COMPUTER ENGINEERING

计算机工程

大学英语专业阅读精选系列教材

FOCUS READING SERIES

上海外语教育出版社

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卜玉坤　于元方　编著

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前　言

大学英语教学大纲规定大学本科(包括理工科和文理科)的英语教学分为基础阶段和专业阅读阶段。专业阅读阶段的任务是:指导学生阅读有关专业的英语书刊和文选,使其进一步提高阅读英语科技资料的能力,并能以英语为工具,获取专业所需要的信息。我们感到基础阶段学生所接触的语言材料在文体和词汇方面与专业阅读阶段有着较大的差别,而且一般说来学生第五学期刚开始接触专业基础课,他们还缺乏专业知识,直接进行专业阅读尚有一定困难。另外学生在基础阶段学习中所掌握的读、听、写、说四种技能在专业阅读阶段还需要进一步巩固和提高。

Focus Reading Series 是为解决大学英语从基础阶段过渡到专业阅读阶段的衔接问题而编写的一套系列教材。本系列教材按专业大类分成六个分册:Mechanical Engineering, Electrical and Electronic Engineering, Chemistry and Chemical Engineering, Computer Engineering, Materials Science 和 Power Engineering。教师可按学生所学专业选用对口的分册。在编写过程中编者力求打破同类教材的老框框,使学生通过大量专业基础方面有关材料的阅读不仅能学到英语,而且还能学到一定的专业基础知识,熟悉和了解专业题材文章的特色并掌握一定量的专业词汇,从而为他们顺利进入专业阅读阶段学习打下良好的基础。本系列教材练习形式力求新颖多样,学生可以通过各种练习在语言运用上得到锻炼,使他们在大学英语基础阶段所掌握的读、听、写、说技能得到进一步的巩固和提高,并进而提高交际能力。本系列教材在编写过程中还着重强调了专业文章的特色及与之有关的功能意念和语言技能训练。

全套教材由机械工业部大学英语协作组责成华东工业大学、湖南大学、吉林工业大学和沈阳工业大学负责编写,并特邀上海大学合作编写。华东工业大学程月芳教授担任总主编,卢思源教授担任总主审。本教材在编写过程中得到了机械工业部教育司的领导和上海外语教育出版社编辑同志的大力支持和帮助。

编著者

1995 年 6 月

本书使用说明

本书为 Computer Engineering 分册，供有关专业的大学本科学生用作专业阅读阶段之前的过渡性教材。一般在第五学期使用，约需 34 学时。

本书由 15 个单元组成，各单元均按专业内容划分，既考虑到专业知识的连贯性又照顾到英语学习的循序渐进。每个单元由 Reading and Comprehension, Reading and Practice 和 Reading and Translation 三个部分组成。Reading and Comprehension 部分有一篇阅读文章，其后是检查学生对文章理解的练习，旨在训练提高学生对科技体裁文章的阅读技能。文章后面附有生词表，将大学英语 1～4 级中未出现过的词汇或虽已出现过但在专业方面有特殊词义的词汇列入表内，生词后注有国际音标、词性和汉语词义，生词表中出现的词汇在文章内用斜体标出，便于学生预习时查找。Reading and Practice 部分也有一篇文章，其内容基本与 Reading and Comprehension 部分一致，也附有生词表，但文字较浅近易懂。要求学生在理解文章内容的基础上做好练习。该部分练习由 Use of English 和 Guided Writing 两个部分组成，是为训练学生运用语言的能力而设计的。在 Use of English 中，有的是 Use of Language，有的是 Information Transfer，旨在为学生提供运用语言的实践机会。教师在引导学生做这一练习时应注意语言的流畅和准确性并重，并要尽力鼓励学生将已有的语言知识较流利地运用到实践中去。Guided Writing 旨在指导并训练学生的书面表达能力，练习的设计从连句成段开始，最后到指导学生写出简单的实验报告以及定义、分类和描述。在这一练习的教学过程中教师可向学生推荐一些简单的实验报告格式，也可让学生对某些实物进行定义、分类和描述。Reading and Translation 部分要求学生把英语短文中的斜体部分翻译成汉语。在做这部分练习时教师可作一些翻译指导，并要求学生不仅注意单句的译法，还要注意上下文意思对译文的影响，该部分选材以有利于指导翻译教学为主，但在内容上力求不脱离本分册的专业范围。

本书阅读总量约为 60,000 词，每一阅读文章（不包括翻译部分）篇幅一般为 1,000 词左右。总生词量为 500 个左右，并按字母顺序列于书后。在讲课中教师应注重阅读理解、翻译和语言实践的指导及交际能力的培养。学生宜在课前做好预习工作。本书的阅读和练习量较大，教师可根据学生的实际情况安排教学内容，对教材进行有选择的使用。

殷切期望本教材的使用者提出宝贵意见。

编著者

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Focus Reading Series

大学英语专业阅读精选系列教材

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Unit One

Ⅰ. Reading and Comprehension

WHAT IS A COMPUTER?

Data and Information

A computer is a machine whose function is to accept data and process them into information. Data are facts or observations, while information is the meaning we attribute to them.

Let's use an example to illustrate. Johannes Kepler sensed a pattern: the orbit of Mars resembled an ellipse. He spent much of his life processing Brahe's data, performing tedious computations and reorganizing the observations in an attempt to verify that pattern. Eventually he succeeded, publishing his laws of planetary motion in 1621.

Kepler's laws represent information. Using them, he could understand and predict the motions of the planets. Scientists and engineers still rely on his laws to help plan space flights. Information has meaning.

Clearly, Kepler's laws were derived from Brahe's data, but the raw data were useless without processing. Until they were organized and the necessary calculations performed, the data were *unstructured* facts, with no clear meaning. Knowing the exact position of Mars on April 1, 1599, might earn an extra move in Trivial Pursuit, but, by itself, that fact is not very useful. Processing data extracts their meaning.

Data Processing

A computer is a data processing machine. Data flow into the machine as input(Fig. 1-1). Information flows from the machine as output. The computer processes the data. Johannes Kepler spent twenty years of his life processing data. Today, a college student using a computer can repeat his computations in a few hours.

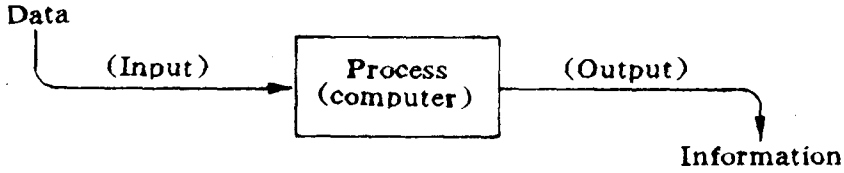

Fig. 1-1 A computer is a machine that processes data into information. It accepts input data, processes these data, and generates information as output.

What do we mean when we say that a computer processes data? We process iron ore to make steel, we process wood pulp to make paper. "Process" implies that a change takes place, that the

raw materials are in some way *restructured* or manipulated. Often, data processing involves filtering and summarizing data so that underlying patterns can be perceived. How does a computer process its data? What functions, what operations, can it perform? Generally, computers can add, subtract, multiply, divide, compare, copy, request input, and request output. So can most pocket calculators. What makes a computer different?

The Stored Program Concept

To add two numbers on a calculator, you:

1. *Enter* the first number.
2. Press the add(+)button.
3. Enter the second number.
4. Press the result(=)button.
5. Record the sum for future reference.

The calculator finds the sum, but you must provide control by deciding what button to push next. A calculator requires direct human *intervention* at each step.

A computer processes data automatically without human intervention. Computers are not intelligent, however. They don't know when to add, or subtract, or compare, or request input. If a computer is to function without direct human control, it must be given a set of instructions to guide it, step by step, through a process. The set of instructions is called a program. The program is stored physically inside the machine, making it a stored program(Fig. 1 - 2). The stored program distinguishes a computer from a calculator and allows it to function without human intervention. Let's *incorporate* this idea into our definition:

Computer: A machine that processes data into information under the control of a stored program.

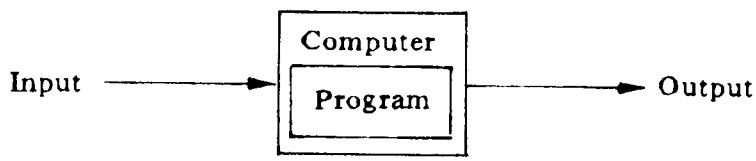

Fig. 1-2 A computer processes data automatically under control of a stored program

System Components

A computer system consists of several basic components. An input device provides data. The data are stored in *memory*, which also holds a program. Under control of that program the computer's *processor manipulates* the data, storing the results back into memory. Finally, the results flow from the computer to an output device. Additionally, most modern computers use *secondary storage* to extend memory capacity.

In the *foreground*, the keyboard is an input device. Above the keyboard is an output device, the display screen. The image displayed on a screen is *temporary*; a more permanent copy of the output can be obtained by sending it to a printer. The computer's processor and main memory are located in the small cabinet near the center. The diskette drives in the front of the cabinet extend

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the computer's memory; programs often enter the system through such secondary storage devices.

The basic building block of a modern computer is a *chip*, a complex, *integrated* electronic circuit *etched* on a tiny square of *silicon* no bigger than a fingernail. Since loose chips are *fragile* and difficult to handle, they are normally *packaged*, and mounted on boards. A computer is assembled by sliding the appropriate boards into cabinet. One board might hold the processor. Another might hold main memory, while a third might contain the electronics to link a particular input or output device to the system.

From *Fundamental Computer Concepts* by W. S. Davis

New Words

unstructure /ʌn'strʌktʃə/ *v.* & *n.*	不构成，无结构
restructure /ri'strʌktʃə/ *v.*	重新构成
enter /'entə/ *v.*	键入
intervention /intə'venʃən/ *n.*	介入，干涉
incorporate /in'kɔ:pəreit/ *v.*	使结合
memory /'meməri/ *n.*	存储器
processor /'prəusesə/ *n.*	处理器
manipulate /mə'nipjuleit/ *v.*	处理
secondary /'sekəndəri/ *a.*	辅助的
storage /'stɔ:ridʒ/ *n.*	存储器
foreground /'fɔ:graund/ *n.*	前述事项
temporary /'tempərəri/ *a.*	暂时的
chip /tʃip/ *n.*	芯片
integrate /'intigreit/ *v.*	集成
etch /etʃ/ *v.* & *n.*	蚀刻
silicon /'silikən/ *n.*	硅
fragile /'frædʒail/ *a.*	脆弱的
package /'pækidʒ/ *v.*	封装
board /bɔ:d/ *n.*	印刷电路板

Reading Comprehension

Choose the best answer for each of the following.

1. The _____ unstructured facts.
   a. information b. data
   c. bytes d. processes
2. _____ is the meaning that human beings attributs to facts.
   a. Information b. Data

c. Knowledge d. Structure

3. A computer processes _____ into _____.
   a. information/data b. data/information
   c. facts/data d. information/facts
4. Data flow into the computer as _____.
   a. output b. a program
   c. a process d. input
5. Information flows from a computer as _____.
   a. output b. memory
   c. a program c. input
6. The _____ distinguishes a computer from a calculator.
   a. processor b. stored program
   c. memory d. output
7. Data and program instructions are stored in _____.
   a. the processor b. an output device
   c. the stored program d. memory
8. The computer component that actually manipulates the data is _____.
   a. main memory b. an input device
   c. the processor d. an output device
9. The basic building block of a modern computer is a _____.
   a. chip b. tube
   c. transistor d. switch
10. Chips are normally mounted on _____ . Typically, each one contains the electronics for one of the computer's major components.
   a. plates b. boards
   c. cylinders d. carriers

Ⅱ. Reading and Practice

THE COMPUTER

A computer is a machine with an *intricate* network of electronic circuits that operate switches or *magnetize* tiny metal *cores*. The switches, like the cores, are capable of being in one of two possible states, that is, on or off; magnetized or *demagnetized*. The machine is capable of storing and manipulating numbers, letters and characters. The basic idea of a computer is that we can make the machine do what we want by inputting signals that turn certain switches on and turn others off, or that magnetize or do not magnetize the cores.

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 char-

acters called data, perform mathematical and/or logical operations on the information, and then supply results of these operations. The program, or part of it, 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.

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 wouldn't be of much use. However, certain computers (commonly *minicomputers* and *microcomputers*) are used to control directly things such as robots, aircraft navigation systems, medical instruments, etc.

Some of the most common methods of inputting information are to use punched cards, magnetic tape, disks, and terminals. The computer's input device (which might be a card reader, a tape drive or disk drive, depending on the medium used in inputting information) reads the information into the computer.

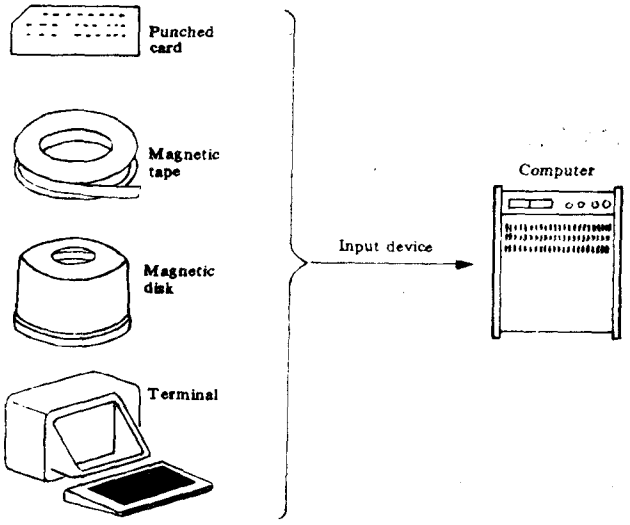

Fig. 1-3 Some of the most common methods of inputting information

For outputting information, two common devices used are a printer which prints the new information on paper, or a *CRT display screen* which shows the results on a TV-like screen.

Third, computers have circuits which can make decisions. The kinds of decisions wihich computer circuits can make are not of the type: 'Who would win a war between two countries?' or 'Who is the richest person in the world?' Unfortunately, the computer can only decide three things, namely: Is one number less than another? Are two numbers equal? and, Is one number greater than another?

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 judgments. There are times when a computer seems to operate like a mechanical 'brain', but its achievements are limited by the minds of human beings. A computer cannot do anything unless a person tells it what to do and gives it the appropriate information; but because electric pulses can move at the speed of light, a computer can carry out vast numbers of arithmeticlogical operations almost *instantaneously*. A person can do everything a computer can do, but in many cases that person would be dead long before the job was finished.

From *A Course in Computer English* by N. D. Malan and P. C. Braun

New Words

intricate /'intrikit/ *a*.	复杂的,错综的
magnetize /'mægnitaiz/ *v*.	使磁化
core /kɔ:/ *n*.	磁心
demagnetize /di:'mægnitaiz/ *v*.	使退磁
subtraction /səb'trækʃən/ *n*.	减法
multiplication /'mʌltipli'keiʃən/ *n*.	乘法
exponentiation /ekspəunenʃi'eiʃən/ *n*.	指数
minicomputer /'minikəm'pju:tə/ *n*.	微型计算机
microcomputer /'maikrəukəm'pju:tə/ *n*.	微型电子计算机
CRT display screen	阴极射线管显示器
originality /ə,ridʒi'næliti/ *n*.	创造力,独创性
instantaneously /,instən'teinjəsli/ *adv*.	瞬间地

1. Use of Language

Exercise A

Complete the following statements with the appropriate words. (Some can be used more than once.) Make sure you use the correct form, i.e. singular or plural.

core	device	data	circuit	terminal
switch	program	memory	medium	CRT display

1) Every computer has _____ for performing arithmetic operations, operating _____ or magnetized _____.
2) A _____ with a screen is normally referred to as a _____ unit.
3) A computer is a _____ that processes information in the form of _____ and _____ and can store this information in a _____.
4) Card readers, tape drives, or disk drives are different _____ for inputting information.

Exercise B

Decide whether the following statements are true or false (T/F)by referring to the information in the text.

1) A computer can store or handle any data even if it hasn't received information to do so. ( )
2) All computers accept and process information in the form of instructions and characters. ( )
3) The information necessary for solving problems is found in the memory of the computer. ( )
4) Not all computers can perform arithmetic operations, make decisions, and communicate in some way with the user. ( )
5) Computers can still be useful machines even if they can't communicate with the user. ( )
6) There are many different devices used for feeding information into a computer. ( )
7) There aren't as many different types of devices used for giving results as there are for accepting information. ( )
8) Computers can make any type of decision they are asked to. ( )
9) Computers can work endlessly without having to stop to rest unless there is a breakdown. ( )

Exercise C

Find the passages in the text where the following ideas are expressed. Give line references.

_____ 1) Computers accept information, perform mathematical and/or logical operations then supply new information.
_____ 2) All computers have three basic capabilities.
_____ 3) A computer is a machine that can be made to operate by receiving signals.
_____ 4) A computer cannot work without being told what to do.
_____ 5) A computer can make three types of decisions.
_____ 6) The fundamental job of a computer is processing information.
_____ 7) A computer can do the work of hundreds of people in a very short time.
_____ 8) The memory of a computer is used for storing information.

2. Guided writing

Definition (I)

Definitions are a very important writing skill for science students to know. They are frequently used by scientists, engineers and technicians to define ideas, concepts, laws, substances or objects in scientific writings.

A definition usually has two parts. The first part is the class or category consisting of items which can be grouped together because of their likenesses or traits. The second part is the characteristic of the defined item which differentiates it from other members of the same class. Take for

example the definition of the word "pulsar", "A pulsar is a star that emits radio waves in uniform pulses." Here the first part is "a star" that tells you which class the pulsar belongs to. The fact that "it emits radio waves in uniform pulses" differentiates the pulsar from any other stars. It is the second part.

Stage 1

Fill in the blanks with the given words so as to complete each statement as a definition.

a memory	information	data	a chip
output	a processor	a computer	input

1)_____ is a machine that processes data into information under control of a stored program.
2)_____ are raw, unstructured, unprocessed facts.
3)_____ is the meaning a human being assigns to data, processed data.
4)_____ is a transferring data from an external device into a computer's main memory.
5)_____ is the computer component in which instructions and data are stored.
6)_____ is the act of transferring data or information from the computer's main memory to an external device.
7)_____ is a tiny square of silicon that holds thousands of integrated electronic circuits.
8)_____ is the component of a computer that selects and executes instructions. The processor contains a clock, an instruction control unit, an arithmetic and logic unit, and registers.

Stage 2

Write the definitions of the following things.

1) computer program
2) stored program
3) circuit board
4) data processing
5) software
6) hardware

Ⅲ. Reading and Translation

Read either of the following passages and translate the italicised parts into Chinese.

(1) WHAT ARE COMPUTERS?

Since their first appearance on earth, men have gathered information and have attempted to pass useful ideas to other men. The carvings of word-pictures on the walls of ancient caves as well as hieroglyphics on stone tablets represent some of man's earliest efforts to convey information. Scenes of hunting, maps of battles, and the stories of heroes were put down for all to see.

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