

教育部 高职高专 规划教材

高职高专 计算机系列 规划教材



计算机专业英语

(第3版)

卜艳萍 主编 周伟 副主编



电子工业出版社

PUBLISHING HOUSE OF ELECTRONICS INDUSTRY

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内 容 简 介

本书共分6个单元。第1单元介绍计算机硬件基础,分别讲述处理器、存储器和输入/输出技术。第2单元是计算机软件知识部分,包括C语言、数据结构、操作系统、编译原理及数据库技术。第3单元是多媒体及应用方面的知识,包括多媒体、图形图像、CAD、计算机动画和多媒体应用软件。第4单元是计算机网络相关知识介绍,包括计算机网络基础、互联网搜索引擎、无线网络技术及网络安全。第5单元讲述电子商务方面的内容,包括电子商务基础、EDI和网络广告。第6单元介绍计算机领域的新技术,包括人工智能、虚拟现实和神经网络。

本书可作为高职高专计算机应用及相关专业的教材,也可供广大计算机专业技术人员学习和参考。

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前 言

“计算机专业英语”是计算机应用及相关专业高职高专类学生的必修课程。这门课程的开设，对于提高学生的专业词汇量、加强学生对专业文献的阅读能力以及书写技术报告的能力都将打下坚实的基础；同时，为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。

本书在《计算机专业英语（第2版）》的基础上，替换和修改了大量的课文及阅读材料，并将原来的4个单元扩展为6个单元，课文数量也由原来的20篇增加到23篇。

本教材涵盖计算机硬件基础、软件知识、多媒体技术、计算机网络、电子商务以及专业前沿知识等计算机专业技术内容。其特点是：①计算机专业知识丰富，包含了计算机专业的多门专业基础课和专业课内容；②专业知识系统性强，注重理论与实践的结合以及与其他专业课内容的衔接与知识补充；③选取的资料内容新颖、难度适当、可读性高；④每篇阅读课文后均附有重点词汇、课文难点注释、练习及一篇与课文内容相关的阅读材料；⑤书后附有所有专业文章的参考译文和习题答案；⑥附录列出了常用的计算机专业词汇和缩写词。

本书由上海交通大学技术学院教师卜艳萍任主编，并完成 Unit 1、Unit 2、Unit 3、Unit 6 的 6.1、附录 A 和附录 B 内容的编写以及全书的审校、统稿工作；华东理工大学的周伟任副主编，并编写了 Unit 4、Unit 5 和 Unit 6 的 6.2、6.3 部分内容。赵桂钦、陈绍东、何飞、周风波、刘雅琴、周焯晴等参加了本书的资料整理工作，并对本书结构和内容组织给出了很好的建议。在此对各位的辛勤工作表示衷心的感谢。

由于编者水平有限，错漏及不当之处恳请同行与读者批评指正。

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编 者

2009年6月于上海

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Unit 1 Hardware Basics

1.1 Central Processing Unit

1.1.1 Text

The hardware of a digital computer system is divided into four functional sections. The block diagram of Fig. 1-1 shows the four basic units of simplified computer: the input unit, central processing unit (CPU), memory unit, and output unit. Each section has a special function in terms of overall computer operation.

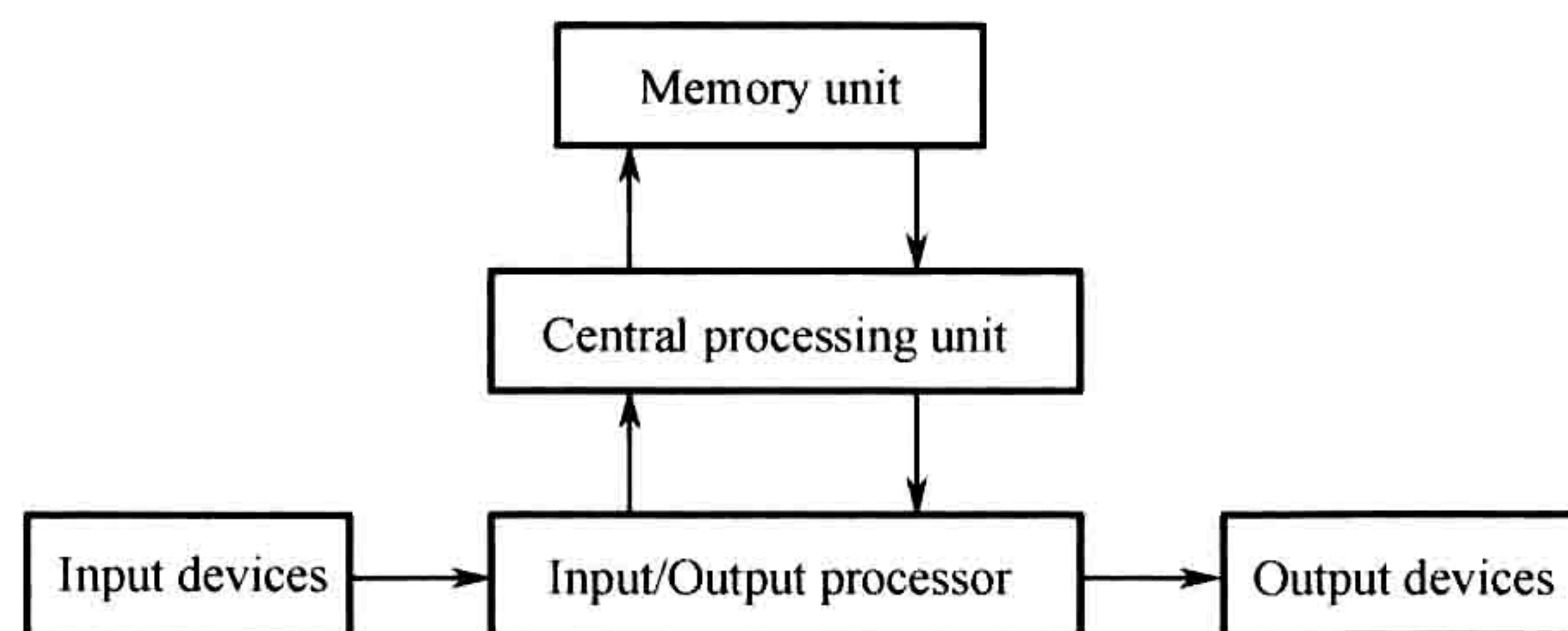


Fig. 1-1 Block diagram of a digital computer

The 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.

The input and output units are the means by which the CPU communicates with the outside world. 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 results must be output. This output of data from the system is performed under control of the output unit. The memory unit of the computer is used to store information such as numbers, names and addresses. In the computer system, memory is divided into two different sections, known as main storage and auxiliary storage.

A computer can solve 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 human beings in dull and 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 in a microcomputer is actually the 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.^[1] 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 what is the 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 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, are kept inside the computer in a place called memory. ^[2]

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-computers and micro-computers. A processor is composed of two functional units: a control unit and an arithmetic/logic unit, and a set of special workspaces called registers.

The control unit

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.

The Arithmetic/Logic Unit

The Arithmetic/Logic Unit (ALU) is the functional unit that provides the computer with logical and computational capabilities.^[3] Data are brought into the ALU by the control unit, and the ALU performs whatever arithmetic or logic operations are required to help carrying 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.

Registers

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.

Instruction

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. ^[4] 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 to 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 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 over again at awesome speed. A timer called a clock releases precisely timed electrical signals that provide a regular pulse for the processor's work. ^[5] 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.

Key Words

address	地址，寻址
analogous	类似的，相似的
arithmetic	算术的
auxiliary	辅助的，补充的

awesome	惊人的，令人敬畏的
capability	性能，能力
decode	解码，译码
distinguish	区别，辨别
exponentiation	幂运算
fetch	获取，取得
fraction	小部分
initiate	开始，启发，提议，创始
instantaneously	瞬间地，即时地
instruction	指令
keyboard	键盘
mainframe	大型机
manipulation	操作，处理
microelectronic	微电子的
operand	操作数
originality	创意，创造力
retrieve	恢复
remarkable	显著的，不平常的
sequence	顺序，序列
silicon	硅
transistor	晶体管

Notes

[1] 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.

本句由“Although”引导让步状语从句，“the electronic components”作主语。

译文：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。

[2] 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，而数据则是为解决问题提供的所需要的信息，两者都存储在存储器里。

[3] 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。

[4] 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？

[5] 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：一个称为“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号。

1.1.2 Exercises

1. Translate the following phrases into English

- (1) 集成电路
- (2) 取指—译码—执行
- (3) 算术逻辑运算
- (4) 微电子技术
- (5) 数字计算机系统
- (6) 辅助存储器
- (7) 工作区
- (8) 逻辑决策

2. Translate the following phrases into Chinese

- (1) Central Processing Unit
- (2) functional unit
- (3) current instruction
- (4) instruction register
- (5) program counter
- (6) electronic components
- (7) input information and commands
- (8) Arithmetic/Logic Unit

3. Identify the following to be True or False according to the text

- (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.
- (8) The term that is used to measure the computer's speed is borrowed from the domain of electrical engineering.

4. Reading Comprehension

- (1) A processor is composed of two functional units, they are _____.
- an arithmetic/logic unit and a storage unit
 - a control unit and some registers
 - a control unit and an arithmetic/logic unit
 - some registers and an arithmetic/logic unit
- (2) The control unit fetches _____ from memory and decodes them.
- data
 - information
 - results
 - instructions
- (3) _____ is a storage location inside the processor.
- A register
 - ALU
 - Control unit
 - Memory
- (4) The CPU executes each instruction in a series of steps, the sequence is _____.
- execute-fetch-decode
 - fetch-decode-execute
 - decode-execute-fetch
 - fetch-execute-storage

1.1.3 Reading Material

Microprocessor

Microcomputer, or micro for short, is a kind of computer. It was born in the early 1970s. 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, 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 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 things—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.

1.2 Memory

1.2.1 Text

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. A 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, a 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. 1-2. The terminal connections may include inputs, outputs, addresses, and read and write controls. The main portion of the memory involves the data storage. A RAM memory will have all of the terminal connections mentioned, whereas a ROM memory will not have the inputs and the write controls.

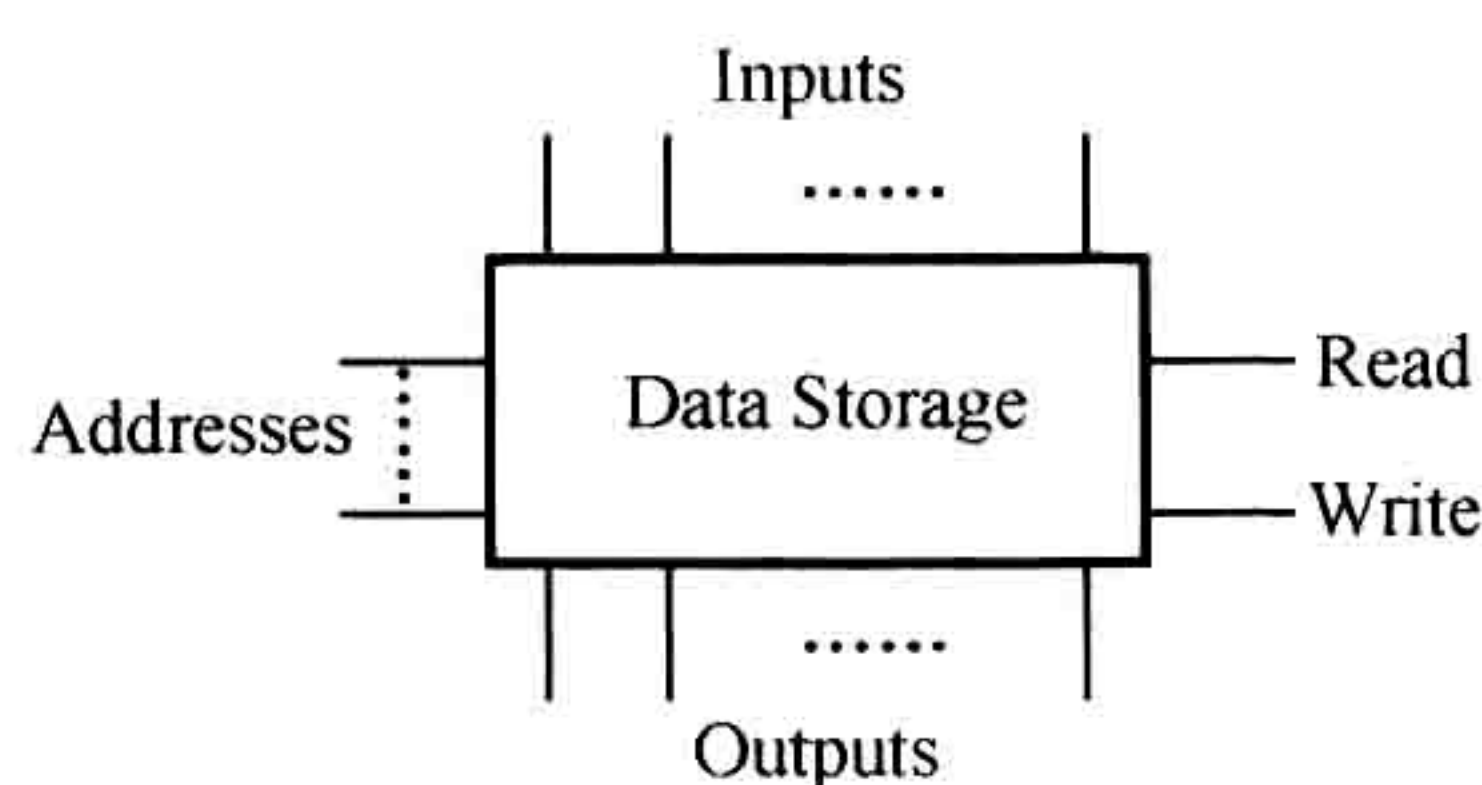


Fig. 1-2 Basic memory architecture

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 1 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.