计算机系列教材

计算机英语

（第五版）

刘兆毓 郑家农 等 编著

清华大学出版社

计算机系列教材

刘兆毓 郑家农 闫金平 刘华群 武华 编著

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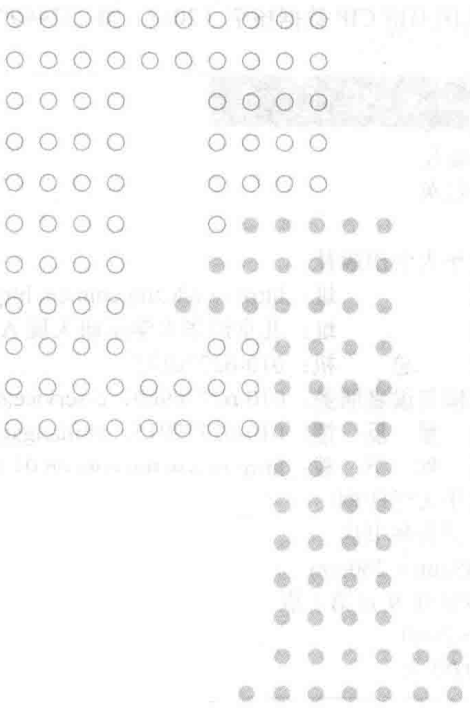

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内 容 简 介

本书是计算机及相关专业的专业英语教材，是按计算机的知识结构层次编写的。内容涵盖以下三个部分：计算机及计算机网络硬件结构（第 1 章和第 3 章），计算机软件（第 2 章、第 6 章为系统软件，第 7、8、9、10、11 章为应用软件）和因特网应用（第 4、5 章）。在具体内容的选取上，除了基础知识以外，尽量吸取最先进的技术和知识，这其中包括云计算、大数据、3D 打印技术、工业 4.0 和慕课等。鉴于因特网应用发展异常迅猛，本书有 19 课（约占全书 59 课的 1 / 3）涉及因特网应用。

为便于读者阅读，书中对一些较难理解和翻译的句子做了注释，对遇到的专业术语也都做了解释。

本书主要用作大学计算机及相关专业本科生、专科生的教材，也可供研究生及参加计算机水平考试的考生使用。

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《计算机英语（第五版）》前言

《计算机英语（第四版）》出版6年以来，计算机和因特网又出现了很多新技术，为了适应这种新的形势，编写了第五版。第五版只保留了第四版中计算机和网络的基础内容，超过80%是新内容。考虑到长期使用本教材的教师和读者的用书习惯，本书编写格式与第四版保持一致，即课文中有注释、关键词和练习题，书后附有习题答案和参考译文。

本书由刘兆毓、郑家农等编著，全书共11章，46节（内含59课），其中郑家农编写了第9～11章，闫金平编写了第1、3章，刘华群编写了第2、6章，武华编写了第4、8章，刘兆毓编写了第5、7章。

本书在编写过程中，引用了刘艺、王春生编写的《计算机英语（第4版）》的部分内容，在此表示感谢。

由于作者水平有限，书中难免有不当之处，敬请批评指正。

编者

2017年10月于北京

FOREWORD

PART Ⅰ COMPUTER ARCHITECTURE AND COMPUTER NETWORK

CHAPTER 1 COMPUTER ORGANIZATION AND UNITS /3

1.1 COMPUTER ORGANIZATION /3

1.2 MICROPROCESSOR AND SYSTEM BOARD /10

1.3 MEMORY /15

1.4 SECONDARY STORAGES /19

1.5 INPUT AND OUTPUT DEVICES /27

CHAPTER 2 SYSTEM SOFTWARE /40

2.1 COMPUTER SOFTWARE /40

2.2 SUMMARY OF OPERATING SYSTEM /43

2.3 WINDOWS 10 /47

2.4 UNIX AND LINUX /52

2.5 MAC OS /57

2.6 ANDROID /60

CHAPTER 3 COMPUTER NETWORK /65

3.1 LOCAL AREA NETWORKS (LANs) /65

3.1.1 ETHERNET /65

3.1.2 Wi-Fi AND BLUETOOTH /69

3.1.3 HOME NETWORK /74

3.2 WIDE AREA NETWORKS (WANs) /76

3.2.1 OVERVIEW OF WIDE AREA NETWORKS (WANs) /76

3.2.2 STORAGE AREA NETWORK (SAN) AND INTERNET AREA NETWORK (IAN) /81

3.3 THE INTERNET /83

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PART Ⅱ INTERNET APPLICATIONS

CHAPTER 4 TRADITIONAL INTERNET APPLICATIONS /93

4.1 OVERVIEW OF WORLD WIDE WEB (WWW) /93

4.1.1 ABOUT WWW /93

4.1.2 SEARCH ENGINES /97

4.2 E-MAIL /100

4.3 ELECTRONIC COMMERCE AND THE INTERNET OF THINGS /103

4.3.1 ELECTRONIC COMMERCE AND SOCIAL COMMERCE /103

4.3.2 INTERNET OF THINGS /111

4.4 COMPUTER AND NETWORK SECURITY /115

4.4.1 COMPUTER CRIMINALS AND CRIME /115

4.4.2 PROTECT COMPUTER SECURITY /120

CHAPTER 5 NEW INTERNET APPLICATIONS /123

5.1 INSTANT MESSAGING (IM) /123

5.1.1 OVERVIEW OF INSTANT MESSAGING (IM) /123

5.1.2 QQ /126

5.1.3 FACEBOOK /129

5.1.4 TWITTER /132

5.1.5 MICROSOFT SERVICE NETWORK (MSN) /134

5.1.6 WECHAT /138

5.2 SOCIAL NETWORKING SERVICE (SNS) /140
5.2.1 OVERVIEW OF SOCIAL NETWORKING SERVICE (SNS) /140
5.2.2 WIKI /144
5.2.3 BLOG AND MICROBLOG /146
5.3 CLOUD COMPUTING /151
5.4 BIG DATA /158
5.5 MOOC AND FLIPPED THE CLASS ROOM /163

PART Ⅲ PROGRAM DESIGN LANGUAGES AND DATABASES

CHAPTER 6 PROGRAMMING LANGUAGES /173
6.1 OVERVIEW OF PROGRAMMING LANGUAGES /173
6.2 C, C++, AND C# /177
6.3 JAVA /181
6.4 MARKUP AND SCRIPTING LANGUAGES /185
CHAPTER 7 DATABASE /192
7.1 DATABASE CONCEPTS /192
7.2 THE WEB AND DATABASES /197
7.3 MySQL /201

PART Ⅳ APPLICATION SOFTWARE

CHAPTER 8 OFFICE AUTOMATION SOFTWARE /209
8.1 THE BASICS OF OFFICE AUTOMATION SOFTWARE /209

8.2 MICROSOFT OFFICE 2013 /215
8.3 MICROSOFT OFFICE MOBILE /220
CHAPTER 9 MULTIMEDIA /224
9.1 MULTIMEDIA AND ITS MAJOR CHARACTERISTICS /224
9.2 USAGE/APPLICATION /227
9.3 MULTIMEDIA NETWORKING /232
CHAPTER 10 COMPUTER GRAPHICS AND IMAGES /235
10.1 OVERVIEW /235
10.2 THE VARIOUS COMPUTER GRAPHICS /237
10.3 GRAPHICS SOFTWARE (1) /241
10.4 GRAPHICS SOFTWARE (2) /246
10.5 DIGITAL IMAGE FILE FORMATS /249
CHAPTER 11 MODERN INDUSTRIAL AUTOMATION /253
11.1 OVERVIEW /253
11.2 USE OF CAD, CAM, AND CAE /256
11.3 PRODUCT LIFECYCLE MANAGEMENT (PLM) /260
11.4 INDUSTRY 4.0 /265
11.5 3D PRINTING /270
ANSWERS TO THE EXERCISES /277
BIBLIOGRAPHY /282
参考译文 /283
第一部分 计算机体系结构和计算机网络 /283
第 1 章 计算机组成和部件 /283
1.1 计算机组成 /283
1.2 微处理器和系统板 /285
1.3 存储器 /286
1.4 二级存储器 /288

1.5 输入与输出设备 /290
第 2 章 系统软件 /294
2.1 计算机软件 /294
2.2 操作系统概述 /296
2.3 Windows 10 /297
2.4 UNIX 和 LINUX /299
2.5 Mac 操作系统 /300
2.6 安卓操作系统 /301
第 3 章 计算机网络 /303
3.1 局域网 /303
3.1.1 以太网 /303
3.1.2 Wi-Fi 和蓝牙 /304
3.1.3 家庭网 /305
3.2 广域网 /305
3.2.1 广域网概述 /305
3.2.2 存储区域网和因特网区域网 /307
3.3 因特网 /308
第二部分 因特网应用 /310
第 4 章 传统因特网应用 /310
4.1 万维网概述 /310
4.1.1 关于万维网 /310
4.1.2 搜索引擎 /311
4.2 电子邮件 /312
4.3 电子商务和物联网 /313
4.3.1 电子商务和社会商务 /313
4.3.2 物联网 /315
4.4 计算机和网络安全 /316
4.4.1 计算机罪犯和犯罪 /316
4.4.2 保护计算机安全 /318
第 5 章 因特网新应用 /319
5.1 即时消息 /319

5.1.1 即时消息概述 /319
5.1.2 QQ /320
5.1.3 脸谱 /321
5.1.4 推特 /322
5.1.5 微软服务网 MSN /323
5.1.6 微信 /324
5.2 社交网络服务 /324
5.2.1 社交网络服务概述 /324
5.2.2 维基 /325
5.2.3 博客与微博 /326
5.3 云计算 /327
5.4 大数据 /329
5.5 慕课与翻转课堂 /331
第三部分 程序设计语言和数据库 /333
第 6 章 程序设计语言 /333
6.1 程序设计语言概述 /333
6.2 C、C++ 和 C# /335
6.3 Java /336
6.4 标记和脚本语言 /337
第 7 章 数据库 /339
7.1 数据库的概念 /339
7.2 万维网与数据库 /341
7.3 MySQL /342
第四部分 应用软件 /343
第 8 章 办公自动化软件 /343
8.1 办公自动化软件基本知识 /343
8.2 微软 Office 2013 /345
8.3 微软 Office Mobile /346
第 9 章 多媒体 /347
9.1 多媒体及其主要特点 /347
9.2 多媒体应用 /348
9.3 多媒体网络技术 /350

第 10 章　计算机图形图像　/351
10.1　概述　/351
10.2　各种各样的计算机图形　/351
10.3　图形软件（1）　/353
10.4　图形软件（2）　/355
10.5　数字图像文件格式　/356
第 11 章　现代工业自动化　/357
11.1　概述　/357
11.2　CAD、CAM、CAE 的应用　/358
11.3　产品生命周期管理　/359
11.4　工业 4.0（第 4 次工业革命）　/361
11.5　3D 打印　/363

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PART I

COMPUTER ARCHITECTURE AND COMPUTER NETWORK

PART I

COMPUTER ARCHITECTURE AND COMPUTER NETWORK

CHAPTER 1
COMPUTER ORGANIZATION AND UNITS

1.1 COMPUTER ORGANIZATION

1. Computer Organization

A computer is a programming, electronic device that accepts input, performs operations or processing on the data, and outputs and stores the results. Because it is programmable, the instructions—called the program—tell the computer what to do. The relationships between these four main computer operations (input, processing, output, and storage) are shown in Figure 1-1.

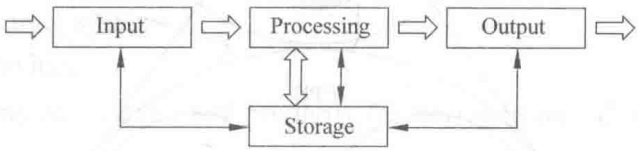

Figure 1-1 Basic operations within a computer

The corresponding devices to perform these tasks are input devices, processing devices, output devices, and storage devices.

(1) Input Devices

An input device is any piece of equipment that supplies materials (input) to the computer. The most common input devices are the keyboard and mouse (see Figure 1-2). Other possibilities include image and bar-code scanners, joysticks, touch screens, digital cameras, electronic pens, fingerprint readers, and microphones. Input devices for a stereo system might be a CD player and antenna.

Figure 1-2 Hardware of a computer system

（2）Processing Unit

The heart of any computer system is the central processing unit (CPU), located inside the computer's main box or system unit.

A processor is composed of two functional units—a control unit and an arithmetic/logic unit—and a set of special workspaces called registers.

Figure 1-3 depicts its structure, in which the Internal CPU Interconnection provides communication among the Control Unit, ALU, and register.

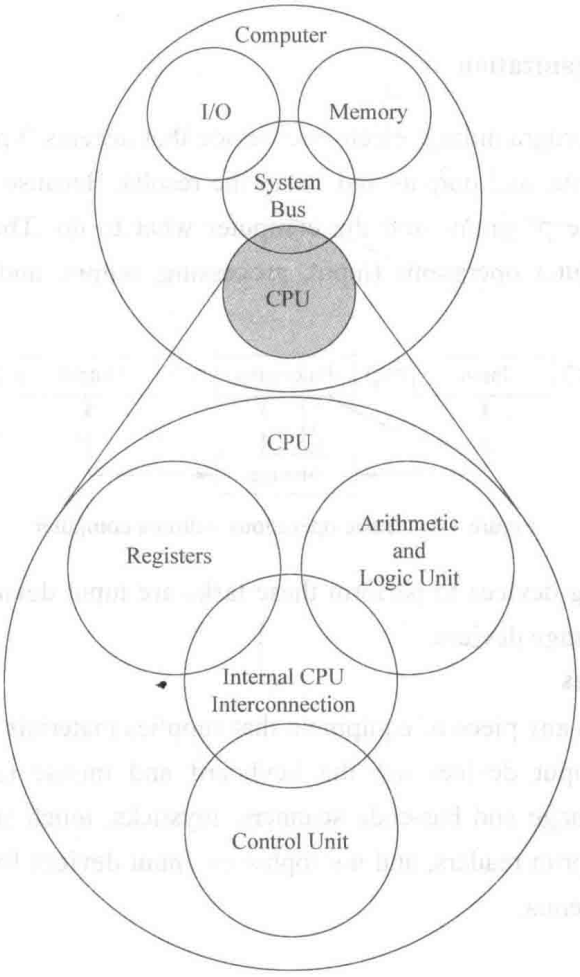

Figure 1-3 Central Processing Unit (CPU)

The control unit is the functional unit that is responsible for supervising the operation of the entire computer system.

The control unit fetches instructions from memory and determines their types 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 and logic unit (ALU) is the functional unit that provides the computer with logical and computational capabilities. Data are brought into the ALU by the control unit, and

the ALU performs whatever arithmetic or logic operations are required to help carry out the instruction [1].

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 [2]. 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.

(3) Output Devices

Like input units, output devices are instruments of interpretation and communication between humans and computer systems of all sizes. These devices take output results from the CPU in machine-coded form and convert them into a form that can be used (a) by people (e.g. a printed and/or displayed report) or (b) as machine input in another processing cycle [3].

In personal computer systems, display screen and desktop printers are popular output devices. Larger and faster printers, many online workstations, and magnetic tape drives are commonly found in larger systems.

(4) Storage Devices

Storage is a computer section used primarily for storing information such as instructions, programs and data.

There are two types in storage devices, one is the memory (sometimes called as primary storage), another is the secondary storage. Primary storage is located within the system unit that houses the CPU and other components [4]. Secondary storages include the storage media and drives, We will describe them in section 1-4 of this textbook.

An arbitrary desktop computer (not necessarily a PC) is shown in Figure 1-4. It has a large main memory to hold the operating system, applications and data, and an interface to mass storage devices(disks and DVD/CD-ROMs). It has a variety of I/O devices for user input (keyboard, mouse, and audio), user output (display interface and audio), and connectivity (networking and peripherals). The fast processor requires a system manager to monitor its core temperature and supply voltages ,and to generate a system reset.

2. Types of Computer

There are four types of computers: supercomputers, mainframe computers, minicomputers, and microcomputers.

(1) Supercomputers are the most powerful type of computer. These machines are special high-capacity computers used by very large organizations. IBM's Blue Gene is considered by many to be the fastest computer in the world.

(2) Mainframe computers occupy specially wired, air-conditioned rooms. Although not nearly as powerful as supercomputers, mainframe computers are capable of great processing

speeds and data storage [5]. For example, insurance companies use mainframes to process information about millions of policyholders.

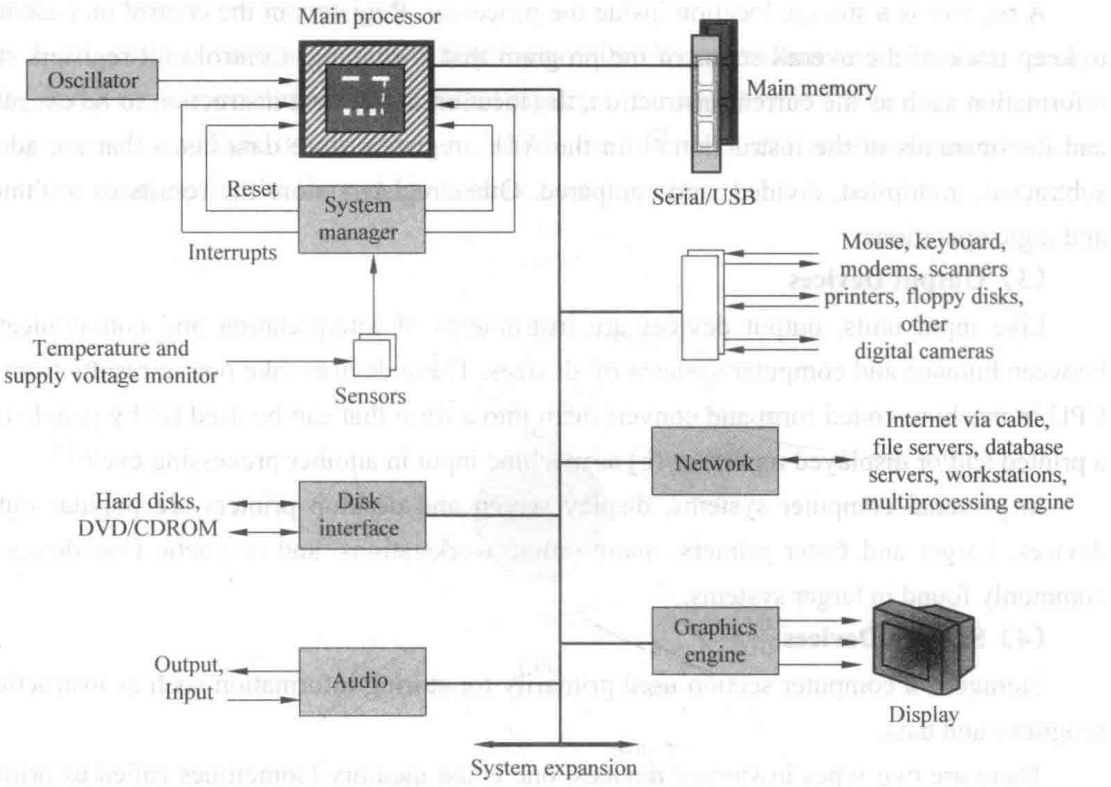

Figure 1-4 Block diagram of a generic computer

（3）Midrange computers, also referred to as servers, are computers with processing capabilities less powerful than a mainframe computer yet more powerful than a microcomputer[6]. Originally used by medium-size companies or departments of large companies to support their processing needs, today midrange computers are most widely used to support or serve end users for such specific needs as retrieving data from a database or supplying access to application software.

（4）Microcomputers are the least powerful, yet the most widely used and fastest-growing, type of computer. There are four types of microcomputers: desktop, notebook, tablet and handheld computers. (See Figure 1-5.) Desktop computers are small enough to fit on top of or alongside a desk yet are too big to carry around [7]. Notebook computers, also known as laptop computers, are portable and lightweight and fit into most briefcases. Tablets, also known as tablet computers, are the newest type of computer. They are smaller, lighter, and generally less powerful than notebook. Like a notebook, tablets have a flat screen but typically do not have a standard keyboard. Instead tablets typically use a virtual keyboard that appears on the screen and is touch-sensitive [8]. The best known tablet is Apple's iPad [9]. Handheld computers are the smallest and are designed to fit into the palm of one hand. These systems

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