

The

Computer

英语科普注释读物



计算机



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潘绪年 陈士源 注释

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注释者的话

本书是英国科普丛书 How It Works 中的一个分册，由 David Carey 撰写。全书简单介绍了计算机的历史及其原理、性能、基本结构和用途。

本书文字比较浅近，我们对文中一些句子结构、习惯用法和专业用语作了注释，可供广大科技工作者、英语师生阅读。

在注释过程中，曾得到上海计算技术研究所情报室的大力协助，谨在此表示感谢。由于我们的水平所限，错误之处，希望读者批评指正。

一九八〇年四月

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What are Computers? *

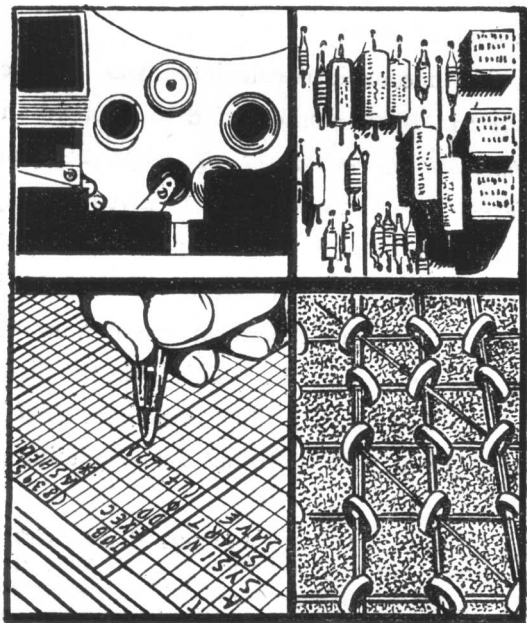
There is something about computers that is both fascinating and alarming. They are fascinating *when they are used in rocketry and space research and when they enable man to get to the moon and back*¹. Many people *think of them as almost-human machines with 'brains' that allow them to think*². After all, there are computers which play 'music' or 'speak'.³ On the other hand, we are inclined to be alarmed by their complex mechanisms and the involved scientific principles upon which they are built.⁴

In fact, computers do not have brains and they *cannot really think for themselves*⁵. They are primarily machines for doing arithmetic. They are automatically controlled and do the work of *many human beings*⁶ at fantastically high speeds, but the really important thinking is done by the humans *who feed them with information and program them to perform particular operations with the information they are given*⁷.

*Although primarily a calculating machine,*⁸ the modern

* 什么是计算机? 1. 当计算机用于火箭和宇宙空间研究方面, 当计算机能使人登上月球并返回地面时。 2. 认为计算机是具有思维“头脑”的近似于人的机器。as...think 作宾语补语。 3. 终于有了能“奏乐”或“说话”的计算机。 4. 另一方面, 计算机的复杂机械结构和制造计算机所涉及到的复杂的科学原理使我们感到惊奇。 5. 不能真正独立思维。for themselves 相当于 on their own。 6. 许多人。 7. 人们给计算机输入信息, 并为计算机编制程序, 使它

computer can also store up a vast mass of information. It can be programmed to carry out 'logical' operations, such as transferring certain information from one part of the machine to another, *sorting this information and comparing it with other pieces of information or using it in arithmetical calculations*⁹. We hope this book will help you to understand how most of this is done.



按所给的信息来进行特定的运算。 8. 虽然主要是一种进行计算的机器。 = Although it is primarily... 9. 对这一信息进行分类并把它与其他信息作比较, 或用它进行算术运算。

How Computers Developed *

To think that computers have suddenly arrived on the scene would be wrong,¹ although it is true that their number and use have greatly increased during recent years. Desk calculators² have been in use for a very long time, and even in the days of the old navigators and astronomers there was a need for some sort of calculating instrument to relieve the human brain of work³.

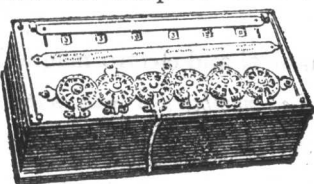
The first mechanical calculator was produced by *Blaise Pascal⁴* in 1642. Others tried to improve on it but *not until the nineteenth century was any real progress made⁵*. In 1801 a Frenchman named *Jacquard⁶* invented a *punched card system⁷* for controlling the threads on his weaving looms. *Charles Babbage⁸* followed in 1833 with his '*Analytical Engine⁹*', which could perform calculations automatically, using punched cards. This was the first *digital computer¹⁰* (see next page). The American *Hollerith system¹¹* also used punched cards, but the calculating machin-

* 计算机是怎样发展的 1. 认为计算机是突然出现的想法是错误的。动词不定式短语 *To think...the scene* 在句中作主语。 2. 台式计算机。 3. 减轻人们的脑力劳动。 4. 布累斯·巴斯噶(1623—1662), 法国哲学家和数学家。 5. 直到十九世纪才取得真正的进展。这是倒装句, = *no real progress was made until the nineteenth century*. 6. 雅卡尔·约瑟·马利(1752—1834), 法国发明家。 7. 穿孔卡片系统。 8. 查尔斯·巴贝奇(1792—1871), 英国数学家。 9. 解析机。 10. 数字计算机。 11. 何勒内斯系统。何勒内斯·赫尔曼(1860—1929), 美国发明家。

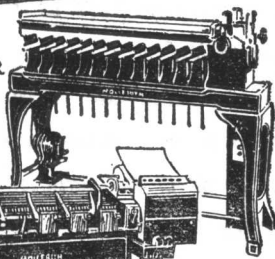
ery was operated by electromagnetic means. It was introduced in 1889 and was generally used, in a highly developed form, *right up to the widespread introduction of electronic computers in the 1950's*¹².

1943 saw the need for computing artillery firing charts, and *ENIAC (Electronic Numerical Integrator and Calculator)* was born.¹³ *EDSAC (Electronic Delay Storage Automatic Calculator)*¹⁴ was first used at Cambridge University six years later. And so the modern electronic computer came into being.

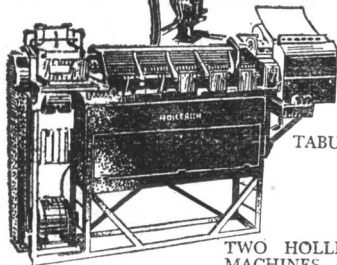
PASCAL'S
CALCULATOR
1642



CARD SORTER



TABULATOR



TWO HOLLERITH
MACHINES OF 1924

12. 一直到二十世纪五十年代广泛采用电子计算机为止。up to 作“直到”解，right 是修饰它的副词，用来加强语气。 13. 为了计算炮兵射程图的需要，电子数字积分计算器在1943年问世了。 14. 电子延迟存储自动计算器。

Different Designs *

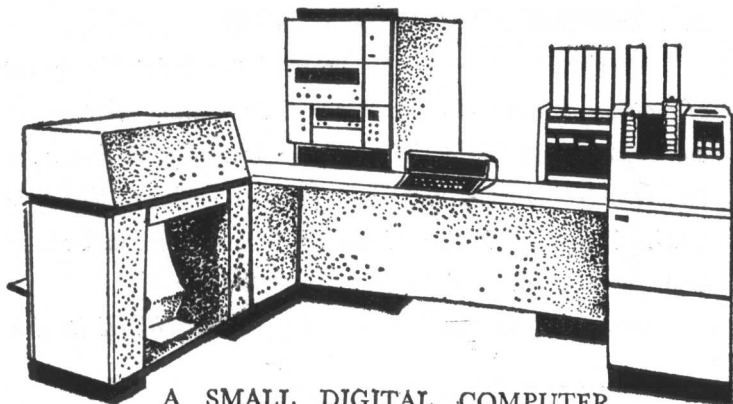
The name computer, covers many different types of machine. They can be mechanical, electro-magnetic, fluidic or electronic, and *can operate on either analogue or digital information; hence the names Analogue Computer and Digital Computer*¹. This seems to introduce a complication right at the beginning, but there is no need to worry; we are only concerned here with the electronic digital computer.

Mechanical and electro-magnetic machines have working parts, *i.e., numbered wheels that revolve and rods that move backward and forward to operate the mechanism*². *The electronic computer has no working parts as such, the whole system being operated by electricity*.³

An analogue computer is one *in which a calculation is represented by a mechanical action such as the revolving of a wheel, the sliding of a rod or the variation of a voltage*⁴. A digital machine *performs calculations with 'digits' (whole numbers or parts of numbers)*⁵.

* 不同的设计 1. 能够根据模拟信息或数字信息进行运算, 因此有模拟计算机和数字计算机的名称。 2. 即: 转动的刻有数字的轮盘和前后往复运动的棒杆使机器运转, *i.e.* 系拉丁文 *id est, = that is*. 两个 *that* 引起的都是定语从句。 3. 电子计算机没有那样的工作部件, 整个系统由电力驱动, *the whole ...electricity* 是说明原因的独立结构。 4. 在这种计算机里, 计算是由机械动作来表现的, 例如: 轮盘的转动, 棒杆的滑动或电压的变化。 5. 用“数字”进行计算(整数或分数)。

Computers are usually designed for a particular purpose, therefore each type of machine has its own variations, depending on the work it will have to do. Machines handling data for scientific work, for industry or for commercial undertakings, all have their own special features. In the following pages we will consider *what we might loosely call a typical electronic digital computer system with its subsidiary equipment for receiving, storing and presenting information*⁶.



A SMALL DIGITAL COMPUTER
DESIGNED FOR THE BUSINESSMAN

6. 我们可以笼统地把带有接收、存贮和显示信息的辅助装置的计算机称为典型的电子数字计算机系统。

Data Processing *

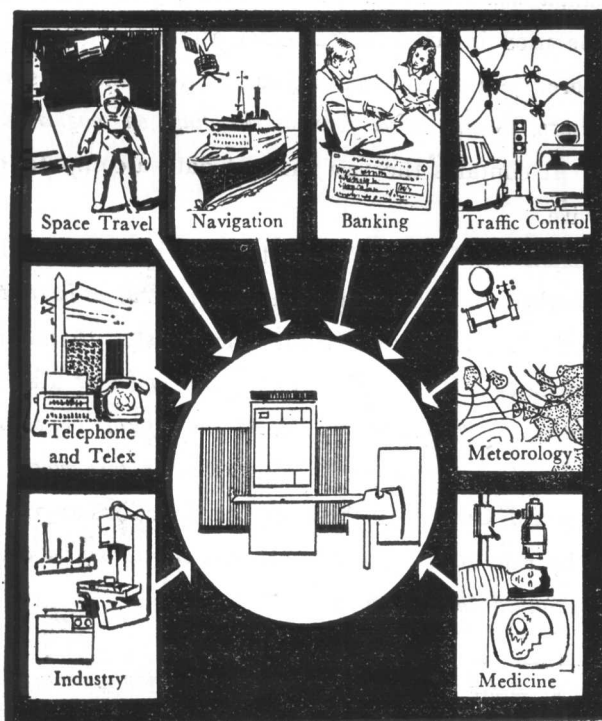
As we have already mentioned, there are a *great many kinds of computer*¹, each being designed for a particular purpose. Our *'typical' machine will very likely be used for 'data processing' in a large manufacturing organisation in which there will be a great amount of routine office work.*² For instance, the payroll has to be prepared every week and the names and wages of all the employees printed on their individual *pay slips*³. Records of all the employees must be maintained and *continually brought up to date as some people leave and others are engaged.*⁴

This computer may also be used *to calculate the amount of material of different kinds that will be needed in factory production, and thus help to bring the hundreds of parts forward to the assembly line in the right sequence and at the right time*⁵. Records of sales of different products can be kept and *forecasts made of possible future sales*⁶.

Organising the operations of a big factory with all its vital

* 数据处理 1. 许多种类的计算机。kinds 是语法上的主语，故动词用复数；computer 可用复数。 2. 一个大工业机构里通常有大量的日常行政工作，很可能用这种“典型的”计算机来进行“数据处理”。 3. 工资单。 4. 必须不断地加以更新，因为经常有人离职，另外一些人受雇。 5. 计算工厂生产所需的各种原料的数量，并且协助把成百种零件按正确的先后次序准时地传送到装配线上。that...production 是定语从句修饰 the amount... kinds。 6. 能对未来可能的销售量作出预测。在 made 前省略了 can be。

functions is a very complicated business,⁷ but a computer of the Advanced Data Processing (A. D. P.) type⁸ can be of immense help in providing the necessary information in a tiny fraction of the time it would take a large staff of clerical workers.



7. 组织一个大工厂中所有的重要部门进行生产是一件非常复杂的事情。Organising ... functions 动名词短语作主语，operations 原意为“操作”，此处指生产。functions 原意为“功能”，此处指“部门”。8. “高级数据处理”型计算机。

The Main Parts of a Computer *

A computer system consists of several different units which each have their own special function.

Input Unit. *This 'reads' the information to be stored in the machine and converts it into an electrical form¹ which can later be used in arithmetical calculations.*

Store. Data (information) can be permanently stored away here, *usually in the form of recordings on magnetic material²*. It contains the vast mass of data a computer can deal with.

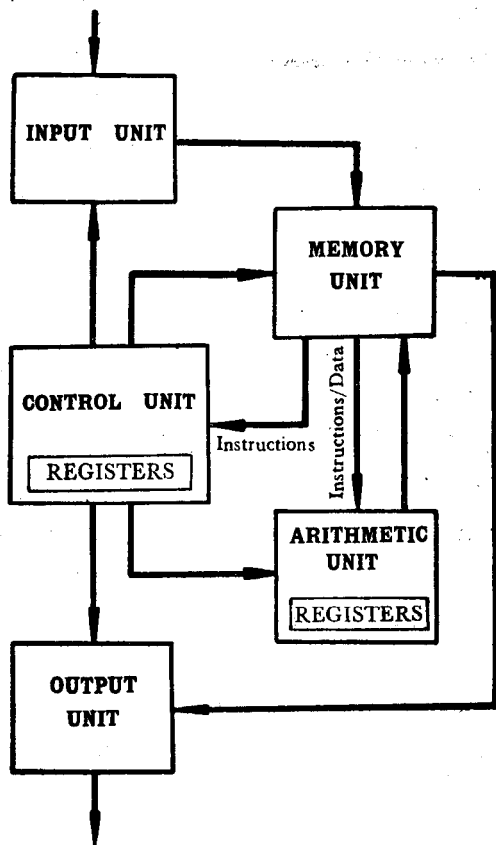
Registers. These are small stores. They hold the data to be worked on in a calculation and *give it up as instructed³*. Data can be transferred from one register to another.

Arithmetic Unit. *The actual operational unit where the calculations are performed and where the logical processes of selecting, sorting and comparing of information take place.⁴*

Control Unit. All the computer functions are coordinated by this unit, *which interprets and carries out the instructions contained in a program⁵*.

* 计算机的主要部件 1. 这个输入设备“读出”要存储到机器里的信息并把它转换成电子信号。 2. 通常采取把信息记录在磁性材料上的方式。 3. 按指令取消数据。 4. (这是)进行运算和进行信息选择、分类和比较等逻辑处理的实际操作部件。两个 where 引起的定语从句都修饰… unit, 主句中主谓语 this is 省略。 5. 控制设备解释并执行程序里的各项指令。非限制性定语从句。

Output Unit. This presents the results of a computer operation, *very often in printed form as on a pay slip, or on magnetic tape, disc, drum or card, or even on a television screen*⁶.



6. 通常象工资单那样打印出来, 或者记录在磁带、磁盘、磁鼓、或磁卡上, 甚至在电视屏上显示出来。作方式状语, 修饰动词 **presents**。

Combining the Parts *

The main store, the arithmetic unit, and the control unit together with a group of registers, *form what is called the central processor*¹. Surrounding the central processor we have the input and output units together with additional storage. These are known as *the peripheral units*².

We can now see *in a very general way*³ the method by which the computer works. Information in a specially coded form is fed into the input unit where it is 'read' by a device *which turns it into a series of electric pulses*⁴. The computer then 'writes' *down*⁵ this information, that is, transfers it to a storage unit. The information that is stored is of two kinds, data and instructions.

A list of instructions forms a program,⁶ and when the program is started data is transferred into the arithmetic unit and calculations are carried out at a very high speed. All activities within the computer are supervised by the control unit.

The central processor is made up from several thousand transistors together with other electrical compo-

* 部件的组合 1. 构成中央处理机。 2. 外部设备。 3. 非常笼统地。 4. 这种装置把信息转换成一系列电脉冲。 it 指 information。 5. “写”下来。 6. 一系列的指令组成一个程序。