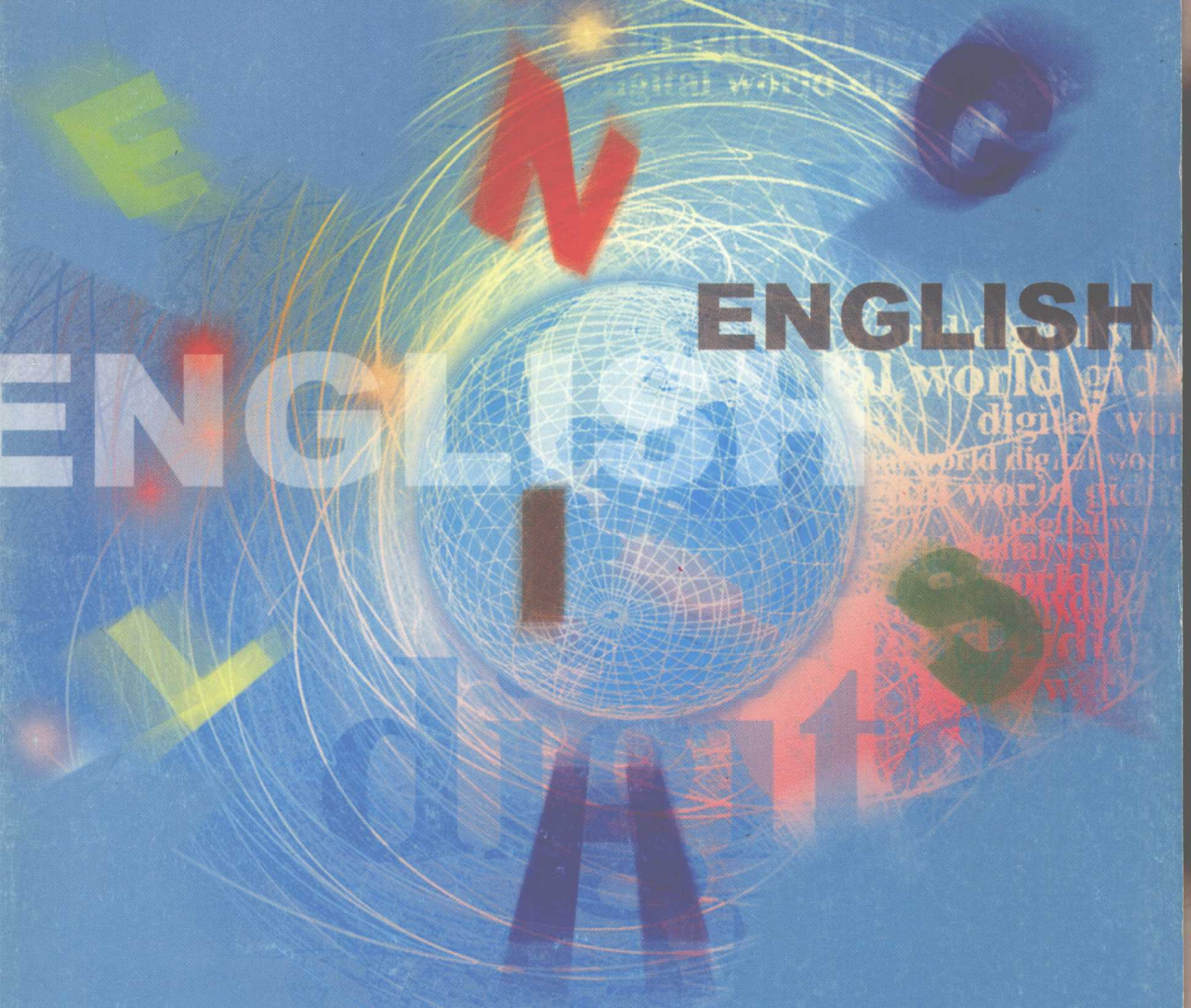
计算机基础英语

新一轮课程改革高中选修课教材

◎ 王行刚 主编



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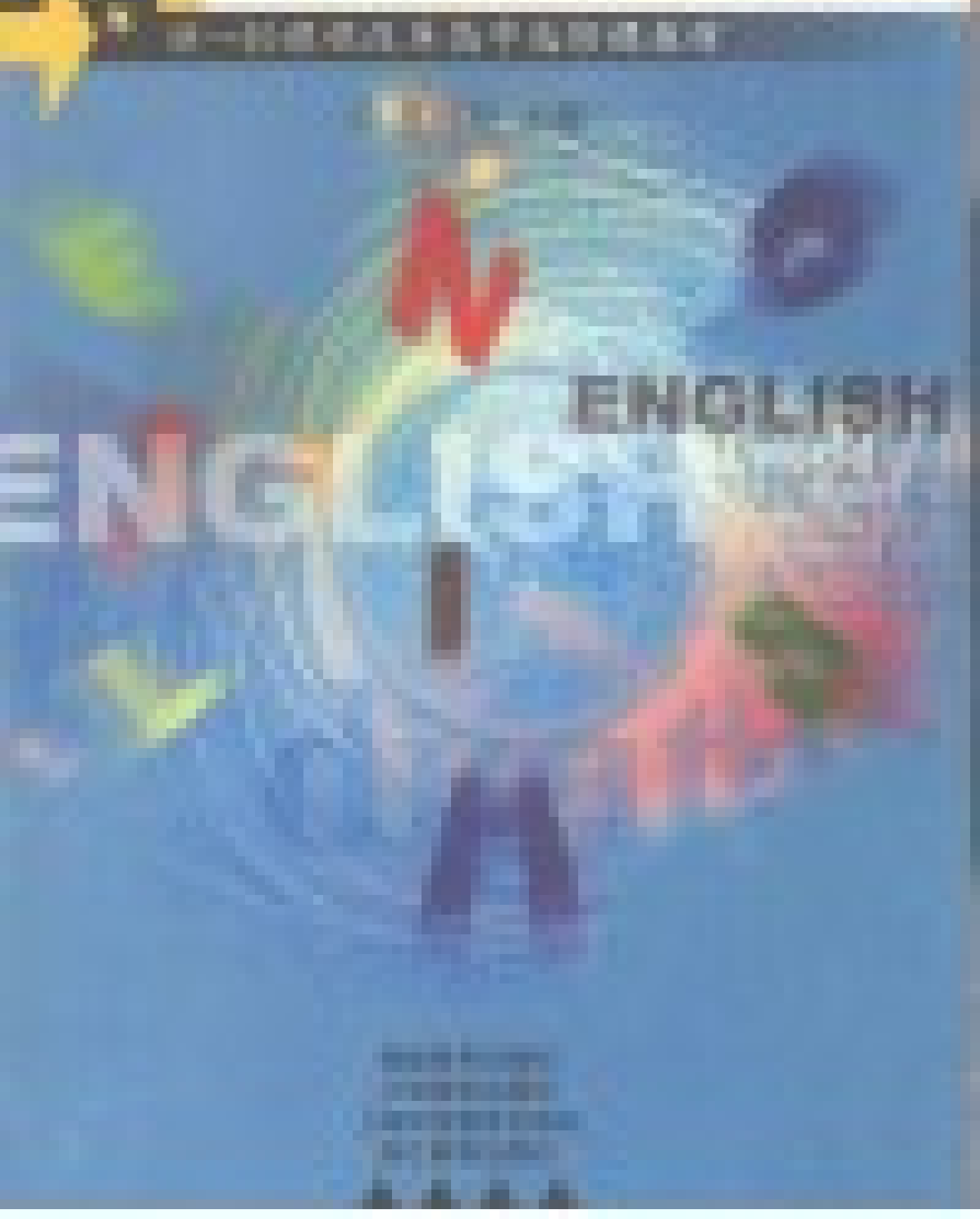

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编写说明

计算机开山之祖约翰·阿塔纳索夫，蓝色巨人 IBM 公司，软件帝王比尔·盖茨，鼠标发明人恩格尔·巴特……，计算机的发明、创新、革命乃至产业化，等等，都肇始于美国，我们梦想会读原汁原味的原版计算机书，《计算机基础英语》希望能引你入门。

本书力求用原版书的编写风格编写，以培养学生英语阅读能力和积累计算机常用英语词汇为目标，以计算机、网络、通信技术的发展过程为主线，介绍与之相关的故事和人物。全书共八讲，每一讲由 Preview, Text, Summary, Words and Expressions, Questions 5 个部分构成。

本书由中国科学院计算技术研究所信息网络方向首席科学家王行刚主编，内容撰稿人：王晟、张威。

Preface

This book is designed for high school students. Our goal is to write the book with a 'hot' new language and use it in a way not similar to so many introductory texts. We have tried to introduce the computer history, hardware, operating system, computer languages, internet, computer network, network security and artificial intelligence. We hope these articles will help students to understand the computer science and we believe this will be helpful for students to grasp the fundamental computer science English. Our intentions are that the material presented here will provide a basic and general understanding about the computer science.

The material here is based on the concept that the study of computer science should be part of the high school studies. It is also based on the idea that computer science is not a very difficult task for novice to master. Most importantly, this book holds the view that the study of computer science should be interesting and should be funny. The study of computer science must cover those areas that are acknowledged as fundamental to computer science. The foundation that is constructed during this study can be used to study current trends that change and enable students to learn more.

This is more than a book about computer science. Although its principal focus is on computer science, it is also a book about computer science English. However, this is neither a book that adopts what some have called a 'breadth-first' approach to computer science nor is it a book primarily designed to teach English.

We have noticed that some paragraphs may be difficult for high school level readers, so we provide Chinese beside some words which may be hard for

high school students to understand.

We are anxious to correct all the errors and fuzzy, incoherent, or otherwise incomprehensible passages for the first edition of the book. We would be ecstatic to hear about the methods that might improve certain sections, or comments about sections.

We have borrowed ideas from almost all the textbooks we have read in our life and all the articles related to computer science, so we acknowledge them all together.

We'd like to appreciate Fujian Publishing House for providing an atmosphere in which the computer science teaching is supported to make this book possible.

Also, we'd like to extend our thanks to all the readers for their support.

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UNIT 1

The History of the Computer

PREVIEW

Computer is not a rare thing now for everyone. It plays a very important role (作用) both in our life and work. But do you know where computer comes from and who is the inventor (发明人) of computer. It is a long history of working out any equipment (设备) to help our calculations instead of our hand computing. Before the modern electronic computer came out, our ancestors had made some mechanical (机械的) machines for automatic computing. In this lesson, we will review the history of computer from 2000 years ago, and recollect the pioneers of inventing computer.

TEXT

1.1 In the Beginning

The history of 'computer' started about 2000 years ago, at the birth of abacus (算盘). At that time, abacus was made of a wooden rack(支架) holding two horizontal wires with beads(珠子)strung on them. When the beads are moved up and down, according to programming rules(规则) memorized by the user, all regular(有规则的) arithmetic(算术) problems can be solved. The abacus, which was invented by the Chinese and is still in use today, may be considered the first computer. But as the use of paper and pencil spread, particularly in Europe, the abacus lost its importance.

B. Pascal(帕斯卡)is usually credited for building the first digital computer that was called numerical wheel calculator in 1642. It added numbers entered with dials(刻度盘)and was made to help his father, a tax collector. In 1671, G. W. Leibniz(莱布尼茨)invented a computer with a special stepped (梯形的) gear(齿轮)mechanism(机械装置)for introducing the digits. After changing some things around, it could add and multiply. That was built in 1694, and is still being used.

The prototypes(原型) made by Pascal and Leibniz were not used in many places, until a century later, when Thomas of Colmar(卡尔·托马斯) created the first successful mechanical calculator that could add, subtract, multiply, and divide.

A lot of improved desktop calculators by many inventors followed, so that by 1890's, the computer has been largely improved.

1.2 Use of Punched Cards

A step towards automated computing was the development of punched cards,

which were first successfully used with computers in 1890 by H. Hollerith (H. 霍列瑞斯), who worked for the United States Census Bureau(人口调查局). They developed devices(装置) that could read the information that had been punched(打孔) into the cards automatically, without human help. Because of this, reading errors were reduced dramatically(极大地), work flowing increased.

These advantages were seen by commercial companies and soon led to the calculating puncher development created by International Business Machines (IBM) and other corporations. These computers used electromechanical(电动机械的) devices in which electrical power provided mechanical motion(运动)——like turning the wheels of an adding machine. Such systems included features to feed in a specified(指定的) number of cards automatically, and add, multiply, sort, feed out cards with punched results.

Compared to today's machines, these computers were slow, usually processing 50-220 cards per minute, each card holding about 80 decimal numbers (characters). At that time, however, punched cards were a huge step forward. They provided a means of I/O, and memory storage. For more than 50 years after their first use, punched card machines did most of the world's first business computing, and a considerable amount of the computing work in science.

1.3 Electronic Digital Computers

The start of the Second World War produced a large need for computer capacity, especially for the military(军事). At that time, the United States government sought to develop a kind of computer to exploit their potential strategic(战略的) importance. This increased funding(筹集资金) for computer development projects hastened(加速) technical progress. New weapons were made for which trajectory(弹道) tables and other essential data were needed. By 1941 German engineer K. Zuse(K. 朱斯) had developed a computer, the Z3, to design airplanes and missiles(导弹). The Allied forces, however, made greater strides(大步) in developing powerful computers. In 1942, John P. Eckert

(J.P.埃克脱), John W. Mauchly(J.W.莫奇利), and their associates at the Moore School of Electrical Engineering of University of Pennsylvania decided to build a high-speed electronic computer to do the job. This machine became known as ENIAC (Electronic Numerical Integrator and Calculator, 电子数字积分计算机).

The size of ENIAC's numerical 'word' was 10 decimal digits, and it could multiply two of these numbers at a rate of 300 per second, by finding the value of each product(乘积) from a multiplication table(乘法表) stored in its memory. ENIAC was therefore about 1,000 times faster than the previous generation of relay computers.

ENIAC used 18,000 vacuum tubes, and was about 1,800 square feet of floor space, and consumed about 180,000 watts of electrical power. It had punched card I/O, one multiplier(乘法器), one divider/square rooter(根计算器), and 20 adders(加法器) using decimal ring counters(计数器), which served as adders and also as quick-access read-write register(寄存器) storage (存储器). The executable instructions(指令) making up a program were embodied(合并) in the separate 'units' of ENIAC, which were plugged(插紧) together to form a 'route' for the flow of information.

These connections had to be redone after each computation, together with presetting function tables and switches. This 'wire your own' technique was inconvenient(不方便的) for obvious reasons, and with only some area could ENIAC be considered programmable. It was, however, efficient(高效的) in handling the particular programs for which it had been designed.

ENIAC is commonly accepted as the first successful high-speed electronic digital computer (EDC, 电子数字计算机) and was used from 1946 to 1955.

Fascinated(着迷的) by the success of ENIAC, the mathematician John von Neumann undertook, in 1945, an abstract(抽象的) study of computation that showed that a computer should have a very simple, fixed physical structure, and yet be able to execute any kind of computation by means of a proper

(固有的)programmed control without the need for any change in the unit itself.

Von Neumann put forth(提出) a new awareness of how a practical computer should be organized and built. This idea, usually referred to as the Stored-Program(存储程序) technique, became essentials(必需品)of future generations of high speed digital computers, and was universally(普遍地) adopted.

The Stored-Program technique involves(包括) many features of computer design and function besides the one that it is named after. In combination, these features make very-high-speed operation attainable(可行的). A glimpse(一瞥) may be provided by considering what 1,000 operations per second means. If each instruction in a job program(工作程序,也被称为子程序) was used once in consecutive(连续的) order, no human programmer could generate enough instruction(指令)to keep the computer busy.

Arrangements(协调) must be made, therefore, for parts of the job program to be used repeatedly in a manner(方式)that depends on the way the computation goes. Also, it would clearly be helpful if instructions could be changed if needed during a computation to make them behave differently. Von Neumann met these two needs by making a special type of machine instruction, called a conditional control transfer——which allowed the program sequence(序列) to be stopped and started again at any point——and by storing all instruction programs together with data in the same memory unit, so that, when needed, instructions could be arithmetically changed in the same way as data was.

As a result of these techniques, computing and programming became much faster, more flexible(灵活的), and more efficient for work. Regularly used subroutines(子程序) did not have to be reprogrammed for each new program, but could be kept in 'libraries' and read into memory only when needed. Thus, much of a given program could be assembled(组合) from the sub-