

004  
INF  
998

# Information Technology

**THE BREAKING WAVE**

**DENNIS P. CURTIN**

**KIM FOLEY**

**KUNAL SEN**

**CATHLEEN MORIN**

**GIFT OF  
THE ASIA FOUNDATION  
NOT FOR RE-SALE**

ĐẠI HỌC QUỐC GIA HÀ NỘI  
TRUNG TÂM THÔNG TIN THƯ VIỆN  
No A-00/27-18



**Irwin  
McGraw-Hill**

Boston Burr Ridge, IL Dubuque, IA Madison, WI New York San Francisco St. Louis  
Bangkok Bogotá Caracas Lisbon London Madrid  
Mexico City Milan New Delhi Seoul Singapore Sydney Taipei Toronto



# CONTENTS

## 1 THE INTERNET AND THE WORLD WIDE WEB 2

- 1.1 The World Wide Web—What Is It?** 4  
What is the Internet?; What is the World Wide Web?; What's a home page?; Are the Internet and the Web the same thing?
- 1.2 The Web—What Makes It Happen?** 6  
Where did the Web come from?; Where do Web sites come from?; What are Web sites used for?
- 1.3 Getting Connected to the Web** 8  
Presence providers; Access providers; Types of access
- 1.4 Browsing the Web** 10
- 1.5 Locating Information on the Web** 12  
The browser; Internet addresses—URLs; The anatomy of a URL; Push or pull?; Browsing; Search engines; Lists; Tours; Geographical or map directories;
- 1.6 Web Multimedia** 14  
Bandwidth—How big is your pipe? Web sounds and video sounds; Internet phone; Multimedia
- 1.7 Enhancing and Testing Your Understanding** 16  
Summary; Review Questions

## 2 INFORMATION TECHNOLOGY TODAY—AN OVERVIEW 18

- 2.1 Information Technology—An Introduction** 20  
What is information technology? Hardware and software; The information processing cycle; Information processing at work
- 2.2 Information Systems** 22  
What is a computer?; What is a system?; People
- 2.3 Software and Data** 24  
What is software?; Software from A to Z; What is data?; Data isn't what is used to be
- 2.4 IT in Business and Industry** 26  
Computers in business; Computers in industry
- 2.5 IT in the Home and at Play** 28  
Computers in the home; Computers at play
- 2.6 IT in Education and Training** 30  
Computers in education; Computers in training
- 2.7 IT in Entertainment and the Arts** 32  
Computers in entertainment; Computers in the arts
- 2.8 IT in Science, Engineering, and Math** 34  
Computers in science and engineering; Computers in mathematics;
- 2.9 Computers in Hiding** 36  
Large computer systems you don't see; Small computers you don't see
- 2.10 Picture Essay: The Global Positioning System (GPS)** 38  
The applications of GPS; How GPS works
- 2.11 Enhancing and Testing Your Understanding** 40  
Summary; Review Questions

## 3 THE COMPUTER SYSTEM AND CENTRAL PROCESSING UNIT 42

- 3.1 Types of Computers: Corporate and Departmental Computers** 44  
Supercomputers; Mainframes and servers; Networks
- 3.2 Types of Computers: Desktop and Personal Computers** 46  
Desktop computers and workstations; Notebook computers; Subnotebook computers
- 3.3 The Anatomy of a Computer** 48  
Inside the case; System board
- 3.4 The Foundations of Modern Information Technology: Binary Numbers—0s and 1s** 50  
Digital versus analog; Binary numbers; Why digital?
- 3.5 The Foundations of Modern Information Technology: Digital Signals** 52  
Paul Revere's ride—a digital revolution?; The telegraph—a digital code; The transistor—the computer's digital device; Moore's Law



### **3.6 The Foundations of Modern Information Technology: Bits and Bytes—The Binary Code 54**

Bits and bytes; Groups of bytes; Our language to computer language and back again; Codes in use

### **3.7 The Central Processing Unit: The Microprocessor 56**

They keep getting better; Microprocessor compatibility; Co-processors and parallel processors; Costs of processing data; Embedded microprocessors

### **3.8 The Central Processing Unit: The Path of Progress 58**

Improving data capacity; Improving processing speed; Improving efficiency; Joy's Law; Benchmarks

### **3.9 Picture Essay: How Microprocessors and Memory Chips are Made 60**

Design; Fabrication; Sorting; Packaging

### **3.10 Memory: ROM and RAM 62**

Scrabble—An Analogy; Read-only memory (ROM); Read-only memory (RAM); Types of memory

chips; Memory modules—SIMMs and DIMMs

### **3.11 Memory: Other Forms and Uses of Memory 64**

Virtual memory; Caches; Buffers

### **3.12 Memory: How the CPU and Memory Work Together 66**

The machine cycle; Registers

### **3.13 Buses for Input and Output: Introduction 66**

The bus; System buses; Local buses

### **3.14 Buses for Input and Output: Adapter Cards and Multimedia Systems 70**

Expansion slots and adapter cards; Plug and play; Hot docking; Laptop computers; Multimedia systems

### **3.15 Communications with Peripherals 72**

Computer ports; Universal serial bus (USB) and firewire

### **3.16 Enhancing and Testing Your Understanding 74**

Summary; Review Questions

## **4 Input and Output 76**

### **4.1 Input and Output Devices: Introduction 78**

Input devices; Output devices; Special purpose input and output devices; Check numbers; Card scanners

### **4.2 Inputting Text: Keyboards 80**

The standard keyboard; Virtual keyboards; Ergonomic keyboards

### **4.3 Inputting Text: Direct Input Devices 82**

Optical character recognition; Handwriting recognition; Bar codes and bar code scanners; Speech recognition

### **4.4 Inputting Graphics: Direct Input Devices 84**

Types of graphic scanners; How a scanner works; Resolution; Color depth; Yikes—these files are huge!; Digitizing photos and video

### **4.5 Picture Essay: State-of-the-Art Input and Output 86**

Virtual reality; Holograms; Beam me up Scotty—3D scanning; Body scanning

### **4.6 Pointing Devices 88**

Mice; Track sticks; Trackballs; Fingers; Touch pads; Graphics tablets; Joysticks; Cordless mice

### **4.7 The Foundations of Modern Output: Pixels and Resolution 90**

Pixels—all output is dots; Resolution

### **4.8 The Foundations of Modern Output: Fonts 92**

Speaking of fonts; Scalable outline and bitmapped fonts; WYSIWYG

### **4.9 The Foundations of Modern Output: The Range of Color 94**

Palettes; Flashing; The range of colors; Colors and memory

### **4.10 Display Screens: Types of Screens 96**

CRT displays; Flat panel displays; How flat panel displays work

### **4.11 Display Screens: Resolution 98**

Display modes; Resolution and display size; Multiple frequency display monitors; Resolution and size

### **4.12 Printers: Laser Printers 100**

Laser printer output; How a laser printer works; Printer control languages; Laser printer features

### **4.13 Printers: Other Printers 102**

Dot-matrix printers; Plotters; Label printers; Digital presses; Large color printers; Line printers; Photo printers

### **4.14 Printers: Color Printers 104**

How solid colors are formed; How continuous tone colors are formed; Liquid inkjet; Solid ink; Color laser; Thermal wax transfer; Dye sublimation; Fiery output

### **4.15 Enhancing and Testing Your Understanding 106**

Summary; Review Questions



# CONTENTS

## 5 SECONDARY STORAGE 108

### 5.1 The Foundations of Modern Storage: How Data is Stored 110

Storage devices and media; Magnetic storage; Optical storage; Magneto-optical storage; Solid state storage

### 5.2 The Foundations of Modern Storage: Storage Characteristics 112

Random versus sequential access; Tracks and sectors; Speed; Storage capacity; Removable media

### 5.3 Storage Media: Floppy Disks 114

Floppy disk characteristics; Write protecting floppy disks; Floppy disks—the end is near

### 5.4 Storage Media: Hard Disk Drives 116

Inside a hard disk; Hard disk technologies; Hard disk tolerances; Hard disk controllers; RAID storage devices

### 5.5 Storage Media: Optical Discs 118

Lasers—the optical pen; Applications of optical discs; Types of optical discs; CD discs; DVD discs

### 5.6 Increasing Data Storage Capacity 120

Compression; Jukeboxes; Hierarchical storage management (HSM); Tape systems for large computers and networks

### 5.7 Backing Up Your Data 122

Why backup?; Off-site storage; Backup media with random access; Backup media with sequential access

### 5.8 Picture Essay: The Smart Card 124

Smart cards; Applications; Adding money to a card; The retailer's machine; Balance reader; Security

### 5.9 Enhancing and Testing Your Understanding 126

Summary; Review Questions

## 6 SOFTWARE—AN INTRODUCTION 128

### 6.1 Software: What Is It? 130

Operating systems; Application programs; Other programs; Progress

### 6.2 User Interfaces 132

Interfaces and operating systems; Graphical user interfaces (GUIs); Pen-based interfaces; Touch-screen interfaces; Conversational interfaces

### 6.3 Application Programs 134

Horizontal market applications; Vertical market applications; Custom applications; Shareware and public domain software

### 6.4 Operating Systems: Introduction 136

Controlling input and output; The role of BIOS; Processing commands; Multitasking; Multithreading; Multiuser; Multiprocessor support; Miscellaneous tasks

### 6.5 Operating Systems: Types 138

Tasks and operating systems; Operating system characteristics; Desktop operating systems; Server operating systems; Mainframe operating systems; Handheld operating systems; Embedded operating systems

### 6.6 Operating Systems: File Management 140

Filenames; Folders; Drives; Trees; Paths; File managers

### 6.7 Operating Systems: Utilities 142

Formatting; Fragmenting; Disk scanning; File deletion and recycle bins

### 6.8 Document-Centric Computing 144

Object linking and embedding (OLE); Embedding data; Linking data

### 6.9 Major Software Issues 146

Installing and uninstalling programs; Drivers; Program updates; Program distribution; Technical support; Bugs; Disclaimers

### 6.10 Picture Essay: Network Computing 148

The computer; The software; Component software

### 6.11 Enhancing and Testing Your Understanding 150

Summary; Review Questions



## **7 Word Processing & Desktop Publishing 152**

### **7.1 Entering and Editing Documents 152**

Word wrap; Editing; Spelling checkers; Grammar checkers; Thesaurus; Reference sources

### **7.2 Other Word Processing Features 156**

Find and replace; Outlines; Revision marks and document compare; Merge-printing; Footnotes and endnotes

### **7.3 Formatting Documents 158**

Basic formatting; Tables; Styles; Templates; Wizards and helpers

### **7.4 Desktop Publishing for Print 160**

Page layout; Graphic images; Special characters; Tables of contents and indexes; Columns; Desktop publishing versus word processing

### **7.5 Desktop Publishing for the Screen 162**

Hypertext Markup Language; Hypertext Links; Internet enabled applications; Internet page layout programs; Document conversions; Portable document formats

### **7.6 Enhancing and Testing Your Understanding 164**

Summary; Review Questions

## **8 Spreadsheet & Database Applications 166**

### **8.1 Spreadsheet Applications: Introduction 168**

The spreadsheet screen display; The spreadsheet window; Spreadsheet models

### **8.2 Spreadsheet Applications: Entering Data 170**

Entering data; Formulas, cell references, and what-ifs; Formats; Functions; Templates

### **8.3 Spreadsheet Applications: Charts and Graphs 172**

Charts as analysis tools; Chart types; Maps

### **8.4 Database Applications: Introduction 174**

What are databases?; Databases versus spreadsheets;

### **8.5 Database Applications: Principles of Data Storage 175**

Database organization; Creating databases; Relational databases

### **8.6 Database Applications: Working with a Database 176**

Forms; Entering data-validity checks; Printing reports; Exporting to a spreadsheet; Exporting to a word processor; Media databases

### **8.7 Queries—The Essence of Computing 180**

What are queries?; Creating queries; Using relational operators; Using logical operators

### **8.8 Internet Connectivity 182**

Dynamically updated on-line databases; Querying on-line databases; Entering data into on-line databases; Web page development tools

### **8.9 Enhancing and Testing Your Understanding 184**

Summary; Review Questions

## **9 COMMUNICATIONS-The Electronic Web 186**

### **9.1 Network Applications: Fax, Voice, and Information Services 188**

Fax; Fax back services; Voice mail; On-line services

### **9.2 Network Applications: Person to Person Communications 190**

Electronic mail; Store and forward; E-mail software; Stop and think

### **9.3 Network Applications: Group Communication 192**

News groups; Mailing lists; Internet relay chat; Network games; Video conferencing

### **9.4 Network Applications: Exchanging Files 194**

Uploading and downloading; ASCII and binary files; Shared disks; FTP on the Internet; Binary files as e-mail attachments

### **9.5 The Foundations of Modern Networks: Understanding Bandwidth 196**

How big is your pipe?; Bandwidth and frequency; Bandwidth and data; Influences on bandwidth

### **9.6 Local Area Networks: Introduction 198**

Network resources; Network users; Network administrators