

21世纪高等学校计算机教育实用规划教材

# 计算机英语阅读教程

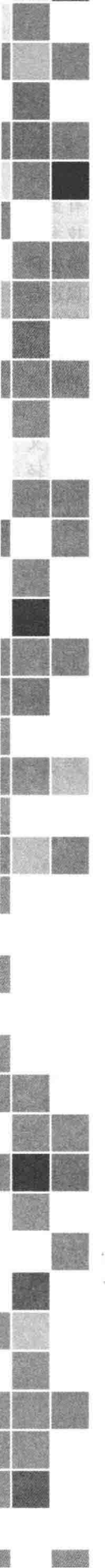
Computer English——A Reading Tutorial

张璇 王旭 编著

Zhang Xuan Wang Xu

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北京

## 内 容 简 介

计算机英语作为一门专业基础课程,对于培养具有国际视野和交流能力的计算机专业人才具有重要的支撑作用。该课程的基本定位就是要引导学生通过该课程的学习,构建对于计算机各领域相关技术的系统认知,掌握必要的计算机专业术语,了解计算机技术的发展趋势,为日后双语教学的开展以及学生科研学术交流能力的培养打下基础。本书的编写在内容选择上力图能够对计算机相关领域的基本知识进行基础而全面的介绍,涉及计算机硬件、软件、网络、信息安全、软件工程和数字媒体等诸多方面;在材料组织和叙述方式上,既介绍与计算机相关的技术,又介绍与计算机相关的人物和事件,力图使学生了解计算机发展的历史脉络,从而更好地把握计算机技术发展的现状和未来;在知识点的组织上,将术语、概念的介绍融入相关技术、人物或事件,使学生了解相关术语和概念的来龙去脉。

本书既可作为计算机相关专业学生的基础课程教材,也可作为教师指导学生开展计算机专业英文文献阅读的辅导用书,还可为希望系统地了解计算机技术发展的非计算机专业的英语学习者提供有趣而轻松的阅读体验。

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# 出版说明

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随着我国高等教育规模的扩大以及产业结构调整的不断深入,社会对高层次应用型人才的需求将更加迫切。各地高校紧密结合地方经济建设发展需要,科学运用市场调节机制,合理调整和配置教育资源,在改革和改造传统学科专业的基础上,加强工程型和应用型学科专业建设,积极设置主要面向地方支柱产业、高新技术产业、服务业的工程型和应用型学科专业,积极为地方经济建设输送各类应用型人才。各高校加大了使用信息科学等现代科学技术提升、改造传统学科专业的力度,从而实现传统学科专业向工程型和应用型学科专业的发展与转变。在发挥传统学科专业师资力量强、办学经验丰富、教学资源充裕等优势的同时,不断更新教学内容、改革课程体系,使工程型和应用型学科专业教育与经济建设相适应。计算机课程教学在从传统学科向工程型和应用型学科转变中起着至关重要的作用,工程型和应用型学科专业中的计算机课程设置、内容体系和教学手段及方法等也具有不同于传统学科的鲜明特点。

为了配合高校工程型和应用型学科专业的建设和发展,急需出版一批内容新、体系新、方法新、手段新的高水平计算机课程教材。目前,工程型和应用型学科专业计算机课程教材的建设工作仍滞后于教学改革的实践,如现有的计算机教材中有不少内容陈旧(依然用传统专业计算机教材代替工程型和应用型学科专业教材),重理论、轻实践,不能满足新的教学计划、课程设置的需要;一些课程的教材可供选择的品种太少;一些基础课的教材虽然品种较多,但低水平重复严重;有些教材内容庞杂,书越编越厚;专业课教材、教学辅助教材及教学参考书短缺,等等,都不利于学生能力的提高和素质的培养。为此,在教育部相关教学指导委员会专家的指导和建议下,清华大学出版社组织出版本系列教材,以满足工程型和应用型学科专业计算机课程教学的需要。本系列教材在规划过程中体现了如下一些基本原则和特点。

(1) 面向工程型与应用型学科专业,强调计算机在各专业中的应用。教材内容坚持基本理论适度,反映基本理论和原理的综合应用,强调实践和应用环节。

(2) 反映教学需要,促进教学发展。教材规划以新的工程型和应用型专业目录为依据。教材要适应多样化的教学需要,正确把握教学内容和课程体系的改革方向,在选择教材内容和编写体系时注意体现素质教育、创新能力与实践能力的培养,为学生知识、能力、素质协调发展创造条件。

(3) 实施精品战略,突出重点,保证质量。规划教材建设仍然把重点放在公共基础课和专业基础课的教材建设上;特别注意选择并安排一部分原来基础比较好的优秀教材或讲义修订再版,逐步形成精品教材;提倡并鼓励编写体现工程型和应用型专业教学内容和课程体系改革成果的教材。

(4) 主张一纲多本,合理配套。基础课和专业基础课教材要配套,同一门课程可以有多种具有不同内容特点的教材。处理好教材统一性与多样化,基本教材与辅助教材,教学参考书,文字教材与软件教材的关系,实现教材系列资源配套。

(5) 依靠专家,择优选用。在制订教材规划时要依靠各课程专家在调查研究本课程教材建设现状的基础上提出规划选题。在落实主编人选时,要引入竞争机制,通过申报、评审确定主编。书稿完成后要认真实行审稿程序,确保出书质量。

繁荣教材出版事业,提高教材质量的关键是教师。建立一支高水平的以老带新的教材编写队伍才能保证教材的编写质量和建设力度,希望有志于教材建设的教师能够加入到我们的编写队伍中来。

21 世纪高等学校计算机教育实用规划教材编委会

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# 前言

本教材面向计算机专业以及其他各个学科的学生,介绍计算机科学与技术的入门知识,使学生对计算机科学与技术有一个总体的概念,在此基础上,帮助计算机相关专业学生了解该领域今后其他课程的概貌以及课程之间的相互关系,其他学科的学生也可通过本教材的学习,了解信息技术相关领域较为宽泛的基础知识。

## 章节安排

本教材内容遵循由浅入深的原则,在兼顾学科广度的同时自然地引导出各个主题的深度,内容编排顺序如下:

章节	内容
1.1~1.4	计算机基本概念和分类,计算机历史,数据编码
2.1~2.3	计算机的计算设备、存储设备和输入/输出设备
3.1~3.4	计算机语言与编程概念,系统软件与应用软件
4.1~4.3	计算机网络,因特网与万维网
5.1~5.2	软件工程基础,软件开发方法和软件项目管理
6.1~6.3	信息安全基础,软件安全和网络安全
7.1~7.3	数字媒体硬件和数字媒体技术

教师和学生可以根据需要选择仅讲授/学习基本概念或者忽略基本概念而直接讲授/学习各个专题的深度内容,当然,也可以选择由浅入深、循序渐进地完成所有内容。

## 教学特色

本教材根据计算机科学与技术的各个方向编排章节内容,各个章节之间有先后顺序关系,但各个章节的内容本身是自成体系且相对独立的,教师可以根据教学目的的不同,重新调整本教材各章节内容的教学顺序。另外,本教材的每一章节中都将某些主题的内容留作学生自习,这些内容可以不用于课堂讲授,而由学生通过独立学习来掌握。

在每一章节的教学内容后都附有本章节专业词汇的汇总,并提供了丰富的习题以加深学生对所学知识的理解。习题分为三类:第一类是用于复习章节内容的选择题,其内容覆盖整章;第二类是用于复习和讨论的问答题,这些问题既可以用于课堂教学的思考讨论,也可以用来开展相关课外研究;第三类是用于复习专业词汇的匹配练习题,着重强调学生对专业词汇的掌握。在很多章节的末尾还增加了课外阅读和技术实践的内容,这些内容是留



给学生扩展专业知识、实践基本操作技能的自学内容。

## 致谢

本教材的完成首先要感谢最初提出教材编写的王仲民教授,本教材所有的章节安排都是在王教授的指导下完成的,并且王教授还亲自对教材的前三章进行了审校,他的审校意见对于我们完善全书的内容编排和陈述方式起到了关键的作用。另外,感谢参与撰写本教材第一个版本的李震雄老师、何婧老师、林英老师、张艳老师、胡盛老师和刘春花老师的大力支持。本教材的第一个版本虽然没有付梓,但其中汇集的每一位老师的真诚和智慧,成为这一版本教材的最终调整和完善的基础。在此向他们每一位致以最真诚的谢意。

感谢为本书的出版辛勤工作的清华大学出版社的工作人员,使得本书能够顺利出版。

感谢家人多年来对我们的支持和默默付出,使我们能够专心致志地完成教材的编写。

编者

2015年3月



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# Chapter 1

## Computer Basics

This chapter deals with the issues of:

### 1.1 What is a computer

Computer equipment, Input device, Output device.

### 1.2 Brief Histories of Computer

Abacus, Mechanical computing device, Concept of the modern computer, First computer programmer, Electric Tabulating Machine, Binary numbering system, First electronic computer, Transistor, Integrated circuit, Microprocessor, Personal computer.

### 1.3 Computer Category

Supercomputer, Mainframe computer, Minicomputer, Microcomputer, Personal Computer, Workstation, Server, Video game console.

### 1.4 Data Representation

Binary numbering system, Binary coding scheme, Byte, Data, Information, file.

After you have finished this chapter you should be able to:

1. Describe the hardware of a personal computer, including input devices and output devices.
2. Identify the differences of the following computer categories: supercomputer, mainframe computer, minicomputer, microcomputer, personal computer, workstation, server, video game console.
3. Compare the four types of personal computer.
4. Define data, information, bit, and byte.
5. Distinguish between binary numbering system and binary coding scheme.

## 1.1 What is a Computer?

A **computer** is a programmable machine that receives data from outside to process, then stores them in the computer or outputs them. In this section we give you an overview of a personal computer to help you start using your computer. If you have worked with computers before, don't skip this section. If you have had little or no experience with computers, you'll find all the necessary basic knowledge here.

### Computer equipment

Your computer—the one you own, the one you use in a school lab—is technically

classified as a personal computer. A typical **personal computer** consists of several devices—you must be able to identify these devices to use them. Below are the core components of two kinds of commonly used personal computers. Figure 1.1 shows the core components of a **desktop computer** and its **peripherals**. Figure 1.2 shows the core components of a **laptop computer**, also known as a **notebook computer**.

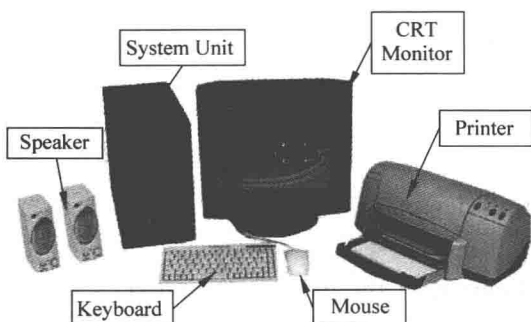


Figure 1.1 Desktop computer and the peripherals

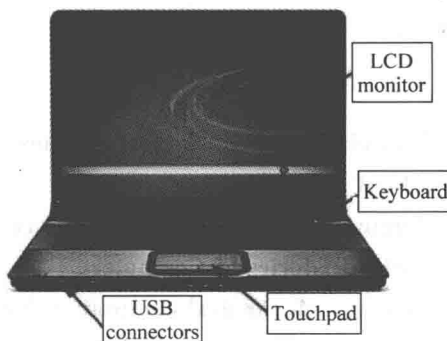


Figure 1.2 Laptop computer

In the following, we give some brief introductions to some commonly used devices of the computers mentioned above. More detailed introductions can be found in Chapter 2.

### Input devices

Keyboard, mouse and touchpad are computer **input devices**. They are used to receive data from users.

The **keyboard** is the primary input device, which is used for typing text and entering commands. Figure 1.3 shows a computer keyboard and gives an introduction to some frequently used keys.

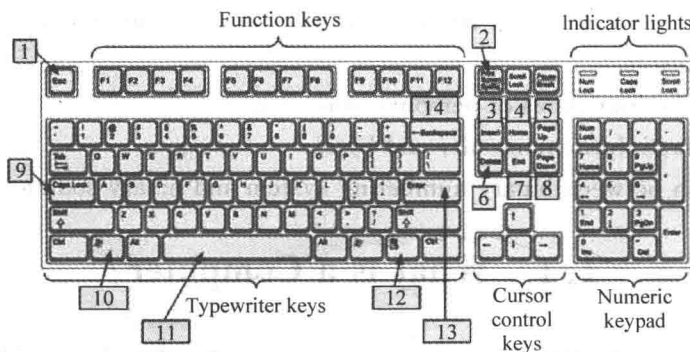


Figure 1.3 Computer keyboard

- |  |   |
|--|---|
| <p>1 “Esc” key cancels an operation.</p> <p>2 “Print Screen” key copies an image of the current screen to a clipboard, which can be used in graphics software.</p> | <p>3 “Insert” key switches between insert mode and overwrite mode when typing text in a document.</p> <p>4 “Home” key returns the cursor to the</p> |
|--|---|

beginning of a line or a document.


5 “Page Up” key scrolls the page up.

6 “Delete” key deletes the character right of the cursor.


7 “End” key brings the cursor to the end of a line or a document.

8 “Page Down” key scrolls the page down.

9 “Caps Lock” key switches the inputting letters between uppercase mode and lowercase mode.


10  key opens or closes start menu.

11 “Spacebar” key is used to insert a blank space.

12  key launches a context menu which can also be launched by right-click of mouse.

13 “Enter” key starts a new paragraph or gives an running command to software.

14 “Backspace” key deletes the character left of the cursor.

The **mouse** is a **pointing device** which is used to manipulate items on the screen. When you move your mouse, the pointer  on the screen moves accordingly in the same direction. The left and right buttons (see Figure 1.4) on the top of the mouse allow the user to manipulate the items on operating system desktop. The functions of the left and right buttons may be redefined based on whether you are left-handed or right-handed. Roll the scroll wheel will scroll the page up or down.

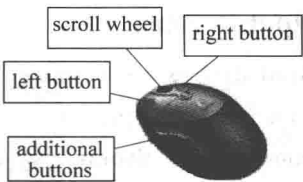




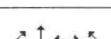




Figure 1.4 Computer mouse

- Click left button; select an item.
- Click right button; launch a context menu.
- Double click left button; activate an item.
- Hold left button and drag; move an item

The **mouse pointer** is the symbol that indicates the position and operation of the mouse on the desktop. Table 1.1 displays the icons of mouse pointer and gives the relevant descriptions.

Table 1.1 Mouse pointer

Pointer symbol	Relevant descriptions
	Select
	Computer is busy doing its current task
	The position of mouse when editing a document
	Current operation cannot be executed
	Adjust image size bigger or smaller
	Move an item
	hyperlink

The **touchpad** (see Figure 1.5) is also a pointing device consisting of a special surface that is sensitive to fingertips and can translate the motion and position of a user's fingers to a relative position on the screen. It is usually used in portable laptop computers.

When you move your finger on the touchpad (see Figure 1.5 A) the pointer on the screen moves in the same direction. One feature of a touchpad is the ability to recognize taps on the touchpad area as clicks of the mouse left button. The left and right buttons (see Figure 1.5 C and D) below the touchpad have the same functions as the corresponding mouse buttons. Slide your finger up or down in the scroll zone (see Figure 1.5 B) to scroll through the pages you are visiting.

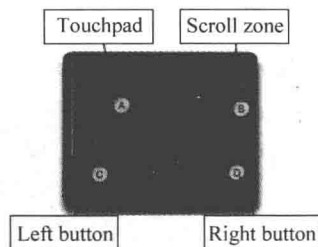


Figure 1.5 Touchpad

- A. Touchpad
- B. Scroll zone
- C. Left button
- D. Right button

### Output devices

**Output devices** are responsible for translating computer data into a form that people can understand.

A **monitor** (or **display**) is an output device for computers. It is typically a **thin Liquid Crystal Display (LCD)** (see Figure 1.6 A) or a **Light-Emitting Diode (LED) display** (see Figure 1.6 B), while older monitors use a **Cathode Ray Tube (CRT)** (see Figure 1.6 C).

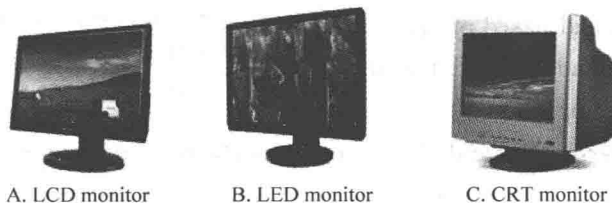


Figure 1.6 Three types of monitors

A **printer** is another type of output device which transfers text and images from computer to paper. The most commonly used printers are **ink-jet printer** (see Figure 1.7 A), **laser printer** (see Figure 1.7 B), and **photo printer** (see Figure 1.7 C).

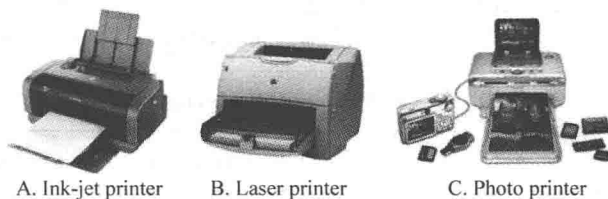


Figure 1.7 Three types of printers

If you are playing audio or video, or running the related applications on your computer, a pair of **speakers** (see Figure 1.8 A), a **headphone** (see Figure 1.8 B), or an **earphone** (see Figure 1.8 C) may be used as audio output devices.



Figure 1.8 Audio output devices

## Beyond the Basics

### System unit

The **system unit** is the main body of a desktop computer. It is typically an enclosure containing the essential components of the computer. Figure 1.9 shows the components in the system unit, including motherboard (see Figure 1.10), power supply, cooling fans and internal disk drives, etc.

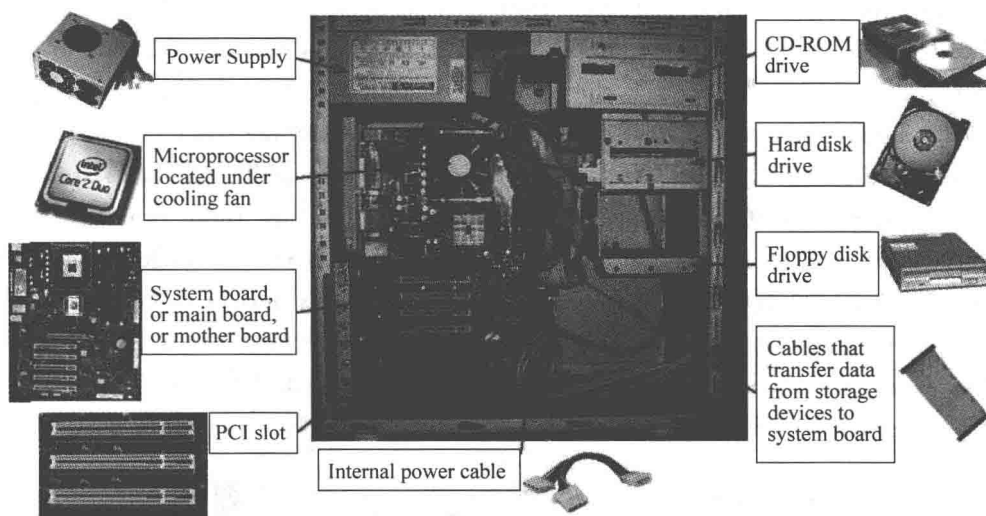


Figure 1.9 System unit

A **motherboard** holds many of the crucial components of the computer such as microprocessor, memory, video card, audio card, network interface card, modem and connectors for other peripherals. All components on the motherboard are communicated through a standard bus. Typical bus standards are ISA (Industry Standard Architecture) and PCI (Peripheral Component Interconnect), which will be described later. Figure 1.10 shows the picture of a motherboard in a desktop computer.

A **microprocessor** is the brain of a computer. It is responsible for executing instructions under the control of the computer program and the primary element carrying out the computer's functions.

A **memory**, also called **main memory** or **primary storage**, is composed of a large collection of circuits that is capable of storing program instructions and data as patterns of bits



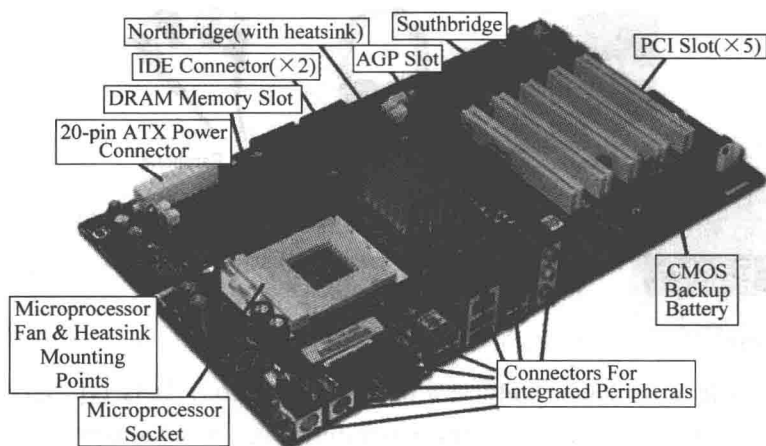


Figure 1.10 Motherboard of desktop computer

(refer to the introduction of data representation in section 1.4). The microprocessor can read data from the main memory quickly. However, the main memory is a kind of temporary storage. Its data will be lost if the computer is shut off. It is also expensive by comparing with some other storage devices and offering limited storage space (usually 512MB, 1GB, 2GB or above in a typical personal computer). Thus, additional mass storage devices, called **secondary storage devices**, are provided. There are three typical secondary storage devices; magnetic storage, optical storage, and solid state storage devices. **Hard disks** (see Figure 1.11 B) are commonly used **magnetic storage devices**. They are faster to access and have large storage capacities (usually hundreds or even thousands of GB). A hard disk drive (see Figure 1.11 A) can be an **external hard disk drive** (see Figure 1.11 C) which is a removable hard drive with a proper enclosure and the connecting port.

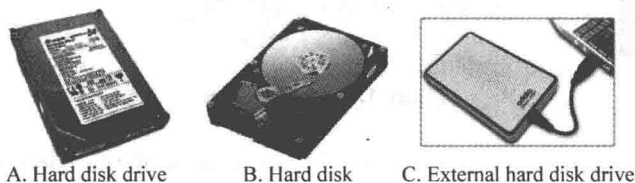


Figure 1.11 Hard disk drive, hard disk, and external hard disk drive

**Optical disks** are portable. They consist of reflective materials and data are stored and retrieved by laser technology. The most popular optical disks are **Compact Disks (CDs)** and **Digital Versatile Disks (DVDs)**.

Figure 1.12 shows one kind of popular **solid state storage device**—**USB flash drive**, commonly known in China as the “U” disk. More details about it are in Chapter 2.

As the development of the **Universal Serial Bus (USB)**, a kind of secondary storage disk named flash storage, also called the USB flash drive, has eventually replaced the floppy disk. It is a flash storage connected to a computer through a USB port.

A **video card** (or **graphics card**, see Figure 1. 13 A) works as a converter. Video signals processed by the microprocessor are digital. However, the display needs analog signals to form images. So a video card needs to convert digital signals into analog information. Along with the increasingly prevalent use of **Graphical User Interfaces (GUIs)**, numerous graphical procedures must be processed in real-time. To lessen the calculation burdens of the microprocessor, some video cards accelerate their graphical calculation abilities. These video cards are called **graphical user interface accelerator adapters**.

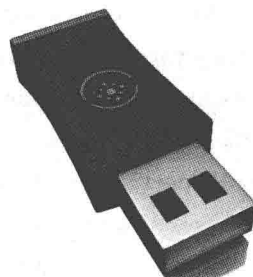


Figure 1. 12 USB flash drive

Similar to a video card, an **audio card** (see Figure 1. 13 B) converts digital audio information from the microprocessor into analog sound waves which are broadcasted on the speakers or earphones. But the audio card is bidirectional. It converts analog sound from the microphone into digital audio.

**Network interface card** (see Figure 1. 13 C) and **modem** are both network components. A modem (modulator-demodulator) is designed for the early network which employs the telephone network to transmit signals. It converts digital signals into analog signals suitable for telecommunication circuits, and in reverse converts analog signals into digital form for computers. These two processes are called **modulation** and **demodulation** respectively. A network interface card is designed for modern network which uses proprietary wire network. The main purpose of a network interface card is packing up data to be transmitted in proper packages and sending them off, and in reverse receiving packages and unpacking them into data to be processed by computers.

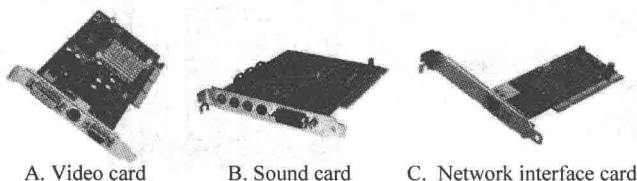


Figure 1. 13 Video card, sound card, and network interface card

To install a new adapter card in a computer, you can plug it into a bus slot on the motherboard. A **computer bus** is a hardware pathway through which data are transmitted between the components in the system unit. There are several **bus slots** available:

- **ISA (Industry Standard Architecture)** bus slot is a computer bus standard for IBM compatible computers. Although it only has a 16-bit data bus, several manufacturers still produce adapter cards for ISA bus slots. Therefore, most new computers still have two ISA slots.
- **PCI (Peripheral Component Interconnect)** bus slot has a 64-bit data bus and is for Pentium and newer computers. It has replaced ISA as the standard expansion bus.