电子信息工程专业本科系列教材

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专业英语 下

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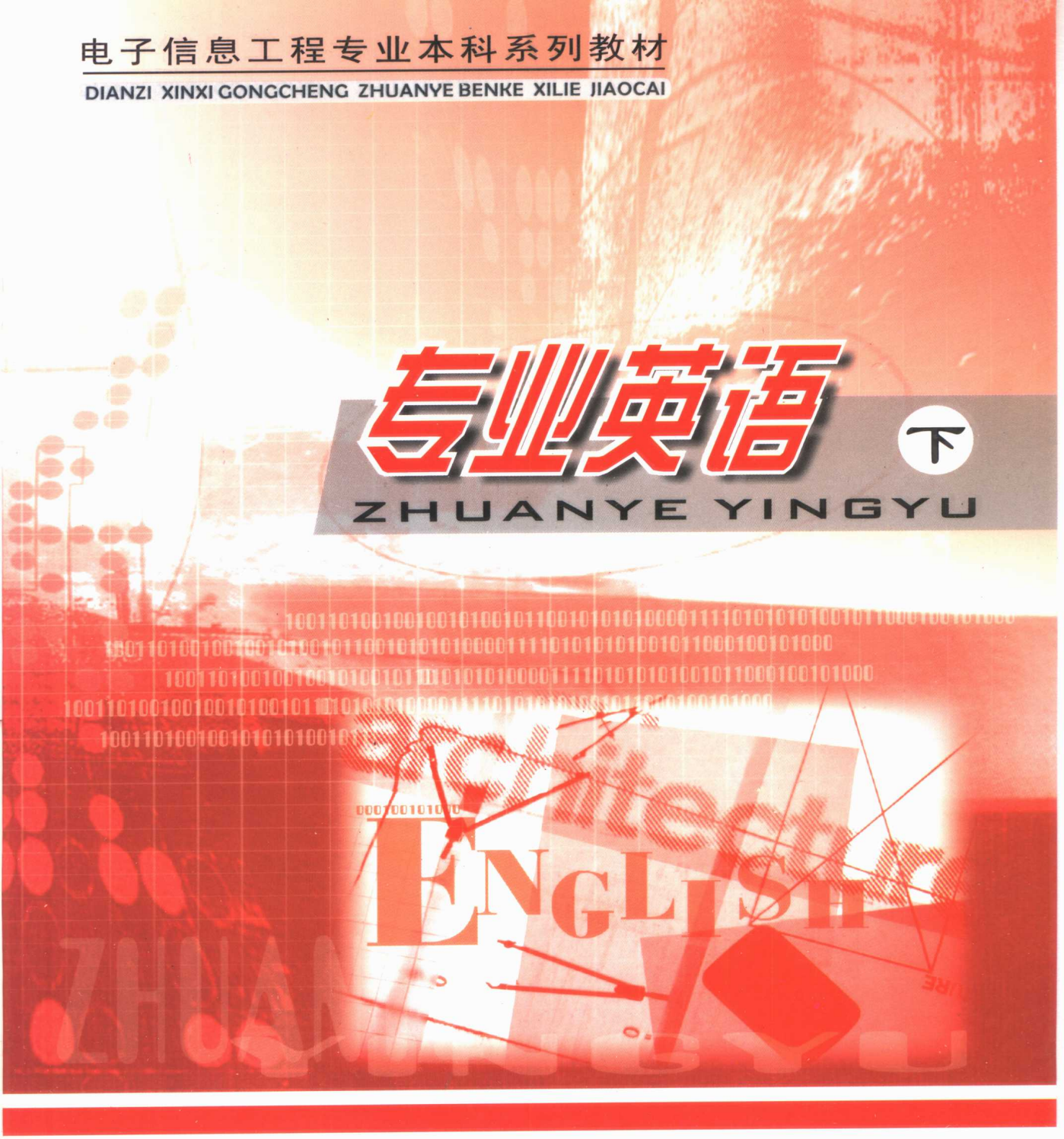

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重庆大学出版社

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内 容 提 要

本书由 14 章和附录组成，内容十分丰富，主要包括 IT 百年历史、个人计算机、数据库管理系统、计算机网络、系统安全、管理信息系统、企业应用集成、开放资源、企业门户、全息照相技术、电子电路基础、数字通信、CDMA、ATM 等，每章都包含两篇精读和一篇泛读，对专业词汇做了注释，书后附有习题，精读课文备有参考译文，另外在课文后面还有几篇补充阅读材料。

本书可作为高等理工科院校电子信息、通信工程、信号与信息处理学科的本科生教材，也可供研究生以及从事图像研究的科研工作者学习参考。

图书在版编目(CIP)数据

专业英语．下册/杨德仁主编．—重庆：重庆大学出版社，2003.8
（电子信息专业本科系列教材）
ISBN 7-5624-2825-5

Ⅰ．专… Ⅱ．杨… Ⅲ．英语—高等学校—教材
Ⅳ．H31

中国版本图书馆 CIP 数据核字(2003)第 043649 号

专 业 英 语
（下）
主　编　杨德仁
副主编　樊则宾
责任编辑：余成波　　版式设计：彭　宁
责任校对：廖应碧　　责任印制：秦　梅
*
重庆大学出版社出版发行
出版人：张鸽盛
社址：重庆市沙坪坝正街 174 号重庆大学(A 区)内
邮编：400030
电话：(023) 65102378　65105781
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邮箱：fxk@cqup.com.cn (市场营销部)
全国新华书店经销
自贡新华印刷厂印刷
*
开本：787×1092　1/16　印张：12　字数：300 千
2003 年 8 月第 1 版　2003 年 8 月第 1 次印刷
印数：1—5 000
ISBN 7-5624-2825-5/H·288　　定价：15.00 元

前言

近年来随着信息技术的不断发展，被称为“万精油”的电子与信息工程专业覆盖的技术越来越宽，包含电子技术、自动化技术、通信技术、计算机技术等。在专业英语教学中，很难找到兼顾这些技术的教材，满足不了教学要求。重庆大学出版社组织的面向21世纪的西部高校教材，要求体现内容“新、奇、特”为指导思想。电子与信息工程专业英语教材内容是最新的，取材范围也广，在编者的专业英语教学经验基础上，整合并包含了所涉及的专业课程，希望能体现新世纪专业英语教学上两者兼顾的要求。书中有些内容是笔者的教学资料。编写本书目的是通过专业英语的学习，能掌握常用的专业词汇、能阅读和翻译专业文章，为跟踪和学习专业新知识打下坚实的基础。

本书由14章和附录组成，内容十分丰富，主要包括IT百年历史、个人计算机、数据库管理系统、计算机网络、系统安全、管理信息系统、企业应用集成、开放资源、企业门户、全息照相技术、电子电路基础、数字通信、CDMA、ATM等，每章都包含两篇精读和一篇泛读，对专业词汇做了注释，书后附有习题，精读课文备有参考译文。

本书由杨德仁同志担任主编，杨德仁同志担任第1、2、3、4、5、6、7、8单元和补充阅读材料编写，张言波同志担任第9单元编写，樊则宾同志担任第10单元编写，丁黎明同志担任第11单元的编写，徐亚宁同志担任第12、13、14单元的编写，全书由杨德仁统改、定稿。闫丽君同志审阅了全书并提出了宝贵意见。限于编者水平，错误难免，不足之处，恳请读者批评指正。

编 者

2002.12

目录

Unit 01

The Brief History of Information Technology (IT)

01.1 100 Years of IT (part 1)

When we surveyed a panel of experts to help identify the 20th century's most significant information technologies, they brought us face to face with an important reality: IT isn't just computers or software. It's all the technologies that over the past hundred years have changed the way we gather, move and use information[1].

What information technology products had the greatest impact on our lives and businesses over this century? We asked for input from people with a broad range of interests in technology—prominent CEOs, analysts, educators, attorneys and others. Their verdict was that the earliest vacuum tubes, rotary phones and office copiers were as ingenious and significant—and their effects as unexpected—as today's smart phones, high-definition TV, the Web and Pentium III chips. The fundamentals of technology advances are predictable—circuits per inch, bits per second, cost per megabyte—but the applications are not. That's because human ingenuity is involved.

The big iron

The Electronic Numeric Integrator and Calculator (ENIAC) (1946) was the first large-scale, general-purpose electronic computer. Its offspring, the Univac I (1951), became a television star during the 1952 U. S. presidential election. But the mainframe that changed the face of computing and drew the most mentions from our experts was the IBM System 360 (1964).

Before IBM began work on the 360 in the early 1960s, every new model required new hardware and software. But the 360 was designed as a family of compatible machines. The 360 provided broad-based computing with standards. The 360 opened mainframe computing to the world.

But the 360 shared the spotlight with other key, large-scale computing innovations. The Hollerith paper punch card (1887) became a 20th-century mainstay of data storage—the start of business systems analysis. The Manchester University Mark 1 (1948), affectionately known as "Baby," and John von Neumann's Electronic Discrete Variable Automatic Computer (EDVAC,

1947), the first stored-program electronic computer, were early steps forward.

The IBM 1401 (1959) was the first fully transistorized commercial computer. Digital Equipment Corp.'s (DEC) PDP machines (1960) and IBM's Series 1 (1976) made departmental computing a reality. And Digital's VAX (1977) became the only real competitor to the 360 and its successors.

Wang Laboratories Inc.'s word processing system (1971) brought computing power beyond the data center for the first time. Key storage innovations included magnetic storage (1949), the IBM Ramac (1957) and the Winchester hard disk (1973). Underlying them all was Alan Turing's 1936 conceptual model for all stored-program computing, the Turing machine.

On the Desktop

If there was a single machine that made desktop computing a reality, it would have to be the IBM Personal Computer (1981).

IBM engineers designed the PC in a place, far from the center of IBM's mainframe-based universe. Cobbled together from standardized parts and borrowed ideas, the PC enjoyed instant success because of IBM's brand name—and its impact is a lasting legacy. The PC put computing power on the business desktop. It ultimately revolutionized business information and its use.

Although the IBM PC was the desktop device most often cited by voters, there was no single machine that created desktop computing. Half a decade before the PC, electronics hobbyists could buy and build the MITS Altair (1975), the first microprocessor-based computer. The Apple II (1977), from Apple Computer Inc., was the first commercially successful off-the-shelf desktop computer.

At Xerox Corp.'s Palo Alto Research Center (Parc), the Alto (1972) and Star (1981) workstations pioneered the use of the mouse and graphical user interfaces. They were the foundation of graphical user interface computing and graphic displays. And a 1979 visit to Parc by Apple's co-founder and now-interim CEO, Steve Jobs, led directly to Apple's Lisa (1983) and Macintosh (1984).

The PC was built from standard parts—as was the Sun Microsystems Inc. workstation (1982)—and that standardization led to the creation of PC clones (1982).

Portable PCs led to laptop computers and handhelds, including the now-ubiquitous 3Com Corp. Palm (1996).

And home computers, including Atari Corp.'s Atari 2600 game machine (1977) and the Commodore 64 (1982) from Commodore Business Machines Inc., laid the groundwork for what would eventually be in every home and on every desktop—the universal appliance.

Key words and terms:

CEO	执行总裁(Chief Executive Officer)
Attorney	律师,业务代理人
Ingenuity	独创性,机灵
Mainframe	主机,大型机
Turing	图灵机

Cobble	修(补)
MITS	管理信息和文本系统
Parc	(施乐公司)帕洛阿尔托研究中心
Legacy	遗产
off the shelf	新的
interim	临时的,过渡的
clone	克隆
laptop	膝上型电脑,笔记本电脑

Notes:

1. It's all the technologies that over the past hundred years have changed the way we gather, move and use information. That 引导的定语从句修饰 technologies;修饰 the way 的定语从句 we gather, move and use information 省略了关系代词 that。

01.2 100 Years of IT (part 2)

Out of the Labs

The transistor (1947) may be tiny, but its importance dwarfs nearly every other technological advance in this century. When researchers at AT&T Corp.'s Bell Laboratories discovered that a chip of semiconductor could replace a vacuum tube (1907), the transistor became the basis of all technologies in the second half of this century.

The transistor was smaller, lighter, more durable and reliable than tubes, and it generated far less heat. Without it, we'd be up to our ears in power plants to power all the triodes needed to fuel the Information Age.

And transistors just kept getting smaller—first to form integrated circuits (1959) and then microprocessors. The first commercial microprocessor, the Intel Corp. 4004 (1971), was designed to power a desktop calculator. Within a few years, a successor, the Intel 8080 (1974), was the brains behind the first desktop computer kit, the Altair.

While Motorola Inc. and other vendors competed with Intel, IBM developed the first RISC processors (1974), whose offspring would eventually power workstations from Sun, Digital, Hewlett-Packard Co. and Silicon Graphics Inc. Gallium arsenide chips (1974) promised blazing speed for communications applications, even though they never cracked the mainstream processor market.

Lasers (1960), once imagined as sci-fi death rays, got smaller, too—to become a core technology for both printers and communications. And although nanotechnology hasn't delivered its promise of molecular manufacturing, it may yet prove to be how a future generation of transistors is put to work.

The New Gutenberg

It wasn't the first xerographic copier; that was the Model A in 1949. But when the Xerox

914—the first automatic, plain-paper office copier—appeared in 1959, it changed the face of information in businesses.

Copying led to the standardization of paper. Fax and scanning were based from the acceptance of photocopiers. It's the way we think of record-keeping. The 914 made everyone a printer.

The fax machine itself, like the typewriter, dated from the 19th century. But both came into their own in 20th-century business. The electric typewriter (1933) gave way to the IBM Selectric (1961) and magnetic card typewriters (1969). The Teletype teletypewriter (1920) made it practical to send typed information instantly across a wire and eventually found a place as a time-sharing computer peripheral.

The first commercial laser printer, the Xerox 9 700 (1978), began a steady march toward the widespread use of laser printing. And the flat-panel display offered the first step toward a screen as convenient as the Xerox copy.

Information Everywhere

Is there any promise the World Wide Web can't fulfill? Ten years ago, it didn't exist. Last year, it accounted for one-third of U. S. economic growth, according to the White House. It has become telephone, loudspeaker, radio, television, cinema, phonograph, doctor, Village Square and lover.

All this from an idea first suggested in August 1990 by researchers Tim Berners-Lee and Robert Cailliau at Switzerland's CERN, the European Laboratory for Particle Physics, who thought it would be useful for document registration, online help and project documentation. By October, they had a prototype Web browser. By early 1993, there were 50 Web servers worldwide. Within 18 months, that number had increased thirtyfold and was growing too fast to be counted accurately.

The nuts and bolts of the Web are now household words: HTML, URLs, browsers—especially Netscape Communications Corp.'s Navigator, which made e-commerce serious business.

Of course, without the Arpanet network (1968), created by the U. S. Department of Defense to connect its researchers, and the TCP/IP protocol (1975) that gave the Internet its name, the Web would have no road to run on. But when the National Science Foundation opened the Internet to commercial use in 1991, no one could expect what the Web would ultimately become.

Key words and terms:

dwarf	(使)变矮小
vendor	供应商
compete	竞争,比赛
Gallium	(元素)镓
Arsenide	砷化物
Blaze	照耀
Crack	使破裂
sci-fi	科幻小说
xerographic	静电复印
photocopier	影印机

peripheral	外围设备
World Wide Web	环球网
Thirtyfold	30 倍的
nuts and bolts	细小的方面,细节
Arpanet	美国国防部高级研究计划局建立的计算机网

01.3 100 Years of IT (part 3)

On the Air

Until the arrival of the Web, only one form of information technology could claim to have revolutionized 20th-century life. And broadcasting hardly seemed like a world beater in 1920 when Westinghouse Electric Co.'s station KDKA in Pittsburgh reported the U. S. presidential election returns during the first broadcast of a regularly transmitting commercial radio station.

By 1924, there were 600 commercial radio stations—and the number grew so quickly that in 1927 the Federal Communications Commission was created to regulate them. Television began to come into its own in 1937, when the British Broadcasting Corp. began regular, electronic television broadcasts. The first transistor radio (1952) made portable wireless communications a practical reality and proved a commercial use for transistors.

How far-reaching was broadcasting's effect? It's how the country got homogenized and information was transmitted. This has enabled mass communications and changed most people's living and learning habits in profound and subtle ways. It brought world events to business and to the home.

The wireless Morse code transmissions that Guglielmo Marconi demonstrated in 1901 were largely overwhelmed by the voice radio demonstrated five years later by Reginald Fessenden. Nonetheless, today wireless data networks and spread-spectrum technology transmit more data than voice despite the growth of mobile and cellular phones—the fastest adapted of all innovations.

Before the Internet

Telegraphs had sent messages across wires since the early 19th century, and packet switching—a system for breaking messages into pieces and routing them automatically—was first proposed in 1961. When Bolt, Beranek &Newman developed the IMPS packet switch for Arpanet in 1968, modern networking became a possibility.

But with Ethernet (1973), networking became a reality. Robert Metcalfe's system, tested at Xerox Parc, made it possible to connect large numbers of devices to a local network because each device "listened" before sending and detected when its messages collided with those of another sender. Ethernet was the basis of a distributed computer architecture.

The 3Com EtherLink (1982) was the first network adapter card for the IBM PC. The Cisco Systems Inc. router (1986) added intelligence to the switches delivering messages between networks. And Asynchronous Transfer Mode made it practical to mix time-sensitive traffic such as

voice and video over the same networks as ordinary data.

No More ' Number, Please'

The telephone, mentioned in some way by a third of our voters, was already having its impact on business communication and information technology by 1900. So, in fact, was the device that would launch the networking revolution more than half a century later: the Strowger telephone switch (1889).

The story almost seems like slapstick comedy: Almon Strowger, a Kansas City, Kan., undertaker, hired several engineers to design an automatic telephone switch when he suspected local operators were steering business to his competitors. That switch and a telephone that could be dialed (1896) were adopted by AT&T in 1916, making it possible for businesses to dial their own calls.

The Strowger switch gave us the concept of switching. And the dial telephone itself changed our reach and range. The Touch-Tone phone—invented in 1941 but made practical only by transistors in 1964—enabled the telephone to become a data-entry device.

The four-prong telephone jack made it possible for customers to use different telephones interchangeably. Answering machines and voice mail let telephone users leave messages when no one could answer the phone. Modems (1957) made the connection between phones and computers, and the digital telephone network (1986) completed that connection.

Software

As software goes, e-mail may not seem like much. We don't turn to it to produce something, as with a word processor or spreadsheet. But e-mail may have had a greater impact—forcing business executives to learn to type and encouraging grandparents to climb aboard the Internet.

E-mail has changed how we communicate, whom we communicate with and what we communicate about. And maybe I'm an IBM bigot, but I think PROFS (Professional Office system from IBM) got it rolling. PROFS—which remained the king of e-mail for years after PC-based mail systems were introduced—has been eclipsed by Internet mail systems.

But other software innovations are still making their mark. Relational databases, data compression, artificial intelligence and digital imaging are so common—and crucial—that we don't even notice them. And virtual reality has changed the way we interact with computers.

Among the many software products that have been key to IT: Multics (the first real operating system); Windows; Novell NetWare; Unix; Linux; CP/M; Mac OS; Digital's VMS; the Oracle and DBase II databases; IBM's CICS transaction monitor; Visicalc, Lotus 1-2-3 and Microsoft Excel spreadsheets; word processors; and Cobol, C, C++, Java and Visual Basic.

Beyond Bits and Bytes

When the first credit card hit New York in 1946, few people would have identified it as information technology. Even today, "plastic money" usually seems more like a contributor to electronic commerce than IT itself.

But credit cards fundamentally transformed us to a symbol economy. Without that experience, we couldn't have an information economy. The Internet rests on the credibility of credit cards.

Other choices

Experts made other unconventional choices for key IT products, too. The automobile led to suburbanization of the world. The elevator made skyscrapers possible. The airplane made Federal Express Corp.'s overnight package delivery possible—and closed the speed gap between paper and electronic communications. Gene-splicing and the human genome project are already changing key information of a different sort.

Key words and terms:

Homogenize	均质化
Morse code	莫尔斯电码
Demonstrate	示范,证明
spread-spectrum	扩频
Telegraph	电报
Packet	分组,信息包
Switch	交换
Asynchronous	异步的
Slapstick	喜剧
Comedy	喜剧性的事情
Dial	拨(号盘)
Prong	叉子
Jack	叉孔
Modem	调制解调器
Make one's mark	使自己出名
Spreadsheet	电子表格
Suburbanization	市郊化
Skyscraper	摩天大楼
Genome	基因组

Exercises

1. Fill in the blanks with the best choices:

IT is __(1)__ for Information Technology, and __(2)__ as separate letters, the broad subject __(3)__ with all aspects of managing and processing information, especially within a large organization or company. Because computers are __(4)__ to information management, computer departments within companies and universities are often called IT departments. Some companies __(5)__ to this department as IS (Information Services) or MIS (Management Information Services).

refer, central, short, concerned, pronounced

2. What do the following acronyms stand for?

IT

CEO
MIS
ENIAC
PROFS
PC
DEC
TV
EDVAC
HTML
URL
TCP/IP
CICS
IBM
OS
RICS

3. True/False

(1) IT is just computers or software. ( )
(2) The first large-scale computer is the Univac I. ( )
(3) The voice radio was demonstrated in 1906 by Reginald. ( )
(4) A lot of people had identified credit card as IT in 1946. ( )
(5) The switch was adopted by AT&T in 1896. ( )

Reading Material:

IT management

The original idea of IT management wasn't to get a better return on investment. The original idea was to keep the mainframe busy.

When mainframe computers began arriving at large corporations in the late 1950s, they were there to replace banks of mechanical tabulating machines that had been used for decades to sort and process customer and transaction information on punched paper cards.

The Tabulations (or "Tabs") group was usually part of the accounting department, and in the beginning the mainframe's role was simple: to store accounting data and process it faster than the old tabulators could.

But the mainframes were far more expensive than the tabulators. So the first management goal as Tabs became the data processing department was to schedule jobs efficiently, so no time on the big machine went to waste.

True, the role of DP was expanding. In the 1960s, Big Iron began to get its first big jobs.

Material requirements planning (MRP) software made it possible to link purchasing, production and cost accounting and the mainframe began to pay its own way.

And special-purpose systems such as American Airlines Inc.'s Sabre system for airline reservations and capacity planning were designed to give the companies that built them a competitive advantage, offering capabilities that simply wouldn't exist without the computer system.

But those were the exceptions. Most data processing management still consisted of keeping the mainframe busy and keeping system development teams on track, since the large accounting and transactions programs that were the data processing department's stock in trade were almost always written and maintained by the data processing department itself.

Then came the 1970s and management information systems. With all that data about sales, production and other business functions on the mainframe, business-side executives wanted more from data processing than simply running bookkeeping reports. Data processing's role shifted to MIS as the department began to crank out more and more reports outside the scope of accounting though the vice president of MIS still invariably reported to the chief financial officer.

As the MIS department's role expanded, homegrown systems were getting bigger and harder to build and maintain. By the early 1980s, an MIS director's biggest concern was keeping the cost of all those programmers and their projects under control. Almost all software development projects ran late and over budget; many failed completely. Computer-aided software engineering was supposed to solve the problems. In a few MIS shops it did, but in most, it simply became shelfware.

Meanwhile, desktop computers began to arrive, first as intelligent terminals, and then as the user end of client/server systems. Packaged PC software, once limited to stand-alone applications such as word processors and spreadsheets, became more complicated. Now the problem was keeping a rein on the data that had once been kept safely inside the mainframe and keeping down the now-spiraling costs of all the hardware, software and networking that was outside the MIS department.

They weren't just management information systems any longer—a PC was on almost every desk by the early 1990s. And the renamed information systems department could no longer bill departments for their computing time. Now came the hard demand that every project be able to show a return on the investment.

Remember Re-engineering?

But ROI wasn't the only acronym that IS shops faced. BPR—business process reengineering—demanded that decades-old, homegrown mainframe business software be changed to match new business models. ERP—enterprise resource planning, the grandson of the old MRP systems—offered the chance to make those changes with packaged software that IS shops could buy, not build themselves.

JIT—just-in-time manufacturing—depended on supply chain management systems. Y2k was looming, with the threat that a business could be wiped out by faulty computer systems. And e-commerce on the World Wide Web meant that, suddenly, business computer systems could become directly responsible for selling products—or losing the sale.

IT departments scrambled—downsizing hardware to Unix servers, consolidating data centers

onto bigger mainframes, outsourcing software development and Internet services. And CIOs faced the harsh glare of board-level attention, now that their IT departments were deeply involved in almost every aspect of the business.

And since the start of the recession a year ago, ROI isn't just a demand on IT shops. It's IT's contribution to the business's survival.