microseconds. The almost instantaneous frame access and massive still storage ability make the videodisc a uniquely ideal visual storage format that can be used by educators and can easily be controlled by computers , providing an interactive media useful in all forms of education.

Computer-based approaches to education can enhance almost all other forms of distance education. <sup>[1]</sup> The ability of computer technology to interface with and control other technologies has placed it in the forefront of all technologies as the greatest proponent of change in the educational environment. As rapid advances in computer technology foster obsolescence of older equipment , the economic realities are that prices continue to decrease for the technology. It must be understood that the reason computer programs are praised as being innovative and productive in the educational arena , is often traced to the amount of time expertise utilized by the instructional designer in production of program. Computers have the same drawbacks as other media , and yet they also offer opportunities for counteracting the inherent deficits. The computer is just a tool , abate a very powerful one , that is available for educations in their pursuit to create an educational environment in which learning will take place.

The definition of computer-mediated communication appears to parallel the definition of distance education in that it often removes the teacher from the student in time and location. Computer technologies have caused tremendous advancements in information storage and retrieval sciences that are combined with electronic communications to produce tremendous educational tools : Internet , telecommunication , electronic bulletin boards , electronic mail ,

video conferences , and many others.

Recent developments and decreasing costs are providing access to unsurpassed amounts of information from around the globe through electronic Internet.<sup>[2]</sup> All that is required for students anywhere in the world to access this information is a computer , modem , telephone , and access port ( commercial , educational , or business ). The ability for students to conduct research without leaving their homes is changing the way that educational institutions structure research. Electronic publishing is one of the fastest growing fields , but establishment of standards before it will be accepted equally as printed material.

Telecommunications support distance education by providing delivery systems that carry programs and allow interaction between the participants. The availability of satellite and cable delivered programming provide economic options to school districts throughout the country. Programs such as the Jason Project and Space Explorer , allow any school to procure access to distance learning projects that can be seen world wide and interactive with each remote site. Rapid advancements in optical technology are providing methods of transferring increasing amounts of information and will allow remote students to use cable or telephone connections to use interactive multimedia programming.

Electronic bulletin boards and news services provide access to world wide discussions on any range of topics. These one-to-many communication platforms allow postings of assignments and course information for distance education. Group discussions allow individuals to analyze the thoughts of their peers as well as those of uncountable experts on any topic.

Increasing access to the Internet is promoting electronic mail ( E-mail ) as a one-to one or one-to many platform of communication. E-mail allows peer-to-peer conversations and can be almost instantaneous in response if the user sets up a two-way conversation mode. The ability to attach text and graphic files to E-mail allows the user to send papers and articles to any number of addresses.<sup>[3]</sup> E-mail is extremely useful for correspondence between teacher and student , allowing feedback to any questions that the student might encounter while working on course material and allowing the teacher to transmit grades and feedback on submitted lessons.

Often , the need for face-to-face interaction is required and can easily be allowed through the use of video teleconferencing. Students enter into a cooperative learning process , enhancing the instructional experience and thus reducing isolation. Two-way full-motion video is available through satellite communications , coaxial cable , and in the near future through fiber-optic link. The current cost of video conferencing restricts its use to mostly commercial purposes , but as the price continues to drop it will undoubtedly be used throughout most

distance education courses.

All of the technologies discussed above are easily controlled through computer-mediated communications and many are extensions of computer technology. There are many benefits derived from the use of computer-based communications. The first is the ability of computer programs to be interactive and provide feedback to the student. The second value is the ability of computers to become any and all existing media, including books and musical instruments. A third is that information can be presented from many different perspectives. Further values include the ability to use computers in simulation models and the ability to engineer computers to be reflective. [4]

#### 运 用 选 择

tremendous	巨大的, 非常的	recognition	承认, 认可
resistant	抵抗的, 反抗的	accessible	易接近的
microsecond	微秒	instantaneous	即时的, 瞬时的
massive	宽大的, 宏伟的	proponent	建议者, 支持者
foster	培养, 鼓励, 养育	obsolescence	荒废, 淘汰
arena	舞台, 场地	drawback	缺点, 退税
deficit	赤字, 不足额	abate	减少, 减弱
pursuit	追踪, 追赶	bulletin	公告, 布告
delivery	递送, 交货	participant	参与
peer-to-peer	点对点	interaction	交互作用
isolation	隔绝, 隔离	telecommunications	电讯, 远距离通讯
reflective	反射的, 反映的		

#### 晕 译 释

[1] Computer-based approaches to education can enhance almost all other forms of distance education.

本句的主语是 approaches, 谓语是 enhance, 宾语是 forms。

译文: 将计算机技术用于教育, 改善了几乎各种远程教育方式。

[2] Recent developments and decreasing costs are providing access to unsurpassed amounts of information from around the globe through electronic Internet.

不定式短语作定语, 修饰 access。

译文: 最新的发展和不断降低的费用, 提供了通过互联网从全球获得大量信息的途径。

[3] The ability to attach text and graphic files to E-mail allows the user to send papers

and articles to any number of addresses.

“to send papers and articles to any number of addresses”作宾语补足语。

译文：把文本或图片文件粘贴到 E-mail 上的能力，使用户能把作业和论文发送到任何地址。

[4] Further values include the ability to use computers in simulation models and the ability to engineer computers to be reflective.

本句的“the ability... the ability...”并列作宾语。

译文：更深远的用处包括在模拟模型中使用计算机，并能让计算机深思。

### 源 词 组 音 标 释 义

员 援 裁 剔 喇 吐 登 喊 喇 桌 本 桌 曾 早 责 剔 非 译 圣 赋 昧 太 巨 登 桌

- (1) 远程教育
- (2) 激光技术
- (3) 教育环境
- (4) 非传统的
- (5) 电子通信
- (6) 电子出版
- (7) 远距离通讯
- (8) 乐器

国 爱 裁 桌 圣 译 吐 登 喊 喇 桌 本 桌 曾 早 责 剔 非 译 圣 赋 昧 太 巨 登 桌

- (1) Traditional students have been the chief beneficiaries of distance education.
- (2) The development of videodisc is useful for distance education.
- (3) According to the text , the standards of electronic publishing are easy to make.
- (4) Telecommunications support distance education by providing delivery systems.
- (5) We can use E-mail only as a one-to-one platform.
- (6) In distance education , the information can be presented from many different perspectives.
- (7) E-mail do not support peer-to-peer conversations.

猜 爱 晒 桌 圣 译 吐 登 喊 喇 桌 本 桌 曾 早 责 剔 非 译 圣 赋 昧 太 巨 登 桌

- (1) Videodisc and laser technology provide the ability to \_\_\_\_\_ .
  - a. cost more
  - b. create some education files
  - c. enhance other forms of education
  - d. store large amounts of data

(2) \_\_\_\_\_ and news services provide access to world wide discussions.

- a. E-mail
- b. Fax
- c. Electronic bulletin boards
- d. E-commerce

(3) Electronic bulletin boards are \_\_\_\_\_ communication platforms.

- a. one-to-many
- b. one-to-one
- c. many-to-many
- d. all above

(4) The almost instantaneous frame access and massive still storage ability make the \_\_\_\_\_ a uniquely ideal visual storage format.

- a. tape
- b. disc
- c. video disc
- d. soft disc

源缘猿瑶砾蒙岩早耘券康肇造

悦桌皂责颢澳叫粤番漳都附挂渤慨慨录士

CAI (Computer Aided Instruction) is to build instructional computer programs that incorporate well-prepared course material in lessons that are optimized for each student. The first instructional programs took many forms, but all adhered to essentially the same pedagogical philosophy. The student was usually given some instructional text (sometimes "on line", sometimes not) and asked a question that required a brief answer. After he/she responded, the student was told whether his/her answer was right or wrong. His/Her response was sometimes used to determine his "path" through the curriculum, that is, the sequence of problems he was given. When the student made an error, the program branched to remedial material. The courseware author attempted to anticipate every wrong response, pre-specifying branches to appropriate remedial material based on his ideas about what the underlying misconceptions might be that would cause each wrong response.

In spite of the widespread use of CAI in diverse educational applications, many researchers believe that most CAI courses are not the best use of computer technology. The computer does little more than what a programmed textbook can do, and one may wonder why the machine is used at all, in most CAI systems. When teaching sequences are extremely simple, perhaps trivial, one should consider doing away with the computer, and using order

devices or techniques more related to the task.

Then came a computer based tutor which called knowledge based or intelligent CAI (ICAI). ICAI has prompted researchers to apply AI techniques to create increasingly complicated computer programs. AI work in natural-language understanding , knowledge representation , and methods of inference , as well as specific AI applications such as algebraic simplification , symbolic integration , medical diagnosis , and theorem-probing , have been applied by various researchers toward making CAI systems increasingly intelligent and effective.

Early research on ICAI systems focused on representation of the subject matter. AI programs often employ very powerful problem-solving methods that do not resemble those of humans. In some cases , CAI researchers borrowed AI techniques for representing subject domain expertise but had to modify them , often making the inference routines less powerful , in order to force them to follow human reasoning patterns , to make the line of reasoning more understandable to the student , and to model his problem-solving progress more closely. Even AI representations designed to replicate human reasoning steps at some level of detail , such as production rules , may be inadequate for use in teaching if important organizational and strategic concepts are not represented explicitly.

The main components of an intelligent CAI (ICAI) system are problem-solving expertise , the knowledge that the system tries to impart to the students ; the student model , indication what the student does and does not know ; and tutoring strategies , which specify how the system presents material to the student. Not all of these are fully developed in every system. Because of the size and complexity of ICAI programs , most researchers tend to concentrate their effort on the development of a single part of what would constitute a fully usable system.

# 第 缘 章

## 悦巢责想藻则粤贵造曹翰豫译

缘贵遥阅蚤髓都兑葬霖

缘贵遥裁藻成

Computational image processing can be defined as the operation of mathematical functions on numeric representations of pictorial scenes. In general it is part of an overall process of visual perception , pattern recognition and image understanding. These form the essential components of computer vision. Fortunately image processing is conceptually rather simpler than many of the cognitive processes associated with computer vision and has been the subject of rather more practical and successful effort.

The term digital image processing generally refers to processing of a two-dimensional picture by a digital computer. In a broader context , it implies digital processing of any two-dimensional data. A digital image is an array of real or complex numbers represented by a finite number of bits. An image given in the form of a transparency , slide , photograph , or chart is first digitized and stored as a matrix of binary digits in computer memory. This digitized image can then be processed and/or displayed on a high resolution television monitor.

For display , the image is stored in a rapid-access buffer memory which refreshes the monitor at 30 frames/s to produce a visibly continuous display. Mini- or micro-computers are used to communicate and control all the digitization , storage , processing , and display operations via a computer network ( such as the Ethernet ). Program inputs to the computer are made through a terminal , and the outputs are available on a terminal , television monitor , or a printer/plotter.

Digital image processing has a broad spectrum of applications , such as remote sensing via satellites and other spacecrafts , image transmission and storage for business applications , medical processing , radar , sonar , and acoustic image processing , robotics , and automated

inspection of industrial parts. <sup>[1]</sup>

Images acquired by satellites are useful in tracking of earth resources ; geographical mapping ; prediction of agricultural crops , urban growth , and weather ; flood and fire control ; and many other environmental applications. Space image applications include recognition and analysis of objects contained in images obtained from deep space-probe missions. Image transmission and storage applications occur in broadcast television , teleconferencing , transmission of facsimile images ( printed documents and graphics ) for office automation , communication over computer networks , closed-circuit television based security monitoring systems , and in military communications. Radar and sonar images are used for detection and recognition of various types of targets or in guidance and maneuvering of aircraft or missile systems. There are many other applications ranging from robot vision for industrial automation to image synthesis for cartoon making or fashion design. <sup>[2]</sup> In other words , whenever a human or a machine or any other entity receives data of two or more dimensions , an image is processed.

The amount of data associated with visual information is so large that its storage would require enormous storage capacity. Although the capacities of several storage media are substantial , their access speeds are usually inversely proportional to their capacity. Typical television images generate data rates exceeding 10 million bytes per second. There are other image sources that generate even higher data rates. Storage and/or transmission of such data require large capacity and/or bandwidth , which could be very expensive. Image data compression techniques are concerned with reduction of the number of bits required to store or transmit images without any appreciable loss of information. Because of image transmission and storage wide applications , data compression is of great importance in digital image processing.

#### 反射成像与透射成像

Images are formed either by reflection or transmission , in the first case a typical example is an object illuminated by visible light and recorded with a camera. The geometry of the resultant image is governed by the general translation of a 3D object ( world coordinates ) to a 2D scene ( camera coordinates ).

Transmission images , on the other hand , result from the passage of radiation through an object. The structure of a resultant image depends on the internal properties of the object. A typical example is the normal medical X-ray film , producing an image in two dimensions of electron density integrated along a ray path , thereby discriminating bone from soft tissue. A variant of this , topographic imaging , produces a cross section ( transverse ) image and is the

result of processing transmission profiles taken at a number of different angles of illumination , which are then built into a three-dimensional data space.

#### 数字图像文件的存储与传输

As an activity , digital image processing generally creates large numbers of relatively large data files containing digital images. These must be archived , and often they need to be exchanged between different users and systems. This calls for some standard format for the storage and transfer of digital image files.

Many digital image file formats have been defined and used. A few have gained wide enough usage to become more or less de facto standards. ( See Table 5-1 for examples. ) Most commercially available image-processing programs can read and write several of the popular image file formats. Other programs exist simply to read and display images stored in a variety of file formats and convert them from one format to another. <sup>[3]</sup>Such programs automatically sense the format of the specified input file , either from its filename extension or from identifying information in the file itself. When saving a displayed image to a file , the user can specify the desired file format.

表 5-1 数字图像文件的存储与传输

Name	Type	Usage
Tagged image file format	* .TIF	DOS ,UNIX ,and Macintosh images
Encapsulated PostScript	* .EPS	Publishing industry format
Graphical interchange format	* .GIF	CompuServe graphics format
Bit-mapped format	* .BMP	Macintosh Windows format
Presentation manager	* .BMP	IBM OS/2 bit-mapped format
Macintosh	* .PICT	Apple Macintosh images

#### 数字图像的压缩与解压

There are two general types of compression : lossless and lossy. Lossless compression means that you can achieve a certain compression factor and be able to exactly reproduce the original image. Lossy compression on the other hand allows some loss , but has the potential for much higher compression rates. No matter what technique that you use , the exact rate is very dependent on the complexity of the image that you are analyzing. <sup>[4]</sup> For example , the normal best that can be achieved with lossless encoding is a rate of 2 bits per pixel. In fact , for some landsat scenes with urban areas and many small farms , the factor of 2 bits per pixel

may not be able to be achieved. The same technique applied to a landsat image of the Midwest where large fields occur and few shadows exist images might produce a much better compression.

### 运载辞彙

pictorial	绘画的, 形象化的	conceptually	概念地
cognitive	认知的, 认识的	transparency	透明度, 透明性
digitization	数字化	radar	雷达, 无线电探测器
sonar ( sound navigation and ranging )	声呐, 声导航和测距(法)	facsimile	传真
acoustic	听觉的, 声学的	compression	压缩
maneuver	演习, 调遣	radiation	辐射
resultant	结果的, 合成的	tissue	薄的织物
topographic	地形学, 地形学的	lossless	无损的
profile	描述.....的轮廓	landsat	(美国)地球资源(探测)卫星
lossy	有损耗(失)		
Midwest	(美国)中西部地区		

### 彙释

[ 1 ] Digital image processing has a broad spectrum of applications , such as remote sensing via satellites and other spacecrafts , image transmission and storage for business applications , medical processing , radar , sonar , and acoustic image processing , robotics , and automated inspection of industrial parts.

这是一个长句, 主语是 Digital image processing , 谓语是 has , 宾语是 spectrum , such as... 作宾语补足语。

译文: 数字图像处理的应用范围较广, 例如: 与人造卫星和其他宇宙飞船有关的遥感技术, 用于业务上的图像传输和存储, 医疗诊断, 雷达、声呐、声像处理、机器人和工业零件的自动检测。

[ 2 ] There are many other applications ranging from robot vision for industrial automation to image synthesis for cartoon making or fashion design.

本句中, 现在分词短语 ranging from... to... 作定语, 修饰 applications; 介词短语 for industrial automation 和 for cartoon making or fashion design 作后置定语, 分别修饰 robot vision 和 image synthesis。

译文: 还有很多其他方面的应用, 其范围从工业自动化中的机器人视觉到卡通制作或时装设计的图像合成。

[ 3 ] Other programs exist simply to read and display images stored in a variety of file

formats and convert them from one format to another.

句中的谓语动词是 exist ,不定式短语 to read and display... and convert... 做目的状语。

译文:另外一些程序仅仅只能读出并显示用各种文件格式存储的图像,并且将它们从一种文件格式转换到另一种文件格式。

[4] No matter what technique that you use , the exact rate is very dependent on the complexity of the image that you are analyzing.

本句由 No matter 引导让步状语从句。

译文:无论使用哪种技术,适当的压缩比取决于你所分析图像的复杂程度。

### 练习 1

1. 将下列句子翻译成中文。

- (1) 数学函数
- (2) 模式识别
- (3) 数字图像处理
- (4) 图像处理程序
- (5) 图像文件格式
- (6) 无损压缩
- (7) 有损压缩
- (8) 卫星图像

2. 将下列句子翻译成英文。

- (1) The structure of a resultant image depends on the internal properties of the object.
- (2) There are three general types of compression.
- (3) Images acquired by satellites are useful in tracking of earth resources.
- (4) Lossless compression allows some loss , but has a potential for much higher compression rates.
- (5) Digital image processing has a broad spectrum of applications.
- (6) Many digital image file formats have been defined , but only a few have gained wide enough usage.
- (7) The \*.BMP file can only be used in the IBM systems.

3. 将下列句子翻译成中文。

- (1) Transmission \_\_\_\_\_ result from the passage of radiation through an object.
  - a. errors
  - b. files

c. commands

d. images

(2) The normal best that can be achieved with lossless encoding is a rate of \_\_\_\_\_ per pixel.

a. 2 bits

b. 4 bits

c. 8 bits

d. 16 bits

(3) \_\_\_\_\_ refers to the process of a two dimensional picture by a digital computer.

a. Pattern recognition

b. Image compression

c. Digital image processing

d. Image data file format

(4) Followings are some image data file formats , which is wrong ? \_\_\_\_\_

a. \* . TIF

b. \* . DOC

c. \* . BMP

d. \* . GIF

缘爱找资源 硕博论文 毕业论文 开题报告

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Graphics has always been associated with the display of information. Examples of the use of orthographic projections to display floodplains of buildings can be found on 4000-year-old Babylonian stone tablets. Mechanical methods for creating perspective drawings were developed during the Renaissance. Countless engineering students have become familiar with interpreting data plotted on log paper. More recently , software packages that allow interactive design of charts incorporating color , multiple data sets , and alternate plotting methods have become the norm. In fields such as architecture and mechanical design , hand drafting is being replaced by computer-based drafting systems using plotters and workstations. Medical imaging uses computer graphics in a number of existing ways.

Recently there has been great interest in problems of scientific visualization. Although researchers are now using supercomputers to solve formerly intractable problems in fields such as fluid flow and molecular biology , they need new display techniques to interpret the results of analyzing the vast quantities of multidimensional data generated.

阅读 资源

Consider for example how computer graphics might enter into the design of an electronic

circuit. The designer is seated at a graphics workstation with a graphical input device , such as a mouse , with which she can indicate locations on the display. The initial display screen might consist of the various elements that can be used in the circuit and an empty area in which the circuit will be “constructed. ” The designer will then use the input device to select and move the desired elements into the design and to make connections between elements. To form this initial design , the system makes sophisticated use of computer graphics. Circuit elements are drawn , and perhaps are moved about the screen. A graphical input device is used to indicate choices and positions. A number of aids may be used to help the designer position the elements accurately and to do automatically such tasks as routing of wires.

At this point , the designer probably will want to test her design. The circuit will be tested by an analysis program , which will display its results ( e. g. , graphs of voltages versus time ) on the workstation. Now the designer can modify the design as necessary , try another design , or accept what has already been done. The designer never had to write a graphics program or even to know much about computer graphics ; yet , without computer graphics , this design process would not be possible.

#### 杂思与遐想

Some of the most impressive and familiar uses of computer graphics can be classified as simulations. Video games demonstrate both the visual appeal of computer graphics and our ability to generate complex imagery in real time. The insides of an arcade game reveal state-of-the-art hardware and software. Computer-generated images are also the heart of flight simulators , which have become the standard method for training pilots. The saving in dollars and lives realized from use of these simulators has been enormous. The computer-generated images we see on television and in movies have advanced to the point that they are almost indistinguishable from real-world images.

#### 哉 稔 小 地 稔 稔 稔 稔

The interface between the human and the computer has been radically altered by the use of computer graphics. Consider the electronic office. A secretary sits at a workstation , rather than at a desk equipped with a typewriter. This user has a pointing device , such as a mouse , that allows him to communicate with the workstation. The display consists of a number of icons that represent the various operations the secretary can perform. For example , there might be an icon of a mailbox that , if pointed to and clicked on , cause any electronic mail messages to appear on the screen. An icon of a wastepaper basket allows the user to dispose of unwanted mail , whereas an icon of a file cabinet is used to save letters or other documents.

## 缘因摇酝怎制是藻播裁藻界上造导曾

### 缘因爱瑶栽藻成

Multimedia is not a product ; rather , it is a technology (or more accurately a combination of technologies). A technology is anything that makes something else more efficient. For example , suppose you have a list of written directions for getting to the bank. Now imagine you have a mapping application that you could use to pinpoint where you want to go (“ the bank ”). Not only could that application print out detailed instructions of how to get to the bank , it could also display a full-color image of a map to the bank , along with a brief audio segment telling you the traffic conditions of roads around the bank.

This mapping application (let’s call it MAPMAN) is multimedia in action. Notice the combination of text (the printed instructions) , static graphic images (the color map) , and digital sound (the narration describing traffic conditions).

Multimedia aims at making computers easier to use. As you can see from the previous example , the added information provided by sound and color pictures will make getting to the bank faster. Say you want to go to a bank in another town , or in another state. A multimedia application will usually store huge amounts of information (usually on CD-ROM) , so that you can also get the same information for other communities. This type of information access makes computers much more valuable for the user. By adding multimedia to your programs , you can make computers more interesting and much more fun for the user.

What is being advocated is using multimedia to expand the uses of computers. Let’s take a look at certain areas where multimedia could have a direct impact :

- 悦果皂荚哪穿著劫理蚤早(悦月裁) Many corporations are turning to multimedia applications to train their employees. A major telephone company has put together a multimedia application that simulates major emergencies and trains the employees on what to do in these situations. By using a multimedia application , the company found it has saved expenses and trained employees more effectively than anything else it had tried. <sup>[1]</sup>
- 耘造皂葬藻皂藻皂 The essence of multimedia is to make computers more interesting. It doesn’t matter if a child is in grade school or an adult is getting a master’s degree.
- 耘造皂葬藻皂藻皂 This is a new type of software category that mixes education with entertainment. The idea is to make learning fun while providing some type of entertainment.

- 绝对娱乐至上主义 There is absolutely nothing wrong with a litter fun. In many cases , the graphics technology used in today's best games will show up in tomorrow's business applications. If that is a way to expand technology to the next level , it definitely deserves attention from multimedia developers. Besides , writing entertainment applications ( that is , games ) can be a lot of fun.
- 信息过载与多媒体 It is often said that this is the age of information. We are literally being overwhelmed with an overload of information. This abundance of information makes it difficult to access. Multimedia provides effective ways to organize information and search for specific facts quickly and efficiently.
- 多媒体在商务中的应用 In many companies , presenting information to business professionals is a required form of communication. Applications are already available for creating great-looking presentations and through multimedia these applications will become even better and more effective.

When you combine standard data processing with graphics , animation , speech synthesis , audio , and video , you're part of a phenomenon in computing. Multimedia uses the computer to integrate and control diverse electronic media such as computer screens , videodisk players , CD-ROM disks , and speech and audio synthesizers. <sup>[2]</sup> If you make logical connections between those elements and make the entire package interactive , then you are working with hypermedia.

Just about any modem computer can handle text processing and produce basic sounds. Most computers can handle graphics pretty well , too , although they differ in details such as display resolution , color selection , and performance. But the different computers start to spread apart when you look at animation—which is essentially high-performance graphics. When you examine high-quality audio , they move even further apart. And they are radically separate in their abilities to handle video—importing video signals from tape or camera , editing and merging video and computer-generated graphics or text , and exporting the resulting mix to video tape.

Different strains of computers have quite different abilities to integrate all those elements. Each offers different operating system and “authoring-system” software to create , read from peripherals ( e. g. , videodisk players , CD players , optical disk drivers , and video cameras ) , combine , edit , and produce multimedia as the sophisticated video , audio , and graphics hardware.

The advancement of hardware technology is certainly central to the success of multimedia. However , application developers must keep their feet on the ground and concentrate their

efforts on delivering real utility.

Multimedia capabilities will be sprinkled through almost all layers of software , offering new interfaces , new business applications , redefined programming tools , and possibly new operating systems. <sup>[3]</sup> What is being advocated is using multimedia to expand the uses of computers. Multimedia could have a direct impact at the following areas : computer-based training , education , edutainment , entertainment , information access , business presentations , and other areas.

As an example , consider how utility is moving the personal computer industry from the traditional character-based user interfaces to the now-popular graphical user interface , with their windows , icons , mice , and pull-down menus. It's not because GUIs are more fun to use but because they can make you more productive. In fact , the GUI will eventually become standard features in new applications.

We will have a third interface : the video user interface. Windows will be filled with static and motive video , high-resolution icons will become animated graphics , and audio will be a standard accompaniment to text.

As for programmer's tools and operating systems , multimedia-assisted tools will prove to be as helpful to program developers as interfaces to end users. Object-oriented programming will grow to include more media-rich objects ; programming tools will offer diagrammatic control of code. <sup>[4]</sup> Here again , utility will pay off in programmer productivity.

#### 运 译 宰 爆 措 译

multimedia	多媒体	pinpoint	细微的 精确的
narration	叙述 讲述	advocate	主张 提倡
employee	职员 员工	emergency	紧急
essence	实质 本质	category	种类 类项
entertainment	娱乐	presentation	描述 介绍
litter	杂乱	deserve	该得到 值得
literally	不夸张地	overwhelm	制服 压倒
synthesis	合成	phenomenon	现象 迹象
hypermedia	超媒体	essentially	本质上
radically	根本地 完全	merge	合并 消失
camera	摄像机		

#### 晕 爆 宰 译

[1] By using a multimedia application , the company found it has saved expenses and



- (4) Hypermedia is the same as multimedia.  
 (5) All computers can handle text processing and produce basic sounds.  
 (6) GUI will eventually become standard features in new applications.  
 (7) There are no relations between the hardware and multimedia.

猿猴瑶砾藻昔早悦燥皂责燥藻藻译录上

- (1) "Multimedia" means that \_\_\_\_\_  
 a. it can play music.  
 b. it can show a graph.  
 c. it can rotate a three-dimensional model.  
 d. it can do all above at the same time.
- (2) By adding \_\_\_\_\_ to your programs , you can make computers more interesting and much more fun for the user.  
 a. multimedia  
 b. text  
 c. music  
 d. picture
- (3) Multimedia-assisted tools will prove to be as helpful to program developers as \_\_\_\_\_ to end users.  
 a. tools  
 b. interfaces  
 c. methods  
 d. products
- (4) Many companies use \_\_\_\_\_ to train their employees.  
 a. technology  
 b. entertainment  
 c. multimedia applications  
 d. animation

猿猴瑶砾藻昔早悦燥皂责燥藻藻译录上

西云总燥藻藻译录上

PowerPoint is multimedia display software , is one component of Office suite software. It provides means for making multimedia display. You can use it to make your pictures , electronic spreadsheets and graphs , to visit library of art montage , and to select various tone , mode and format of text , etc.

PowerPoint has very strong functions for making slides. You can input title and text easily, and also add montage pictures, spreadsheets, graphs on the slide, and change the layout of the slide, adjust their sequence, delete or duplicate the slide.

- 阅读与检索

After entering PowerPoint, an “activation dialogue box” first appears. It provides four ways to set up a display file. The display file is a series of slides, each slide can be seen as an independent page of a book. A slide can be used to display outline, text, numbers, analytic spreadsheets or images, and by “link”, it can realize hypertext and hypermedia.

- 模板与母版

Each slide follows a standard format, which is called “template”. In display software, various module libraries are available for selection.

- 幻灯片放映

Using “view” button, PowerPoint can perform view switching. Regardless of what view is selected, contents of the display file will not change. PowerPoint provided five views.

Common view—It is the most commonly used view. Using it, you can put all the slides in a sequence or organize all slides in the display file into a structure.

Outline view—When switching to outline view, you can edit the display file’s outline structure.

Slide view—In this view, you can display each slide and edit its details.

Overlook view—In this view, a diminished view of each slide, a complete file and photos in a display file can be shown. You can re-set their sequence, add switching and animated effects and set projection time.

Projection of slides—It performs projection of slides. In slide view, projection begins with the current slide, and in overlook view, projection begins with the selected slide.

- 图表与数据表

Graphs and sheets can help audience to see clearly tendency and proportion. EXCEL electronic spreadsheets and graphs can be introduced into slides to show 2-dimensional or 3-dimensional effect. You can also use rotating graphs and spreadsheets to help visual effect. You can also combine multiple figures into one, or combine figures with correspondent graphs and spreadsheets into one slide.

- 动画与声音

You can find out photos from picture library or CD-ROM or hard disc as you like and insert them into the slide. Most pictures are included in display software, or can be downloaded free from charge from network, but in some cases, some pictures are patented—to use them, you must buy and register.

- 杂

This method is used mostly , and is applicable to more objects. First , select “ self-define ” command from “ slide projection ” menu to open “ self-define ” dialogue box. Second , set the projection order of each object ( it is possible to project the object soon after the precedent one or after several seconds , or by clicking the mouse ) , and set animation effect together with sound effect. If the object is photo ( figure ) , animation effect is possible ; if the object is text , it can project them one word after another or project them in a group.

- 杂

It is possible to add hyperlink in display file to transfer to different positions , for example , skip to slide , other display files , Word files , EXCEL spreadsheet or other applied procedures , etc. To do this , you first select text or objects to be hyperlinked ; second , use “ hyperlink ” command in “ insert ” tool bar ; third , single click the slide or files to be hyperlinked in the “ insert hyperlink ” dialogue box. In projection , when the mouse arrives at the object ( underlined ) or hyperlinked object , the mouse arrow will turn into a “ hand ” as a sign of hyperlink.

Using “ action ” button in the “ slide projection ” menu , you can insert various action buttons onto the slide. In so doing , an “ action setting ” dialogue box will pop up automatically for you to select the skip position in the “ hyperlink list ”.

## 缘

### 缘

Artificial Intelligence (AI) is the study and creation of machines that exhibit humanlike qualities , including the ability to reason. Even the seventeenth-century scientists and engineers who built the first calculators and mechanical robots that could play musical instruments may ( have ) dreamed of this goal , but none of these early machines had quite so ambitious a program as contemporary efforts in artificial intelligence. Experts in artificial intelligence believe that one day , computer will be able to learn natural languages such as English , perceive objects in the same way as humans do , and exhibit all the qualities that we think of as human reason—the ability to think , make judgments , arrive at conclusions , and make comparisons. These systems will not look like robots or R2\_D2 in the film Star Wars. Instead , these systems will reside inside desktop computers , similar to the ones we now call personal computers. Artificial intelligence is also the stuff of military dreams in which AI machines fight future wars largely independent of human intervention.

## 裁藥云界強樂粵則醫醫名切藥各藥化藥裁藥醫藥

Artificial intelligence is not a single phenomenon but sometimes a family of related activities , each of which seeks to capture some aspect of human intelligence and being. <sup>[1]</sup> Computer scientists , electronic engineers , psychologists , linguists , physiologists , and biologists are all involved in that search , which leads them into research on natural language , robotics , perceptive systems , expert systems , neural networks , and intelligent software.

1. Natural Language Natural language is languages , including idioms that are used by humans. Natural language focuses on computer speech recognition and speech generation. The basic goal is to build computer hardware and software that can recognize human speech and “ read ” text and that can speak and write as well. A related goal is to build software that can perform research requested by humans.

2. Robotics The goal of robotics research is to develop physical systems that can perform work normally done by humans , especially in hazardous or lethal environment. <sup>[2]</sup> Modern robotics is concerned with the development of numerically controlled machine tools and industrial fabrication machine that are driven by CAM ( computer-aided manufacturing ) system.

3. Perceptive Systems Like humans , robots need eyes and ears in order to orient their behavior. Since World War II , computer scientists and engineers have worked to develop perceptive systems , or sensing devices that can see and hear in the sense of recognizing patterns. <sup>[3]</sup> This field of research , which is sometimes called “ pattern recognition ” , has focused largely on military applications such as photo reconnaissance and missile control and navigation. Progress has been uneven because of problems teaching computers the differences between decoys and the real thing.

4. Expert Systems Expert systems are relatively recent software applications that seek to capture expertise in limited domains of knowledge and experience and apply this expertise to solving problems. Media attention has perhaps focused more on expert systems than on any other member of the AI family. In part this is because such systems can assist the decision-making of managers and professionals when expertise is expensive or in short supply.

5. Neural Networks People have always dreamed of building a computer that thinks , a “ brain ” modeled in some sense on the human brain. Neural networks are usually physical devices that electronically emulate the physiology of animal or human brains.

6. Intelligent Software Many products now on the market claim to use AI techniques or to be “ intelligent ”. Later sections of this chapter describe some of these development , including fuzzy logic for representing thought processes with some degree of ambiguity ; genetic

algorithms , which use genetic processes as models for solutions ; and intelligent agents , which can perform specific tasks for individuals.

### 人工智能的发展

In the quest to create intelligent machines , the field of Artificial Intelligence has split into several different approaches based on the opinions about the most promising methods and theories. These rivaling theories have lead researchers in one of two basic approaches : bottom-up and top-down. Bottom-up theorists believe the best way to achieve artificial intelligence is to build electronic replicas of the human brain's complex network of neurons , while the top-down approach attempts to mimic the brain's behavior with computer programs.

Because of the large storage capacity of computers , expert systems had the potential to interpret statistics , in order to formulate rules. <sup>[4]</sup> An expert system works much like a detective solves a mystery. Using the information , and logic or rules , an expert system can solve the problem.

As stated upon , an expert system is able to do the work of a professional. Moreover , a computer system can be trained quickly , has virtually no operation cost , never forgets what it learns , never calls in sick , retires , or goes on vacation. Beyond those , intelligent computers can consider a large amount of information that may not be considered by humans.

But to what extent should these systems replace human experts ? Or , should they at all ? For example , some people once considered an intelligent computer as a possible substitute for human control over nuclear weapons , citing that a computer could respond more quickly to a threat. And many AI develops were afraid of the possibility f programs like Eliza , the psychiatrist and the bond that humans were making with the computer. We cannot , however , overlook the benefits of having a computer expert. Forecasting the weather , for example , relies on many variables , and a computer expert can more accurately pool all of its knowledge. Still a computer cannot rely on the hunches of a human expert , which are sometimes necessary in predicting an outcome.

AI has always been on the pioneering end of computer science. Advanced-level computer languages , as well as computer interfaces and word-processors owe their existence to the research into artificial intelligence. The theory and insights brought about by AI research will set the trend in the future of computing. The products available today are only bits and pieces of what are soon to follow , but they are a movement towards the future of artificial intelligence. The advancements in the quest for artificial intelligence have , and will continue to affect our jobs , out education , and our lives.

### 运载辞彙

calculator	计算器	ambitious	有雄心的,有野心的
contemporary	同时代的	expert	专家
perceive	感觉,认知	psychologist	心理学家
linguist	语言学家	physiologist	生理学家
biologist	生物学家	hazardous	危险的,冒险的
lethal	致命的	fabrication	制造,建造
reconnaissance	侦察,勘察	missile	导弹
decoy	圈套,诱骗	professional	专业的,职业的
emulate	效法,模仿	ambiguity	不明确,含糊
rival	对手,竞争者	formulate	制订,用公式表示
mystery	神秘,秘密	substitute	代替,取代
nuclear	核的,原子能的	weapon	武器,兵器
psychiatrist	精神病学家,精神病医生	hunch	预感

### 晕译释

[1] Artificial intelligence is not a single phenomenon but sometimes a family of related activities, each of which seeks to capture some aspect of human intelligence and being.

本句的 not... but... 结构作表语, each of which... 作非限定性定语从句, 修饰 activities。

译文: 人工智能并不是单一的事物, 有时候它属于某些相关学科领域, 它们中的每一个都组成了人工智能的某些方面。

[2] The goal of robotics research is to develop physical systems that can perform work normally done by humans, especially in hazardous or lethal environment.

本句由不定式结构作表语, that 引导的定语从句修饰 systems。

译文: 机器人技术研究的目标是发展这样的物理系统: 它能够完成人类通常所做的工作, 特别是在有害或者十分危险的环境中进行的工作。

[3] Since World War II, computer scientists and engineers have worked to develop perceptive systems, or sensing devices that can see and hear in the sense of recognizing patterns.

本句的 Since World War II 是时间状语从句, “that can see and hear in the sense of recognizing patterns” 作 sensing devices 的定语。

译文: 自第二次世界大战以来, 计算机科学家和工程师们一直在发展感知系统, 或者说从识别方式方面讲, 是一种可以“看”和“听”的识别装置。

[4] Because of the large storage capacity of computers ,expert systems had the potential to interpret statistics ,in order to formulate rules.

本句中的 Because of the large storage capacity of computers 作原因状语从句。

译文：由于计算机巨大的存储能力,专家系统有分析统计数字的潜力,并总结出规律。

### 练习四 翻译题

1. 自然语言 (Natural language)

(1) 自然语言

(2) 专家系统

(3) 神经网络

(4) 智能软件

(5) 感知系统

(6) 自下而上

(7) 自上而下

(8) 智能计算机

2. 人工智能专家系统 (Expert systems in Artificial Intelligence)

(1) Experts in Artificial intelligence believe that computer will be able to perceive objects as human doing.

(2) Natural language doesn't include idioms that are used by humans.

(3) The research of Artificial intelligence includes natural language ,robotics ,expert systems ,etc.

(4) To create expert systems ,we should develop top-down theorists.

(5) The research of parttern recognition is about perceptive systems.

(6) Expert systems can replace human experts completely in the future.

(7) The theory and insights brought about by Artificial intelligence research will set the trend in the future of computing.

3. 人工智能 (Artificial Intelligence)

(1) \_\_\_\_\_ is the study and creation of machines that exhibit humanlike qualities ,including the ability to reason.

a. Artificial intelligence

b. Expert systems

c. Perceptive systems

d. Natural language

(2) The goal of \_\_\_\_\_ is to develop physical systems that can perform work normally done by humans.

- a. natural language
- b. expert systems
- c. pattern recognition
- d. robotics

(3) Neural networks are usually physical devices that electronically emulate the physiology of animal or human \_\_\_\_\_.

- a. hearts
- b. brains
- c. hands
- d. feet

(4) Fuzzy logic , genetic algorithms and intelligent agents all belong to \_\_\_\_\_.

- a. Expert system
- b. Robot
- c. Intelligent software
- d. Perceptive system

缘溪访翠瑶 研藻昔岳 西云 咏 柳 晓 窗

陝 加 藻 昔 藻 岳 岳 嶽 嶽 嶽 嶽 嶽 嶽 嶽

Here was review briefly the intelligent computing techniques that stand the best chance of developing into major fields for applications today and in the future-fuzzy logic , genetic algorithms and intelligence agents.

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Fuzzy Logic , a relatively new , rule-based development in AI , consists of a variety of concepts and techniques for representing and inferring knowledge that is imprecise , uncertain , or unreliable. Fuzzy logic can create rules that use approximate or subjective values and incomplete or ambiguous data. By allowing expressions such as “ tall ” , “ very tall ” , and “ extremely tall ” , fuzzy logic enables the computer to emulate the way people actually make decisions , as opposed to defining problems and solutions using restrictive IF—THEN rules.

Fuzzy logic is based on the concept of sets and the degree of membership in a set. In traditional computer logic , a set has rigid membership requirements—an object is either true or false , completely included or excluded. Fuzzy logic , on the other hand , allows “ degrees ” of truthfulness that measure the extent to which a given numeric value is included in a “ fuzzy set ”.

### 遗传算法的生物学背景

Some artificial intelligence technologies are using problem-solving approaches found in nature. Genetic algorithms are one example. They consist of a variety of problem-solving techniques based on Darwinian principles of evolution. The algorithms start with building blocks that use processes such as reproduction, mutation, and natural selection to “breed” solutions. As solutions alter and combine, the worst ones are discarded, and better ones survive to go on and electronically breed with others to produce even better solutions. The process may produce results superior to anything crafted by humans.

### 智能代理的概念

The concept of intelligent agents evolved in 1950s as an offshoot of investigations into artificial intelligence. Since that time, the level of interest in intelligent software agents has grown. What exactly goes into these software programs that do their work behind the scenes? They are run by small but effective strings of programming code that demonstrate the task performance capabilities of script language and the communications abilities of object technology. These codes are then allowed to wander free in networks, searching for nuggets of information. The tasks that an intelligent agent performs for a user require the characteristics of specificity, repetitiveness, and predictability. Agents can also work for a business process or a software application and easily outperform humans when they function at a high level.

Intelligent agents have found their way into our daily lives already, perhaps without us having realized it. Operating systems, E-mail systems, mobile computing software, and network tools all serve as hosts for intelligent agents. While these agents show great potential for enhancing many business operations, like many advances in technology, they provoke some controversy as well. One possible use for agents is employee monitoring, which has both organizational and legal ramifications. Agents are also capable of completing financial transactions on their own once a user sets them free to do so. This notion will probably be a cause of great concern for people who worry about the security of their personal information.

### 分布式数据库系统的概念

### 分布式数据库系统

In a distributed database system, the database is stored on several computers. The computers in a distributed system communicate with one another through various communication media, such as high-speed networks or telephone lines. They do not share main memory or disks. The computers in a distributed system may vary in size and function, ranging from

workstations up to mainframe systems.

The computers in a distributed system are referred to by a number of different names , such as sites or nodes , depending on the context in which they are mentioned. We mainly use the term site , to emphasize the physical distribution of these systems.

The main differences between shared-nothing parallel databases and distributed databases are that distributed database are typically geographically separated , are separately administered , and have a slower interconnection. <sup>[1]</sup> Another major difference is that , in a distributed system , we differentiate between local and global transactions. A local transaction is one that accesses data in the single site at that the transaction was initiated. A global transaction , on the other hand , transaction was initiated , or accesses data in several different sites.

#### 例 5.1 银行系统

Consider a banking system consisting of four branches located in four different cities. Each branch has its own computer , with a database consisting of all the accounts maintained at that branch. Each such installation is thus a site. There also exists one single site that maintains information about all the branches of the bank. Each branch maintains (among others) a relation account (Account-schema) , where

Account-schema = (branch-name , account-number , balance)

The site containing information about the four branches maintains the relation branch (Branch-schema) , where

Branch-schema = (branch-name , branch-city , assets)

There are other relations maintained at the various sites ; we ignore them for the purpose of our example.

To illustrate the difference between the two types of transactions , we consider the transaction to add \$ 50 to account number A-177 located at the Valleyview branch. <sup>[2]</sup> If the transaction was initiated at the Valleyview branch , then it is considered local ; otherwise , it is considered global. A transaction to transfer \$ 50 from account A-177 to account A-305 , which is located at the Hillside branch , is a global transaction , since accounts in two different sites are accessed as a resulted of its execution.

What makes this configuration a distributed database system are these facts :

- The various sites are aware of one another.
- The sites share a common global schema , although some relations may be stored at only some sites.
- Each site provides an environment for executing both local and global transactions.
- Each site runs the same distributed database-management software.

If different sites run different database-management software , it is difficult to manage global transactions. <sup>[3]</sup> Such systems are called multidatabase systems or heterogeneous distributed database systems.

### 判断与选择

There are several reasons for building distributed database systems , including sharing of data , autonomy , and availability.

- ~~判断与选择~~ The major advantage in building a distributed database system in the provision of an environment where users at one site may be able to access the data residing at other sites. For instance , in the distributed banking-system example from last section , it is possible for a user in one branch to access data in another branch. Without this capability , a user wishing to transfer funds from one branch to another would have to resort to some external mechanism that would couple existing systems.
- ~~判断与选择~~ The primary advantage of sharing data by means of data distribution is that each site is able to retain a degree of control over data that are stored locally. In a centralized system , the database administrator of the central site controls the database. In a distributed system , there is a global database administrator responsible for the entire system. A part of these responsibilities is delegated to the local database system , each administrator may have a different degree of local autonomy. The possibility of local autonomy is often a major advantage of distributed database.
- ~~判断与选择~~ If one site fails in a distributed system , the remaining sites may be able to continue operating. In particular , if data items are replicated in several sites , a transaction needing a particular data item may find that item in any of several sites. Thus , the failure of a site does not necessarily imply the shutdown of the system.

The failure of one site must be detected by the system , and appropriate action may be needed to recover from the failure. The system must no longer use the services of the failed site. Finally , when the failed site recovers or is repaired , mechanisms must be available to integrate it smoothly back into the system. <sup>[4]</sup>

Although recovery from failure is more complex in distributed systems than in centralized systems , the ability of most of the system to continue to operate despite the failure of one site results in increased availability. Availability is crucial for database systems used for real-time applications. Loss of access to data by , for example , an airline may result in the loss of potential ticket buyers to competitors.

The primary disadvantage of distributed database systems is the added complexity required to ensure proper coordination among the sites. This increased complexity takes

various forms :

- 实现并行数据库比实现集中式数据库更困难且更昂贵。It is more difficult to implement a distributed database system ;thus , it is more costly.
- 由于构成分布式系统的各个站点是并行操作的,因此,要确保算法的正确性,特别是在系统部分发生故障时的恢复,以及从故障中恢复,都存在潜在的极微妙的漏洞。Since the sites that constitute the distributed system operate in parallel , it is harder to ensure the correctness of algorithms , especially operation during failures of part of the system , and recovery from failures. The potential exists for extremely subtle bugs.
- 消息交换和为实现站点间协调而需要的附加计算是集中式系统中不存在的开销。The exchange of messages and the additional computation required to achieve intersite coordination are a form of overhead that does not arise in centralized systems.

In choosing the design for a database system , the designer must balance the advantages against the disadvantages of distribution of data. There are several approaches to distributed database design , ranging from fully distributed designs to ones that include a large degree of centralization.

#### 词汇注释

parallel	平行的 相似的	ignore	忽视 忽略
site	节点 位置 场所	heterogeneous	异种的 异质的
autonomy	自治 自治权	availability	有效性 可利用性
provision	供应品 提供	fund	基金 资金
resort	手段 凭借	delegate	代表
shutdown	停机 停工	smoothly	平滑地 流畅地
crucial	决定性的 重要的	competitor	竞争者
correctness	纠正 校正	overhead	经常开支 普通费用

#### 注释

[ 1 ] The main differences between shared-nothing parallel databases and distributed databases are that distributed database are typically geographically separated , are separately administered , and have a slower interconnection.

本句的主语是 differences ,that... 作表语。

译文:无共享的并行数据库与分布式数据库之间的主要区别在于:分布式数据库一般是地理上分开的,分别管理的,并且是以较低的速度互相连接的。

[ 2 ] To illustrate the difference between the two types of transactions , we consider the transaction to add \$ 50 to account number A-177 located at the Valleyview branch.

本句的“ To illustrate the difference between the two types of transactions ”是目的状语

从句。

译文：为说明两类事务的差别，考虑如下事务：将 \$ 50 增加到 valleyview 分支机构中的账户 A-177 中。

[ 3 ] If different sites run different database-management software , it is difficult to manage global transactions.

本句的“ If different sites run different database-management software ”是条件状语从句。

译文：如果不同的节点运行不同的数据库管理软件，那么管理全局事务就很困难。

[ 4 ] Finally , when the failed site recovers or is repaired , mechanisms must be available to integrate it smoothly back into the system.

本句的“ when the failed site recovers or is repaired ”是时间状语从句。

译文：最后，当故障节点恢复或修理好了，还需要一定的机制来将它平滑地重新集成到系统中。

### 练习 4 录音材料

分布式数据库系统、高速网络、工作站、全局模式、多数据库系统、共享数据、中心节点、局部自治

- (1) 分布式数据库系统
- (2) 高速网络
- (3) 工作站
- (4) 全局模式
- (5) 多数据库系统
- (6) 共享数据
- (7) 中心节点
- (8) 局部自治

通过媒体、相同的媒体、不同的媒体、每个站点、故障恢复、分布式系统、集中式系统、系统、系统、系统

(1) The computers in a distributed system communicate with each other through the same media.

(2) A global transaction was initiated or accesses data in several different sites.

(3) Each site only provides an environment for executing local transactions.

(4) Recovery from failure is more complex in distributed systems than in centralized systems.

(5) If one site fails in a distributed system , the remaining sites could not work.

(6) The distributed systems have greater potential for bugs.

(7) The designer must balance the advantages against the disadvantages of distribution

of data.

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(1) The \_\_\_\_\_ in a distributed system may vary in size and function.

- a. computers
- b. hardware
- c. software
- d. database

(2) There are several reasons for building distributed database systems , including \_\_\_\_\_.

- a. sharing of data and autonomy
- b. autonomy and availability
- c. sharing of data , autonomy , and availability
- d. sharing of data and availability

(3) The primary \_\_\_\_\_ of distributed database systems is the added complexity required to ensure proper coordination among the sites.

- a. advantage
- b. disadvantage
- c. property
- d. character

(4) It is more difficult to implement a distributed database system , so it is more \_\_\_\_\_.

- a. cheaply
- b. costly
- c. quickly
- d. slowly

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阅拜藏宰期藻藻汁藻社

A data warehouse is a repository (or archive) of information gathered from multiple sources , stored under a unified schema , at a single site. Once gathered , the data are stored for a long time , permitting access to historical data. Thus , data warehouses provide the user a single consolidated interface to data , making decision-support queries easier to write. Moreover , by accessing information for decision support from a data warehouse , the decision maker ensures that on-line transaction-processing systems are not affected by the decision-support

workload.

Fig. 5-1 shows the architecture of a typical data warehouse ,and illustrates the gathering of data ,the storage of data ,and the querying and data-analysis support. Among the issues to be addressed in building a warehouse are the following :

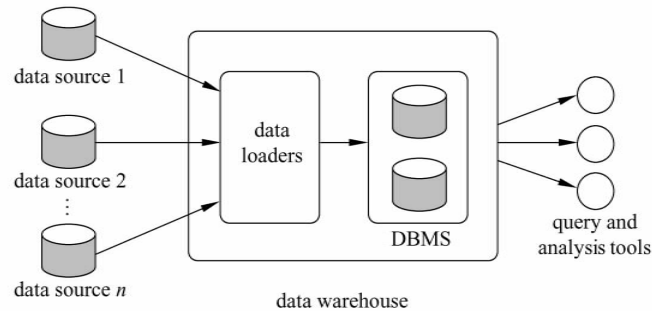


Fig. 5-1 data-warehouse architecture

- In a source-driven architecture for factoring data , the data sources transmit new information , either continually , as transaction processing takes place , or periodically , such as each night. In a destination-driven architecture , the data warehouse periodically sends requests for new data to the sources.

Unless updates at the sources are replicated at the warehouse via two-phase commit , the warehouse will never be quite up to date with the sources. Two-phase commit is usually far too expensive to be an option , so data warehouses typically have slightly out-of-date data. That , however , is usually not a problem for decision-support systems.

- Data sources that have been constructed independently are likely to have different schemas. In fact , they may even use different data models. Part of the task of a warehouse is to perform schema integration , and to convert data to the integrated schema before they are stored. As a result , the data stored in the warehouse are not just a copy of the data at the sources. Instead , they can be thought of as a stored view (or materialized view) of the data at the sources.
- Updates on relations at the data sources must be propagated to the data warehouse. If the relations at the data warehouse are exactly the same as those at the data source , the propagation is straightforward.
- The raw data generated by a transaction-processing system may be too large to store on-line. However , we can answer many queries by maintaining just summary data obtained by aggregation on a relation , rather than

maintaining the entire relation. For example, instead of storing data about every sale of clothing, we can store total sales of clothing by category.

## 缘缘瑶耘上壤费竖算而棠霖则霖孕攀北留早

### 缘缘瑶耘上壤费竖算而棠霖则霖孕攀北留早

Enterprise resource planning software, or ERP, doesn't live up to its acronym. Forget about planning—it doesn't do much of that—and forget about resource, a throwaway term. But remember the enterprise part. This is ERP's true ambition. It attempts to integrate all departments and functions across a company into a single computer system that can serve all those different departments' particular needs.

That is a tall order, building a single software program that serves the needs of people in finance as well as it does the people in human resources and in the warehouse. Each of those departments typically has its own computer system optimized for the particular ways that the department does its work. But ERP combines them all together into a single, integrated software program that runs off a single database so that the various departments can more easily share information and communicate with each other. That integrated approach can have a tremendous payback if companies install the software correctly.

Take a customer order, for example. Typically, when a customer places an order, that order begins a mostly paper-based journey from in-basket to in-basket around the company, often being keyed and rekeyed into different departments' computer systems along the way.<sup>[1]</sup> All that lounging around in in-baskets causes delays and lost orders, and all the keying into different computer systems invites errors. Meanwhile, no one in the company truly knows what the status of the order is at any given point because there is no way for the finance department, for example, to get into the warehouse's computer system to see whether the item has been shipped. "You'll have to call the warehouse" is the familiar refrain heard by frustrated customers.

ERP vanquishes the old standalone computer systems in finance, HR, manufacturing and the warehouse, and replaces them with a single unified software program divided into software modules that roughly approximate the old standalone systems. Finance, manufacturing and the warehouse all still get their own software, except now the software is linked together so that someone in finance can look into the warehouse software to see if an order has been shipped. Most vendors' ERP software is flexible enough that you can install some modules without buying the whole package. Many companies, for example, will just install an ERP

finance or HR module and leave the rest of the functions for another day.

What will ERP fix in my business ?

There are five major reasons why companies undertake ERP. <sup>[2]</sup>

**Integrate financial information**—As the CEO tries to understand the company's overall performance , he may find many different versions of the truth. Finance has its own set of revenue numbers , sales has another version , and the different business units may each have their own version of how much they contributed to revenues. ERP creates a single version of the truth that cannot be questioned because everyone is using the same system.

**Integrate customer order information**—ERP systems can become the place where the customer order lives from the time a customer service representative receives it until the loading dock ships the merchandise and finance sends an invoice. By having this information in one software system , rather than scattered among many different systems that can't communicate with one another , companies can keep track of orders more easily , and coordinate manufacturing , inventory and shipping among many different locations at the same time.

**Standardize and speed up manufacturing processes**—Manufacturing companies—especially those with an appetite for mergers and acquisitions—often find that multiple business units across the company make the same widget using different methods and computer systems. ERP systems come with standard methods for automating some of the steps of a manufacturing process. Standardizing those processes and using a single , integrated computer system can save time , increase productivity and reduce head count.

**Reduce inventory**—ERP helps the manufacturing process flow more smoothly , and it improves visibility of the order fulfillment process inside the company. That can lead to reduced inventories of the stuff used to make products ( work-in-progress inventory ) , and it can help users better plan deliveries to customers , reducing the finished good inventory at the warehouses and shipping docks. To really improve the flow of your supply chain , you need supply chain software , but ERP helps too.

**Standardize HR information**—Especially in companies with multiple business units , HR may not have a unified , simple method for tracking employees' time and communicating with them about benefits and services. ERP can fix that. In the race to fix these problems , companies often lose sight of the fact that ERP packages are nothing more than generic representations of the ways a typical company does business. While most packages are exhaustively comprehensive , each industry has its quirks that make it unique. Most ERP systems were designed to be used by discrete manufacturing companies ( that make physical things that can be counted ) , which immediately left all the process manufacturers ( oil , chemical and utility

companies that measure their products by flow rather than individual units) out in the cold. Each of these industries has struggled with the different ERP vendors to modify core ERP programs to their needs.

Needless to say, the move to ERP is a project of breathtaking scope, and the price tags on the front end are enough to make the most placid CFO a little twitchy. In addition to budgeting for software costs, financial executives should plan to write checks to cover consulting, process rework, integration testing and a long laundry list of other expenses before the benefits of ERP start to manifest themselves. Underestimating the price of teaching users their new job processes can lead to a rude shock down the line, and so can failure to consider data warehouse integration requirements and the cost of extra software to duplicate the old report formats. A few oversights in the budgeting and planning stage can send ERP costs spiraling out of control faster than oversights in planning almost any other information system undertaking.

Companies that install ERP do not have an easy time of it. Don't be fooled when ERP vendors tell you about a three or six months average implementation time.<sup>[3]</sup> Those short (that's right, six months is short) implementations all have a catch of one kind or another: The company was small, or the implementation was limited to a small area of the company, or the company used only the financial pieces of the ERP system (in which case the ERP system is nothing more than a very expensive accounting system). To do ERP right, the ways you do business will need to change and the ways people do their jobs will need to change too.<sup>[4]</sup> And that kind of change doesn't come without pain. Unless, of course, your ways of doing business are working extremely well (orders all shipped on time, productivity higher than all your competitors, customers completely satisfied), in which case there is no reason to even consider ERP.

The important thing is not to focus on how long it will take—real transformational ERP efforts usually run between one and three years, on average—but rather to understand why you need it and how you will use it to improve your business.

#### 运营字典

acronym	首字母组合词	throwaway	一次性使用的物品
journey	旅程, 旅行	lounge	闲逛, 休闲
refrain	节制, 避免, 克制	frustrate	挫败, 击败
vanquish	打败, 克服	standalone	独立
vendor	供应商, 卖主	revenue	收入, 税收
merchandise	商品, 货物	invoice	发票, 发货票

inventory	详细目录 存货清单	standardize	标准化
merger	合并 归并	acquisition	获得 获得物
fulfillment	实现 履行	exhaustively	彻底地 详尽地
comprehensive	广泛的 有理解力的	quirk	特点
placid	平静的 温和的	twitchy	抽搐 阵痛
laundry	洗衣店	manifest	载货单
spiral	螺旋形的 盘旋的	transformational	变化的 改革的

### 案例解析

[1] Typically, when a customer places an order, that order begins a mostly paper-based journey from in-basket to in-basket around the company, often being keyed and rekeyed into different departments' computer systems along the way.

when a customer places an order 是时间状语从句 in-basket 译为“文件篮”。

译文：典型地，当一个客户发送了一份订单，他就开始以书面的形式在企业各个部门的文件篮里“旅行”，常常被一再地键入不同部门的计算机信息系统。

[2] There are five major reasons why companies undertake ERP.

why companies undertake ERP 是原因状语从句。

译文：有五个主要理由告诉你为什么要企业中实施 ERP。

[3] Don't be fooled when ERP vendors tell you about a three or six months average implementation time.

本句的主语省略，由 when 引导时间状语从句。

译文：不要听信 ERP 系统卖主所说的平均实施时间是 3 个月到 6 个月。

[4] To do ERP right, the ways you do business will need to change and the ways people do their jobs will need to change too.

To do ERP right 是目的状语从句，the ways... the ways... 是具有相同结构的并列句。

译文：要正确实施 ERP，你要改变你以前的经商方式，人们也要改变他们做自己的工作的方式。

### 练习与思考

1. 将下列句子翻译成中文。

- (1) 企业资源计划
- (2) 人力资源
- (3) 整合财务信息
- (4) 用户订单
- (5) 制造过程

- (6) 生产力
- (7) 供应链
- (8) 竞争者

國發科委業化增助深業本定選學生早賦遺業初信業與云奔登業本精觀世各早賦則深業則豐成

- (1) ERP attempts to integrate all departments and functions across a company into a single computer system.
- (2) You must buy the whole ERP software instead of buying some modules.
- (3) After installing ERP , everyone in the company can access the same system.
- (4) One advantage of ERP is it can standardize and speed up manufacturing processes.
- (5) Companies that install ERP need short implementation time.
- (6) Companies that have installed ERP do not need to change their ways of doing business.
- (7) If your ways of doing business are working extremely well , you don't need to install ERP.

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- (1) \_\_\_\_\_ combines all needs of the company together in order to create a integrated software.
  - a. Human resources management
  - b. Enterprise resource planning
  - c. Finance management
  - d. Warehouse management
- (2) ERP software is \_\_\_\_\_ enough that you can install only parts of modules.
  - a. quick
  - b. slow
  - c. cheap
  - d. flexible
- (3) To do ERP \_\_\_\_\_ , the ways people do their jobs will need to change.
  - a. different
  - b. wrong
  - c. right
  - d. slow
- (4) ERP can standardize HR information , especially in \_\_\_\_\_ with multiple business units.

- a. companies
- b. departments
- c. schools
- d. colleges

缘缘猿瑶砾蒙岩早云券奥曝造

耘匝孕糈土歪责煨蒙拜糈皂券社燧冷意译译责澳时奥电焚社糈

ERP's best hope for demonstrating value is as a sort of battering ram for improving the way your company takes a customer order and processes it into an invoice and revenue—otherwise known as the order fulfillment process. That is why ERP is often referred to as back-office software. It doesn't handle the up-front selling process (although most ERP vendors have recently developed CRM software to do this); rather, ERP takes a customer order and provides a software road map for automating the different steps along the path to fulfilling it. When a customer service representative enters a customer order into an ERP system, he has all the information necessary to complete the order (the customer's credit rating and order history from the finance module, the company's inventory levels from the warehouse module and the shipping dock's trucking schedule from the logistics module, for example).

People in these different departments all see the same information and can update it. When one department finishes with the order it is automatically routed via the ERP system to the next department. To find out where the order is at any point, you need only log in to the ERP system and track it down. With luck, the order process moves like a bolt of lightning through the organization, and customers get their orders faster and with fewer errors than before. ERP can apply that same magic to the other major business processes, such as employee benefits or financial reporting.

That, at least, is the dream of ERP. The reality is much harsher.

Let's go back to those inboxes for a minute. That process may not have been efficient, but it was simple. Finance did its job, the warehouse did its job, and if anything went wrong outside of the department's walls, it was somebody else's problem. Not anymore. With ERP, the customer service representatives are no longer just typists entering someone's name into a computer and hitting the return key. The ERP screen makes them businesspeople. It flickers with the customer's credit rating from the finance department and the product inventory levels from the warehouse. Will the customer pay on time? Will we be able to ship the order on time? These are decisions that customer service representatives have never had to make before, and the answers affect the customer and every other department in the company. But it's not just the customer service representatives who have to wake up. People in the

warehouse who used to keep inventory in their heads or on scraps of paper now need to put that information online. If they don't, customer service reps will see low inventory levels on their screens and tell customers that their requested item is not in stock. Accountability, responsibility and communication have never been tested like this before.

People don't like to change, and ERP asks them to change how they do their jobs. That is why the value of ERP is so hard to pin down. The software is less important than the changes companies make in the ways they do business. If you use ERP to improve the ways your people take orders, manufacture goods, ship them and bill for them, you will see value from the software. If you simply install the software without changing the ways people do their jobs, you may not see any value at all—indeed, the new software could slow you down by simply replacing the old software that everyone knew with new software that no one does.

# 练习答案

## 第 4 章 寄存器

### 4.1 名词解释

1. 锁存器 latch

(1) 锁存器 latch

(2) 选通脉冲 strobe pulse

(3) R-S 触发器 R-S flip-flop

(4) 有效数据 valid data

(5) 向左移位操作 a shift-left operation

(6) 输出变量 output variable

(7) 8 位移位寄存器 8-bit shift register

(8) 二进制信息 binary information

2. 寄存器 register

F T F F T F T

3. 寄存器 register

(1) c A gated latch

(2) a Clock pulses

(3) b binary

(4) a A control state

### 4.2 名词解释

1. 存储单元 memory unit

(1) 存储单元 memory unit

(2) 输出设备 output devices

- (3) 更新 update  
 (4) 系统板 the system board  
 (5) 视频显示终端 a video display terminal  
 (6) 键盘 keyboard  
 (7) 分别地 respectively  
 (8) 高速打印机 high-speed printer

圆媛裁燥 番藻健增 燥藻本燥增 早燥燥 遭燥裁燥 燥燥云 葬燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥  
 F T T F T F T

猿媛燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥

- (1) c CPU , memory and I/O system  
 (2) a Internal memory  
 (3) d AT and ATX styles  
 (4) b expansion cards

### 圆媛燥燥 燥燥燥燥

员媛裁燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥

- (1) 智能 intelligence  
 (2) 取指—译码—执行 fetch-decode-execute  
 (3) 算术逻辑运算 Arithmetic Logical Operations  
 (4) 硅 silicon  
 (5) 区别 辨别 distinguish  
 (6) 顺序 sequence  
 (7) 发出 释放 release  
 (8) 兆赫 Megahertz

圆媛裁燥 番藻健增 燥燥本燥增 早燥燥 遭燥裁燥 燥燥云 葬燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥  
 F T T F T F F

猿媛燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥 燥燥燥燥

- (1) c a control unit and an arithmetic/logic unit  
 (2) d instructions  
 (3) a A register  
 (4) b fetch-decode-execute



- (3) b control bus  
 (4) b tens MHz to hundreds MHz

## 第 7 章 数据库系统

### 7.1 数据库系统

1. (1) 数据库系统 (2) 数据库系统 (3) 数据库系统 (4) 数据库系统 (5) 数据库系统 (6) 数据库系统 (7) 数据库系统 (8) 数据库系统

- (1) 内部结构 internal construction  
 (2) 数据类型 data type  
 (3) 数据结构 data structure  
 (4) 数据值 data value  
 (5) 作用于 act on  
 (6) 抽象数据类型 abstract data type  
 (7) 链接结构 linked structure  
 (8) 算术表达式 arithmetic expression

2. (1) 数据库系统 (2) 数据库系统 (3) 数据库系统 (4) 数据库系统 (5) 数据库系统 (6) 数据库系统 (7) 数据库系统 (8) 数据库系统

T F F T F T T

3. (1) 数据库系统 (2) 数据库系统 (3) 数据库系统 (4) 数据库系统

- (1) c either component values or component elements  
 (2) c object-oriented  
 (3) d first-in/first-out  
 (4) b first-in/last-out

### 7.2 数据库系统

1. (1) 数据库系统 (2) 数据库系统 (3) 数据库系统 (4) 数据库系统 (5) 数据库系统 (6) 数据库系统 (7) 数据库系统 (8) 数据库系统

- (1) 数据库管理系统 database management system  
 (2) 数据定义语言 data definition language  
 (3) 数据字典 data dictionary  
 (4) 不一致 inconsistency  
 (5) 发生, 出现 occurrence  
 (6) 数据库管理员 database administrator  
 (7) 程序员 programmer  
 (8) 完整性约束 integrity constraint





- |          |                   |
|----------|-------------------|
| (2) 广域网  | Wide Area Network |
| (3) 通信   | communication     |
| (4) 物理布局 | physical layout   |
| (5) 环网   | ring network      |
| (6) 星形网络 | star network      |
| (7) 点对点  | point to point    |
| (8) 网关   | gateway           |

源爱判桌番策址增册桌本选增早则桌道桌劫信桌像云奔桌考精桌世生早则桌册桌成  
F T T F T T F

猿爱晒桌番早悦桌皂责桌桌译桌

- (1) a bus network
- (2) b star network
- (3) c cable
- (4) d hardware

源爱晒桌番早悦桌皂责桌桌译桌

员爱判桌番策址增册桌本选增早则桌道桌劫信桌像云奔桌考精桌世生早则桌册桌成

- (1) 电话应用接口程序 TAPI (Telephony API)
- (2) 文件服务器 file server
- (3) 分布式网络 distributed network
- (4) 集成网络 integrated network
- (5) 帮助菜单 Help menu
- (6) 面向服务的 service-oriented
- (7) 视频会议 conference video
- (8) 中间件 middleware

源爱判桌番策址增册桌本选增早则桌道桌劫信桌像云奔桌考精桌世生早则桌册桌成  
T F T F T F T

猿爱晒桌番早悦桌皂责桌桌译桌

- (1) d server-oriented
- (2) c service number
- (3) d World Wide Web
- (4) a Programs





T F T F T T F

猿猴晒草喜鹊早悦巢皂猴猴猴上猴上

- (1) d images
- (2) a 2 bits
- (3) c Digital image processing
- (4) b \*.DOC

猿猴晒草喜鹊早悦巢皂猴猴猴上猴上

猿猴晒草喜鹊早悦巢皂猴猴猴上猴上

- (1) 全彩色图像 full-color image
- (2) 交通状况 traffic condition
- (3) 图形技术 graphics technology
- (4) 著作系统 authoring-system
- (5) 外围设备 peripherals
- (6) 光盘驱动器 optical disk driver
- (7) 编程工具 programming tools
- (8) 多媒体辅助工具 multimedia-assisted tools

F T T F F T F

猿猴晒草喜鹊早悦巢皂猴猴猴上猴上

- (1) d it can do all above at the same time.
- (2) a multimedia
- (3) b interfaces
- (4) c multimedia applications

猿猴晒草喜鹊早悦巢皂猴猴猴上猴上

猿猴晒草喜鹊早悦巢皂猴猴猴上猴上

- (1) 自然语言 natural language
- (2) 专家系统 expert system
- (3) 神经网络 neural network
- (4) 智能软件 intelligent software
- (5) 感知系统 perceptive system
- (6) 自下而上 bottom-up

- (7) 自上而下 top-down  
 (8) 智能计算机 intelligent computer

圆媛裁燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥 燥燥  
 T F T F T F T

猿媛砾燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥

- (1) a Artificial intelligence  
 (2) d robotics  
 (3) b brains  
 (4) c Intelligent software

缘媛砾燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥

圆媛裁燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥

- (1) 分布式数据库系统 distributed database system  
 (2) 高速网络 high-speed network  
 (3) 工作站 workstation  
 (4) 全局模式 global schema  
 (5) 多数据库系统 multi-database system  
 (6) 共享数据 sharing of data  
 (7) 中心节点 central site  
 (8) 局部自治 local autonomy

圆媛裁燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥  
 F T F T F T T

猿媛砾燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥

- (1) a computers  
 (2) c sharing of data , autonomy , and availability  
 (3) b disadvantage  
 (4) b costly

缘媛砾燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥

圆媛裁燥 善策址增 燥桌本造 曾早 燥遣 裁劫作 燥像 云葬 燥非 燥燥 燥燥 燥燥

- (1) 企业资源计划 Enterprise resource planning  
 (2) 人力资源 human resources  
 (3) 整合财务信息 integrate financial information  
 (4) 用户订单 customer order

- (5) 制造过程                    manufacturing process
- (6) 生产力                      productivity
- (7) 供应链                      supply chain
- (8) 竞争者                      competitor

圆爰裁泉至该此委增办城泉至该委至早爰遭集裁办景像川云吞集孝精眼世至早爰办城泉建城

T F T T F F T

猿爰办泉至该此委增办城泉至该委至早爰遭集裁办景像川云吞集孝精眼世至早爰办城泉建城

- (1) b   Enterprise resource planning
- (2) d   flexible
- (3) c   right
- (4) a   companies

# 参考译文

## 第 4 章 硬件知识

### 4.1 硬件基础

#### 课文

#### 门控锁存器

微处理器使用了各种各样的门控锁存器。门控锁存器(图 2-1)有一个门控或选通输入,该输入为数据提供了一个输入窗口。除了选通脉冲的短暂脉冲持续时间外,选通输入对出现在 D 端的任何数据起到封锁的作用。这种锁存器称之为透明锁存器,因为在门控或选通脉冲持续时间,其 Q 输出端跟随 D 输入端。当该控制脉冲较宽时,称之为门控脉冲,相反,相对较窄的脉冲被称为选通脉冲。

我们说图 2-1 中 D 端的数据是选通到锁存器中去的。除了在选择脉冲期间,门控输入部分是冻结的。符合要求的数据称为有效数据,当门控端被激励到逻辑高时,该有效数据将被接收到锁存器中。另一方面,非有效数据(无效数据)将在门控端被激励到逻辑低时被拒绝或冻结。透明的锁存器有一个优点,如果选通脉冲适当交错开的话,用一根 D 线可以给一个以上的锁存器输入数据。

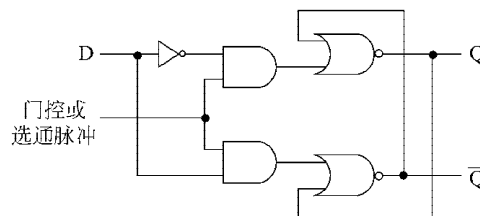


图 2-1 基本的门控锁存器

#### 触发器与时钟脉冲

微处理器既使用锁存器也使用触发器。基本的 RS 锁存器或基本的 D 锁存器不是触

发器,因为它们都是异步的器件(不是时钟同步的)。也就是说,无论数据脉冲何时到达,锁存器随时能起作用。另一方面,我们将会看到,触发器是一种同步器件,它是受时钟脉冲控制的,只有当某一个时钟脉冲到达的时候它才能改变状态。时钟脉冲基本上是方波,它们的重复率可能很低,也可能有很高的重复率。

注意,图 2-2 所示的简单设计是作为一个触发器工作的,因为 RS 锁存器的功能锁定在与时钟输入同步。这是一种低电平有效的线路接法,只有当时钟脉冲为低电平时,R 及 S 输出端才可能互补。请注意图 2-1 和图 2-2 的电路的相似性,如果图 2-1 中的门控或选通脉冲用时钟信号来代替,该锁存器就称为触发器了。换句话说,门控脉冲可以发生在任何时候,而时钟输入是一个稳定的方波信号。

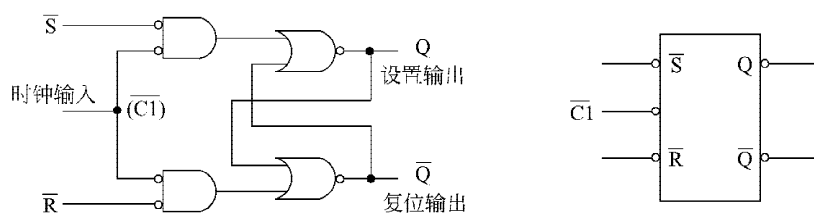


图 2-2 RS 触发器

### 移位寄存器

能够将其二进制信息在一个或两个方向移动的寄存器称为移位寄存器。移位寄存器的逻辑结构是由一连串串联的触发器所组成的,一个触发器的输出端连接到相邻的触发器的输入端。所有的触发器都接受公共的时钟脉冲,该时钟脉冲使寄存器从一个状态进入到下一个状态。

最简单的移位寄存器是如图 2-3 所示的只使用触发器的移位寄存器。某一个触发器的输出连接到其右边的触发器的 D 输入端,时钟是所有触发器公用的。由串行输入端决定移位期间进入到移位寄存器最左边的是什么数据,串行输出从最右边的触发器的输出端获得。

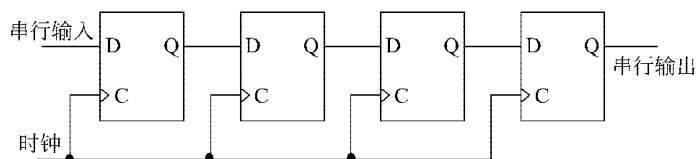


图 2-3 4 位移位寄存器

有时候有必要对移位进行控制,以便移位只对某些特定脉冲而不对其他脉冲发生。这可以通过在寄存器的输入端禁止那些我们不想由它们引起移位的时钟脉冲来实现。当

使用图 2-3 所示的移位寄存器时,可以通过把时钟接到与门的一个输入端来实现移位控制,该与门的第二个输入端通过禁止时钟来控制移位。

能够在两个方向上移位的寄存器叫做双向移位寄存器,而能够在两个方向上移位的寄存器叫做双向移位寄存器。有些移位寄存器为并行传送提供了必要的输入端。最为通用的移位寄存器具有下面所列出的全部功能;其他移位寄存器可能只具有某些功能,但是至少具有一种移位操作。

- 具有一个时钟输入端以便同步全部操作。
- 右移操作以及与右移操作有关的串行输入线。
- 左移操作以及与左移操作有关的串行输入线。
- 并行输入操作以及与并行传送操作有关的  $n$  根输入线。
- $n$  根并行输出线。
- 一个控制状态,它使保存在寄存器内的信息在连续施加时钟脉冲也不会改变。

#### 组合电路

组合电路是具有一组输入和输出信号的若干逻辑门的连接排列。在任何给定的时间,输出的二进制值是输入二进制值组合的函数。组合电路的框图如图 2-4 所示。 $n$  位二进制输入变量来源于外部, $m$  位二进制输出变量也输出到外部部件,在两者之间是一个逻辑门的互连网络。组合电路通过传输二进制信息,使得给定的输入数据产生了所需要的输出数据。

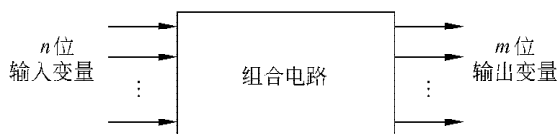


图 2-4 组合电路的框图

组合电路可以由表示  $n$  位输入变量和  $m$  位输出变量之间二进制位关系的真值表来描述。真值表列出了针对  $2^n$  个输入组合中的每一种情况的相应输出的二进制组合。组合电路也能规定  $m$  种布尔函数,每种函数对应一个输出变量,每个输出函数根据  $n$  位输入变量来表达。

#### 阅读资料

#### 逻辑电路

众所周知,计算机系统内部运行的关键部分是以信息处理的方式完成的,我们也知道它是通过被集成到若干功能单元里的逻辑电路实现的。

必须明确的是:计算机中所有的集成电路物理元件只能具备“开”或“关”两种状态中的一种状态。

以推理方式组织的逻辑用于作出判断。为了对计算机作出逻辑判断,已经研制了三种基本的逻辑电路(也称逻辑门):“或”电路、“与”电路和“非”电路。

数字计算机的设计基于称为布尔代数的逻辑方法学,它采用三种基本运算:逻辑加,称为“或”功能;逻辑乘,称为“与”功能;逻辑求补,称为“非”功能。布尔代数中的变量是二进制数,也就是说,一个操作或一系列操作之后的结果变量也只能是1或0两个值之一。这两个值也可被认为是正确或错误、是或否,以及正的或负的。

因为开关只能是“开”或“关”两个状态,所以它最适合表示两状态变量值了。

只有三种基本逻辑运算:合取(逻辑乘积)通常称为“与”;析取(逻辑和)通常称为“或”;而否定通常称为“非”。

迄今为止,可见开关(最简单的电子元件)的不同组合可以用于构造计算机的基本逻辑电路。

“或”电路有两个或多个输入及一个输出。输入、输出都可以处于0或1两种状态中的一种。“或”电路设计成当任一输入为1时,输出即为1。我们可以列出开关状态的各种组合以及对应的输出状态,这个表叫真值表。从中可以看到,只有所有输入都为0时输出才是0。

这种电路叫或门,它通常用于对输入状态中是否至少有一个为1作出逻辑判断。

“与”电路也有几个输入和一个输出。然而只有当所有输入同时为逻辑1时,电路输出才为逻辑1。

与门用于对输入信号是否同时为1的情况作出逻辑判断。

逻辑门的输入端数量叫扇入。逻辑门只有一个输出信号,但可能需要将此信号作为其他若干个逻辑门的输入。特定门的输出能驱动的其后门的数量叫扇出。

“非”电路是单入单出,它的输出状态总是与输入状态相反。使输出状态与输入状态相反的运算叫反相,能实现此功能的电路叫反相器。

尽管逻辑门至少有两个输入一个输出,但显然反相器只有单入单出。

如上所述,只有三种基本逻辑运算,我们可以用相应的逻辑电路实现之,计算机内的所有功能都可以由这三种基本逻辑运算的组合来实现。

## 圆形计算机系统

### 课文

#### 数字计算机系统

数字计算机系统的硬件划分成4个功能部分。图2-5的方框图表示了一台简化了的计算机的4个基本单元:输入设备、中央处理器、存储器以及输出设备。就整个计算机系统来说,每一部分都具有某种特定的功能。

中央处理器是计算机系统的核心,它负责实现由程序启动的全部算术运算和逻辑判断。除了算术和逻辑功能外,CPU还控制整个系统的运行。

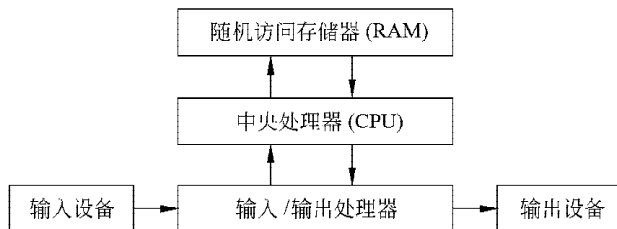


图 2-5 数字计算机的方框图

另一方面 输入/输出设备是 CPU 和外部世界通信的手段。输入设备用来向 CPU 输入要进行处理的信息和命令,例如,键盘可以用来输入新的程序。经过处理所产生的信息必须输出。来自系统的这种数据输出是在输出设备的控制下实现的。输出信息的方法有由高速打印机产生的打印纸或者视频显示终端的屏幕显示。

计算机的存储器用来存储信息,如数字、名字及地址。用 store 这个词我们表示存储器具有保留这些信息以便今后处理或输出的能力。定义计算机如何输出数据的程序也驻留在存储器中。

在计算机系统中,存储器划分成两种不同的类型,称作主存储器和辅助存储器。有时,它们也分别被称为内存和外存。外存用来长期存储现在不使用的信息。例如,它存储程序、各种数据文件及信息文件。在大多数计算机里,这类存储器使用磁性介质存储,如磁带、磁盘及磁鼓。这是由于它们具有存储大容量数据的能力。内存只是存储器的一小部分,它用来临时存储程序、数据及信息。例如,当某段程序准备要执行时,其指令及数据和信息文件首先从外存取到内存,然后程序得以执行,保存在内存中的文件得到更新。当由程序定义的处理任务完成之后,被更新的文件又返回到外存中去。程序及其各种文件保留在外存中以便日后使用。

### 主 板

在计算机系统中,主板几乎和 CPU 一样重要。如果 CPU 是心脏或大脑,那么主板是血管或神经系统。CPU 必须在主板的帮助下来控制和管理整个系统。主板实际上是计算机部件中最大的电路板。在它上面,有许多元件、插座、插槽和接插件。它能把 CPU 和外围设备联系在一起,下面将依次介绍一些主要元件、插座、插槽和接插件。处理器插座是用来固定 CPU 的,可以很容易地把 CPU 插入其中,因为处理器插座是零插拔力插座,插座旁的小杠杆将帮助插座固定 CPU。电源是计算机的能源。大部分的主板采用两种电源插座:AT 和 ATX。当用 AT 插座时要小心,必须保证电缆插头和 AT 插座处于正确的位置,否则将毁坏计算机。

芯片组是主板的司令部,它管理着数据的传输。如果拿 286 主板和奔腾主板相比较,将会发现在 286 主板上有许多各种各样的元件且主板电路复杂。但奔腾的主板看起来简

单明了,主板上只有很少几个元件。为什么这两种主板有如此大的差别呢?原来,在 286 主板上的大部分元件和部分复杂电路在奔腾主板上都集成到一个芯片组上去了,所以奔腾主板看起来美观且性能更好。芯片组由两个部分组成:南桥和北桥。南桥主管 PCI 总线、ISA 总线和外围设备之间的数据传送,北桥控制了 CPU、L2 高速缓冲器和 DRAM 之间的数据传送,且管理动力源。

#### 扩展槽与扩展卡

在母板的后面部分,也就是在主机箱的后挡板上,会发现几个细长的槽,它们是扩展槽,可把专用的扩展卡插入槽中。这种想法使你能够通过给 PC 机增加它没有的可选器件来扩展其功能。用于 PC 机的扩展卡的种类是无止境的。不久前,扩展卡提供的是现在认为的基本功能:更多的存储器、一个打印机端口、一个游戏操纵杆端口、系统时钟等。目前,扩展卡可提供音乐合成器、传真机、CD-ROM 驱动器、扫描器、外部视频输入和一些外加设备。

有几种不同的用于 PC 机扩展槽和扩展卡的系统,最常见的是 ISA。ISA 是工业标准结构的英文缩略语。ISA 是老式总线,ISA 插槽已很少生产,现有的插槽仅用于老式的扩展卡。AGP 的意思是加速图形卡接口。如果把图形加速卡插进槽中,它将提高计算机 3D 图像的显示质量。如果你有一个 IBM PS/2 系统,很可能使用的是 MCA(即微信道结构)扩展槽/扩展卡系统(一些 PS/2 使用老式的 ISA)。为什么会有不同的扩展槽系统?因为 ISA 的技术不能满足某些用户要求的那样先进,IBM 公司开始改进其 PS/2 计算机系列,但是无人仿效。因此目前老式的 ISA 标准仍在流行,并且各种各样的扩展卡能用在这种计算机上。第三种标准是 EISA,仅应用于非常高级的工程技术和网络服务系统。E 是昂贵的英文字头。

一些令人注目的快速 Pentium 计算机装有速度很快的 PCI 扩展槽。与本机母线扩展槽一样,PCI 扩展槽可使专用 PCI 扩展卡更快地工作。一个常规的扩展卡在专用的 PCI 槽内工作良好,但不应考虑把本机母线卡插入 PCI 槽。

#### 阅读资料

#### 砸碎拼凑技术

RISC 方法学是基于由一套结构设计规范引导的自上而下的方法,其主要目的是减少硬件和实用级之间的语义差别,同时最大限度地提高执行速度。因此,在 RISC 设计方法学中的第一步就是对应用编码的详尽分析,以便发现使用频度最高的操作。这个分析必须通过大量的与应用领域相关的程序代码来完成,所引用的主要例子是在过去较为常用的 C 编程、符号处理和信号处理等方面。对高频度操作的研究使得设计人员能够确定指令系统结构。下一步是对每一个指令能否不增加周期时间而适合基本结构模型进行验证:提高性能的关键是使用单周期执行,并尽量缩短周期时间。需要注意的是,某一给定的实现技术和相应软件工具的选择也会对设计产生极大的影响。

下面 9 点是 RISC 的设计规范。

1. 相对少的指令以及对每一条指令的单周期操作。
2. 极少的寻址方式和一个固定的指令格式。
3. 没有微代码的硬连线控制。
4. 复杂指令向软件转移。
5. 只有 load 和 store 指令才涉及外部存储器。
6. 每一个指令必须与一个流水线模式相配合,该模式允许数个操作的一些部分同时处理。
7. 延迟转移允许不影响流水线的情况下执行条件和非条件跳转。
8. 结构必须至少有 32 个通用寄存器和大容量高速缓冲存储器。
9. 结构必须能适用专用领域并支持高级语言。

RISC 的主要原则表明:许多固定运行时间的复杂指令可以并且应该由优化编译器先于运行时间进行处理。最终的硬件结构必须相当简单,以确保每条指令单周期的执行以及很短的时钟周期。注意,所有这些特性,特别是流水线和高性能存储器已经在巨型机设计上使用多年。应该记住,RISC 的主要优势在于将所有这些概念集成于一个单一的结构模型中,并配以连贯的自上而下的方法。

最后要讨论的是,RISC 微处理器和 CISC 微处理器之间的主要区别。RISC 是一种表明软硬件之间新关系的新设计方法学,而不是一系列技术特性。实际上,RISC 方法对计算机设计的效果已远远不止是使 CPU 运行更快速的各种方法的集合。在这个意义上,“精简指令系统计算机”一词有点让人误解。RISC 设计的真正目的肯定不是任意地减少指令的数量,相反,其主要目的是通过使编译系统与硬件相匹配来产生一个高速的计算机。CISC 设计的主要目的是减少用于执行程序的指令数量,而 RISC 主要是减少每条指令时钟周期(CPI)的平均数。两种结构均想通过使用高速技术来提高时钟频率。但是,由于 RISC 降低了复杂性使之能更早地采用该技术,它在性能方面提高更大。

无论其他微处理器设计者是否赞同 RISC,他们已经受到 RISC 方法学的影响。例如:Motorola 的 68030 已采用了 RISC 的一些特性。RISC 的魅力就在于它是基于一种真正的设计方法,而该设计方法是由编译技术的进步而推动的。在 RISC 中,硬件工程师和编译设计师合作制定出一个统一的设计思想:即仅将那些由其在程序跟踪分析中的出现而证实的指令集成于硬件,从而将硬件的复杂程度降为最低。

## 圆舞曲中央处理器

### 课文

计算机能够解决一系列问题,作出成百甚至上千个逻辑判定而不感到疲劳和厌烦。计算机能够在人类做这项工作所需的一小部分时间内就找到问题的答案。计算机可以代替人们做那些单调的日常工作,但是它没有创造力;计算机根据给它的指令工作,而不能

行使任何意义的判断。但是计算机几乎在瞬间就可以处理大量的算术逻辑运算。

CPU 即中央处理器,是计算机的心脏。微机上的 CPU 实际上是一个很小的集成电路芯片。虽然大多数 CPU 芯片比一块眼镜片还小,但所包含的电子元件在几十年前却要装满一个房间。应用先进的微电子技术,制造者能够把上万个的电子元件集成到很小很薄的硅芯片上,这些芯片的工作性能可靠且不耗电。中央处理器协调计算机各个部件的所有活动。它确定应该以什么顺序执行哪些操作。中央处理器也可取出存储器的信息并将操作结果存到存储媒体里,以备以后参考。

计算机的基本工作是处理信息。为此,计算机可以定义为接收信息的装置。信息是以指令和字符形式出现的,其指令组称为程序,字符则称为数据。该装置可对信息进行算术和逻辑运算,然后提供运算结果。程序的作用是指示计算机如何工作,而数据则是为解决提供所需要的信息,两者都存储在存储器里。

人们认为计算机具有很多显著的功能。不过大多数计算机,无论是大型机还是小型机,都具有三个基本性能:

第一,计算机具有进行加、减、乘、除及求幂等各种算术运算的电路。

第二,计算机具有与用户通信的功能。如果不能输入信息和取出结果,这种计算机毕竟不会有有多大用处。

第三,计算机具有进行判定的功能。其电路能对如下事件作出判定:一个数是否小于另一个数?两个数是否相等?一个数是否大于另一个数?

CPU 可以是一个单独的微处理器芯片,一组芯片或者一个带有晶体管、芯片、导线和接点的插件板。在 CPU 方面的差别可以区分大型、小型和微型计算机。处理器由两个功能部件(控制部件和算术逻辑部件)和一组称作寄存器的特殊工作单元组成。

#### 控制部件

控制部件是负责监督整个计算机系统操作的功能部件。在有些方面,它类似于智能电话交换机。因为它将计算机系统的各种功能部件连接起来,并根据当前执行程序的需要控制每个部件完成操作。控制部件从存储器中取出指令,并确定其类型或对之进行译码,然后将每条指令分解成一系列简单的、很小的步骤或动作。这样,就可以控制整个计算机系统一步一步地操作。

#### 算术逻辑单元

算术逻辑单元(ALU)是为计算机提供逻辑及计算能力的功能部件。控制部件将数据送到算术逻辑单元中,然后由算术逻辑单元完成执行指令所需要的算术或逻辑操作。算术操作包括加、减、乘、除。逻辑操作完成比较,并根据结果选择操作。例如,比较两个数是否相等,如果相等,则继续处理;如果不等,则停止处理。

#### 寄存器

寄存器是处理器内部的存储单元。控制部件中的寄存器用来跟踪运行程序的所有状

态,它存储诸如当前指令、下一条将执行指令的地址以及当前指令的操作数等信息。在算术逻辑单元中,寄存器存放要进行加、减、乘、除及比较的数据项,而其他寄存器则存放算术及逻辑操作的结果。

### 指 令

指令由操作码和操作数组成,操作码指明要完成的操作功能,而操作数则表示操作的对象。例如,一条指令要完成两数相加的操作,它就必须知道:这两个数是什么?这两个数在哪儿?当这两个数存储在计算机的存储器中时,则应有指明其位置的地址。如果一个操作数表示的是计算机存储器中的数据,则该操作数叫做地址。处理器的工作就是从存储器中找到指令和操作数,并执行每个操作。完成这些工作后,就通知存储器送来下一条指令。

CPU 按照下列步骤执行每一条指令:

1. 从存储器取出一条指令,送入指令寄存器。
2. 修改程序计数器以指向下一条指令。
3. 确定刚刚取出的指令类型。
4. 如果指令使用存储器中的数据,则需确定它们的地址。
5. 取出数据(如果有的话),并送到 CPU 内部寄存器。
6. 执行指令。
7. 将结果存储到适当的位置。

然后返回到第 1 步,开始执行下一条指令。

这个顺序执行的系列步骤常称为“取指——译码——执行”周期。所有计算机的操作都是以此为f中心的。处理器以惊人的速度一遍又一遍地重复以上这一步步的操作。一个称作时钟的计时器准确地发出定时电信号,该信号为处理器工作提供有规律的脉冲信息。计算机速度的计量单位术语引自电子工程领域,称为兆赫。兆赫意指每秒执行百万个指令周期。

阅读资料

### 微 处 理 器

计算机的大脑称为微处理器,它是计算机内的主要芯片,可完成所有工作。它也是母板上的工作中心,能解释和执行构成计算机程序的指令。CPU 由一个称为算术逻辑单元(ALU)的算术单元及其相关电路、一个指令计数器和译码器组成的。CPU 一次只能完成一个操作。实质上,数字化编码的指令存储于计算机的高速存储器或基本存储器中,CPU 一次取一条指令并执行之。数字化编码的指令告诉 CPU 完成什么操作,以及操作所需的数据存储在什么地方。

CPU 控制计算机系统的各种操作,它可以分为两个功能部件,即控制器(CU)和算术逻辑部件(ALU)。CPU 一次只能完成一个操作。实际上,数字化编码的指令存储于计算

机的高速存储器或主存储器中,CPU 一次取一条指令并执行它们。数值化编码的指令告诉 CPU 完成什么操作,以及操作所需的数据存储在什么地方。

微型计算机或简称微机是计算机的一种,它诞生于 70 年代初期。称为微处理器的微机中央处理器是单片半导体装置。也就是说,实现计算机所有逻辑和算术功能所必不可少的成千上万个单独的电路元件都制造在一块芯片上。完整的微机系统由微处理器、存储器和外围设备组成。处理器、存储器和外围设备的电子控制装置通常一起放在一块或几块印刷电路板上。使用微处理器的系统可以联合起来做迄今为止只有小型计算机系统才能够做的工作。一般来说,微机的指令系统比小型机略为简单,灵活性稍低,而且比小型机明显慢得多。尽管小型机可以装上较大的内存,但是微机的功能变得越来越强,并与小型机技术结合起来了。

实质上,微处理器是一台小计算器,它可完成基本计算器所做的工作,即对存储在计算机内存的数据进行加、减、乘、除运算。计算机程序告诉微处理器做什么,这就是 PC 机内的每项操作的工作方式。

微处理器的其他一些叫法有处理器、中央处理器(CPU),也可以由微处理器的编号命名,比如 8088、80286、80386、80486 等(注意,尽管微处理器有许多编号/名称,但上述这些微处理器是最常用的)。PC 使用的微处理器主要有三种:8088/8086、80286 或 AT 微处理器和 386 系列。不会有 586 微处理器,因为生产微处理器的 Intel 不再用编号命名,而是称其为奔腾(Pentium)微处理器。正是微处理器的这个“微”字才使一些老计算机用户称 PC 机为微机。这可能适用于第一代微处理器,而目前发电站用的 PC 机根本不“微”。

如何知道你的 PC 机装的是哪一种微处理器呢?最好的办法是看一下标牌,上面可能有:386 和 486。作为最后一招,你可使用 PC 诊断软件来断定你使用的是哪一种微处理器。奔腾计算机是 386 系列的最新产品,可能被称作 586 的奔腾基本上是一种快速的、无所不能的 386。第一批 Pentium 推出后约一年的时间,出现了一个小问题。Pentium 在进行数学运算时出了问题,尤其是在做除法运算时问题更大。当除以两个特定的数字时,Pentium 得出的结果不准确。Intel 公司马上承认了这个错误,并更换了 Pentium。后来他们解决了这一问题。现在制造的所有新的 Pentium 运行非常好,再没有出现过数学运算差错。

## 圆源存储器

### 课文

一个存储器单元是一个电路,或在某些情况下只是一个能存储一位信息的单个器件。存储器单元的系统排列组成了存储器。存储器也必须包括外围电路,以此来寻址,并将数据写到单元内,以及检测数据是否存储在单元中。

基本的半导体存储器有两类。第一类是随机访问存储器(RAM),是一种可读可写存

存储器,它的每个独立单元可以在任何指定的时间寻址。对每个单元的访问时间实际上与寻址是一样的。RAM 的定义指出,每个单元都允许做读和写的操作,所用时间几乎与访问时间相同。

第二类半导体存储器是只读存储器(ROM)。尽管这类存储器中所设置的数据在某些设计中可以改变,但这些数据通常是固定的。不过,在 ROM 中写一个新数据所需要的时间比对存储器单元的读访问时间要长得多。例如,ROM 可用于存储操作系统程序的指令。

易失性存储器是一种当电路中电源断开时数据丢失的存储器,而非易失性存储器是即使电源断开数据也能保存的存储器。一般情况下,随机访问存储器是一种易失性存储器,而只读存储器是非易失性的存储器。

RAM 的两种类型是静态 RAM(SRAM)和动态 RAM(DRAM)。静态 RAM 由基本的双稳态触发器电路组成,它只需要直流电流或电压以保持记忆。静态 RAM 有两个稳定状态,定义为逻辑 1 和逻辑 0。动态 RAM 是 MOS 存储器,当在一个电容上充电时它存储一位信息。由于电容上的电荷会延迟一个固定的时间常数(毫秒级),需要有定期重新存储电荷的刷新使得动态 RAM 不丢失它存储的信息。

SRAM 的优点是这个电路不需要额外复杂的刷新周期和刷新线路,但它的缺点是电路相当大。一般地,SRAM 的一个位需要 6 个晶体管。DRAM 的优点是它的一个位只由一个晶体管和一个电容组成,但缺点是需要刷新线路和刷新周期。

ROM 一般有两种类型。第一种既可以由制造厂家编程(掩模可编程的),也可以由用户编程(可编程的或 PROM),以前 ROM 可以用任何一种方法编程,存储器中的数据是固定的并且不能改变。第二类 ROM 可以认为是一种可改变的 ROM,如果需要的话,ROM 中的数据可以重编程。这类 ROM 可以叫做 EPROM(可擦除的可编程 ROM),EEPROM(可电擦除的 PROM)或闪存。正如前面提到的那样,这些存储器中的数据可以重新编程,尽管所包含的时间远远长于读访问时间。在某些情况下,在重新编程过程中,有可能不得不从电路中移走存储器芯片。

基本的存储器结构如图 2-6 所示。端点的连接可以包括输入、输出、地址、读和写控制信号。存储器的主要部分是数据存储体。一个 RAM 存储器将包括上面提到的所有连接端点,而一个 ROM 存储器不包括输入和写控制信号线。

计算机内存以信息的千字节或兆字节来度量(1 个字节等于一个字符、一个字母或数字的存储量)。1KB 大约等于 1024B,1MB 约等于 1000000B。软件需要一定数量的内存来正常工作。如要给计算机增加新的软件,在软件包装上通常可以找到该软件所需要的确切内存容量。

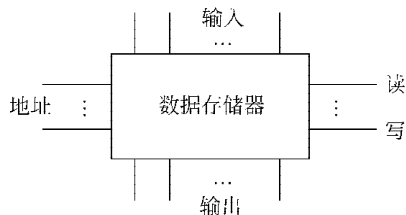


图 2-6 基本存储器结构示意图

存储器由许多单元(或存储单元)组成,每个单元可以存储一个信息。每个存储单元有一个号码,叫做单元地址。通过单元地址,程序可以访问存储单元。假定存储器有  $n$  个单元,它们就有地址编号  $0 \sim n-1$ 。存储器的所有单元具有同样的位数。如果一个单元有  $k$  位,它可以保存  $2^k$  个不同位组合数据中的任一个。注意相邻的单元具有连续的地址。

使用二进制(包括使用对二进制数的八进制和十六进制的记数法)的计算机,也用二进制表示存储器地址。如果地址有  $m$  位,可直接寻址的最大单元数量是  $2^m$  个。地址的位数与存储器可直接寻址的最大单元数量有关,而与每个单元的位数无关。具有 8 位长的  $2^{12}$  个单元的存储器和具有 64 位长的  $2^{12}$  个单元的存储器都需要 12 位地址。

单元的含义表示它是最小的可寻址单位。近年来,大多数计算机制造商已经使其长度标准化为 8 位,这样的单元叫做字节。字节可组成字,16 位字长的计算机每个字包含 2 个字节,而 32 位字长的计算机每个字则包含 4 个字节。字的含义是大多数指令对整字进行操作,比如把两个字相加在一起。因而 16 位机器具有 16 位的寄存器和指令以实现 16 位字的操作,32 位机器则有 32 位的寄存器和指令,以实现传送、加法、减法和其他 32 位字的操作。

70 年代,计算机有了进一步的发展,使计算机领域发生了一场革命。这就是将成千上万个集成电路蚀刻在一小块硅(芯)片上的能力。硅片是具有半导体特性的非金属元件。芯片上具有成千上万个相同的电路。每个电路能存储一位。由于芯片很小,且电路蚀刻在芯片上,电信号无需行进很远,因此它们传输得较快。此外,装有电路的部件体积可以大大减小,这一进步导致了小型机和微型机的引入。其结果是计算机体积变小,速度加快,价格更便宜。可是半导体存储器有一个问题,当电源切断时,存储器里的信息就丢失了,而不像磁心存储器,在断电时还能保留信息。

在实模式下运行的 80x86 系列处理器,其物理寻址能力达到 1MB。EMS 采用页面调度或存储切换技术,使得微处理器能访问更大的存储空间。为了扩展存储器,需要额外的硬件和驱动程序。存储切换寄存器作为有 1MB 空间的物理窗口和驻留在扩展存储器上的逻辑存储器之间的信闸。驱动程序,也称作扩展内存管理(EMM),控制这个寄存器,使得程序的存储器存取在整个可用的扩展存储器工作以实现重定向。

为了访问扩展存储器,程序需要与 EMM 联系。与 EMM 通信的方式与调用 DOS 类似。程序中设立了专门的 CPU 寄存器并建立了一个软件中断请求,同时定义了 30 多个功能,并用应用程序和操作系统来控制扩展存储器。当一个程序装入扩展存储器页中时,EMM 就将一个标志回复给这个请求程序。当再次调用 EMM 时,这个标志将用来区分逻辑页中哪些块被用过。

阅读资料

#### 磁盘和光盘

磁盘主要有软盘、硬盘两种。这两种盘都是由以磁性介质封装的可旋转的盘片构成

的,由一个可移动的读写头来存取信息。磁盘的记忆是非易失性的,就是说即使掉电,磁盘内的数据也不会丢失。由于硬盘中盘片是金属的(最近也出现玻璃的),因此比软盘有更多的优越性。

每个用户都用过硬盘而且很喜欢它,因为它有巨大的存储容量和快速的工作速度,特别是在操作系统愈来愈大的时代。如 Windows 98,它的全部安装需要 300MB 存储空间,较大的应用程序和多媒体的发展需要的存储空间也愈来愈大,所有这些都刺激了硬盘的发展。硬盘存储容量几乎每年都加倍增长而且工作速度越来越快。

硬盘电动机主轴的旋转速度是硬盘的工作速度。一般来说,这个速度从 5400r/min ~ 7200 r/min。高的旋转速度可以减少平均寻道时间和等待时间。大部分平均寻道时间都低于 10ms。硬盘的存储容量发展很快,几乎每年增加一倍。存储容量越大,则每位存储价格越低。用户应根据自己的经济能力和经验来选择合适的硬盘。

为了存取数据,操作系统必须引导磁盘经过三个阶段的处理。第一步是把机械臂定位在正确的磁道上。这个操作叫查找,把机械臂移动到所希望地方的时间叫查找时间。一旦磁头已经到达正确的磁道,还必须等待我们所希望的扇区转到读写磁头下。这个时间叫旋转等待时间或旋转延迟时间。得到所要信息的平均等待时间一般是磁盘一周的一半。小直径的硬盘因为能以更高的速度旋转而不过多地消耗能量,且因而减少了旋转等待时间而更具有吸引力。磁盘存取的最后一个组成部分,传送时间,指传送一块比特数据,典型的是一个扇区的时间。它是传递大小、转动速度和磁道记录密度的函数。

光盘是由激光在其表面对数据编码的圆盘。它提供的信息密度远远超过现行的磁性大容量存储设备的范围。类似的设备已经在市场上出现了几年的时间,以激光视盘和音频致密盘(CD)的形式供用户使用。这些激光视盘是模拟的,即光盘包含了像唱片那样的一条螺旋记录道。用于计算机的光盘是数字式的,像磁盘一样,信息存储在同心道上。目前,有三种类型的光盘技术竞争于大容量存储器市场,它们是只读光盘、一次写入型光盘和可擦除光盘。

与常规的磁盘不同,只读光盘不可写入。所以与只读存储器(ROM)有等价的功能。最流行的只读光盘的版本采用的技术与已流行的用于音频唱片的 CD 技术相同。这种技术是数字式的,并且基于单面能存储 540MB 的 4 3/4 英寸的光盘。这种设备叫做致密光盘只读存储器(CD-ROM)。

一次写入型光盘(也称一次写入多次读出,或 WORM)是由用户记录的空白盘。为了写入数据,激光的强大光束将覆盖在光盘的表层并烧出小斑点或凹点。一旦烧出,这些斑点就不能擦除。为了获得这些数据,使用不太强的激光去读斑点的模式,并且把该模式转变为可以在电视机上播放的视听信号。一次写入型光盘可用来代替微缩胶片存储器。因为光盘具有存储图像和声音的能力,它们的用途是多方面的。任何能够被数字化的事物,比如文件、图像、照片、线图和音乐都可以记录和存储在光盘上。

可擦除光盘使用激光从光盘读出或向光盘写入信息,不过盘的表面也使用磁性材料和磁性写磁头以获得可擦性。为了向盘中写入数据,激光束在盘上加热成小点,接着提供一个磁场以改变点的磁性。可擦除光盘系统既提供了与非擦除光盘相同的存储能力,又具有与 Winchester 系统那样的常规磁盘的重复使用能力。

## 圆盘输入输出

### 课文

输入是一个过程,它包括用设备将数据编码或转换成计算机能够处理的数字码。例如,如果按下终端或个人计算机上的字母键 A,则激活了一个信息处理周期。该键是一个简单的开关,它感受手指的触压,并触发一个完成下列步骤的循环:(1)按键被编码或转换成机器能识别的代码;(2)将已编码的数据存储在存储介质中以备处理;(3)在计算机的监视屏上显示字母 A。

了解输入过程后,将输入分成两大类是很有用的:(1)转录输入,通过将源文件的数据转录到另一种能够输入到计算机系统的介质上的方法来获取数据;(2)直接源输入,无分离的转录步骤,可以直接从输入源获取数据。输入技术的提高使得输入过程离开了抄写,而朝向直接从数据源获取数据的方向发展。

处理结果的输出标志着信息处理的完成。计算机程序产生的是编码的符号流。在多数情况下,输出设备的任务就是将这些编码符号解码成人们易于使用或理解的信息。如文本、图片、图形或声音。

### 键 盘

若熟悉打字机,则会发现计算机的键盘与其非常相似。使用键盘可以进行如下工作:

- 输入信息
- 用数字小键盘输入数字
- 请求特殊功能
- 用键组合执行系统功能
- 在屏幕上移动

键盘有字母键、标点符号键和一个空格键。它还有功能键、数字键和箭头键。如何使用这些键,取决于计算机上所安装的软件。软件所带的资料包含关于特殊键功能的信息。你也许注意到了计算机键盘与打字机的响应有所不同。计算机的键盘非常敏感,只需轻轻触摸便可输入。当保持按下一个字符键时,该字符将持续输入。这就叫做计算机键盘的复击效应。

### 鼠 标

鼠标与系统之间的接口可以采用如下两种方式之一:通过鼠标的移动产生一系列脉冲(使用 LED 和检测器产生脉冲)或者利用鼠标使计数器增值或减值。处理器能定期读取这些计数器中的值或对脉冲计数,并且确定自上一次检测点处算起,鼠标移动了多远。

然后系统把光标移到屏幕的恰当位置。这种移动看起来是很平滑的,因为鼠标的移动速度与处理器读取鼠标的位置以及移动屏幕上光标的速度相比是很低的。

大部分鼠标还装有一个或多个按钮,并且当按钮按下时,系统必须能够及时检测到。依靠对按钮状态的监测,系统也就能区分单击按键与按着按键拖曳之间的差别。当然,计数器与按键实际位置之间的转换以及屏幕上的变化都是由软件控制的。这也正说明了为什么鼠标在屏幕上的移动速度以及鼠标按键是单击还是双击的识别速度能够由用户来设定。同样,用软件描述鼠标位置,也意味着当鼠标沿一个方向长距离移动时,光标不会完全跳离屏幕。

### 显示器

显示器也许是最重要的输出设备之一。计算机只能用它们来显示有趣的结果和神奇生动的画面。显示器也是人机对话的最好窗口,所以很多用户选择显示器时非常小心。选择显示器时应该注意哪些参数和指标呢?这儿给出一些参数可供参考。

**像素距离:**两个像素水平方向的距离称为像素距离。目前大多数PC显示器的流行像素距离是0.28毫米。这个值越小,屏幕越清晰。

**视频带宽:**它是显示器技术中一个很重要的概念,关系到显示器的最高工作频率。其范围从几十兆赫到几百兆赫。用来计算视频带宽的公式如下:

$$\text{视频带宽} = \text{行数} \times \text{列数} \times \text{刷新率}$$

其中,行数等于每列中像素的个数,列数等于每行中像素的个数,刷新率等于每秒帧的变化次数。

**垂直扫描和水平扫描频率:**垂直扫描频率等于刷新率,水平扫描频率就是它名字所提示的。二者与视频带宽的关系在非隔行监视器下如下:

$$\text{垂直扫描频率} = \text{视频带宽} / \text{列数} / \text{行数}$$

$$\text{水平扫描频率} = \text{视频带宽} / \text{列数}$$

**分辨率:**它是显示器的另一个重要参数,其值越高,屏幕上的图像越清晰。分辨率表示一个屏幕上全部像素的总和。

**扫描方式:**显像管中的电子枪的扫描方式有两种,隔行和非隔行。在隔行方式中,电子射枪首先扫描奇数项中的像素,第二次再扫描偶数项中的像素。一帧画面的更新需扫描两次。在非隔行的方式中,电子射枪一次完成扫描全部像素。在这种工作方式中,显示器工作得更好而且图像清晰、不闪烁。

### 总线

总线是共享的通信链路,它用一束通信线来连接多个子系统。总线结构的两个最主要的优点是:灵活性和廉价性。通过定义一种连接方式,可以很容易地增加新设备,甚至也可将外围设备在两个使用同类总线的计算机系统间搬动。此外,总线能被有效地使用,因为一条总线可以多种方式共享。总线的最大缺点是它产生通信瓶颈,可能限制最大的

I/O 流量。当 I/O 必须经过一条总线时,总线带宽限制了最大 I/O 流量。

总线设计如此困难的一个原因是,总线的速度很大程度上受物理因素限制:总线长度和设备数量。这些物理因素使我们不能以任意高速使用总线。在这些限制下,尽管可用许多技术来提高总线的性能,但是,这些技术也会相反地影响其他性能。例如,为获得较快的 I/O 响应时间,必须用流水线化通信路径来最小化总线延时。另一方面,为维持高速 I/O 数据速率,必须最大化总线宽度。使用更多的缓冲和用更大的数据块通信能增加总线宽度,但两者都增加总线的延时。显然,这两个目标,低延时和高带宽,会导致设计要求的冲突。最后,要求设备支持具有不同延时和数据传输速率的各种各样的需求,也使总线设计成为困难。

一条总线一般包括一束控制线和一束数据线。控制线用于标记请求和应答,并且指出数据线上信息的种类。总线的数据线在源地和目的地间运送信息。这种信息可以包括数据、复杂命令和地址。比如,磁盘想要从某个扇区向内存中写数据,数据线就用于指明内存中的哪个地址用于存放数据,并且在实际上将数据从磁盘输入到内存,控制线用于指出传输的每一时刻数据线上都包括哪种类型的信息。一些总线有两束信号线,在一个总线传输中分别传输数据和地址。在任何一种情况下,控制线都用于指出总线包括什么并且执行总线协议。

#### 阅读资料

### 打印机

#### 点阵击打式打印机

字符是作为点的矩阵被打印出来的。由打印头尾部的螺线管驱动细打印针将色带撞击到纸上,便打出点。打印针是按垂直列分布的。因此,当打印头沿行移动时,字符每次都被打出一列点。早期的点阵式打印头只有七个打印针,所以这些设备的打印质量不太好。目前,可用的点阵式打印机的打印头是 9、14、18 甚至 24 针的。使用针头数很多的打印头和/或每行打两次而第二次打印的点稍微偏离第一次打印的点,打印出的结果与(字球式)电动打字机或菊花轮打印机打印的质量没什么区别。

不同于成形的字符打印机,点阵式打印机还能够打印图形。为了打印图形,当打印头在纸上移动时,每个点阵的模式就传至打印头的螺线管。这个原理类似于在阴极射线管 CRT 的屏幕上绘制位映射光栅图形的方法。通过使用不同颜色的色带并多次扫描同一行,某些点阵击打式打印机就可打印彩图。如今,大部分点阵式打印机都装有一个或多个微处理器来控制这一切。

#### 点阵热敏式打印机

大部分热敏式打印机需要使用有特殊热敏层的纸。当这种特殊纸的一点遇热时,该点会变黑。字符或图形用点阵打出。用来产生点的打印头形状主要有两种。其中之一是由微小热元件组成的  $5 \times 7$  或  $7 \times 9$  的矩阵构成。为打印一个字符,把打印头移到字符位

置并且接通要打印字符的点阵的热元件。过一会儿,切断这个热元件并把打印头移到下个字符的位置。于是,每次打印出一个完整的字符。

热敏式打印机的主要优点是噪音低。主要缺点是:特殊纸或色带的价格昂贵;不能打印炭黑拷贝,而且大部分打印质量高的热敏式打印机速度慢。

#### 激光和其他静电打印机

这类打印机的工作原理同大部分办公室的复印机一样,例如静电复印机。基本方法是先在机器的感光鼓上形成欲打印页面的图像,然后,把粉末状的油墨或调色剂涂至鼓上的图像,接下来,这个图像就会从鼓上静电转印到一张纸上,最后,纸上的油墨图像通过加热使其熔凝。

#### 喷墨式打印机

利用点阵方式打印文本和图形的另一种打印机是喷墨式打印机。早期的打印机利用一个泵和一个微小的喷嘴连续不断地送出一股细小的墨滴流。这些墨滴通过电场,带上电荷。然后,带电的墨滴流在纸上被静电偏转产生字符,其方式就像电子束被偏转,在阴极射线管屏幕上产生图像一样。剩余的墨被偏转到一个槽中,并返回到墨水回收盒。喷墨式打印机相对安静。一些这类静电偏转的喷墨式打印机能够每分钟打印 45000 行。然而,一些缺点使它们不能被广泛使用。它们容易混乱并很难保持良好的工作状态。高速打印时质量不好而且不能多份打印。

较新的喷墨式打印机利用各种方法来解决这些问题。其中一些例如 HP 的 Thinkjet 牌喷墨式打印机,使用带有一列微型加热器的墨盒。当其中一个微型加热器脉冲式接通时,它便向纸面喷射一滴墨。另外一些喷墨式打印机,例如 IBM 的 Quietwriter 打印机,利用电流使来自专用色带的微型墨泡直接喷到纸上。最后这两种方法实际上是热敏和喷墨两种技术的混合。

## 第 猿章 猿摇软件知识

### 猿摇猿摇数据结构

#### 课文

数据类型的本质是标识一组个体或目标所共有的特性,这些特性把该组个体作为可识别的种类。如果我们提供了一组可能的数据值以及作用在这些数据值上的一组操作,那么,这两者结合在一起就称之为数据类型。

人们可以将其值由某种结构相关的组成元素构成的数据类型称之为结构化数据类型或数据结构。换句话说,这些数据类型的值是可分解的,因此必须知道它的内部结构。任何可分解的目标有两个必要的组成成分——组成元素和结构,亦即将这些元素相互关联或匹配的规则。

数据结构是一种数据类型,其值是由与某些结构有关的组成元素所构成的。它有一组针对其值的操作。此外,可能有一些操作是定义在其组成元素上的。由此可知:数据结构可以有定义在构成它的值之上的操作,也可以有定义在这些值的组成元素之上的操作。

数组和记录在大多数编程语言中都作为固有数据类型,通过使用指针数据类型和动态存储分配,大多数编程语言也能为用户提供建立链接结构的机制。数组、记录和链接结构是更高一级抽象数据类型的基本构造单元,我们将要讨论的两种更高一级的抽象数据类型——栈和队列,对计算至关重要。

栈的主要性质是由对其节点的插入与删除的管理规则来确定的,被删除或移去的节点只能是刚刚插入的,就是所谓具有后进先出(LIFO)性质或协议的结构。栈这种数据类型虽然简单,但并不影响其重要性,许多计算机系统的电路中都含有多个栈,并且含有操作硬件栈的机器指令。多重子程序的调用和返回伴随着栈的操作,算术表达式的计算通常是通过栈的一系列操作来实现的。大多数袖珍计算器都是用栈模式来操作的,在学习计算机科学时,人们能看到许多栈的例子。

队列的例子在日常生活中经常出现并且为我们所熟悉,在银行等待服务或在电影院门口等待买票的一队人,在交通灯前面等待通行的一长串汽车都是队列的例子。队列的主要特征是遵循先来先服务(first-come/first-served)的原则。与栈最后插入元素,最先删除或服务不同,在队列中,最先插入的节点将最先被服务,这样的原则与日常生活中人们公平合理的想法是一致的。

队列的先进先出(FIFO)原则在计算机中有很多应用,例如,在多用户分时操作系统中,多个等待访问磁盘驱动器的输入/输出(I/O)请求就可以是一个队列。等待在计算机系统中运行的作业也同样形成一个队列,计算机将按照作业和I/O请求的先后次序进行服务,也就是按先进先出的次序。另外,还存在着一种重要的队列,这在日常生活中也是可以看到的,比如在医院的急救室内,在危重病人较多的情况下,医生必须首先抢救生命垂危的病人。

在计算机系统中,要求计算机系统服务的事件通常根据最重要的事件最先服务来处理的,换句话说,是按服务优先级最高先进/先出队列(HPIFO)的原则,这种队列称之为优先队列。优先队列并不按时间的先后决定服务的次序,而是按照优先级越高越优先服务的原则。

面向对象的程序设计是一种现代的软件开发方法,用这种方法设计的软件具有较高的可靠性和灵活性。软件系统实现的复杂性包括信息表示的复杂性和对这些表示进行操作的算法复杂性。数据结构则是研究一些方法,这些方法用来表示对象、安全可靠的封装结构、研发采用这些表示的算法以及测量因此而得到的系统的时空复杂度。面向对象的方法强调对象的作用以及它们的属性和操作,这些构成了解决问题的核心。

在特定类中,从决定使用何种数据结构来表示对象的属性这一点来看,面向对象方法中对抽象的强调,在软件开发过程中是非常重要的。抽象意味着隐藏不必要的细节。过程抽象或算法抽象是对算法隐藏细节的,允许算法在各个细节层次上可见或被描述。建立子程序是抽象的一个实例,子程序名描述了子过程的功能,子程序内部的代码表示了处理过程是如何完成的。

类似地,数据抽象隐藏了描述的细节。一个明显的例子是通过把几种数据类型组合来构建新的数据类型,每种新类型描述了一些更复杂的对象类型的属性或组成。数据结构中面向对象的方法通过把一类对象的表示整合,将数据抽象和过程抽象组合在一起。

一旦选择了一个合适的抽象,就有一些选择来表示数据结构。在许多情况下,至少有一种静态表示、一种动态表示,在静态和动态表示中,典型的折衷方法是介于针对存储空间的需要,选择边界或非边界的表示,以及和一些非边界表示有关联的时间需求之间。

在选择了抽象和表示后,就有各种不同的方法来封装数据结构。对封装的选择是另一种权衡了,在如何使结构对用户有用与包怎样来操作用户的示例对象之间进行。封装对表示的完整性及与封装相关的时间、空间需求都有影响。一旦说明以后,一个或更多的竞相存在表示方法将被执行,与解决的问题有关的结构、它的表示和封装将被评价。每种方法的时间和空间需求必须相对于系统需求和约束被衡量。

#### 阅读资料

#### 栈和队列的应用

当进行一个新函数调用时,所有局部于调用程序的变量,都需要由系统存储起来,否则新函数将要重写调用程序的变量。而且调用程序的当前位置也必须保存,以便新函数知道它运行后返回何处。变量通常由编译器分配给机器寄存器,而且尤其是涉及递归时,肯定会有冲突。

调用函数时,所有需要存储的重要信息像寄存器值和返回地址,都以抽象方式存于“一片纸”上,且放在一个堆的顶端。然后控制转向新函数,新函数可自由地用它的值替换寄存器的值。如果它再做其他函数调用,则可进行同样的步骤。当函数要返回时,先查看在堆顶的“纸片”,并恢复所有寄存器,然后进行返回跳转。

显然,所有这些工作都可用栈来完成,而且实际上每一种实现递归的程序语言中都是这样做的。保存的信息称为活动记录或栈框架。现实计算机中的栈常常由内存部分的高端向下延展,并且在很多系统中没有溢出检查。而且总是有可能,由于同时具有太多运行的函数而溢出栈空间,不用说,栈空间溢出是个致命的错误。

在对栈溢出不做检查的语言和系统中,程序可能没有合适的解释就崩溃了。在这些系统中,当栈太大时,常会发生奇怪事情,因为栈可以延伸入程序部分。它可能是主程序,也可能是部分数据,尤其是当有一个大型数组时,若它进入程序,则程序可能会错误百出,并会产生一些毫无意义的指令,且一经执行此指令,就会崩溃。如果栈延伸至数据,可能

发生的情况是,当向数据中写入某内容时,它将会破坏栈的信息——或许是返回地址——且程序将会试图返回到某个古怪地址并崩溃。

有几种采用队列的算法能给出有效的运行时间,现在举几个使用队列的简单例子。当作业提交给打印机时,它们是按到达顺序排列的,所以基本上送往打印机排队的作业都是按队列放置的。另一个例子与计算机网络有关,很多网络与个人计算机连接,其中硬盘与一台称为文件服务器的机器相连。可以在先来先受服务的基础上给予其他机器上的用户访问文件,所以这个数据结构是队列。

还有如下一些例子:

- 打入大公司的电话,在接线员很忙时,通常按队列安排。
- 在大型综合性大学里,资源有限,若所有终端都被占用,学生就要填写候机单。占有终端时间最长的学生将首先被迫离开,等待时间最长的学生将成为下一个允许使用者。

一个完整的数学分支称为排队论,研究以概率方式计算在排队中预期用户要等待多久,在占线中要用多长时间以及其他诸如此类的问题等。答案取决于用户到达队列的频率以及为用户提供服务后,用户要使用多长时间。这两个参数均以概率分布函数给出。

## 猿瑶数据库技术

### 课文

数据库管理系统(DBMS)由一个互相关联的数据集合和一组用以访问这些数据的程序组成,这个数据集合通常称作数据库,其中包含了关于某个企业的信息。DBMS的基本目标是要提供一个可以方便、有效地存取数据库信息的环境。

设计数据库系统的目的是为了管理大量信息。对数据的管理既涉及到信息存储结构的定义,又涉及信息操作机制的提供。另外,数据库系统还必须提供所存储信息的安全性保证,即使在系统崩溃或有人企图越权访问时也应保障信息的安全性。如果数据将被多用户共享,那么系统还必须设法避免可能产生的异常结果。对大多数组织而言,信息都非常重要,这决定了数据库的价值,并使得大量的用于有效管理数据的概念、技术得到发展。

数据库系统所使用的存储结构和访问方式通过一系列特殊的DDL语句来定义。这种特殊的DDL语句称作数据存储定义语言。这些语句的编译结果是一系列用来描述数据库模式实现细节的指令,这些实现细节对用户来说通常是不可见的。数据库模式也是通过DDL来表达的。DDL语句的编译结果产生存储在一个特殊文件中的一系列表,称作数据字典或数据目录。数据字典是一个包含元数据的文件,元数据是关于数据的数据。在数据库系统中,实际数据读取和修改前总要先查询该文件。

### 事务管理

事务是数据库应用中完成单一逻辑功能的操作集合,是一个既具有原子性又具有一致性的单元。因此,要求事务不违反任何的数据库一致性约束,也就是说,如果事务启动

时数据库是一致的,那么当这个事务成功完成时数据库也应该是一致的。但是,在事务执行过程中,必要时允许暂时的不一致,这种暂时的一致尽管是必需的,但在故障发生时,很可能导致问题的产生。

正确定义不同事务是程序员的任务,事务的定义应使之能保持数据库的一致性。例如,资金从账户 A 转到账户 B 可以定义成由两个单独的程序组成:一个对账户 A 执行借出操作,另一个对账户 B 执行贷入操作。这两个程序的依次执行可以保持一致性,但是,这两个程序本身都不能把数据库从一个一致状态转入另一个新的一致状态,因此它们都不是事务。

原子性和持久性的保证是数据库系统自身的任务,更确切一些,是事务管理器的任务。在没有故障发生的情况下,所有事务均成功完成,这时要保证原子性很容易。但是,由于各种各样的故障,事务并不总能成功执行完毕。为了保证原子性,失败的事务必须对数据库状态不产生任何影响,因此,数据库必须能恢复到该失败事务开始执行以前的状态。数据库系统应该能检测到系统故障并将数据库恢复到故障发生以前的状态。

#### 存储管理

数据库常常需要大量存储空间。公司数据库的大小是用 gigabyte( $10^9$  字节,1GB)来计算的,最大的甚至需要用 terabyte( $10^{12}$  字节,1TB)来计算。一个 gigabyte 等于 1000 个 megabyte( $10^6$  字节,1MB),1 个 terabyte 等于 100 万个 megabyte。由于计算机主存不可能存储这么多信息,因而信息被存储在磁盘上,需要时信息在主存和磁盘间移动。由于同中央处理器的速度相比数据出入磁盘的速度很慢,数据库系统对数据的组织必须满足使磁盘和主存间数据移动的需求最小化。

数据库系统的目标是要简化和辅助数据访问,高层视图有助于实现这样的目标。系统用户可以不受系统实现的物理细节所带来的不必要的负担所累。但是,决定用户对数据库系统满意与否的一个主要因素是系统的性能。如果一个要求的响应速度太慢,系统的价值就会下降。系统性能决定于用来表示数据库中数据的数据结构的高效性,以及系统对这样的数据结构进行操作的高效性。正如计算机系统中其他地方也会出现一样,不仅要在时间与空间两者间进行权衡,还要在不同操作的效率间进行权衡。

存储管理器是在数据库中存储的低层数据与应用程序及向系统提交的查询之间提供接口的程序模块。存储管理器应负责与文件管理器的交互。原始数据通过文件系统存储在磁盘上,文件系统通常由传统的操作系统所提供。存储管理器将不同的 DML 语句翻译成低层文件系统命令,因此,存储管理器负责数据库中数据的存储、检索和更新。

#### 数据库管理员

使用 DBMS 的一个主要原因是可以对数据和访问这些数据的程序进行集中控制。对系统进行集中控制的人称作数据库管理员(DBA)。DBA 的作用包括:

- 模式定义。DBA 通过书写一系列的定義来创建最初的数据库模式,这些定义被

DDL 编译器翻译成永久地存储在数据字典中的表集合。

- 存储结构及存取方式定义。DBA 通过书写一系列的定義来创建适当的存储结构和存取方式,这些定义由数据存储和数据定义语言编译器来翻译。
- 模式及物理组织的修改。程序设计人员偶尔也会对数据库模式或物理存储组织的描述进行修改,这是通过书写一系列的定義来实现的,DDL 编译器或数据存储和数据定义语言编译器使用这些定义,对适当的内部系统表(例如:数据字典)产生修改。
- 数据访问授权。通过授予不同的权限,数据库管理员可以规定不同的用户各自可以访问的数据库的部分,授权信息保存在一个特殊的系统结构中,一旦系统中有访问数据的要求,数据库系统就会去查阅这些信息。
- 完整性约束的定義。数据库中所存储的数据值必须满足一定的一致性约束。完整性约束保存在一个特殊的系统结构中,一旦系统中发生更新,数据库系统就去查阅这些约束。

#### 阅读资料

##### 数据库的前景

计算机技术将对今天世界上的商业产生深远的影响。鼠标只要单击一下就可以将数据入库或对其进行访问,制造商的国外订货单可以立即接受并执行。尽管在 20 年以前信息的交换还需要大型机的支持,而办公领域处理事务也仍在采用批处理的方式。要完成某一个查询用户需要将需求提交给服务器上的信息管理系统 MIS,结果将会以最快的速度返回给用户,尽管经常不是足够快。

此外,随着关系型数据库模型的发展,有两种技术被引用到了在今天被称为服务器/客户机的数据库系统当中。第一项技术就是个人电脑廉价而又易用的应用程序如 Lotus 1-2-3 和 WordPerfect。允许员工(和家庭用户)可以建立文档来快速而准确地处理数据。用户也会经常升级他们的系统,以使其速度更快,巧的是这时系统的价格却在迅速下跌。

第二项技术则是局域网的发展,它导致在世界范围内的交叉办公。虽然,用户习惯于采用终端与主机相连。在今天一个字处理文档可以存储在本地而被任何连接到网络上的电脑访问。随后苹果的 Macintosh 电脑为大家提供了一个友好易用的图形用户界面,使得电脑变得物美价廉。此外,他们可以访问远程站点,并从服务器上下载大量的数据,在这个飞速发展的时期一种新型的叫作服务器/客户机的系统诞生了。这种系统的处理过程被分解在客户机和数据服务器上,这种新型的应用程序取代了基于主机的应用程序。这一体系有着相当多的优点:

- 降低了维护费用。
- 减轻的网路负荷处理过程在服务器上和客户机上均有。

- 多个操作系统可以基于相同的网络协议来共同工作。
- 本地化的数据操作提高了数据的完整性。

对于什么是客户机/服务器型电脑系统 ,Bernard H. Boar 的定义如下 :

客户机/服务器系统就是把单一的任务 ,分解到多个处理器上进行协同处理 ,就像在单个处理器上运行时一样。一个完备的客户机/服务器系统可以将多个处理器捆绑在一起 ,以提供一个单一系统。虚拟环境共享的资源可以被位于远端的客户机通过特殊的服务来访问 ,这种结构可以逐级递归 ,所以服务器可以在最后转变为客户机并要求其他的服务器提供服务 ,就这样一直继续下去。

这种类型的应用程序 ,在设计时需要全新的程序设计技巧。今天的用户界面都是图形用户界面 ,不论是微软的 Windows ,苹果的 Macintosh ,IBM 的 OS/2 还是 UNIX 的 X-Windows 系统均是如此 ,通过使用 SQL 和网络应用程序就可以访问位于远端服务器上的数据库。个人电脑处理能力的提高可以对存放在一系列相关的服务器中的数据库作出评定。这些服务器是可以更换的 ,而应用程序则只需做出较少的改动 ,甚至无需改动。

## 猿猿操作系统

### 课文

操作系统是一种程序 ,它是用户与计算机硬件之间的接口。目的就是提供一种用户能执行程序的环境。一般来说 ,操作系统没有一个完整恰当的定义。操作系统的存在是因为它们是解决可用计算机系统问题的一种合理的方法。计算机系统的基本目标是执行用户程序和解决用户问题。计算机硬件就是朝着这个目标而构建的。因为只有硬件的裸机不能使用 ,于是开发了应用程序。这些不同的程序要求某些共同的操作 ,例如控制 I/O 设备。这些控制和分配资源的共同功能合并到一个软件中 ,就形成了操作系统。

一个操作系统与一个政府类似。计算机系统的基本资源由硬件/软件与数据来提供 ,操作系统为计算机提供正确使用这些资源的方法。像一个政府一样 ,操作系统本身执行不了任何有用的功能。它只不过是提供一个环境 ,在该环境中其他程序才能发挥作用。

可以把操作系统看作是一个资源分配器。计算机系统有很多的资源(硬件和软件)用来解决一个问题 :CPU 的时间 ,存储内存大小 ,文件存储空间 ,输入/输出设备等等。操作系统就像管理这些资源的经理 ,为这些资源分配特定的程序和用户作为它们任务的需要。因为有许多资源请求方面可能存在冲突 ,操作系统必须决定给哪些请求分配资源 ,以便计算机系统能合理而有效地运行。

操作系统的主要目标是方便用户。操作系统的存在是因为有操作系统比没有操作系统计算更容易。当你观察一个小型个人计算机的操作系统时 ,这点是特别清楚的。操作系统的第二个目标是对计算机系统进行有效的操作。这个目标对于一些大型共享的多用户系统特别重要。这些系统通常都很昂贵 ,因此使它们尽可能有效地工作是符合人们愿望的。方便和有效这两个目标常常互相矛盾。以往 ,人们常常过多地考虑了有效性而忽

略了方便性,因此许多操作系统理论都集中在计算资源的优化使用方面。

操作系统有单任务和多任务之分。早期的许多单任务操作系统同一时间只能运行一个程序。例如,当计算机打印文件时,它就不能开始运行另一个程序,或者不能响应新的命令,直到打印完成为止。

所有现代操作系统都是多任务的,同时能运行几个程序。大部分计算机中仅有一个CPU,所以,多任务操作系统让人产生CPU能同时运行几个程序的错觉。产生这种错觉的最常用机制是时间片多任务处理,以每个程序各自运行固定的一段时间的方式来实现的。如果一个程序在分派的时间内没有完成,它就被挂起,另一个程序接着运行。这种程序交换称为任务切换。操作系统实行“簿记”法以保存被挂起的程序状态。它同样有一种机制,叫做调度程序,由它决定下一时刻将运行哪个程序。为了把感觉到的延迟减到最小,调度程序运行短程序非常迅速。由于用户的时间感觉比计算机的处理速度要慢得多,所以几个程序看起来是同时执行的。

当实际可用空间不够时,为了运行那些需要更多主存储器空间的程序,操作系统可以利用虚拟存储器。采用这一技术,硬盘空间用来模拟所需的额外存储空间。不过访问硬盘比访问内存更加耗时,所以计算机性能会下降。

操作软件的一个非常重要的职责是调度计算机系统将要处理的作业,这是作业管理功能的主要任务之一。操作系统建立程序处理的顺序,并定义了具体作业执行的次序。术语“作业队列”常用于描述等待执行的作业序列,操作系统在排列作业队列时将权衡各方面因素,包括当前正在处理哪些作业,正在使用哪些系统资源,需要哪些资源来处理后面的程序,与其他任务相比该作业的优先级及系统应响应的一些特殊处理要求等。操作软件应能评估这些因素并控制处理的顺序。

计算机系统资源管理是操作系统的另一个主要方面。显然,如果设备不能用,程序就不能使用该硬件。正如我们所看到的,操作系统监督着所有程序的执行。它还监视正在使用的设备。为达到此目的,它建立了一张表,在表中程序填入它们正在使用或将要使用的设备。操作系统检查该表,同意或取消某一设备的使用。

系统资源的分配与操作软件对I/O操作的控制密切相关。由于I/O操作开始之前需要对指定设备进行访问,因此操作系统必须协调I/O操作和使用设备间的关系。实际上操作系统建立了一个执行程序 and 完成I/O操作必须使用设备的目录。使用控制语句,作业可以访问指定设备。因而用户可以在指定设备上读取数据或在选定的办公室打印信息。利用这一功能,从某一设备读取的数据可以分布贯穿于整个计算机处理系统。

为便于I/O操作的执行,大多数操作系统都有一个标准的控制指令集来处理所有输入和输出指令。这些标准指令称为输入/输出控制系统(IOCS),是大多数操作系统不可分割的部分。它们简化了被处理的程序承担的I/O操作。

实际上,使用一个特殊的I/O设备时,程序在执行的过程中向操作系统请求所要求

的 I/O 操作。控制软件访问 IOCS 软件以实现 I/O 操作。由于大多数程序都考虑 I/O 操作的级别,所以 IOCS 指令至关重要。

#### 阅读资料

#### 宰蚤燥增葬孕技术概述

Windows XP 是微软公司继 Windows 2000 和 Windows Me 之后推出的新一代 Windows 操作系统。Windows XP 将 Windows 2000 的众多优点(例如基于标准的安全性、易管理性和可靠性)与 Windows 98 和 Windows Me 的最佳特性(即插即用、易于使用的用户界面以及独具创新的支持服务)完美集成在一起,从而打造出了迄今为止最为优秀的一款 Windows 操作系统产品。

Windows XP 在现有 Windows 2000 代码基础之上进行了很多改进,并且针对家庭用户和企业用户的不同需要提供了相应的版本:Windows XP Home Edition 和 Windows XP Professional。

在对 Windows 2000 的核心代码加以利用的同时,Windows XP 还对界面进行了全新的设计。新的用户界面对各种常见任务进行了合并和简化,新增加的视觉提示能够帮助你更容易地在计算机中找到所需资料。

#### 针对多个用户的快速用户切换功能

快速用户切换(Fast User Switching)功能针对家庭用户设计,它允许所有的家庭用户共用同一台计算机工作,就像这台计算机只是他们个人拥有的一样。其他用户无需注销或者保存他们正在编辑的文件,你就可以登录到计算机上。Windows XP 利用了终端服务(Terminal Services)技术,在每一个单独的终端服务会话中运行每个用户的会话,从而实现了用户数据的彻底分离。(每个会话大约需要占用 2MB 左右的内存,但是,这一数字没有将在用户会话中运行的应用程序考虑在内。为了保证多用户会话能够稳定可靠地运行,我们建议您至少使用 128MB 内存。)

#### 新的视觉样式

Windows XP 具有新的视觉样式和主题,这些样式和主题使用了颜色亮丽的 24 位彩色图标和同特定任务建立了联系的特特色彩。例如,绿颜色表示你可以做些什么工作,或者前往其他地方,比如:“开始”菜单。

#### 新的用户界面提高了生产力

新的用户界面将 Windows 操作系统的易用性带入到了一个新的水平,你可以比以往任何时候都更加容易和快速地完成工作任务。

#### 宰蚤燥增葬孕多媒体集成

Windows XP 内置 Windows Media Player 8 软件,将各种常见的数字媒体操作集成到了同一个软件之中,这些常见的操作包括:CD 和 DVD 播放、音乐库管理和刻录、音频 CD 刻录、Internet 广播以及便携设备的媒体传输。

Windows Media Player 8 包括了一些新的功能,例如带有丰富媒体信息和全屏控制的 DVD 视频播放,抓取 CD 音轨并将其转换为 MP3 文件。Windows Media Audio 8 的文件大小仅为 MP3 文件的三分之一左右,并且具有更快的 CD 烧录时间,智能化的媒体跟踪为用户提供了对数字媒体的更多控制能力。在 Windows XP 中,新的 My Music(我的音乐)文件夹为常见音乐任务的执行提供了更加便捷的途径。

#### 远源位支持

64 位版旨在对 Intel 新型 Itanium 64 位处理器的强大功能和效率加以利用。Windows XP 的 64 位版本将包括 32 位版本的大多数功能和技术(但不包括红外支持、系统还原、DVD 支持以及针对移动应用的一些功能)。64 位版的 Windows XP 还将通过 WOW64 32 位子系统支持大多数 32 位应用程序,并且能够和 32 位的 Windows 系统实现互操作。这两个版本能够无缝地运行在同一个网络中。

Windows XP 64 位版为基于 Win64™ API 的新一代应用程序提供了一个高性能的可伸缩平台。与 32 位系统相对比,64 位系统的体系结构为超大规模的数据提供了更加有效的处理方式,它支持高达 8TB 的虚拟内存。利用 64 位 Windows 应用程序可以将更多的数据预先加载到虚拟内存中,以便 IA-64 处理器能够快速访问这些数据。这种做法缩短了将数据加载到虚拟内存、读写数据、寻找数据以及将数据写入存储设备所需的时间,从而让应用程序运行的更快和更有效率。64 位版本的 Windows XP 使用的编程模型与标准的 Win32 版本相同,为开发人员提供了一个单一的代码基础。

## 猿程编程语言

### 课文

编写计算机程序有两种常用的方法:面向过程的程序设计和面向对象的程序设计。

面向过程的程序设计包括用程序设计语言建立存放值的存储单元,编写对这些值进行运算的一系列步骤或操作。计算机存储单元称为变量,因为它们所保存的值可以变化。例如,某公司的工资程序中有变量 `rateOfPay`,这个变量存放的存储器单元在不同的时间内可以有不同的值(公司中的每个员工对应不同的值)。当执行工资程序时,对存储在 `rateOfPay` 中的值可对应多种操作,如从输入设备中输入该值,与表示时间的变量相乘,在打印纸上输出。为方便起见,一个计算机程序的各个操作通常被组合成逻辑单元,称为过程。如把确定个人所得税的四或五步比较和计算可以合成一个过程,称为 `calculateFederalWithholding`。面向过程的程序定义了可变的存储单元,然后调用或引用一些过程对这些单元中的值进行输入、操作和输出。一个面向过程的程序通常包括成百上千的变量和过程调用。

面向对象的程序设计是面向过程程序设计的一种扩展,在编写程序时采用的方法有一些不同,用面向对象的方法考虑问题,首先把程序元素看成是与现实世界中的具体对象相似的对象,然后对这些对象进行操作以得到期望的结果。编写面向对象的程序包括创

建对象和创建使用这些对象的应用程序。

### 机器语言

能被计算机操作系统直接运行的计算机程序称为可执行程序。可执行程序是以机器码的形式表示的一系列非常简单的指令。这些指令对于不同计算机的 CPU 而言是特定的,它们与硬件有关。例如,英特尔“奔腾”处理器和 Power PC 微处理器芯片各自有不同的机器语言,要求用不同的代码集来完成相同的任务。机器码指令数量很少(大约 20 ~ 200 条左右,根据计算机和 CPU 的不同而有差异)。典型的指令是从存储单元取数据,或将两个存储单元的内容相加(通常在 CPU 的寄存器中进行)。机器码指令是二进制的——比特序列(0 和 1)。由于这些数字令人难以理解,所以计算机指令通常不是用机器码来写的。

### 汇编语言

与机器语言指令相比,汇编语言使用的命令较容易为程序员所理解。每条机器语言指令在汇编语言中都有等价的命令。例如,在汇编语言中,语句“MOV A,B”命令表示计算机把数据从一个单元复制到另一个单元,而机器代码中同样的指令是由一串 16 位的 0 和 1 组成的。一旦汇编语言程序编写完毕,它就由另一个称之为汇编器的程序转换成机器语言程序。相对于机器语言而言,汇编语言速度快,功能强。可它仍然难以利用,因为汇编语言指令是由一系列抽象代码组成的。另外,不同的 CPU 使用不同的机器语言,因此需要不同的汇编语言。有时为了执行特殊的硬件任务,或者为了加快高级语言程序的速度,汇编语言被插入到高级语言程序中。

### 高级语言

从机器语言进步到汇编语言,使语言达到了更先进的阶段。同样也正是这种进步导致了高级语言的发展。如果计算机能把简便的符号翻译成基本操作,为什么它就不能完成其他文字类型的编码功能呢?

现在让我们来看看所期望的高级语言应有的特点,以及怎样将它们与机器码和汇编语言进行比较。高级程序语言是这样一种编程手段,它用规范化的术语来写出一步步的程序步骤,执行这些步骤时会用惟一确定的方式处理给定的数据集。高级语言与任何给定的计算机无关,但假定将使用一台计算机来进行处理工作。高级语言经常针对某类特殊的处理问题而设计,例如,一些语言设计成适宜处理科学计算问题,另一些语言则更侧重于文件处理的应用。

### 面向对象编程语言

像 C++ 这样的面向对象程序设计语言(OOP)是以传统的高级语言为基础,但是它们能使程序员按照组合对象集方式而不是指令列表方式来进行思考。对象有许多性质,以圆为例,就有圆的半径以及把圆画到计算机屏幕上的命令。对象的类可以从其他对象类那里继承属性。例如,一个定义正方形的类能从定义长方形的类那里继承诸如直角这

样的属性。程序类的这种关系简化了程序员的工作,从而导致更多既可靠又高效的程序产生。

SIMULA 是第一个面向对象的程序设计语言。它是 20 世纪 60 年代中后期在挪威开发的。Smalltalk 是 70 年代初期开发的,它使得面向对象的概念大众化了。这一新的程序设计技术很早便受到人工智能研究协会的欢迎:LISP 程序设计语言中的许多风味及惯用语提供了面向对象的扩展版本。70 年代这些语言只能在研究室内使用,80 年代初期真正开始了面向对象的程序设计时代。1983 年 Smalltalk 80 实现了商品化,其他面向对象的程序设计语言,如 Objective-C、Eiffel、Common Lisp Object System 和 Actor 也已商品化。

面向对象的程序设计提高了系统的长期生产率。这种程序模块的本质是使程序更易适应。这一点对那些需求使用很多年的应用程序来说尤其有益,因为在这期间公司的需求可能有变化,软件的修改是必不可少的。面向对象的编程能提高软件的可靠性。由于对象在不同的应用中受到反复检验,有更多的可能将错误查出和纠正。面向对象的编程在并行处理中也有潜在优势。使用面向对象的方法下,并行处理的执行速度将得到提高。

#### 阅读资料

#### 悦语言

C 语言是一种通用的结构化编程语言,它的指令是由一些类似代数表达式的项加上一些英文关键字(如 as, if, else, for, do 和 while)而组成的。从这方面讲,C 语言类似于其他高级结构式编程语言,如 Pascal 和 FORTRAN-77。可是,C 语言还有另外一些特点,这些特点使它能在较低层次上应用,因而能弥补机器语言和惯用的高级语言之间的差距。这种灵活性使 C 语言可以用于系统编程(例如编写操作系统),也可以用于应用编程(例如,编写解数学方程式的复杂程序或者编写给顾客开账单的程序)。

C 语言的研制开始于 19 世纪 70 年代初期。C 语言也许最适宜被称为“中级语言”。像真正的高级语言一样,一个 C 语句与编译到机器上的语言指令的关系是一对多的关系。因此,像 C 语言这样的语言的编程手段远远超过低级的汇编语言。然而,与大多数高级语言相比,C 语言有一个小的结构集。另外,与大多数高级语言不同,C 语言使操作者很容易地做由汇编语言执行的工作(如操作位与指针)。因此,C 语言是用来研制操作系统(如 UNIX 操作系统)或其他系统软件的特别好的工具。

通常 C 语言被认为是与 Algol 和 Pascal 有某些相似之处的结构化语言。尽管“块结构语言”这个术语从学术上考虑,并不能严格地应用于 C 语言,但是 C 语言是该块结构语言族的非正式成员。块结构语言的显著特征是代码和数据的区域化,这意味着语言能够把完成某个具体任务所必需的所有信息及指令和程序的其余部分分割开并隐藏起来。一般地,区域化是利用含有局部或临时变量的子程序获得的。用这种方法,用户可以编写各种子程序,在这些子程序内部发生的事件对程序的其他部分不会引起副作用。过度使用整个程序都理解的全局变量会在程序中引起错误及意想不到的副作用。在 C 语言中,所

有的子程序都是独立的函数。

函数是 C 语言的组成模块,程序的所有活动都发生在函数中,它们允许用户分别定义和编写程序中的各个特定的任务。使用局部变量的函数调试过后,用户就可以依赖它在各种情况下良好地工作,不会在程序的其他部分产生副作用。在某个函数中定义的全部变量只有那个函数才认识。

C 语言的特点是它能写出很简明的源程序,其部分原因在于该语言中包括大量的运算符。它的指令集相对较小,不过实际的实现包括大量的库函数,这些库函数扩充了基本指令。此外,该语言鼓励用户编写他们自己的附加库函数。因此,用户可以方便地扩展 C 语言的特点和能力。

C 语言的编译程序普遍适用于各种容量的计算机,并且 C 语言的解释程序正变得越来越普通。编译程序是紧凑的。它们生成的目标程序较之由其他高级语言编译所得的程序要短小并且高效。尽管开发新程序时,使用解释程序较容易,但效率低。许多程序员都从解释程序开始,然后一旦程序调试完毕(即一旦编程错误全部排除以后)便转用编译程序。

C 语言的另一个重要特点是它的程序具有高度的可移植性,与其他高级语言相比,就更是如此。其原因是 C 语言把大多数与计算机有关的特性都归进了它的库函数里。因此,每个版本的 C 语言都伴有它自己的库函数集,这些库函数集是按主机的特点而编写的。这些库函数是相对标准化的。一般而言,不同版本的 C 语言访问库函数的方法都一样。因此,大多数 C 程序可不做任何修改或作很少改动,就在许多不同的计算机上被处理。

## 猿猿软件工程

### 课文

软件工程是应用各种工具、方法和原理来产生和维护自动解决现实世界的问题的方法,它需要识别出问题、计算机对软件产品的执行以及软件产品存在的环境(由人员、设备、计算机、文档等组成)。很显然,没有计算机程序就不会有软件产品,更没有软件工程,但这些仅仅是一个必要条件而不是充分条件。

软件工程第一次作为一个通俗的术语出现是 1968 年在德国 Garmisch 市举行的北约会议的标题中。软件和工程并列是为了引起人们的兴趣。数字计算机问世不到 25 年,而我们却已面临着“软件危机”问题。首先我们发明了计算机程序设计,然后教人们如何编写程序,下一个任务便是对大型系统的开发,这种系统要可靠,能按时交付使用,并在预算范围内。随着各种技术的发展,我们的目标放在能够成功地做些什么这个界限上。实践证明,我们不善于准时建好大型系统而不超出期限。因此,软件工程是作为一种克服那些阻碍我们进步的组织力量而出现的。

一个大规模的软件工程横跨相当长的时间周期,这段时期可划分为不同的时间段,将

它们放在一起就组成了软件生存周期。

实际的术语可能不同,但大多数作者将软件生存周期划分为五个关键阶段。它们是:

- (1) 需求定义:确定和规定软件的需求。
- (2) 软件设计:根据需求分析进行设计。
- (3) 软件实现:在特定的机器上使用特定的编程语言实现软件设计的编码。
- (4) 软件测试:测试实现的系统是否满足规定的要求。
- (5) 运行和维护:系统被安装和使用。找到错误并修正。

尽管软件工程可以被定义为这五个阶段,但实际的开发过程本身是一个互相作用的整体过程,各个阶段互相前馈和反馈。每一个阶段向后一个阶段前馈信息,这取决于后续阶段以何为基础。每一个阶段也都向之前的阶段反馈信息。举个例子,软件实现阶段暴露了设计阶段的缺点,测试阶段暴露了软件实现阶段的错误。每一个阶段都有输入和输出,在传递前必须仔细检查输出。

第一阶段,需求定义阶段。参考系统需求分析阶段指定的功能特征和操作的详细资料。该阶段的输入是对软件要求的陈述(常常是种松散的陈述)。通常这个阶段输出一个“需求文档”,该文档由一系列最终产品必须满足的特征或约束的精确陈述组成。这并不是设计,但必须在设计之前完成,规定系统应该做什么而不去规定系统怎样做。需求文档的存在提供了设计阶段(生存周期的下一个阶段)中能够被确认的东西。有时候一个快速的开发原型是实现调试要求的有用工具。

对任何一个阶段,不允许把错误带到后续阶段是十分重要的。在需求定义阶段,一个错误的功能说明会导致不满足需要的设计和实现。如果没有查明错误而让其发展下去,那么到了测试阶段就会花大量的财力去修正这个错误(包括重新设计和重新实现)。

第二阶段,设计阶段。在此阶段占统治地位的是创造性。虽然一些人争论创造力是与生俱有的和不能被训练和提高的,但使用好的程序和工具的确可以提高创造力。这个阶段的输入是一份(经过调试和确认过的)需求文档,输出是以某种适当形式表示出的设计,如“伪代码”。确认设计阶段的正确性是非常重要的。需求文档里每一个需求都必须有相应的设计片段与之相符合。正规的验证虽然可以达到一定的程度,但却是极其困难的。更多的是整个设计团队、管理者甚至是客户的非正式的校阅。

第三阶段,软件实现阶段。它是针对第二阶段设计进行实际编码的阶段。这个阶段具有很大的诱惑力,很多鲁莽的程序员没有经过前两个阶段的充足准备就跳到了软件实现阶段。结果是,需求关系没有完全弄清楚,设计也有缺陷。软件实现进行得很盲目,结果是涌现出越来越多的问题。

第四阶段,测试阶段。它关心的是如何证明实现程序的正确性。不可避免的是,一些测试在前两个阶段已经开始进行了。任何有经验的程序员都在内心里测试每一行产生的语句,并在正式测试之前在心里已经模拟了任何模块的执行过程。测试永远不会简单。

Edsger Dijkstra 就写道：当有效的测试发现错误存在时，它不会表示没有错误。一个“成功”的测试指的是在特定的测试环境下不再发现错误，但并不能说明在其他环境下也没有错误。理论上，测试一个程序是正确的惟一途径是尝试所有可能的情况（也就是众所周知的无遗漏的测试）这对于即使是最简单的程序在技术上都是不可能实现的。举个例子来说，我们编写一个程序来计算一次考试的平均分，无遗漏的测试要求测试所有的分数和班级人数的组合，这将花费很多年的时间去完成这项测试。

第五阶段是程序的维护阶段。不幸的是，程序的学习者很少能参与这个阶段。这在现实世界是很重要的，当然不能被过分强调，因为一个被广泛应用的程序的维护费用可以达到或者超过它的开发费用。不同于硬件的维护，软件的维护不仅包括损坏构件的修复，还包括对设计缺陷的修复，也可能为了满足新的需求添加软件的功能。程序员开发新软件的能力无疑受到了维护旧软件时间长短的影响。维护必须被很好的组织，必须采取措施来减少它所花费的时间。

软件项目的总费用取决于在整个软件生存周期中所用去的人工和时间，对软件生命周期细分成各个要素阶段可以提供更好的费用分析。经过反复地观察，可发现这些阶段所需用的费用各不相同，正如已经被提及到的。举个例子来说，第五阶段即维护阶段可能会花费和开发阶段前四个阶段一样多的费用，这就是软件工程的工作。要尽可能地减低费用，需要对所有的阶段合理地分配时间。给某个阶段（如测试阶段）分配的时间不充分会导致后续阶段（这里对应的是维护阶段）问题的出现，从而引起整个费用的增加。事实表明，在实际项目中，大部分的维护工作不是花在编码或实现的错误上，而是在用户需求的变化或者需求分析中的错误和程序设计的不足等方面。

#### 阅读资料

##### 软件生存周期

图 3-1 所示为软件工程生命周期的范例。生命周期范例有时称之为“瀑布模型”，它要求软件开发按系统的、顺序的方式，从系统级开始向分析、设计、编码、测试和维护方向发展。模仿常规工程周期，软件的生命周期范例包含以下活动：

##### 系统工程和分析

由于软件总是大系统的一部分，所以工作是从为所有系统元素建立需求开始，然后再将这些软件需求的某一子集分配给软件。当软件必须与诸如硬件、人和数据库等其他因素建立接口时，系统观念是不可少的。系统工程和分析，包括系统级的需求收集与少量的高层设计和分析。

##### 软件需求分析

需求收集过程特别重要，并且着重于从软件的角度进行收集。为理解要建立的程序的性质，软件工程师（“分析员”）必须了解软件的信息范畴以及所需功能、性能和接口，把系统和软件的需求制成文档以供用户查阅。

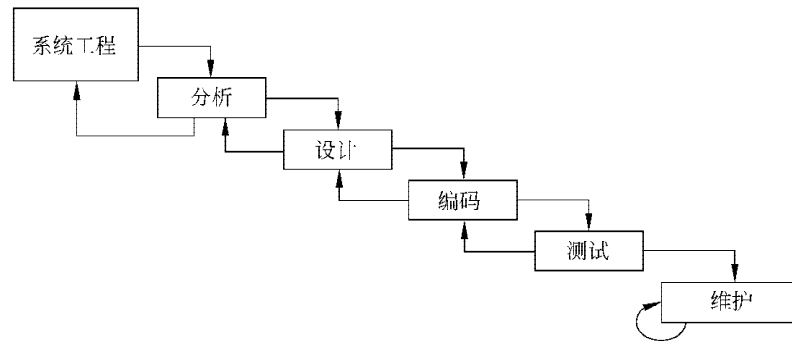


图 3-1 软件工程生命周期

### 设计

软件设计实际上包括多步过程,它着重于程序的三个显著特征:数据结构、软件体系结构和过程细节。在编码前,设计过程把需求翻译成可评价的软件特征。像需求一样,设计要制成文档并成为软件配置的一部分。

### 编码

设计必须被翻译成机器可识别的形式。编码阶段的任务就是做这样的工作,如果设计做得详细,编码就能由机器完成。

### 测试

一旦代码生成,程序测试就开始。测试过程注重于软件内部逻辑和外部功能,前者主要确保所有语句都被测试;后者主要是引导测试以确保已定义的输入能产生与要求相符的实际结果。

### 维护

毫无疑问,软件在交付用户使用之后还要进行修改(嵌入式软件例外)。由于遇到了一些差错,或由于必须调节软件以便与外部环境的变化相适应(例如,由于新的操作系统或外部设备产生的变化)或者由于用户要求提高功能和性能,因此修改是必然的。软件维护是将前述的各种生命周期步骤应用于现存的程序中。

传统的生命周期是软件工程中最早也是应用得最广泛的范例。尽管如此,最近几年里出现了对此范例的批评,即使范例的热烈支持者对它是否适合于所有情况也提出了质疑。应用传统生命周期范例有时会遇到的问题有:

1. 实际工程很少遵循模式中提出的顺序流,应用此范例时经常会发生重复和产生一些问题。
2. 要求用户在开始时明确指出全部需求往往是困难的。传统的生命周期是这样要求的,但由于许多工程开始时存在着非人为的不稳定性,因而很难满足这种要求。

3. 用户需要耐心。程序的工作版本要延续到工程的后期才能使用,如果一个主要错误在工作程序复查时没被检测到,损失将是惨重的。

所有这些问题都是实际存在的,尽管如此,传统的生命周期范例在软件工程中仍然占有明显的重要地位,它提出了一个包含分析、设计、编码、测试和维护方法的样板。传统的生命周期仍然是软件工程中应用最广泛的程序模型,尽管它有一些不足,但它显然比毫无计划地进行软件开发要好得多。

## 第 源章摇计算机网络知识

### 源章摇计算机网络

#### 课文

网络建立了计算机之间的通信。当人们在不同的地方工作时,网络是特别有用的。它提高了通信的速度和准确性,可防止信息被放错地方,且可自动确保关键信息的分发。

#### 网络

通信网络是由使用通信信道共享数据、信息、硬件和软件等的终端、计算机及其他设备组成的。网络可以分为局域网和广域网。

#### 局域网

局域网(LAN)是专有的通信网络,它可以覆盖一个有限的地域,如一个办公室、一幢建筑或一群建筑等。局域网是通过一个通信信道把一系列计算机终端连接到一台小型机上,更普遍的是把若干台个人计算机连接到一起而形成的。复杂的局域网可以连接各种办公设备,如字处理设备、计算机终端、视频设备以及个人计算机等,如图 4-1 所示。

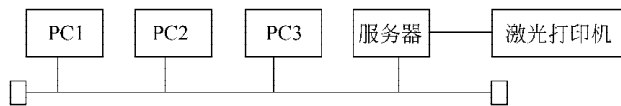


图 4-1 局域网(LAN)

局域网的两个基本应用是硬件资源共享和信息资源共享。硬件资源共享可使网上的每一台计算机访问并使用由于太昂贵而无法为每人配备的设备;信息资源共享允许局域网上每一个计算机用户访问存储于网上其他计算机中的数据。在实际应用中,硬件资源共享和信息资源共享是常常结合在一起的。

#### 广域网

广域网(WAN)相对于局域网,在覆盖的地理范围上要更大一些,它使用电话线、微波、卫星或这些通信信道的组合来传递信息。公共的广域网公司包括所谓的电信公司(如电话公司)。电话公司往往会鼓励很多公司去组建其自己的广域网。

### 网络配置

通信网中设备的配置(或称物理布置)称为拓扑(topology)。通信网络通常被配置为三种模式中的一种或它们的组合。这些配置是星形、总线型和环形网络。虽然这些配置也可用于广域网,但在此仅在局域网中对它们进行说明。连接到网络上的设备,如终端、打印机或其他计算机,称为节点。

### 星形网络

星形网络由一台中央计算机(主机)和一台以上连接到该中央计算机上并形成星形结构的终端或计算机组成。纯粹的星形网络仅由终端和中央计算机之间两点的连线组成,但是大多数星形网络,如图4-2所示,由两点的连线和多条分叉线组成。星形网络配置通常用于中央计算机中含有处理来自终端输入请求所需要的全部数据的场合,如航空订票系统。如果查询是在星形网络上处理的,那么回答该查询所需的所有数据应该包含在存储于中央计算机的数据库中。

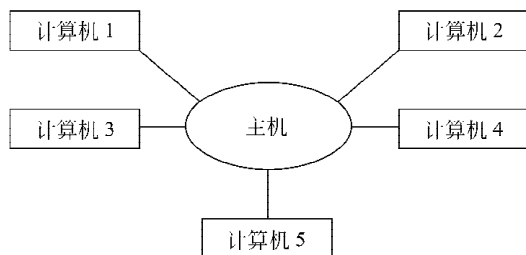


图 4-2 星形网络

星形网络效率相对较高,严密的控制可保证网上数据的安全。其主要缺点是整个网络都依赖于中央计算机及其相关的硬件和软件,如果其中任何部分不能正常工作,整个网络就会瘫痪。所以,在大多数大型的星形网络中,都有一个备用的计算机系统,以防止主系统出现故障。

### 总线型网络

使用总线型网络时,网络中的所有设备都通过同一根电缆连接到一起。信息可以从任何一台个人计算机向任何方向传给另一台计算机,任何信息都可以被传送到某一具体设备。总线型网络的优点是设备可以从任何一点连接到网络,或从网络的任何一点取下,而不会影响网络其他部分的工作。此外,如果网络上的某台计算机出现故障,不会影响网络上其他用户。图4-1所示为一个简单的总线型网络。

### 环形网络

环形网络不使用中央计算机,而是连接成一个环形来实现计算机之间的相互通信,如图4-3所示。当数据处理不是在中心位置而是在当地进行时,环形网络是非常有用的。

例如计算机可以放在三个部门：财务部、人事部和收发部。这三个部门的计算机可以分别完成各部门所要求的处理。但是收发部门的计算机偶尔需要与财务部门的计算机通信，以修改存储在财务部计算机上的某些数据。数据只能沿着环形网络的一个方向顺序通过每个节点进行传送。因此，环形网络的缺点是：如果一个节点出现故障，由于数据不能通过出现故障的节点，就会使整个网络无法工作。环形网络的优点是所需的电缆线少，因此，网络的电缆费用较低。

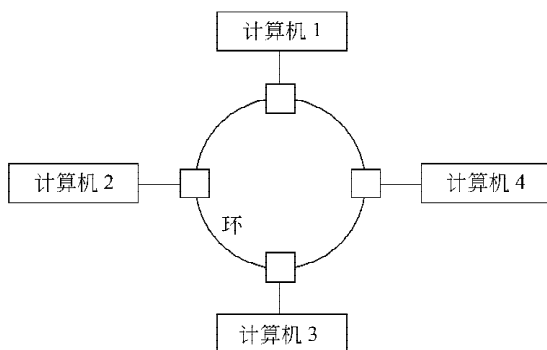


图 4-3 环形网络

### 连接网络

有时你可能想把许多独立的网络连接起来，可以通过使用网关或网桥来实现。网关由允许一个网络上的用户访问另一个不同类型网络上资源的软件和硬件组成。例如，可以用网关把一个由个人计算机组成的局域网和一个由大型计算机组成的网络连接起来。网桥由用于连接网络的软件和硬件组成。例如，某公司在其财务部和市场部各有一套由个人计算机组成的相似但又相互独立的局域网，这两个网络就可通过网桥连接起来。在这个例子中，使用网桥把两个网络连接到一起比把所有计算机连接起来组成一个大的网络要更加明智一些，因为每个部门仅仅偶尔需要访问另一个网络上的信息。

### 阅读资料

#### 网络管理

管理复杂的网络是多数机构所面临的一个挑战。良好的管理提供高质量的服务、高有效性并且能控制其费用（包括人员、设备和产品的升级）。

网络管理的任务可分成战术上和战略上两类。战术上的任务与对当前的状态（如故障、拥塞和不好的服务质量）作出响应有关。这些任务包括故障的解决、配置和流量调整。战略上的任务则是从长远的观点出发，面向制定合理的计划——避免网络的增长而出现的不足。另外，战略上的任务还包括用信息调整运作、优化质量和管理设备以降低总的运作费用。

大多数的网络管理机制是以开发系统互联模型(OSI)为中心的。网络管理的功能领域包括：用户管理、资源管理、配置管理、性能管理和维护——故障管理与安全。

#### 用户管理——账户管理和费用管理

账户管理的功能是记录用户信息——用户名、用户域、用户权限、口令和口令确认。其他账户的合理化管理是作为特殊功能服务并且由系统管理员管理。费用管理是确保目标管理的可靠性、可操作性和可维护性的手段。这项功能使得设备升级、删除无用的服务和把某台服务器功能调到与其提供的服务成为可能。当维护费用不断增加时，与网络维护相关的费用是可调配的。

#### 资源管理——系统管理与功能域管理(酝云碍)

系统管理是管理和执行网络提供的服务。资源管理就是实现和支持网络资源。良好的系统管理会有巨大能力，能合理处理事务并且为用户节省费用和减少工作量。这些产品能很容易地加入到网络系统管理中。

域名管理是企业网络管理在地方域名管理方面的一部分。

#### 配置管理

配置管理大概是网络管理中最重要的一部分，在这里你只有对网络进行配置管理，才有可能准确地管理网络。网络中进行的变更、增加和删除操作必须与网管系统人员相对应。配置的动态更新需要定期完成，以保证随时知道配置情况。

#### 性能管理

性能是牵涉 MIS 管理信息系统的关键。性能管理就是监视和跟踪网络活动，以保证系统的性能。WAN 网性能的连接、电话主干线的利用等都是应该反复关注的方面。

#### 维护——安全与故障管理

大多数网络管理应用软件仅把安全加到网络的硬件方面上，如某人登录到路由器或网桥。一些网络管理系统将报警检测和报告能力作为设备安全的(接触关闭、火警报告界面等)一部分。

故障管理可进行网络问题的检测、故障分离并使网络恢复到正常运行状态。大多数目标管理来回搜索错误并对错误问题以图表的格式或文本信息形式表述出来。这些文本信息绝大多数是系统配置人员在网管方案中设置的。当问题发生时，网管系统直接从报警器的记录中获取信息。故障管理处理的大多数问题是发生在网络上的事件和陷阱。

## 源程互互联网服务

### 课文

我们把 Web 服务简短定义为：允许用户在网上相互交流的一系列标准。

Web 服务的“服务”是指应用程序之间交流的面向服务的特性。由“子程序”、“函数”或“过程”(近期通用的编程术语)的功能扩展开来，“服务”为那些在设计上具有多用途和并可灵活实现的应用程序提供界面——能够同时为不同类型的客房完成几件事情。

服务可以把多个终端应用程序结合在一起成为众所周知的“合成应用程序界面”。比如“旅游路线的预订服务”,它能提供对于多个供应商的有条件的搜索和选择,并利用后台连接到不同的预订系统。Web 站点、服务亭、电话中心或者语音识别系统可以广泛地运用这个服务,而不必了解这些应用程序之间的区别。

Web 服务的界面被定义为使用 XML 标准的“模式”,它描述了请求和响应数据的格式、类型以及数据之间的关系。XML 和模式定义语言的标准都遵循 Internet 标准 W3C。定义模式的目的是使 XML 和 Web 服务不是必需的,它只是一个最好的实践,因为模式约束了数据和服务界面的关系。它清晰地定义出了服务能做和不能做的事,使得应用程序开发者知道用这个服务的目的。

Web 服务技术支持增强的操作效率,提高了允许多个应用程序协作运行的服务。Web 服务的语言 XML 是非常简单和开放的。它的适应性好,可扩展并可支持工业开发标准。Web 服务和 XML 信息标准帮助 IT 经理们通过开发应用程序的基础架构、所有的协议和属性的限制解决了技术决策问题。这一层面的抽象也允许应用应用程序和中间件平台包含新的技术以及更多销售商未来的标准。使用这个界面,软件开发者能致力于开发出最好的商业解决方案,而不必考虑底层中间件的复杂性。

企业也许可以控制他们内部的技术架构,但他们不能控制未来外部合作伙伴组织采用的技术架构。因为有广泛的应用,企业开发的通信协议保证了向前和向外的兼容性,也保证了技术投资的长期性。既然我们对 Web 服务已经有了一些了解,让我们再看一下上面提到的两个不同的方案,内联企业包含企业内部的应用,而互联企业包含不同商业伙伴的应用。

#### 如何使用 Internet 网

不管正在运行何种程序或执行何种任务,Windows 2000 使你能快速而方便地访问因特网。活动桌面使你能定制工作环境,任一窗口中的地址条帮助你接入因特网。你也会发现系统提供了帮助你与他人及另外的计算机进行交流的许多工具。

大多数人通过网络连接或因特网服务提供商(ISP)连接到因特网。ISP 向你提供了用于拨号登录到因特网服务器的服务号码。一旦接入系统,就能访问因特网,使用 ISP 所提供的电子邮件及所有其他服务。ISP 也会向你提供详尽的信息,用于对计算机连接因特网进行配置。如果使用了某个网络连接,系统管理员会提供这些信息。

使用包含在 Windows 2000 中的通讯工具,就能利用计算机发送电子邮件、处理电话、发送传真或举行视频会议。例如,你能使用电话拨号程序回答电话或参加公司的视频会议。Outlook Express 软件帮助你给朋友发送邮件或在全世界做生意。

通讯连接通常通过一根电话线、因特网或一个网络而建立起来。建立这些连接所需的计算机硬件中,有调制解调器、ISDN 适配器、声卡、麦克风或照相机。

通过因特网浏览器和因特网连接,可以在因特网上查找并浏览信息。可以在地址栏

内打入想要访问的网页地址,或从收藏表中单击某一地址。Internet Explorer 也使你能在因特网找人,查询某个企业,以及感兴趣的相关主题信息。Internet Explorer 的安全特性让你放心地浏览,因为你知道计算机及个人信息是安全的。为了打开 Internet Explorer,只要单击“开始”按钮,指向“程序”,然后选择“Internet Explorer”。有关使用 Internet Explorer 的信息,可单击 Internet Explorer 中的“帮助”菜单。另外,如果正在使用 Windows 2000,会看到 Windows 2000 的在线入门课本。如果使用 Windows 2000 服务器版,会看到因特网的服务。

可以使用电话拨号程序打电话或通过计算机参与视频会议。为使用电话拨号程序,你需要连接到计算机上的电话线路、调制解调器、网络账号、连接到本地区网络的电话交换机设备或一个因特网地址。要打开通讯程序,可单击“开始”|“程序”|“附件”|“通讯”命令,然后单击相应的图标。有关使用电话拨号程序的信息,可在电话拨号程序中选择“帮助”菜单得到。

Windows 2000 电话应用程序接口(TAPI)允许你为所有的电话应用程序设置拨号限定。如果在设置拨号前运行一个支持 TAPI 的程序(例如电话拨号程序),程序通常提示你提供拨号所需的最基本信息。安装 Windows 2000 后,为了在计算机上完全设置好拨号限定,可用控制面板上的“电话机”和“调制解调器”选项实现。

#### 阅读材料

##### 旅游企业中的网络服务

企业中对于网络服务技术的最关键的应用在于企业应用整合(EAI)之前提到过的问题,即将你的站点同时和客户积分系统以及预定系统连接,就是一个 EAI 问题的例证。如果还要整合客户关系管理的话,问题也许会更糟,因为客户关系管理系统同样需要和客户积分系统以及预定系统连接。很多时候你会发现,信息技术部门中的各个小组会同时却又各自为政地分析设计与其他一些系统或是数据源的连接途径,这就造成了重复劳动,冗余工作,也降低了成功机会。

利用网络服务来解决这个问题也有好几种做法。第一种方法,可以通过升级程序,或者利用 EAI“适配器”来使现有系统能够具有网络服务的功能(或者至少看起来像)。重写应用程序的方法显然不够经济,所以这里重点讨论采用适配器的方式。

适配器有两种类型,一种本身即是应用程序的扩展功能,用户可以定义,但是必须基于自身所在的操作平台。而像 SAP、PeopleSoft、Oracle 以及其他 EAI 的专业提供商,也可以提供适配器。但是使用这种类型的适配器需要对现有系统进行一些必要的改动。

第二种方法就是使用外部程序统一管理器,它有自己的操作平台,不需要修改原有的应用程序。它可以被置于多个后端系统之间,对系统和数据源提供规划一致的管理。对许多存在 EAI 问题的企业,比如客户服务领域,这是一种值得推荐的做法。应用程序因此可以提供灵活的服务,比方说订飞机票,对于老客户和新客户而言惟一的区别在于付费

表单不同。这样你的站点和客户关系管理系统就可以不用去分辨后端系统的细微差别。而且,还可以方便地使用基于 XML 架构的高级服务,而只需要通过惟一的标准协议: SOAP。

究竟是使用适配器还是统一管理器,需要根据实际的情况来决定。可能在 SAP、ERP 系统中不需要使用统一管理器,因为 Oracle 财务系统可以提供适配器。而对于客户、产品、存货、内容及供应系统,可能就需要用到统一管理器来提供全新的复合型服务。

在旅游行业中使用网络服务(包括 ebXML)究竟能做些什么?这不单由技术本身决定会发生什么,也由不断变化的商业市场来决定。你也许想像过这样的场景,旅游供应商通过网络服务来提供产品和服务。任何人只要有网络服务应用,就可以购买、捆绑、打包并且配送这些产品。购买者可以查看供应商的存货情况,可以细致到城市、旅店、汽车、航班等。

## 源 摇 网络安全

### 课文

近几年来,互联网使我们的生活改变了许多。我们使用电子邮件,通过 IP 电话和网友交谈,从网上获取最新信息,在网络市场购物。与传统通信渠道相比,互联网有许多优势:花费实在,信息传送速度快,并且不受时间和地点的限制。互联网使用的越多,对互联网安全的关注就越多。

当把一个可信赖的网络与一个不可信赖的网络连接在一起时,将牵涉到对可信赖网络的安全负责者。关注与互联网的连接,可能大部分基于从普遍的媒体报道安全突破口收集的轶事类的证据。然而,进一步接近检查事实及媒体报道背后的统计,将会深化这种关注。例如,美国国家计算机安全机构声称,许多对计算机系统的攻击未被发现并报告,美国国防信息系统机构称,美国国防部 9000 台计算机遭到攻击。这些攻击有 88% 获得成功,有 95% 未被目标机构检测到。只有 5% 中的 5% 察觉了攻击,只有 22 个站点对攻击进行了反抗。

### 加密技术

解决数据安全问题的途径是加密。加密技术有两种——对称密钥加密和非对称密钥加密。

对称密钥加密,当事人双方要有一致的密钥。当 A 给 B 要发送消息时,A 用密钥将消息加密,B 收到加密的消息后,用相同的(或最初的)密钥将消息解密。用对称密钥加密的优点在于它的加密和解密速度快(与相同安全标准下的非对称密钥加密术相比)。它的缺点是:第一,在发送秘密消息之前,当事双方必须安全地交换密钥;第二,对不同当事人,我们必须使用不同的密钥。例如,如果 A 与 B、C、D 及 E 通信,A 必须用 4 种不同的密钥。否则,B 将知道 A 和 C,以及 A 和 D 在谈论什么。要找到安全交换密钥的方式很困难,所以,对称密钥加密的缺点使它不适用于互联网。

对非对称密钥加密,当事各方都有一对密钥:公钥和私人密钥。公钥可自由使用,但只有密钥持有者拥有私人密钥。用公钥加密的消息只能用相应的私人密钥解密,反之亦然。当A给B发送消息时,A首先得到B的公钥将消息加密,然后发送给B。B收到消息后,用他的私人密钥将消息解密。这种加密术的优点是人们可以自由获得公钥,因此从交换密钥问题中解脱出来。它的缺点是加密和解密速度慢。在因特网中几乎所有的加密方案都使用非对称密钥加密来替换对称加密密钥和对称加密,以得到更好的加密控制。非对称密钥加密在数据传输上似乎是安全的,但鉴定的问题仍然存在。请考虑如下情节:当A给B发送消息时,A从互联网上得到B的公钥——A怎样才能知道他获得的公钥确实属于B?这个问题由数字证书来解决。

#### 数字证书

数字证书相当于电脑世界的身份证。当一个人想获得数字证书时,他生成自己的一对密钥,把公钥和其他的鉴定证据送达证书授权机构,证书授权机构将核实这个人的证据,来确定申请人的身份。如果申请人确如自己所声称的,证书授权机构将授予带有申请人姓名、电子邮件地址和申请人公钥的数字证书,并且该数字证书由证书授权机构用其私有密钥作了数字签名。当A要给B发送消息时,A必须得到B的数字证书,而非B的公钥。A首先核实带有证书授权机构公钥的签名,以确定是否为可信赖的证书。然后,A从证书上获得B的公钥,并利用公钥将消息加密后送给B。

#### 防火墙

自从互联网问世以及出现了计算机网络安全问题,很多人都在寻找防火墙。“黑客”和“解密高手”的经常性威胁受到前所未有的重视。为了满足在互联网上安全进行电子商务的商业需要,有必要引导企业构建完善的防火墙。建立一些软件和硬件装置来共同保护珍贵的关键数据免遭破坏。一些公司投入大量的资金、时间、物力和人力来建立防火墙系统以确保这些数据免遭侵犯。

使用防火墙就是为了在内部网络(内联网)与互联网之间提供隔离层。防火墙简单地就说是一组构件,可共同在两个网络之间构成一个屏障。

防火墙是将一个网络连接到另一个网络的安全系统。这套安全装置有一对计算机主板,每块主板上都有一个或多个网络用户接口适配器,以适应从一个网络到另一个网络间的接收和发送通信。防火墙被专门设计成一安全系统,以阻止在一个网络与另一个网络间的未被授权的通信,更多的是专门用来阻止那些未被授权的在公众网(像互联网)上的用户去访问个人的专用网。防火墙能够在现行的和未来的网络操作系统上运作,也能在现在和最新开发的客户操作系统上运作。

防火墙的一个主要目的是达到“线速”并且能使数据以每秒几十亿比特的速率通过防火墙。你可能见过有的防火墙设计得像路由器,那是因为好的防火墙要求新一代的超速装置——在每个端口每秒能轻松地处理150万的数据包。现在一个普通的路由器能在

两个网络间寻找最佳路径以向目的地传送数据包。它打开数据包找到其目的地,再用一组路由标签去确定在整个传送路径中的下一个“hop”(网段)。

但是,更多的是将防火墙设计成一个开关。在两个计算机主板间的网络中介质制作两点间的一个专门的动力“管”,让数据从某个IP传送到下一个IP。

这种“开关”装置比普通的路由器能更快地传送数据,因为这种“开关”不需要任何额外的时间或处理去检查在传送中的每一个数据包。防火墙能提供很高的“线速”,典型的是一个千兆位的网络媒介每秒能进出1800万以上的数据包。

#### 阅读材料

#### 计算机安全

计算机安全已经成为急需解决的问题。计算机拥有者必须采取措施防止偷窃和非法使用他们的设备。应该要求计算机用户提供正确的身份标识,而且对计算机的访问应该进行控制。

现在,大多数计算机设备都有某种安全系统。这些设备都具有确认想使用系统的用户身份的能力,从而可使非法用户无法对系统进行访问。一般情况下,合法用户都持有特殊的使用卡、钥匙、口令或账号。在小学和中学里,该身份确认系统可能是一份简单的名单。该名单上的每个人都发给一个上锁的计算机机房的钥匙。不幸的是,有些用户把自己的钥匙和口令都借给别人使用。通常,让计算机用户选择他们的口令时,他们经常会选择一些容易记忆和猜测的口令。

避免这些问题的一种方法是可以指定访问代码,该代码可以由计算机通过读通行卡得到。用户不需要记住自己的访问代码,因此该代码可以很复杂。即使通行卡被盗,挂失后代码就能被修改。

另一个安全问题涉及对计算机操作系统和数据的保护。采用安全措施保护所有的操作系统是很必要的。一些无所不为的人已经有办法避开安全系统打印出用户口令列表,给自己授予访问系统的权利。这些人未被正式授权,并且在系统中传播病毒。由于这些原因,所有敏感数据在不使用时都需要妥善保存。有些大公司以加密码的方式对数据进行存储,因此,如果没有一个称为密钥的特殊数据项的话,这些经过加密的数据对任何人都是无意义的。

计算机还应该预防自然灾害,如电源波动、火灾以及地震等影响。一般情况下,一个好的电源波动保护器能消除大多数电源波动的影响,但是由于磁盘的磨损和火灾的破坏,进行磁盘备份并把它们存放到另外一个地方是非常重要的。

通过讨论,可以清楚地看出计算机安全是多么重要。对系统采取什么样的安全保护措施与系统的成本有关。一般情况下,系统越复杂,进行安全保护所需要的投资也越大。由于计算机和用户人数的增加,计算机安全将会继续成为人们关注的问题。

尽管对安全问题有所恐惧,还是会有越来越多的机构跻身于互联网作为它们战略计

划的一个重要组成部分。将来不会由于对安全的忧虑而阻止许多机构去发掘互联网上所提供的商机。最终,公司将不得不找出办法来管理安全问题。这使得互联网安全市场的成长直接与互联网的成長绑在一起。受互联网和内部网发展的带动,1995年到2000年,互联网防火墙市场的年混合增长率计划达到174%。驱动这种增长的最主要的动力来自WWW服务器在互联网和内部网上的快速而广泛地配置。Web服务器软件的单位出货量预计将从1995年的12700份增加到2000年的超过500万份。尽管IT业一向以高速增长而自豪,这样的增长水平还是前所未有的。

## 源源摇电子商务

### 课文

21世纪,信息技术的快速发展和信息交换的大量增加给整个社会带来了新的驱动力和创新意识。信息技术的广泛应用导致了社会的巨大变化,这不仅仅局限在数据处理或计算范围内。这些变化影响着我們如何相互交流,如何安排日常活动,如何教育下一代,如何进行商业经营。信息技术、计算机网络以及互联网的广泛应用,改变了许多商业的运行模式,同时带来了空前的商业契机。现在商家能够高效率地超越地域和时区的限制从事商业往来。电子商务成了这个世纪的市场趋势。

电子商务就是利用电子媒介做生意。它意味着利用简单、快速和低成本电子通信实现交易,无需交易双方见面。现在,电子商务主要通过互联网和电子数据交换(EDI)的方式来实现。电子商务于19世纪60年代提出,随着计算机的广泛应用,互联网的日趋成熟和广泛利用,信用卡的普及,政府对安全交易协议的支持和促进,电子商务的发展日臻成熟,人们开始利用电子媒介做生意。

计算机网络提供了快速廉价的信息交换方式,互联网几乎进入了世界的每一个角落。中小企业可与世界任何地方的合作伙伴建立全球性的关系。高速的计算机网络使地理上的距离变得微不足道。通过在互联网上全天候地提供产品及服务的最新信息,商家可以与客户和消费者随时建立紧密联系来确保他们的竞争优势。互联网在网络世界为公司提供了大量的市场和产品推销机会,同时也使他们与顾客加强了联系。利用多媒体技术,可在互联网上非常容易地建立起法人形象,产品,企业商标名称。详细精确的销售数据有利于降低库存,节省运转费用。顾客的消费模式、个人爱好及购买能力等详细信息能帮助商家有效地调整营销策略。

在建立电子商务系统之前,必须确定以下问题:建立电子商务系统的目标是什么?公司在什么范围内采用电子商务?有多少投资?建立电子商务系统,也必须考虑公司的硬件和软件,以及建立电子商务系统所必需的技术。

如果要在互联网上建立一个站点来促进或者直接经营你的业务,可用下面的方法设立站点。第一条途径,选择一个虚拟网站服务提供商:如果你不想购买、安装、定制、关心网站运行所必需的所有硬件和软件,你可以将这个任务外包给虚拟网站服务公司。除了

虚拟主机服务外,一些公司也提供包括诸如 ISP 服务、网站设计与实施、域名申请等在内的一站式解决方案。第二,建立你自己的网站服务器:如果有足够的技术人员来规划、维护所有的硬件和软件,你当然也可以用自己的服务器来构建你的网站。

要接入互联网,需要得到来自 ISP 的服务。你可以选择服务内容适合用户要求的 ISP。在接入方式上,你可以选择拨号接入或宽带接入。拨号接入比较慢,但花钱少。无论如何,ISP 会为你提供上网所必需的工具。ISP 也会给你提供一些电子邮件账号,让你通过电子邮件与客户或商业伙伴进行交流。

安全级别也是必须考虑的。要防止系统受到黑客或病毒的袭击,可使用防火墙、非法入侵监测系统、病毒检测软件等。另外,还可采取一些安全措施,如对用户名和口令保密,经常变换你的口令等方法。付款交易需要的安全级别更高。如果要在线得到顾客的个人信息,必须保证数据传输和存储的安全,应该发表数据保密声明。

#### 电子商务的策略

Web 给常规的做生意惯例增加了新的空间,产生了新的生意策略。例如,电子生意产生了一类新的基于网络的中间商,他们正在替代长时期存在的中间环节,如传统的分销商和提供全套服务的中介商。比如,Monster.com 利用 Web 双向交互的能力,把求职者与人事招聘联系起来。有些新的中间商,如(加州)圣何塞市的 eBay 公司经营着拍卖站点,它们使用动态定价,这是一个利用 Web 的实时功能,让价格随供求关系自由波动的模型。

在这个新世界中,生意可能变得很难进行分类和理解。

电子生意分成两大类:建在网上的公司和正在经历生意变革的现有公司。

建在网上的公司倾向于遵循下列三个生意模型中的一个:软件初创公司模式、提供整套解决方案模式和“我有个主意”的模式。Roving 软件公司就是软件初创公司模式的例子,该公司是 Constant Contact(不断联系)软件的制造商,此软件能把个人化的电子邮件发送给 Web 网站上的客户。提供整套解决方案模式的例子是位于波士顿市的 Viant 公司,它提供了完整的网站开发方案。“我有个主意”模式的例子是麻省 Waltham 市的 Driver-Space.com 公司,它在 Web 网站上以 15% 的折扣销售汽车零件。

在电子商务的模型中,各公司必须利用顾客信息。迄今为止,很多现有的零售商在利用顾客信息方面做得极差。零售商应该为连续了解(顾客),而不只是为了交易处理而使用顾客信息。现有很多类型的公司仍倾向于把 Web 只是当作一个新的渠道,而实际上,它将成为其全部生意。

电子商务模型可以细分成三个 C:社团(Communities)、内容(Content)和商务(Commerce)。多数电子生意至少达不到三个 C 中的一个。传统的生意在谈到社团方面最为艰难。消息公告板和聊天会话是建立社团的方法,内容是指在 Web 上传递的信息。新闻报道与股票报价是其中的两个例子。而当消费者或公司付钱买在线张贴或在线广告推销

的实际物品、信息或服务时就产生商务。顾客可能会被以较低价格提供相同产品的网站拉走。为避免这种情况,公司应尝试生成能阻止别人模仿的生意模型。一个办法是投资非常多的钱,构筑不让别人进入市场的屏障;另一个办法是不断地快速革新,使竞争对手感到不可能跟上这种(革新)速度。

### 阅读材料

#### 电子商务模型

准确传送信息对电子商务事务的成功也是至关重要的,不过传送信息的方式有别于传统商业。在电子商务中,信息传送任务是由通信网络完成的。电子商务在信息处理方式上也与传统商业不同。传统商务模式中,要求人的介入来处理信息并采取行动;但在电子商务上,人的介入减到了最小程度。电子商务无论什么情况下,都可通过自动流程无纸化地完成。

因此,电子商务区别于传统商务的特征是信息传送和处理的方式。实现信息传送和处理的变革,无疑需要两种服务的支持:通信和数据管理。另外,为了使电子商务应用在一个可操作的设置上得到实际的应用,安全也是必需的。

为了进一步理解这种环境,也许有必要简单地了解一下通信网络。网络的一个重要方面是它能提供用户之间和用户与信息之间的连接,允许信息从网络的一个地区传送到另一个地区。主机系统为用户提供服务,支持用户上网,连接到自动访问信息仓库的主机系统上。在这种情况下,用户可以以电子化的方式相互传送信息,本地应用程序可利用网上任何地方的信息支持他们提供的服务。用户可通过发送电子邮件来交换信息,而不是利用电话或邮政系统。通过使用电子表格,可以发送订购单。

综上所述,电子商务模型必须包括通信、数据管理和安全。当然,应用程序也是模型必不可少的一部分。因此,一个电子商务模型主要由五部分构成:用户界面、应用程序、通信、数据管理和安全。需注意的是,电子商务模型包括用户界面元件,表面上看,这好像没有包括在上面的讨论中。这是因为用户界面和应用程序结合紧密,以至于经常被作为不可分割的整体。

这些组成部分与电子商务之间的关系值得注意。实现电子商务的主要任务不是加强或者开发新的技术,而是将现有的技术进行集成。这就是说,电子商务的焦点在于将支持服务合并到一个结合力很强的环境之中,由这个环境提供一种框架来支持电子商务应用。当然,要实现这一点,必须对这些领域的每一点进行检查。

还有几点需要说明,在这个模型中,无论是操作系统还是硬件都没有被包含,当然并不是说它们不重要。硬件技术的进步对促进电子商务来说是一个重要的推动因素,而操作系统利用了这些进步并将相应的好处提供给用户和应用程序,因此它们同样也是非常重要的。它们没有出现在我们的模型中,是因为它们被看作是理所当然的,也就是说,它们的出现是不言而喻的,另一个原因是它们都没有将专门针对电子商务架构的开发作为

一个主要议题。

因此要形成普遍的电子商务环境,就必须要求配置一个网络,这个网络有能力提供大量用户和服务提供商之间的连接。硬件、软件和安全问题都必须加以考虑。那些利用网络优势,提升计算机性能的应用程序是必需的。为了支持新的应用程序,要求网络软件必须利用不断增长的带宽。

## 源 缘 远程教育

### 课文

由于远程教育能够接受和使用新的教育技术而得到了广泛的认可,然而传统教育还停滞不前,不能充分利用计算机的新发展。教育中可用的以计算机为基础的技术向教师和学生提供了最新的和高质量的教育选择。摒弃传统教育的学生是远程教育的首要受益人,而且学生队伍不断壮大促使高校进一步使用新技术使教育更便捷、更有效、更有影响力。

视频光盘和激光技术的发展提供了一些独一无二的特点:存储大量数据的能力,无须加装光盘而显示静止图像的能力,在毫秒级内访问任何图像帧的能力。瞬间的帧访问和巨大的静态存储能力,使视频光盘成为独一无二的理想的视觉存储模式,它可以很方便地由教育者使用并由计算机控制,在所有教育的形式中提供了一个交互作用的媒体。

将计算机技术用于教育改善了几乎各种远程教育的方式。计算机技术作为教育环境下最大改变的发起者,联系和控制其他技术的能力使它成为所有技术的最前沿。计算机技术快速发展促使旧的设备更快地淘汰,经济现实是随着技术的发展价格不断降低。在教育领域有一点必须指出,计算机经常被称赞为具有创新性和生产性的工具的原因,应归功于那些不断在编程中用大量时间同专家们合作的教育策划者。与其他媒体一样,计算机也存在弊端,但它们提供了缓解这些内存弊端的机会。计算机只是一个工具,也许并不是非常强大有利,但教育者可以用来创建教育环境,并且创建过程同时也是学习的过程。

计算机媒体交流的定义似乎与远程教育的定义类似,这在于远程教育中教师和学生时间与方位上往往是分离的。计算机技术伴随着电子通信技术在信息存储和检索等方面取得了巨大的进展,从而产生了重要的教育工具:互联网、远程通信、电子公告板、电子信件、电视会议等。

最新的发展和不断降低的费用提供了通过电子互联网从全球获得大量信息的途径。在世界任何地方的学生要获得信息所需要的只是一台计算机,一个调制解调器,电话和访问端口(商业的、教育的或商务的)。学生在家里就可以进行研究的能力正在改变教育院校研究的方法。电子出版领域是发展最快的领域之一,但是在它作为印刷物而被广泛地接受之前需要制定一些标准。

远程通信通过提供传递系统支持远程教育,发送教育节目并使参与者之间互相沟通。卫星和光缆用来发送教育节目为全国各地的学校提供了经济便捷的途径。像杰森项目和

太空探索者一类的项目就可以使任何学校接受世界范围内可以收到的远程教育项目,并且相隔很远的接收点之间可以沟通。光学技术的快速发展为传输日益增加的大量信息提供了方便,并且使相隔很远的学生通过电缆或电话连接来使用可以互相沟通的多媒体方案。

电子公告板及新闻服务为在世界范围内讨论议题提供了途径。这些一对多的通信平台使远程教育能够发送作业和课程信息。成组讨论使每个人能够就任何议题分析他们同学以及不计其数的专家的见解。

国际互联网的日益普及正在促进电子邮件作为一对一或一对多的通信平台。E-mail 允许同伴之间会话,而且如果用户建立了双路通话模式几乎同时就可以收到返回的信息。把文本或图片文件粘贴到 E-mail 上的能力使用户能把作业和论文发送到任何地址。E-mail 对于教师和学生间的通信极有用,它使学生在课程时,遇到的问题能及时得到反馈信息,还可以使教师传送当前课程的成绩并回答相关问题。

一般来说,视频电话会议系统能够方便地实现面对面的交流。学生进入互相合作的学习过程,增强了教学体验而减少了单独学习的弊端。双路电视图像可通过卫星通信、同轴电缆和在不久的将来要用的光纤连接来发送。目前视频会议的造价限制了它在大多数商业领域的使用,但是随着价格的持续下落它将毫无疑问地用于远程教育课程。

以上讨论的所有技术可以容易地由计算机中央通信来控制,而且许多是计算机技术的扩展。使用以计算机为基础的通信有许多益处。首先是通过计算机可以互相沟通,并提供给学生反馈信息。第二是计算机能够代替任何已存在的媒体,包括课本和音乐器具。第三是信息可以从许多不同方面提出。更深远的好处包括在模拟模型中使用计算机和能让计算机深思。

#### 阅读材料

##### 计算机辅助指导

计算机辅助指导(CAI)是指建立指导性的计算机程序,这些程序采用准备好的针对每一个学生的学习最有利的课程资料。最早的指导性程序有很多形式,但是它们都遵循最基本的教学法体系。学生通常会收到一些给定的指导性文本(有时“在线”,有时不在线),同时会被问及一个问题并要求简要回答。当这个学生回答之后,他就会被告知答案是否正确,而他的回答有时会用来决定学习的进度,也即他要回答的问题的顺序。当学生出现误解时,程序就转向补救措施。课件作者试图预测每一个错误的回答,根据他自己对每一个错误回答是基于什么样的误解概念的理解,预先规定适当的补救措施。

尽管 CAI 在各种教学应用中有非常广泛的运用。但在大多数 CAI 系统中,计算机仅仅只是做了一个被编程的课本所能做的工作,人们甚至都怀疑这个机器到底是否派得上用场。很多研究人员却认为大多数 CAI 进程并不是计算机技术的最佳应用。当教学过程极其简单或者说只是琐碎时,人们就会想到不用计算机,而是用其他与这个任务联系

更紧密的设备或技术。

因此就产生了一种以计算机为基础的辅助工具,被称为基于知识的或智能化的 CAI (ICAI)。ICAI 已促使研究人员应用人工智能技术去创建更复杂的计算机程序。人工智能在自然语言的理解、知识陈述和参考方法方面的功用,以及其在诸如代数的简化、符号积分、医疗诊断和定理证明方面的特殊应用,已经被研究人员应用到开发 CAI 系统中,以期提高该系统的智能和效率。

早期对 ICAI 系统的研究致力于对主题的表达。人工智能程序通常使用非常有利的、不同于人类解决问题的方法。在某些情况下,CAI 研究人员借用人工智能技术来表达面向主体范围的专门技术,但是他们必须先修改此技术,通常是使推论程序不那么强大,以便促使他们遵循人类的推理模式,使得这些推理更能被学生理解,并使他们的解决问题方案更加接近。甚至模仿人类推理步骤的人工智能表达法在某些诸如生产法则的细节上,也可能不完全适用在教学上,尤其当重要的组织和战略概念表达得不甚明显时。

智能化 CAI(ICAI)系统的主要组件是面向学生知识的解决问题专业技能,显示学生知道什么不知道什么的学生模式,以及指导系统如何提供资料给学生的辅导策略。这些组件并不是在每一个系统中都完成开发的。由于 ICAI 程序的大小和复杂性,大多数研究人员旨在将努力集中到对能够构成一个完全可用系统的某个单一部分的开发上。

## 第 缘章 摇 计算机应用

### 缘 缘 摇 数字图像

#### 课文

计算机图像处理可定义成对数字表达的图像景象进行的数学函数运算。通常它是视觉感知、模式识别和图像理解所有这些处理的一部分。它们构成了计算机视觉的基础部分。所幸的是,图像处理在概念上比许多与计算机视觉相关的识别处理简单得多,并且是已经有了相当多实践和成功结果的课题。

数字图像处理这个术语通常指的是利用数字计算机处理二维画面。从宏观角度上,它概括了任何二维数据的数字处理。一个数字图像是以有限的二进制位数表示的实数或复数数组。以幻灯片、投影胶片、照片或绘图方式给定的图像首先要进行数字化,再以二进制数字方阵形式存储在计算机存储器内。然后,再对这个数字化的图像进行处理,并(或)将其显示在具有高分辨率的电视显示器上。

为便于显示,图像被存储在快速存取的缓冲存储器内,该存储器以 30 帧/秒的速率刷新显示器,以形成视觉上连续的显示。小型或微型计算机可通过联网方式(例如以太网)通讯,控制所有的数字化、存储、处理和显示操作。利用终端可以把程序输入到计算机内,在终端、电视监视器、打印机或绘图仪上输出信息也是很方便的。

数字图像处理的应用范围较广,例如与人造卫星和其他宇宙飞船有关的遥感技术,用于业务上的图像传输和存储,医疗诊断,雷达、声呐,声像处理,机器人和工业零件的自动检测。

通过卫星获取的图像可用来跟踪地球资源,地理测绘,农作物生长,城市发展和气象的预测,防洪、防火以及其他环境下的应用。空间图像应用包括对在外层空间探测飞行中所获取图像中的物体进行识别与分析。图像传送和存储的应用体现于广播电视、电话会议,办公室自动化的图像传真(打印的文件和图形)、计算机网络通讯、基于安全性监视系统的闭路电视以及军事通讯之中。雷达和声呐图像被用来侦测和识别各类目标,或用于飞行器或导弹系统的制导与操纵。还有很多其他方面的应用,其范围从工业自动化中的机器人视觉到卡通制作或时装设计的图像合成。换句话说,每当人、机器或任何其他系统接收到二维或二维以上的数据信息,都要进行图像处理。

与视频信息相关的数据量是如此之大,以至于需要相当多的存储容量。虽然有些存储介质的容量也很大,但这些存储体的存取速度通常是与其容量成反比。标准电视图像生成的数据速率为每秒10兆以上字节。有些图像源能产生更高的数据速率。这些数据的存储与(或)传输需要很大的容量与(或)带宽,其代价是相当昂贵的。图像数据压缩技术涉及在无信息丢失的前提下减少存储或传输图像所需要的位数。由于图像传输和图像存储的应用范围相当广泛,使得数据压缩在数字图像处理中显得尤为重要。

#### 图像形成

图像通过反射和透射形成,反射形成图像的典型例子是物体由可见光线照射并用照相机拍摄,最终图像的几何形状是由三维物体(自然界坐标)到二维视像(照相机坐标)的转换来确定的。

透射图像,换句话说,是由穿过一个物体的辐射而得到的,所得到的图像取决于物体的内部特征,典型的例子是普通的医疗X射线照片,它沿射线方向汇集电子密度而产生二维图像,因此可从软组织中识别出骨头,X射线体层摄像是其变体之一,它产生交叉(断面)的图像,然后从一系列不同角度的照射而得到透射轮廓,然后就可以构成一个三维数据空间。

#### 图像数据文件格式

作为一种工作,数字图像处理通常要建立大量的相当大的包含数据图像的数据文件。这些文件必须压缩成节省备份存储空间的压缩文件,而且它们经常需要在不同的用户和系统之间进行交换,因此,需要某些标准的格式以便存储和传送数字图像文件。

人们已经定义和使用了许多数字图像文件格式,有些获得了足够广泛的应用并或多或少地成了事实上的标准(见表5-1)。大多数商品化的图像处理程序可以读写若干种常见的图像文件格式。另外一些程序仅仅只能读出并显示用各种文件格式存储的图像,并且将它们从一种文件格式转换到另一种文件格式。这种程序能够根据文件的扩展名或文

件中所包含的标记信息自动地测试指定的输入文件的格式。当把某个显示的图像存储成文件时,用户可以规定所要求的文件格式。

表 2-2-1 常用图像数据文件格式

文件格式名称	后缀	使用环境
Tagged image file format	*.TIF	DOS ,UNIX ,and Macintosh 图像
Encapsulated PostScript	*.EPS	印刷工业标准
图像交换格式	*.GIF	CompuServe 图像标准
位图格式	*.BMP	Macintosh Windows 标准
Presentation manager	*.BMP	IBM OS/2 位图标准
Macintosh	*.PICT	Apple Macintosh 图像

### 图像压缩

通常有两类压缩方法:无损压缩和有损压缩。无损压缩意味着能产生某个压缩系数并可完全复现原始图像。有损压缩则允许某些图像信息的丢失,但在压缩比上有着更大的潜力。无论使用哪种技术,适当的压缩比取决于你所分析图像的复杂程度。例如:通常非损失性编码能产生最好的效果是每像素 2 位的压缩比。实际上,对于有很多农场的乡村卫星图像,用每像素 2 位的系数就不能够实现。但对于大片开阔地和很少阴影的中西部地区的卫星图像,同样的技术就能产生较好的压缩。

### 阅读资料

#### 计算机图形学

图形总是和信息显示相联系的。4000 年以前在巴比伦发现了在石桌上用八面图形投影法表现建筑平面设计图的例子。在文艺复兴时期,发展了创作透视绘画的机械学方法。无数工程学生对解释画在图纸上的数据熟悉起来。最近,允许包括色彩、多数据集和选择算法等的交互式图表设计软件已经规范。在建筑和机械设计等领域,手工画正在被采用绘图仪和工作站的基于计算机的绘图系统所代替。医学图像也采用多种方法运用计算机图形学。

最近,科学视觉化问题引起了很大关注。尽管研究人员现在正采用超级计算机去解决以前如流体流动和分子生物学等领域中难以处理的问题,但他们需要新的显示技术来解释生成的大量多维数据的分析结果。

### 设计

看一下如何用计算机图形学进行电子电路设计的例子。设计者坐在带有图形输入设备的图形工作站前,如用鼠标确定显示的位置。初始显示屏上包括可用在电路中的各种

元件和一个用于“构造”电路的空白区,设计者可以用输入装置选择需要的元件并将其移到设计中,然后进行元件间的连接。为形成这种初始设计,系统综合应用了计算机图形学。电路元件可在屏幕上画出并移动,图形输入装置用来表示选择和定位。许多辅助手段可以用来帮助设计者进行元件的精确定位,自动完成如何布线这样的任务。

这时,设计者可能想测试一下其设计。电路由分析程序进行测试,在工作站上显示其结果(如电压时间图)。然后设计者可视需要修改设计,尝试另一种设计,或者接受已经完成的设计。设计者再也不必写图形程序,甚至不需了解许多计算机图形学知识,但若没有计算机图形学,这种设计过程是不可能的。

#### 模拟

最为人所知的计算机图形学应用可归为模拟类。视频游戏展示了计算机图形学的视觉魅力和我们实时生成复杂图像的能力。走廊游戏的内容展示了当前软件和硬件的 latest 技术发展水平,计算机生成的图像是飞行模拟器的核心,已经成为训练飞行员的标准方法,这种模拟训练大大节省了人力物力。我们在电视和电影中看到的计算机生成的图像已经达到了和真实图像几乎无法区分的地步。

#### 用户界面

计算机图形学的应用已经根本改变了人和计算机之间的界面,讨论一下电子办公室,秘书坐在工作站前,而不是备有打字机的办公桌前,这一用户有一个指示设备(如鼠标)实现他和工作站之间的交互。显示由许多图标组成,代表秘书可进行的各种操作。例如,有一个邮箱图标,如果指向并单击它,屏幕上将会显示电子邮件信息。回收站图标允许用户对不需要的邮件进行处理,而一个文件柜图标用来存放信件及其他文件。

### 缘起 多媒体技术

#### 课文

多媒体不是产品而是一种技术(更确切地说是合成技术)。所谓技术就是使其他事情做起来更有效的东西。例如,假设你想去银行,现在想像你有一种地图应用程序,利用它你可以找到想去的银行,它不仅打印出去银行的详细说明,也可以显示一个去银行的彩色地图,并配上简短的声音,告诉你银行附近的公路交通状况。

这个地图应用程序(不妨称之为地图人)便是多媒体的一种应用。它包括了文本(打印出来的说明)、静态图像(彩色地图)和数字语言(对交通状况的叙述)。

多媒体的目标是使计算机更易使用。从上述例子可见,提供声音和图像信息可使人更快找到银行,即使你想去另外一个城市或另外一个州的银行。一个多媒体应用程序通常保存大量的信息(往往在 CD-ROM 上),这样你也可以从其他社区获取相同的信息。这种信息访问方式使计算机对用户来讲更有价值。通过向程序加入多媒体,用户将觉得计算机更有意思。

现在所提倡的是用多媒体来扩大计算机的使用范围。让我们看一下多媒体可以直接

应用的领域：

- 基于计算机的培训(CBT) 许多公司使用多媒体培训其雇员。一家大电话公司使用多媒体应用程序模拟一些重要的紧急情况来培训雇员如何处理这些情况。通过使用多媒体,公司发现它既节省开支又比其他培训员工的方法有效。
- 教学 多媒体的本质是使计算机变得有意思,无论对小学生或攻读硕士学位的成年人都是如此。
- 寓教于乐 现在有一种寓教于乐的新型软件,想法就是通过提供一些娱乐使学习过程更有趣。
- 娱乐 有一些娱乐是绝对没错的。许多情况下,当今最好的游戏软件中的图形技术将被用于明天的商业软件。如果有一条途径把技术扩展到其相邻层次,你绝对应该把眼光放到多媒体开发者身上。另外,写游戏软件本身也很有趣。
- 信息获取 人们常说现在是信息时代,我们确实被太多的信息搞得不知所措,这么多信息让人难以查找,多媒体提供了有效的方式组织信息,并可以快速有效地查找信息。
- 商业简报 许多公司需要这种向商业人员介绍信息的方式,应用软件可以制作十分漂亮的简报,通过多媒体,这些软件也变得很好用。

当你把标准的数据处理和图形、动画、语音合成、音频以及视频相结合时,你是在进行计算。多媒体技术使用计算机集成并控制各种电子媒体,例如:计算机屏幕,视盘播放器,CD-ROM 盘,以及语音和音频合成器。如果你在这些东西之间建立起逻辑连接,并且使整个包具有交互性,那么你就是在与超媒体一起工作了。

几乎任何现代计算机都能够进行文本处理,并产生基本的声音。多数计算机还能很好地处理图形,尽管它们在诸如显示分辨率,颜色的选择和性能等细节上各不相同。不过当你看动画这一高质量图形时,不同计算机的效果就迥然不同了。而当用户考察高质量音频系统的时候,它们之间的差别就更大了。它们管理视频的能力根本不同,这方面包括:从磁带或摄像机中输入视频信号,编辑并将它和计算机生成的图形或文本进行合成;将结果混合输出到录像带上。

在集成这些元素的能力方面不同类型的计算机大不相同。每种计算机都提供不同的操作系统和“创作系统”软件,这些软件同那些复杂的视频、音频及图形硬件一道,经过生成,从外围设备(如视盘播放器,CD 播放器,光盘驱动器和摄像机等)读取,合成,编辑等步骤,最后完成多媒体的制作。

硬件技术的进步当然是多媒体成功的关键,然而应用程序开发者必须脚踏实地、集中精力,以提供真正可使用的产品。

多媒体的能力将散布在软件的几乎所有层次之中,提供新的接口,新的商业应用,重新定义程序设计工具,甚至可能定义新的操作系统。现在提倡的是用多媒体来扩大计算

机的使用范围,多媒体可以直接应用于以下领域:基于计算机的培训(CBT)、教学、寓教于乐、娱乐、信息获取、商业简报等。

作为一个例子,请考虑实用性的要求是怎样迫使个人计算机工业从传统的基于字符的用户界面转变为目前流行的带有窗口、图标、鼠标和下拉菜单的图形用户界面的。这不仅是由于图形用户界面使用起来有趣,更重要的是它们能提高你的工作效率。事实上,图形用户界面最终将成为新的应用程序的标准特征。

我们即将拥有另一种界面:视频用户界面。窗口将用静止的和运动的视频图像来填充,高分辨率的图标将变成动画,而音频将成为文本的标准陪伴者。

至于程序员的开发工具和操作系统,正如图形界面有益于最终用户一样,多媒体辅助工具将被证明对程序开发者是有帮助的。面向对象的程序设计将不断发展直至包含更多的富有媒体的对象,程序设计工具提供图表式的代码控制。在程序员的工作效率方面又有所提高。

#### 阅读材料

##### 多媒体演示软件

PowerPoint 是多媒体演示软件,是 Office 套件软件之一。它提供制作多媒体演示的手段。你可以利用它制作你的图画、电子图表和图形,去访问艺术“蒙太奇”库,选择各式各样的音调、方式和文本的格式,等等。

PowerPoint 有很强的制作幻灯片的功能。你可以容易地在幻灯片上输入标题和文本,加上蒙太奇图画、图表、图形,又可以改变幻灯片的布局、删除或复制幻灯片。

##### 演示文稿

进入 PowerPoint 后,首先出现“启动对话框”,它提供四种方法建立演示文稿。演示文稿是一系列的幻灯片;每张幻灯片可以看作是书的一页,一张幻灯片可以用来演示提纲、文本、数字、分析图表或图像等,使用“链接”,它可以实现超文本和超媒体。

##### 模板

每一幻灯片都遵循标准的样式(格式)称为“模板”。在演示软件中有各种各样的模块供选用。

##### 视图切换

利用“视图”按钮,PowerPoint 可以进行视图切换。不论选择什么视图,演示文稿的内容都保持不变。PowerPoint 提供五种视图。

普通视图——这是最常用的视图。利用这种视图,可以把全部幻灯片置于一个序列中,或把演示文稿的所有幻灯片置于一个结构中。

大纲视图——当切换到大纲视图时,可以编辑演示文稿的大纲结构。

幻灯片视图——在这种视图中,可以演示每张幻灯片并编辑它的细节。

综览视图——在此视图中,每一张幻灯片为缩小的视图。演示文稿中的完整文件和

图片都可以展示。可以重新安排它们的顺序,增加切换和活动效应并设定放映时间。

#### 增加图形和图表

图和表帮助观众清楚地看到趋势和比例。Excel 电子图表和图可以引进到幻灯片,表现出二维或三维的效果。还可以用旋转图或电子图表去增强视觉效果。也可以把多个图像合成一个图像,或把图与对应的图形和电子图表结合到一张幻灯片里。

#### 蒙太奇

可以从图画库或 CD-ROM 或硬盘中找到你喜欢的图片并把它们插入到幻灯片中。大多数的图画都包含在演示软件中,或者免费从网络下载;但是在某些情形下,有些图画是有专利权的——若要使用它,就要购买或登记。

#### 自定义动画效果

这种方法用得最多而且适用于更多的对象。首先,从“幻灯放映”菜单选择“自定义”命令,以便打开“自定义”对话框。然后,设定每一对象的放映顺序(可以在放映前一对象后立即或在几秒钟后放映这一对象,或者以鼠标单击之),然后与声音效果一起设定动画效果。如果该对象是照片人物,动画效果是必要的;如果它是文字,就可以逐字或成组地放映它们。

#### 设定超级链接

可以在演示文件中增加超级链接,以转移到不同位置,例如,跳到一个幻灯片,其他的演示文稿,Word 文件,Excel 电子图表或其他的应用程序等。要做到这一点,第一,你要选定准备作超级链接的文本或对象;第二,在“插入”工具栏上使用“超级链接”命令;第三,单击在“插入超级链接”对话框中准备作超级链接的幻灯片或文件。在放映时,当鼠标到达该对象(有下划线)或已作了超级链接的对象时,鼠标的箭头就变成“手”型,这是超级链接的符号。

利用在“幻灯放映”菜单中的“动作”按钮,就可以把各种动作按钮插入到幻灯片上。这样做时,一个“动作设定”对话框就会自动弹出;可以在“超级链接表”里选择跳到的位置。

## 缘起人工智能

### 课文

人工智能是对能够展示出类似于人的品质、包括推理能力的机器的研究和创造,虽然制造出第一台计算器和第一台能够演奏乐器的机器人的科学家和工程师们早在 17 世纪就幻想着这个目标,但是所有早期的机器都不具备和当代人工智能领域所取得的成果相媲美的程序。人工智能领域的专家认为,总有一天,计算机学会像英语一样的自然语言,并按人类相同的方式感知物体,获得所有我们认为人类独有的推理能力——思考、判断、下结论和比较的能力。这些系统看起来不会像电影《星球大战》中的机器人或 R2-D2 一样。相反,这些系统会存在于桌面上的电脑中,它类似于我们现在常说的个人电脑。人

工智能在军事方面也有广泛的前景,在未来战争中,人工智能的武器可以不需要人类的干预而进行独立的战争。

#### 人工智能技术的家族

人工智能并不是单一的事物,有时候它是某些相关学科的家族,它们中的每一个都组成了人工智能的某些方面。计算机科学家、电子工程师、心理学家、行为学家、生理学家、生物学家都包括在这个研究领域。这样,人工智能就需要研究自然语言、机器人技术、感知系统、专家系统、神经网络和智能软件这几个领域。

1. 自然语言 自然语言包括习惯用语,是指人类使用的语言。自然语言关注计算机语言的识别和语言产生。基本的目标是建立能识别出人类语言并“读出”文字,以及能说和写的计算机的硬件和软件。一个相关目标是制造出这样的软件,它们可以完成人类所要求的研究。

2. 机器人技术 机器人技术研究的目标是发展这样的物理系统,它能够完成人类通常所做的工作,特别是在有害或者十分危险的环境中进行的工作。现代机器人技术主要发展数控机器工具和由计算机辅助制造(CAM)系统驱动的机器。

3. 感知系统 像人类一样,机器人需要“眼睛”和“耳朵”来指导它们的行为。从第二次世界大战以来,计算机科学家和工程师们一直在发展感知系统,或者说是在识别方式意义下,可以“看”和“听”的识别装置。这个研究领域,有时也被称作“模式识别”,它主要致力于军事应用,比如图片恢复、导弹控制和导航。但这方面的进展并不大,因为教会计算机识别真与假的区别是很困难的。

4. 专家系统 专家系统比较接近软件应用,它是在有限的知识和经验领域中寻求专家的意见,并且把它用来解决问题。在人工智能家族中,新闻媒体可能更加关注专家系统。部分原因是当专业支持相当昂贵或短缺时,这样的系统往往能够帮助管理人员和专业人员做出决策。

5. 神经网络 人们总是梦想建造可以思维的计算机,一个在某种意义上模仿人类大脑的“电脑”。神经网络就是这种用电流来模仿动物或者人的大脑的生理构造的物理装置。

6. 智能软件 现在市场上很多产品都声称它们运用了人工智能技术,或者说具有智能。本章的后面部分将介绍这方面的发展情况,包括用来代表模糊思考过程的模糊逻辑,用遗传过程作为模型来解决问题的遗传算法和能够为个人完成特殊任务的智能代理。

#### 专家系统

在创造智能机器的探索中,人工智能领域根据最可能的方法和理论分成了几个不同的方向。这些针锋相对的理论把研究者方法分为两个基本类型:自下而上和自上而下。自下而上理论研究者认为,实现人工智能的最好的方法是建造复杂人脑的神经网络的电子复制品,而自上而下的方法则是尝试用计算机程序模仿人脑的行为。

由于计算机巨大的存储能力,专家系统有潜力分析统计数字,并总结出规律。专家系统就像一个侦探揭开神秘事物一样。应用信息和逻辑或规律,专家系统能够解决问题。

正如上面所讲,专家系统能够做专家做的工作。而且计算机系统培训时间短,事实上没有运行损耗,所学的永远也不会忘记,不会生病、退休,也不会休假。除此之外,智能计算机能够对人不能思考的大量信息进行思考。

但是这些系统能在多大程度上代替人类专家?或者它们能全代替?例如,曾有人想过用智能计算机代替人控制核武器,说计算机能够对威胁做出更快的反应。许多AI的开发者害怕AI可能会像精神病学家Eliza的程序一样并对人与计算机的联系表示担心。然而我们不能忽视拥有计算机专家的益处。例如,天气预报要依据许多变量,而计算机专家能够更精确地储存它的所有知识。但是计算机不能依据人类专家所有的直觉。而这种直觉在预见结果上有时很必要。

AI始终是计算机科学的前沿。计算机高级语言,计算机接口和文字处理都归功于对人工智能的研究。通过AI研究提出理论和见识将会指导计算机今后的发展趋势。今天我们所用的产品只不过是不久将来的一点点而已,但是它们却是人工智能今后发展的方向。人工智能探索的进步已经并将继续影响我们的工作、教育和生活。

#### 阅读资料

#### 智能技术

下面,我们简单的评述一下现在与将来有可能成为主要应用领域的智能计算技术——模糊逻辑、遗传算法和智能代理。

#### 模糊逻辑

模糊逻辑是人工智能领域新近兴起的、以规则为基础的计算技术,包括用来再现和推理的各种概念和技术,尽管这种再现和推理不准确、不确定或者不可靠。模糊逻辑可以用近似或者主观的数值和不完全的、模糊的数据来建立规则。随着允许使用“高”、“非常高”、“极高”这种的表达式,模糊逻辑能够使计算机模拟人们实际中做出决定的方法,而不是用严格的“如果——那么”规则来定义问题。

模糊逻辑是基于集合和集合中成员资格度的概念。在传统的计算机逻辑中,集合有固定的成员资格要求——一个对象要么是真,要么是假,要么完全包含于一个集合,要么根本不属于一个集合。另一方面,模糊逻辑允许用真实度来表明一个给出的数值包括在一个“模糊集合”中的程度。

#### 遗传算法

一些人工智能技术用在自然界中找到的方法来解决问题。遗传算法就是一个例子。它们包括多种以达尔文的生物进化论为基础的解决问题的技术。算法开始创建一些模块,这些模块使用像繁殖、突变和自然选择等进程来“繁殖”出结论。当结论变化和合并时,较坏的被抛弃,较好的存活并遗传下去,并且和其他结论一起繁殖出更好的结论。这

个过程产生的结果可能会优于其他任何由人类精心计算得到的结果。

### 智能代理

智能代理的概念在 20 世纪 50 年代作为人工智能的一个研究分支得到了发展。从那时起,智能软件代理的影响就越来越大。这些在屏幕后面运行的软件到底是如何工作的?它们是由一些小而有效的程序代码驱动的,这些代码展示了脚本语言的执行能力和对象技术的通讯能力。这些代码能够在网络上自由运行,寻找有价值的信息。智能代理为用户完成的任务要求有以下特征:明确性、重复性和可预言性。代理也可以用于商业过程或软件应用,甚至于当它的功能发展到较高水平时,可以很容易超越人的能力。

智能代理已经用它特有的方式融入了我们的生活,可能我们还没有发现。操作系统、电子邮件系统、移动计算机软件和网络工具可以作为智能代理的主机。这些代理在增强商业运作方面显示出巨大的潜力的同时,它们像科学技术的许多其他进步一样,也激起了一些争论。智能代理的一个可能用途是监控雇员,它是智能代理的一个有组织、合法的分支。一旦用户允许,智能代理可以自身完成金融事物的处理。这种想法很有可能是人们担心他们私人信息安全的原因。

## 缘起 分布式数据库系统

### 课文

在分布式数据库系统,数据库存储在几台计算机中。分布式系统中的计算机之间通过高速网络或电话线等各种通信媒介互相通信。这些计算机不共享公共的内存或磁盘。分布式系统中的计算机的规模和功能可大可小,小到工作站,大到大型主机系统。

分布式系统中的计算机有多种不同的称呼,例如节点或结点,根据讲述的上下文不同而异。我们主要采用节点这个称呼,以强调系统的物理分布。

不共享地并行数据库与分布式数据库之间的主要区别在于,分布式数据库一般是地理上分开的,分别管理的,并且是以较低的速度互相连接的。另外,在分布式系统中,我们将事务区分为局部事务和全局事务。局部事务是仅访问事务被发起的单个节点上的数据的事务,而全局事务或者需要访问发起事务的节点之外的某节点上存放的数据,或者需要访问几个不同节点上的数据。

### 说明性的例子

考虑一个银行系统,它有 4 个分支机构,位于 4 个不同的城市。每个分支机构有它自己的计算机,计算机中维护该分支机构的所有账户的一个数据库。每个这样的配置称做一个节点。另外还有一个节点,它维护该银行的所有分支机构的信息。每个分支机构的数据库中有多个关系,其中关系账户(账户模式)的关系模型如下:

账户模式 = (分支机构名称, 账号, 结算)

关于 4 个分支机构的信息的节点维护的关系分支(分支模式)如下:

分支模式 = (分支机构名称, 分支机构城市, 资产)

各个节点上还有一些其他关系,这里我们不再举例。

为说明两类事务的差别,考虑如下事务:将\$50增加到Valleyview分支机构中的账户A-177中。如果在Valleyview分支机构发起该事务,则它是一个局部事务,否则它就是一个全局事务。将\$50从账户A-177转到Hillside分支机构中的账户A-305的事务是一个全局事务,因为事务的特性是要访问两个不同节点上的账户。

如下事实决定了上述配置是一个分布式数据库系统:

- 各个节点互相知道对方的存在。
- 所有节点共享一个公共的全局模式,尽管有些关系可能存放在其中某些节点上。
- 每个节点提供一个环境,既能执行局部事务,又能执行全局事务。
- 每个节点运行相同的分布式数据库管理软件。

如果不同的节点运行不同的数据库管理软件,那么管理全局事务就很困难。这样的系统称作多数据库系统或异构的分布式数据库系统。

#### 利弊权衡

建立分布式数据库系统的原因包括数据共享、自治性、可用性等。

- 数据共享。建立分布式数据库系统的主要优点是提供一个环境,使得一个节点上的用户可以访问存放在其他节点上的数据。例如,在上节的分布式银行系统例子中,一个分支机构的用户和可以访问另一个分支机构的数据。如果没有这种能力,那么想要将资金从一个分支机构转到另一个分支机构的用户就必须求助于某种将已存在的系统互相关联起来的外部机制。
- 自治性。通过数据分布的方法来共享数据,其主要优越性是每个节点可以对局部存储的数据保持一定程度的控制。在集中式系统中,中心节点的数据库管理员对数据库进行控制。在分布式系统中,一个全局数据库管理员对整个系统负责,部分职责委派每个节点的局部数据库管理员。每个数据库管理员可以有不同程度的局部自治,程度的大小依赖于分布式数据库系统的设计。局部自治的可能性是分布式数据库的一个主要优点。
- 可用性。在分布式系统中,如果一个节点发生故障,其他节点还能继续运行。特别地,如果数据项在几个节点上进行了复制,则需要该特定数据项的事务可以在这几个节点中的任何一个上找到。这样,一个节点的故障不一定意味着整个系统停止运转。

系统必须能检测到一个节点发生了故障,并采取适当的动作使之从故障中恢复。系统不能再使用故障节点的服务。最后,当故障节点恢复或修理好了,还需要一定的机制来将它平滑地重新集成到系统中。

虽然分布式系统的故障恢复比集中式系统复杂,但分布式系统中一个节点发生了故障,系统的绝大部分还能继续运行,这一能力使系统的可用性大大增强。对用于实时应用

的数据库系统来说,可用是至关重要的。例如,如果不能对航班数据进行访问,顾客可能就竞争对手那里去买票了。

分布式数据库系统的主要缺点是由于要保证各节点间的正确合作而增加了复杂性。增加的复杂性表现为以下几种形式:

- 软件开发代价。实现一个分布式数据库系统会更加复杂,因此,代价更高。
- 出现错误的可能性更大。由于构成分布式系统的各个节点并行地运行,因此更难于保证算法的正确性,尤其难于保证当系统的一部分发生故障时的运行,以及从故障中的恢复。其中都会出现很微妙的错误。
- 处理开销增大。消息的交换,以及为了达到节点间的合作而需要的附加的计算,这些都是集中式系统中所没有的开销。

在选择数据库系统的设计时,设计者必须在数据分布的优点和缺点间进行权衡。分布式数据设计的方法有好几种,可以是完全分布式设计,也可以是有很大程度上集中的设计。

#### 阅读资料

#### 数据仓库

数据仓库是从多数据源收集来的信息的仓储(或转储),它在一个地点以统一的模式存储。一旦收集来,数据将长期保存,以支持对历史数据的访问。因此,数据仓库提供给用户一个统一的数据接口,使得决策支持查询的书写更为容易。另外,通过从数据仓库访问用于决策支持的信息,决策制定者保证了联机事务处理系统不会受决策支持工作负载的影响。

图 5-1 给出了一个典型的数据仓库的体系结构,并且表示出了数据的收集、存储、查询和数据分析支持。构造数据仓库面临的问题如下:

- 何时以及如何收集数据。在源驱动数据收集体系结构中,数据源要么连续地在事务处理发生时传送新信息,要么阶段性地,譬如每天晚上传送新信息。在目标驱动体系结构中,数据仓库阶段性地向数据源发送对新数据的请求。

除非对数据源的更新通过两阶段提交在数据仓库中做了复制,否则数据仓库不可能总是与数据源同步。两阶段提交通常因开销太大而不被采用,所以数据仓库常会保留稍微有点儿过时的数据。但这对于决策支持系统来说通常不是问题。

- 采用什么模式。各自独立构造的数据源可能具有不同的模式。事实上,它们甚至可能使用不同的数据模型。数据仓库的部分任务就是做模式集成,并且在数据存储前将数据按集成的模式转化。因此,存储在数据仓库中的数据不仅仅是数据源中数据的拷贝,同时它们也可被认为是数据源中数据所存储的视图(或实体化的视图)。
- 如何传播更新。数据源中关系的更新必须被传至数据仓库。如果数据仓库中的

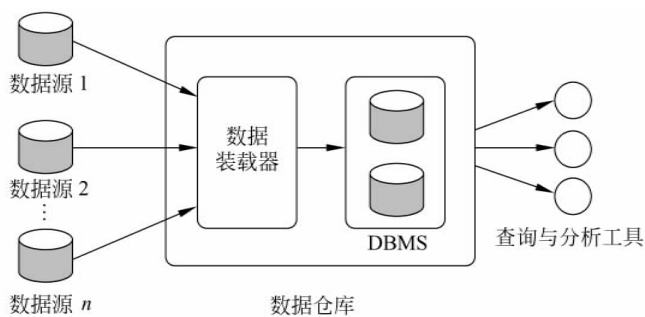


图 5-1 数据仓库结构图

关系与数据源中的一模一样,传播过程则是直截了当的。否则,传播更新的问题基本上是视图维护问题。

- 汇总什么数据。由事务处理系统产生的原始数据可能太大以至于不能联机存储。但是,我们可以通过维护对关系做聚集而得到的汇总数据回答很多查询,而不必维护整个关系。例如,我们不是存储每件服装的销售数据,而是按类存储服装的销售总额。

## 缘起 企业资源计划

### 课文

企业资源计划软件,或者是 ERP 这个缩写并不能完全说明其中的含义。忘记缩写中计划这个词,它并不能做太多的事,也忘记资源这个词,它只是一个广告的术语。但企业这个词,却非常重要,它才是 ERP 的真正野心的体现。它尝试把一个企业交叉的所有部门和功能整合成一个统一的能满足所有不同的部门的各自特殊需求的计算机系统。

那是很高的要求,要建立一个既满足财务部门的需要,又要同时满足人事部和仓库管理的需要。每个部门都有典型的用于优化本部门各自特殊的工作的计算机系统。可是 ERP 要把他们整合在一起成为一个单独的计算机系统,来满足企业各部门的信息共享和交流。如果 ERP 软件安装正确,那整合的途径可以带来巨大的好处。

例如,一个客户的订单。典型地,当一个客户发送了一份订单,它就开始以书面的形式从企业各个部门的文件篮里“旅行”,常常被一再地键入不同部门的计算机信息系统。订单在各个部门的文件篮里“闲逛”可能产生延迟和丢失,把信息键入企业所有相关部门的计算机系统或许会引起错误。同时在企业的各个部门没有人真正了解订单的状态,财务部门就没有了解这批订单状态的渠道,例如,他们能进仓库管理系统看看这批订单上的货物是否已经装运。基于此种状况,失望的顾客常常重复的听到这样话,“你只有打电话给仓库问一下”。

ERP 击败了陈旧的财务、人事、制造和仓库管理信息系统。代替他们的是一种单一

的联合的软件程序,这种软件可以分成若干个软件模块,这些模块概略的近似于原来的各个部门独立的系统。各个部门还是依然保留各自拥有的系统,除此之外,现在系统被连接在一起,目的是为了让财务部门的人能进入仓库系统看一下订单上的货物是否引进装运。大多数商家的 ERP 软件都有足够的“柔韧性”,你可以不买整个的软件包,只安装其中你需要的一部分功能。例如,许多企业只选择了 ERP 软件包中的财务或人事模块,剩下的功能留到以后再决定。

有五个主要理由告诉你为什么要在企业中实施 ERP。

- 整合财务信息——因为公司总裁想要了解企业的整体表现,他可能会去寻找企业各个部门各自情况报告,报告主要体现了各个部门为企业所做的贡献以及带来的收入。财务部门有他们独有的收入数字的设置。销售部门有另一个报告,企业各个不同的部门都有自己的情况报告。ERP 可以整合各个部门不同的报告产生一份不容置疑的财务报告版本,因为公司的每个人都运用这个系统。
- 整合客户订单信息——ERP 系统可以让客户订单,从接受到装运开票等一系列的程序步骤在一个地方完成,在一个系统中获取订单信息胜过在离散的不同的无法互相通信的系统中获取,企业可以更容易地跟踪订单,并在一个时间同时安排生产、库存和装运。
- 使企业的生产进程更为标准更为快捷——生产类型的企业,特别是那些有合并欲望的企业,他们常常在寻找一种部件可适用与企业内各个部门的各自运行的方式和系统。ERP 是随着企业生产自动化标准一起产生的。使企业生产进程标准化,同时运用单个的整合的系统管理,可以节省时间,增加生产力,降低成本。
- 减少库存——ERP 可以使生产程序流程更加平稳,改进企业内部订单实施程序的可见度。它还能减少用于生产的原料库存(工业原料的库存量),并能帮助用户更好的计划去给客户发货,尽量减少产品在仓库和码头的库存。如果要真正地改进你的供应链,你需要去买供应链软件,但是 ERP 也能做这些。
- 使人力信息标准化——特别是在有很多部门的公司里,人力资源管理,比如员工工作时间的考核或者员工福利,无法用一个统一的简单的方式去管理,但 ERP 可以做到这些。在竞争中,企业为了解决以上问题去实施 ERP,但同时由于 ERP 软件包的缺陷,企业常常不得不放弃了以前的一些典型的运行方式。虽然大多数 ERP 软件都尽可能做得完善,但每个产业都有自己独有的特点。大多数 ERP 软件的使用者都是离散型的生产企业,他们依赖 ERP 来走出因为以前落后的管理方式所带来的低谷。每个产业都努力和 ERP 软件的生产商交涉以使其能修改那些 ERP 程序的核心来满足他们自己的需要。

实施一个 ERP 系统成本有多大是不需要说的,它昂贵的成本可以让任何镇静的财务经理心惊。在 ERP 产生利益前,在为了实施系统增加的预算中,财务经理要计划好为一

些东西签支票,如系统咨询,生产程序重组,整合测试,以及一些其他花费。低估员工培训的花费有可能在以后的生产中出现。此外疏忽数据存储的需要以及用来复制原先数据的软件的成本都有可能会导致 ERP 实施的失败。在 ERP 实施预算中只要有一点点的疏忽都会导致成本成几何级数地上升,失去控制的速度超过了任何其他信息系统在实施过程中出现的超出预算的程度。

企业安装一个 ERP 系统需要很长时间。不要听信 ERP 系统卖主所说的平均实施时间是 3~6 个月。那些短的(那是对的,6 个月对 ERP 来说是短的)实施时间只实现了 ERP 的一种或另一种:那些小公司,或者 ERP 实施只限制在企业很小的领域里,或者只运用了 ERP 软件包中的财务部分。(在这个例子中 ERP 是没有超过一个昂贵的会计系统)。要正确实施 ERP,要改变你以前的经商方式,人们也要改变他们做自己工作的方式。每种改变都是痛苦的。当然,如果你的经商方式运行的非常出色(订单按时交货,生产力超过你的竞争对手,客户相当满意)。在这种例子下,根本不需要去考虑实施 ERP。最重要的不是关注于一个 ERP 实施需要多久,一个 ERP 实施转变带来的真正的效果平均要在一年到三年之间体现,但是你必须明白,为什么要实施 ERP 系统,以及怎么使用该系统来改进你的经营。

#### 阅读资料

##### ERP 能改善企业的商业业绩

ERP 最有希望的示范价值是作为一种能改进企业对客户订单进行接受,开票到收入等一系列处理程序的工具,是作为另一种闻名的不同以往的客户订单实施过程。那就是为什么 ERP 常常被作为一种后台办公软件被提及。它不处理前台的销售过程(虽然许多 ERP 软件的卖主已经发展了 CRM 客户关系管理软件来做这些事),更准确地说,ERP 是一个接受客户订单,并提供一种软件路线图,来使订单沿着规定的实施路线自动地完成每一点不同的步骤。当一个客户代表输入客户订单信息进入 ERP 系统后,他就有了所有用来完成订单所需要的信息(例如,他可以从财务模块中了解客户的信用和订单历史,从仓库模块中了解公司库存水平,从后勤部门中了解货船码头运输时刻表)。

不同部门的员工可以看到相同的信息,并可以更新它,当一个部门完成订单的一个步骤后自动地沿着 ERP 系统发送到下一个部门,要想寻找订单在系统的哪一个点,你只需要连接系统,然后沿着踪迹找下去。幸运的话,一个订单处理移动的速度就像一道闪电通过你的组织,客户能比以前更快同时更好地收到订单的回复。ERP 还可以在企业其他商业处理中展现它的魔力,比如员工福利或者是财务报告。

上述的一段话至少是 ERP 的梦想,但现实中有的时候是不尽人意的。

让我们暂时回到 ERP 前的老式系统,那时的系统虽然可能不那么有效率,但它很简单。财务部门做他们自己的工作,仓库部门也如此。在部门以外任何地方发生错误,那是别人的事情。现在,在 ERP 系统中,再也不会出现这种情况了,客户服务代表不再只是键

入客户信息按回车键的打字员了。ERP 系统的屏幕使他成为一个商人 ,屏幕闪烁着从财务部门来的客户的信用 ,从仓库来的库存水平。客户是否准时付款 ,订货是否准时装运。这些以前客户服务代表不用做的决定 ,现在直接影响客户以及整个公司。但是 ,这并不只是唤醒了客户服务代表 ,那些过去习惯把库存信息记在脑子里或写在纸头上的仓库管理人员 ,现在要把那些信息输入电脑。如果他们不这样做 ,显示在客户服务代表屏幕上的信息将显示库存量比较低 ,客户服务代表将不得不告诉客户 ,没有他们所要求的货物。以前 ,各个部门的责任都没有这样测试过。

人们不喜欢变化 ,ERP 需要人们改变以前的工作方式。那就是为什么 ERP 的价值现在是如此难于去展示。改变公司运作的方式比装一个 ERP 软件要重要得多。如果 ERP 改变人们从接受订单 ,生产货物 ,到装运 ,到最后结账开发票等一系列过程的方式 ,就可以从 ERP 系统中发现它的价值。如果只是安装这个软件 ,而没有改变企业原有运作方式 ,你们将根本不会发现 ERP 的价值。新的系统只会使你的行动变慢 ,因为没有人会真正使用新系统 ,你只是简单地把新系统替换了人们熟知的旧系统罢了。

# 附录 粤

## 计算机专业英语词汇表

### 粤

access control 访问控制

access list 访问表

access permission 访问许可

accessory program 附件程序

account 账号

active desktop 活动桌面

active window 活动窗口

ActiveX 微软 Active 平台的核心技术 ,包括 COM 和 DCOM

acyclic directory structure 非循环目录结构

adapter card 适配卡

adaptive scheduler 自适应调度

address space 地址空间

antivirus program 防病毒程序

Applet 一种可嵌入到 HTML 主页中的小型 JAVA 程序

application integration 应用程序集成

application layer 应用层

application object 应用对象

archive 存档

ARPAnet 连接整个美国国防部研究机构的广域网 ,Internet 的早期模型

assemble 汇编

asymmetric encryption 非对称加密

asynchronous 异步

asynchronous primitive 异步原语

atomic action 原子操作

atomicity property 原子属性

attachment 附件

attribute 属性

automation server 自动化服务器

auto-answer 自动应答

### 月

backbone 主干网

background 后台

backup 备份

bandwidth 带宽

Banner 旗帜广告 ,Web 页面中小幅广告部分 ,通常为长条形

bar-code 条形码

baseband 基带

beta testing (软件)Beta 测试

baud 波特

baud rate 波特率

binary 二进制

bind 绑定

bit 位 比特

bitmap 位图

black box 黑盒子

Boolean logic 布尔逻辑

branch 分支

broadband network 宽带网络

broadcast storm 广播风暴	cooling fan 冷却风扇
Browser 浏览器	core dump 内核转储
bubble jet printer 喷墨打印机	cracker 黑客
buffer 缓冲区	critical region 临界区
bulk storage 大容量存储器	cryptography 密码学
bus-contention 总线争用	custom 定制
悦	阅
callback 回调	Data BUS 数据总线
carriage return 回车	data flow diagram 数据流程图
certificate authority 证书认证	data link layer 数据链路层
channel 信道	data stream 数据流
check box 复选框	data structure 数据结构
child window 子窗口	database 数据库
chip set 芯片组	database interface 数据库接口
cipher text 密文	database server 数据库服务器
circuit switching 电路交换	datagram 数据报
click 单击	data source 数据源
client 客户机	data window object 数据窗口对象
client/server 客户机/服务器	deadlock 死锁
close box 关闭框	debug 调试
Cluster 簇	decode 解码
column 列	decryption 解密
command button 命令按钮	dedicated line 专用线路
comment 注释	default 默认 缺省
communication deadlock 通信死锁	Delphi 一种常用的可视化编程开发工具
compile 编译	demo 演示软件
compression 压缩	Desktop 桌面
configuration 配置	device dependent 设备相关的
congestion 拥塞	device independent 设备无关的
connectionless service 无连接服务	device object 设备对象
connection-oriented service 面向连接的服务	diagnosis 诊断
console 控制台	dialog box 对话框
Container 容器,一种特殊的屏幕区域和组件,其中 可包含组件	dialup 拨号
control box 控制框	digital camera 数码相机
Control Panel 控制面板	digital cash 数字现金
	digital certificate 数字证书

digital signature 数字签名

directory 目录

diskless workstation 无盘工作站

display adapter 显示适配器

distributed database 分布式数据库

distributed processing 分布式处理

distributed system 分布式系统

Dreamweaver 由 Macromedia 公司推出的网页开发平台

drop-down listbox 下拉式列表框

drop-down menu 下拉式菜单

dynamic binding 动态绑定

dynamic IP address 动态 IP 地址

dynamic router 动态路由器

耘

embedded computer 嵌入式计算机

embedded real-time system 嵌入式实时系统

emulation 仿真

encapsulation 封装 将相关的数据和过程打包在一个对象中

encode 编码

encryption 加密

encryption key 加密密钥

end user 终端用户

end-to-end 端到端的

entity 实体 ,OSI 模型中活跃在每一层的单元

environment variable 环境变量 ,由系统设置的变量或者由用户在系统命令行上设置的变量

Ethernet 以太网

evaluation copy 评测板 ,为了宣传或测试 ,让用户在购买之前使用的软件产品版本

exception 异常

execution 执行

expanded memory 扩充内存

expansion bus 扩展总线

expansion slot 扩展插槽

expert hypermedia 智能超媒体

extended attributes 扩展属性

extended memory 扩展内存

external frequency 外频 ,CPU 的基准频率 ,也称为系统总线频率

external procedure 外部过程

云

fast packet switching 快速分组交换

fatal error 致命错误

fault tolerance 容错

fiber-optic cable 光纤

field 字段 ,数据库中表的每一列称为一个字段

file handle 文件句柄

file server 文件服务器

file system 文件系统

filter 过滤器

Firewall 防火墙

Flash 由 Macromedia 公司开发的二维矢量图形编辑和交互式动画制作软件

flash memory 闪存

floppy disk 软盘

flow control 流量控制

footer 脚注

foreground job 前台作业

foreign agent 外地代理

Foreign Key 外键 ,数据库中用以建立同其他表间的关联

format 格式化

FORTRAN(Formula Translator)一种主要用于科学计算的高级编程语言

fragmentation 分段

frame relay 帧中继

frame 帧

front-end 前端 ,前台

FrontPage 一种由微软公司开发网页设计工具

full-screen 全屏

function 函数	job object 作业对象,是 Windows 2000 中新的可命名的、安全的、可共享的对象
郅	运
gang scheduling 集体调度	kernel 核心
gateway 网关	Key 关键字
gigabit network 千兆网	蕴
global scheduler 全局调度	laser printer 激光打印机
Gopher 一个著名的文档检索工具	library 库
groupware 群件	link 链接
匀	Linux 一种新的非常热门的类 UNIX 操作系统
hacker 黑客	load 装载
Hewlett-Packard Company 惠普公司	local scheduler 本地调度
hierarchical directory structure 层次目录结构	local variable 局部变量
high-level language 高级语言	log file 日志文件
hits 点击率	logical link control 逻辑链路更新
home page 主页	log in 登录
hub 集线器	log out 注销登录
陨	酝
image 图像	mailbomb 邮件炸弹
index 索引	main window 主窗口
information superhighway 信息高速公路	map 映射(将虚拟地址转换为物理地址)
inheritance 继承(面向对象的三大特性之一)	menu bar 菜单栏
install 安装	micro recorder 宏记录器
instruction 指令	Microsoft 微软公司,全球最大规模的计算机软件公司
Intel 英特尔公司,全球最大的微处理器生产厂商	middleware 中间件
interface 接口,界面	mirror 镜像
internet 互联网	Modem 调制解调器
interrupt 中断	mother board 主板
允	mount 装配
Java Applet Java 小应用程序	multicomputer 多计算机
Java 由 SUN Microsystem 公司开发的用于像互联网这样的广域网的编程语言	multidocument interface 多文档界面
JavaBeans API 一套由 SUN 公司制定的,描述开发独立可重用的 Java 软件组件的标准	multiline edit box 多行编辑框
	multiple inheritance 多重继承

multi-threaded 多线程  
 multi-processor 多处理器  
 multitasking 多任务  
 mutex 互斥量  
 mutual exclusion 互斥

### 晕

navigate 导航  
 netmask 子网掩码  
 NetMeeting 一个可以通过 Internet 或 Intranet 使用的  
 数据、音频、视频,进行应用程序共享、举行在  
 线会议、用户在线聊天的工具  
 Netscape 网景,一种网络浏览软件  
 network layer 网络层  
 network system 网络系统  
 netter 网上漫游者  
 network administer 网络管理员  
 node 节点  
 non-blocking primitive 非阻塞原语  
 non-impact 非击打式  
 nozzle 喷头

### 韵

object 对象  
 object-based system 基于对象的系统  
 object-oriented 面向对象  
 object-oriented system 面向对象系统  
 offline 离线  
 online 在线  
 optimal scheduling algorithm 最优调度算法  
 ORACLE 由 Oracle 公司开发的数据管理程序  
 overflow 上溢  
 overfrequency 超频  
 overlapped 重叠  
 overloading 重载

### 孕

package 软件包  
 packet 数据包  
 page fault 页故障  
 parallel port 并行接口  
 PainterBar 一个按钮栏,允许访问一个给定描绘器  
 中的所有主要功能  
 ParentWindow 父窗口,在 PowerScript 语言中,用来  
 指与当前菜单所关联的窗口的代词  
 Pentium 奔腾计算机  
 permission 许可,特定资源拥有者对共享该资源  
 人的信任程度  
 photo-sensitive drum 感光鼓  
 pin printer 针式打印机  
 pipe 管道,指一个实用程序或者应用程序的输出可  
 被导向另外一个应用程序作为其输入  
 pixel 像素  
 platform 平台  
 plug and play(or PnP, P&P)即插即用,是用于解决  
 设备安装麻烦的一套技术方案  
 pointing device 定位设备  
 point-to-point layer 点对点层  
 polymorphism 多态,同一个对象中的两个或多个名  
 字相同、参数列表不同的函数  
 pop-up menu 弹出式菜单  
 pop-up Window 弹出式窗口  
 preemptive multitasking 抢先式多任务  
 Primary Key 主键,惟一标识数据库表中每条记录  
 的一个或多个列  
 private key cryptography 私钥加密  
 process 进程  
 programming 编程  
 protocol 协议  
 proxy server 代理服务器  
 public key 公开密钥  
 public key cryptography 公钥加密  
 publishing 发布

## 匠

quantizer 数字转换器 编码器

quantometer 光谱分析仪

query 查询

queue 队列

## 砸

radio button 单选按钮

readme 自诉,用来描述计算机和它提供的服务

real time system 实时系统

refresh 刷新

repeater 中继器

remark 注释

remote 远程

resolution 分辨率

response window 响应式窗口

ribbon cartridge 色带盒

right-click 右击

router 路由器

routing 路由选择

## 杂

screen capture 屏幕捕获

screen saver 屏幕保护程序

Script 脚本

serial port 串行接口

Service Pack 服务包

setup 安装

Shortcut Key 快捷键

Shortcut 快捷方式

site 站点

Suite 套件

safe mode 安全模式

scalability 可伸展性

scanner 扫描仪

Sector 扇区

security certificate 安全认证

server 服务器

session 会话

shared variable 共享变量

short cut 短路

signature 签名

simulator 仿真器

single-line edit box 单行编辑框,一个包含单行文本的控件

socket 套接字

source code 源代码

stack 堆栈

storage class specifier 存储类标识符

structure 结构体

structure chart 结构图

subnet 子网

subroutine 子程序

supercomputer 超级计算机

super user 超级用户

swap area 交换区

switch 交换机

synchronous 同步

system board 系统板,主板

## 裁

taskbar 任务栏

telnet 远程登录程序

terminal 终端

thin client 瘦客户端

thread 线程

time slicing 时间分片

title bar 标题条

toner 墨粉 碳粉

topology 拓扑

traffic 通信量

transaction 事务

translation 转换

translator 翻译程序

transport layer 传输层

trap 陷阱

哉

unauthorized access 未授权访问(非法闯入计算机系统的行为)

union 共同体

upgrade 升级

upload 上传

user account 用户账号

user-defined 用户自定义

user ID 用户标识符

User Object 用户对象

灾

video bandwidth 视频带宽

video capture card 视频采集卡

video conferencing 电视会议

video display 视频显示

video game 视频游戏

video phone 可视电话

Video Text 可视图文

viewer 显示程序,这是一种显示或播放 Web 上文档的程序

virtual address space 虚拟地址空间

virtual block caching 虚拟块高速缓存

virtual circuit packet switching 虚电路分组交换

virtual device 虚拟设备

Virtual Host Service 虚拟主机服务

virtual IP address 虚拟 IP 地址

virtual machine 虚拟机器,仿真一种硬件设备的软件使用程序或例程

virtual memory technology 虚拟存储器技术

virtual network 虚拟网络

virus checker 病毒检查程序

Virus Program 病毒程序,是感染计算机软件

Visual Basic Microsoft 公司推出的程序设计语言

Visual C ++ Microsoft 公司推出的开发 Windows 和 Windows NT 32 位应用程序的可视化开发工具

Voice Messaging 语音信息传递

Voice Synthesis 语音合成

volume file 卷文件

宰

warm boot 热启动

Web page 网页

Web paging 网页寻呼

Web server Web 服务器

Web site Web 站点

Webspace Web 空间

wheel 特权用户

white pages 白页,Internet 上专门用于查询电子邮件地址和电话号码的服务

Wild Card Character 通配符

Window Painter 窗口画板

Windows 窗口

windows message 窗口消息

winzip 在 Windows 中使用最广泛的 ZIP 压缩软件

wire pirate 网盗,企图在网络中窃取口令并且访问未授权的系统和数据的人

wizard 向导工具

workgroup hub 工作组集线器

workstation 工作站

再

Yahoo 雅虎,美国四大信息检索公司之一

在

ZIP Driver ZIP 驱动器

zoom 放大

# 附录 月

## 计算机专业英语缩写词表

### 粤

- AAL (ATM Adaptation Layer) ATM 适配层  
ACL (Access Control Lists) 访问控制表  
ACK (acknowledgement character) 确认字符  
ACPI (Advanced Configuration and Power Interface) 高级配置和电源接口  
ACM (Association for Computer Machinery) 计算机协会  
ADSL (Asymmetric Digital Subscriber Line) 非对称用户数字线路  
AGP (Accelerated Graphics Port) 图形加速端口  
AI (Artificial Intelligence) 人工智能  
ANSI (American National Standard Institute) 美国国家标准协会  
AOL (American Online) 美国在线  
API (Application Programming Interface) 应用程序设计接口  
APL (A Programming Language) APL 编程语言  
APPN (Advanced Peer-to-Peer Network) 高级对等网络  
ARP (Address Resolution Protocol) 地址分辨/转换协议  
ASCII (American Standard Code for Information Interchange) 美国信息交换标准代码  
ASP (Application Service Provider) 应用服务提供商  
AST (Average Seek Time) 平均访问时间  
AT&T (American Telephone and Telegraph Company) 美国电报电话公司  
ATM (asynchronous transfer mode) 异步传输模式

### 月

- B2B (Business to Business) 商业机构对商业机构的电子商务  
B2C (Business to Consumer) 商业机构对消费者的电子商务  
BBS (bulletin board system) 电子公告牌系统  
BGP (Border Gateway Protocol) 边缘网关协议  
BIOS (basic input/output system) 基本输入输出系统

BISDN(Broadband-Integrated Services Digital Network)宽带综合业务数字网

BLU(Basic Link Unit)基本链路单元

BOF(Beginning Of File)文件开头

BPS(Bits Per Second)每秒比特数

BRI(Basic Rate Interface)基本速率接口

BSP(Byte Stream Protocol)字节流协议

BSS(Broadband Switching System)宽带交换系统

悦

CAD(Computer Aided Design)计算机辅助设计

CAE(Computer-Aided Engineering)计算机辅助工程

CAI(Computer Aided Instruction)计算机辅助教学

CAM(Computer Aided Manufacturing)计算机辅助管理

CASE(Computer Assisted Software Engineering)计算机辅助软件工程

CAT(Computer Aided Test)计算机辅助测试

CATV(Community Antenna Television)有线电视

CB(control bus)控制总线

CCITT(Consultative Committee on International Telephone and Telegraph)国际电话电报咨询委员会

CCS(Common Channel Signaling)公共信令

CDFS(Compact Disk File System)密集磁盘文件系统

CD-MO(Compact Disc-Magneto Optical)磁光式光盘

CD-ROM(compact disc read-only memory)只读光盘

CD-RW(compact disc rewritable)可读写光盘

CGA(Color Graphics Adapter)彩色显示器

CGI(common gateway interface)公共网关接口

COBOL(Common Business Oriented Language)一种高度结构化的程序设计语言

COM(Component object model)组件对象模型

CORBA(Common Object Request Broker Architecture)公共对象请求代理结构

CPAV(Central Point Anti-Virus)反病毒中心开发的一种反病毒软件

CPU(central processing unit)中央处理单元

CRC(cyclical redundancy check)循环冗余校验码

CRM(Client Relation Management)客户关系管理

CRT(Cathode-Ray Tube)阴极射线管 显示器

CSMA/CD(Carrier Sense Multiple Access with Collision Detection)载波侦听多路访问/冲突检测

CSS(Cascading Style Sheets)层叠式表格

CTS(Clear To Send)清除发送

## 阅

DAO(Data Access Object)数据访问对象  
DAP(Directory Access Protocol)目录访问协议  
DBMS(Database Management System)数据库管理系统  
DCE(data communication equipment)数据通信设备  
DCE(Distributed Computing Environment)分布式计算环境  
DCOM(Distributed COM)分布式组件对象模型  
DDB(Distributed DataBase)分布式数据库  
DDE(Dynamic Data Exchange)动态数据交换  
DDI(Device Driver Interface)设备驱动程序接口  
DDK(Driver Development Kit)驱动程序开发工具包  
DDN(Data Digital Network)数据数字网  
DEC(Digital Equipment Corporation)数字设备公司  
DES(Data Encryption Standard)数据加密标准  
DFS(Distributed File System(Windows 2000))分布式文件系统(Windows 2000)  
DHCP(Dynamic Host Configuration Protocol)动态主机配置协议  
DLL(Dynamic Link Library)动态链接库  
DMA(Direct Memory Access)直接内存访问  
DMSP(Distributed Mail System Protocol)分布式电子邮件系统协议  
DNS(Domain Name System)域名系统  
DNS(Domain Name Server)域名服务器  
DOM(Document Object Mode)文档对象模型  
DOS(Disk Operation System)磁盘操作系统  
DSM(Distributed Shared Memory)分布式共享内存  
DSP(Digital Signal Processing)数字信号处理  
DTD(Document Type Definition)文件定义类型  
DTE(Data Terminal Equipment)数据终端设备  
DVD(Digital Versatile Disc)数字多功能盘  
DVI(Digital Video Interactive)数字视频交互  
DVI(Digital Visual Interface)数码视像接口

## 耘

EEPROM(Erasable and Electrically Programmable ROM)电擦除可编程只读存储器  
EGA(Enhanced Graphics Adapter)彩色显示器,分辨率为 $640 \times 350$ ,可以显示16种颜色  
EGP(External Gateway Protocol)外部网关协议  
EISA(Extended Industry Standard Architecture)增强工业标准结构  
EMS(Expanded Memory Specification)扩充存储器规范

EPH(Electronic payment Handler)电子支付处理系统  
EPROM(Erasable Programmable ROM)可擦除可编程只读存储器  
ERP(Enterprise Resource Planning)企业资源计划  
ETM(ExTended Memory)扩展存储器

## 云

FAT(File Allocation Table)文件分配表  
FCB(File Control Block)文件控制块  
FCFS(First Come First Service)先到先服务  
FCS(Frame Check Sequence)帧校验序列  
FDD(Floppy Disk Device)软盘驱动器  
FDDI(Fiber-optic Data Distribution Interface)光纤数据分布接口  
FDM(Frequency-Division Multiplexing)频分多路  
FDMA(Frequency Division Multiple Address)频分多址  
FDX(Full Duplex)全双工  
FEK(File Encryption Key)文件密钥  
FEP(Front Effect Processor)前端处理机  
FIFO(First In First Out)先进先出  
FRC(Frame Rate Control)帧频控制  
FTAM(File Transfer Access and Management)文件传输访问和管理  
FTP(File Transfer Protocol)文件传输协议

## 郢

GAL(General Array Logic)通用逻辑阵列  
GB(Gigabyte)千兆字节  
GDI(Graphics Device Interface)图形设备接口  
GIF(Graphics Interchange Format)一种图片文件格式 图形转换格式  
GIS(Geographic Information System)地理信息系统  
GPI(Graphical Programming Interface)图形编程接口  
GPIB(General Purpose Interface Bus)通用接口总线  
GPS(Global Positioning System)全球定位系统  
GSM(Group Special Mobile)分组专用移动通信  
GSX(Graphics System Extension)图形系统扩展  
GUI(Graphical User Interface)图形用户接口

## 匀

HDC(Hard Disk Control)硬盘控制器

HDD(Hard Disk Drive)硬盘驱动器  
HDLC(High-level Data Link Control)高级数据链路控制  
HDX(Half Duplex)半双工  
HEX(HEXadecimal)十六进制  
HPNA(Home Phoneline Network Alliance)家用电话线网络联盟  
HTML(Hyper Text Markup Language)超文本标记语言  
HTTP(Hyper Text Transport Protocol)超文本传输协议

#### 陨

ICMP(Internet Control Message Protocol)因特网控制消息协议  
ICP(Internet Content Provider)因特网内容服务提供商,是 ISP 中提供信息服务的一种机构  
IDC(International Development Center)国际开发中心  
IDE(Integrated Development Environment)集成开发环境  
IDL(Interface Definition Language)接口定义语言  
IE(Internet Explorer)因特网探索者,是 Microsoft 公司推出的一个集成的网络浏览工具包  
IEEE(Institute of Electrical and Electronics Engineering)电子电器工程师协会  
IETF(Internet Engineering Task Force)因特网工程任务组  
IIS(Internet Information Service)因特网信息服务  
IP(Internet Protocol)因特网协议  
IPC(Inter-Process Communication)进程间通信  
IPSE(Integrated Project Support Environments)集成工程支持环境  
IRP(I/O Request Packets)输入输出请求包  
ISA(Industry Standard Architecture)工业标准结构,是 IBM PC/XT 总线标准  
ISDN(Integrated Service Digital Network)综合业务数字网  
ISO(International Standard Organization)国际标准化组织  
ISO/OSI(International Standard Organization /Open System Interconnection)国际标准化组织/开放系统  
    互联  
ISP(Internet Service Provider)因特网服务提供者  
ITU(International Telecom Union)国际电信联盟  
ITV(Interactive TV)交互式电视

#### 允

JDBC(Java Database Connectivity)Java 数据库互联  
JDK(Java Developer's Kit)Java 开发工具包  
JPEG(Joint Photographic Experts Group)联合图片专家组  
JSP(Java Server Page)Java 服务器页面技术,使用户能将需动态产生的页面内容与静态的 HTML 部分  
    分开

JVM(Java Virtual Machine)Java 虚拟机

### 运

KB(Kilobyte)千字节

KMS(Knowledge Management System)知识管理系统

### 蕴

LAN(Local Area Network)局域网

LAT(Local Area Transport)本地传输

LCD(Liquid Crystal Display)液晶显示器

LED(Light Emitting Diode)发光二极管

LLC(Logical Link Control sub-layer)逻辑链路控制子层

LSIC(Large Scale Integration Circuit)大规模集成电路

LUT(Look Up Table)查询表

### 酝

MAC(Medium Access Control)介质访问控制

MAN(Metropolitan Area Network)城域网

MB(Megabytes)兆字节(存储容量单位)

MCA(Micro Channel Architecture)微通道结构

MHz(Megahertz)兆赫(频率单位)

MIB(Management Information Bass)管理信息库

MIMD(Multiple Instruction Stream ,Multiple Data Stream)多指令流 ,多数据流

MIS(Management Information System)管理信息系统

MISD(Multiple Instruction Stream ,Single Data Stream)多指令流 ,单数据流

MMC(Microsoft Management Console)微软管理控制台

MMU(Memory Management Unit)内存管理单元

MPC(Multimedia PC)多媒体计算机

MPEG(Moving Picture Expert Group)一种视频和音频的国际标准格式

MUD(Multiple User Dimension)多用户空间

### 晕

NC(Network Computer)网络计算机

NCSC(National Computer Security Center)国家计算机安全中心

NDIS(Network Device Interface Specification)网络设备接口规范

NFS(Network File System)网络文件系统

NIS(Network Information Services)网络信息服务

NIST(National Institute of Standards and Technology)国家标准化与技术研究所  
NORMA(No Remote Memory Access(multiprocessor))非远程内存访问(多处理器)  
NRU(Not Recently Used)非最近使用  
NSA(National Security Agency)国家安全局  
NSP(Name Server Protocol)名字服务器协议  
NTP(Network Time Protocol)网络时间协议  
NUMA(Non-Uniform Memory Access(multiprocessor))非一致内存访问(多处理器)

### 韵

OA(Office Automation)办公自动化  
ODBC(Open Database Connectivity)开放式数据库互联  
ODI(Open Data-link Interface)开放式数据链路接口  
OEM(Original Equipment Manufactures)原始设备制造厂家  
OLE(Object Linking and Embedding)对象链接与嵌入  
OMG(Object Management Group)对象管理组织  
OOP(Object Oriented Programming)面向对象程序设计  
ORG(Object Request Broker)对象请求代理  
OS(Operating System)操作系统  
OSI(Open System Interconnect Reference Model)开放式系统互联参考模型  
OSPF(Open Shortest Path First)开发最短路径优先

### 孕

PCI(Peripheral Component Interconnect)外部连接互联,是一种局部总线  
PDA(Personal Digital Assistant)个人数字助理  
PDF(Portable Document Format)便携式文档格式  
PDN(Public Data Network)公共数据网  
POP(Post Office Protocol)邮局协议  
POST(Power-On Self-Test)加电自检  
PPSN(Public Packed-Switched Network)公用分组交换网  
PRAM(Pipelined Random Access Memory(a consistency model))管道随机存取内存(一种一致性模型)  
PROM(Programmable ROM)可编程只读存储器

### 匝

QC(Quality Control)质量控制  
QLP(Query Language Processor)查询语言处理器  
QoS(Quality of Service)服务质量

## 砸

RAD(Rapid Application Development)快速应用开发  
RAI(Remote Application Interface)远程应用程序界面  
RAM(Random Access Memory)随机存储器  
RAM(Real Address Mode)实地址模式  
RAID(Redundant Arrays of Inexpensive Disks)冗余磁盘阵列技术  
RCP(Remote CoPy)远程复制  
RDA(Remote Data Access)远程数据访问  
RIP(Routing Information Protocol)路由选择信息协议  
RISC(Reduced Instruction Set Computer)精简指令集计算机  
ROM(Read Only Memory)只读存储器  
ROT(Running Object Table(DCOM))运行对象表(DCOM)  
RPC(Remote Procedure Call)远程过程调用  
RTS(Request To Send)请求发送

## 杂

SAA(System Application Architecture)系统应用结构  
SAF(Store And Forward)存储转发  
SAP(Service Access Point)服务访问点  
SCSI(Small Computer System Interface)小型计算机系统接口  
SDLC(Synchronous Data Link Control)同步数据链路控制  
SDK(Software Development Kit)软件开发工具箱  
SGML(Standard Generalized Markup Language)标准通用标记语言  
SHTTP(Secure Hypertext Transfer Protocol)安全超文本传递协议  
SIMD(Single Instruction Stream ,Multiple Data Stream)单指令流 ,多数据流  
SISD(Single Instruction Stream ,Single Data Stream)单指令流 ,单数据流  
SMB(Server Message Block)服务器消息块  
SMDS(Switch Multi-megabit Data Services)交换多兆位数据服务  
SMP(Symmetric Multi-Processor)对称式多处理器  
SMTP(Simple Mail Transport Protocol)简单邮件传输协议  
SNA(System Network Architecture)系统网络结构  
SNMP(Simple Network Management Protocol)简单网络管理协议  
SNTP(Simple Network Time Protocol)简单网络时间协议  
SONET(Synchronous Optic Network)同步光纤网  
SPC(Stored-Program Control)存储程序控制

SSL(Secure Socket Layer)安全套接字层  
SQL(Structured Query Language)结构化查询语言  
SSIC(Small Scale Integration Circuit)小规模集成电路  
STA(Spanning Tree Algorithm)生成树算法  
STDM(Synchronous Time Division Multiplexing)同步时分复用  
STP(Shielded Twisted-Pair)屏蔽双绞线

#### 裁

TCB(Transmission Control Block)传输控制块  
TCP(Transmission Control Protocol)传输控制协议  
TCP/IP(Transmission Control Protocol /Internet Protocol)传输控制协议/网间协议  
TDM(Time Division Multiplexing)时分多路复用  
TDMA(Time Division Multiplexing Address)时分多址技术  
TDR(Time-Domain Reflectometer)时间域反射测试仪  
telcos(telecommunications companies)电子通信公司  
TIG(Task Interaction Graph)任务交互图  
TI-RPC(Transport-Independent Remote Procedure Call)独立传输远程过程调用  
TLI(Transport Layer Interface)传输层接口  
TSR(Terminate and Stay Resident)终止并驻留  
TTL(Transistor-Transistor Logic)晶体管—晶体管逻辑电路  
TWX(Teletypewriter Exchange)电传电报交换机

#### 哉

UART(Universal Asynchronous Receiver Transmitter)通用异步收发器  
UDF(Universal Disk Format)通用磁盘格式  
UDP(User Datagram Protocol)用户数据报协议  
UIMS(User Interface Management System)用户接口管理程序  
UNI(User Network Interface)用户网络接口  
UPS(Uninterruptible Power Supply)不间断电源  
URI(Uniform Resource Identifier)环球资源标识符  
URL(Uniform Resource Locator)统一资源定位器  
USB(Universal Serial Bus)通用串行总线  
UTP(Unshielded Twisted-Pair)非屏蔽双绞线

#### 灾

VAD(Virtual Address Descriptors)虚拟地址描述符

VAN(Value Added Network)增值网络

VAP(Value-Added Process)增值处理

VAS(Value-Added Server)增值服务

VBScript(Microsoft Visual Basic Scripting Edition)程序开发语言 Visual Basic 家族的成员

VCPI(Virtual Control Program Interface)虚拟控制程序接口

VDD(Virtual Device Drivers)虚拟设备驱动程序

VDR(Video Disc Recorder)光盘录像机

VDT(Video Display Terminals)视频显示终端

VFP(Visual FoxPro)是 Microsoft 公司推出的数据库开发管理工具

VFS(Virtual File System)虚拟文件系统

VGA(Video Graphics Array)彩色显示器,分辨率为 640 × 480。

VGA(Video Graphics Adapter)视频图形适配器

VIS(Video Information System)视频信息系统

VISA(Virtual Instrument Software Architecture)虚拟仪器软件体系结构,是控制 GPIB、VXI、RS-232 和其他类型仪器惟一的接口

VLAN(Virtual LAN)虚拟局域网

VLSI(Very Large Scale Integration)超大规模集成

VOD(Video On Demand)视频点播系统

VON(Voice On Net)网上通话

VPN(Virtual Private Network)虚拟专用网

VR(Virtual Reality)虚拟现实

VTP(Virtual Terminal Protocol)虚拟终端协议

VxD(Virtual Device Driver)虚拟设备驱动程序

## 宰

WAN(Wide Area Network)广域网

WAE(Wireless Application Environment)无线应用环境

WAIS(Wide Area Information Service)广义信息服务 数据库检索工具

WAP(Wireless Application Protocol)无线应用协议

WDM(Wavelength Division Multiplexing)波分多路复用

WDP(Wireless Datagram Protocol)无线数据包协议

WML(Wireless Markup Language)无线标记语言

WORM(Write Once, Read Many time)写一次读多次光盘

WWW(World Wide Web)万维网

WYSIWYG(What You See Is What You Get)所见即所得

载

XGA(eXtended Graphics Array)扩展图形阵列

XML(eXtensible Markup Language)可扩展标记语言

XMS(eXtended Memory Specification)扩展存储器规范

XQL(eXtensible Query Language)可扩展查询语言

在

ZA(Zero and Add)清零与加指令

ZBR(Zone Bit Recording)零位记录制

## 参 考 文 献

1. M. Morris mano. *Computer system architecture 3<sup>rd</sup> ed.* Prentice hall International ,Inc 1998
2. Microsoft. *Implementing a Database Design on Microsoft SQL Server 6. 5.* Microsoft Education and Certification Student Workbook ,9/1996
3. Douglas E. Comer. *Computer Networks and Internets.* Prentice-Hall International ,Inc 1996
4. Jeffrey D. Ullman and Jennifer Widom. *A First Course in Database Systems.* Prentice-Hall International , Inc 1997
5. 刘兆毓主编. 计算机英语(第二版). 北京:清华大学出版社,1997
6. 卜玉坤主编. 大学专业英语——计算机英语. 北京:外语教育与研究出版社,2002
7. 王开铸编. 计算机专业英语阅读. 哈尔滨:哈尔滨工业大学出版社,1997
8. 李代平等编著. 计算机专业英语. 北京:冶金工业出版社,2001
9. 卜艳萍主编. 计算机专业英语. 北京:电子工业出版社,2002