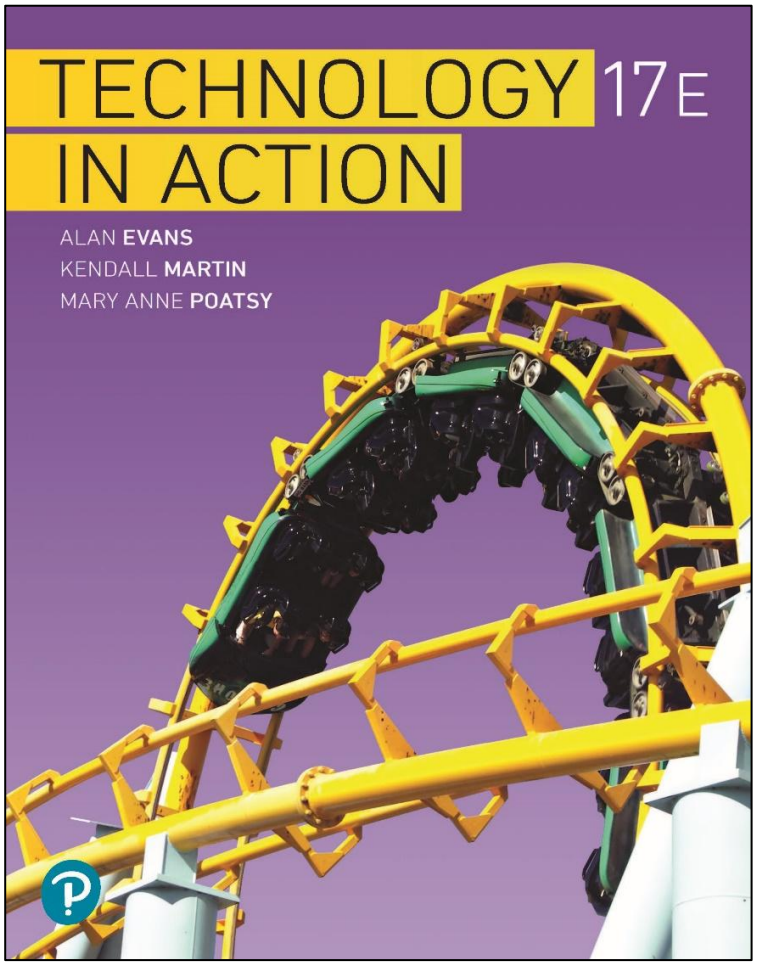
Technology in Action

Seventeenth Edition



Appendix A

The History of the Personal Computer

Learning Objectives (1 of 3)

A.1 Describe the earliest personal computer ever designed.

A.2 Describe the distinguishing features of the Apple I and Apple II.

A.3 Describe the first portable computer.

A.4 Describe the development of the IBMPC.

A.5 Explain why BASIC was an important step in revolutionizing the software industry.

A.6 Explain why the development of the operating system was an important step in PC development.

Learning Objectives (2 of 3)

A.7 List early application software that was developed for the PC.

A.8 Describe the features of the Lisa and Macintosh computers and their predecessor, the Xerox Alto.

A.9 List the first successful web browsers.

A.10 Discuss the features of the Pascalene calculator and the Jacquard loom that inspired modern computer elements.

Learning Objectives (3 of 3)

A.11 Discuss the contributions of Babbage's engines and the Hollerith Tabulating Machine to modern computing.

A.12 Discuss the features of the Z1, the Atanasoff–Berry Computer, and the Mark I.

A.13 Discuss the major features of the Turing Machine, the ENIAC, and the UNIVAC.

A.14 Describe the milestones that led to each "generation" of computers.

Early Personal Computers

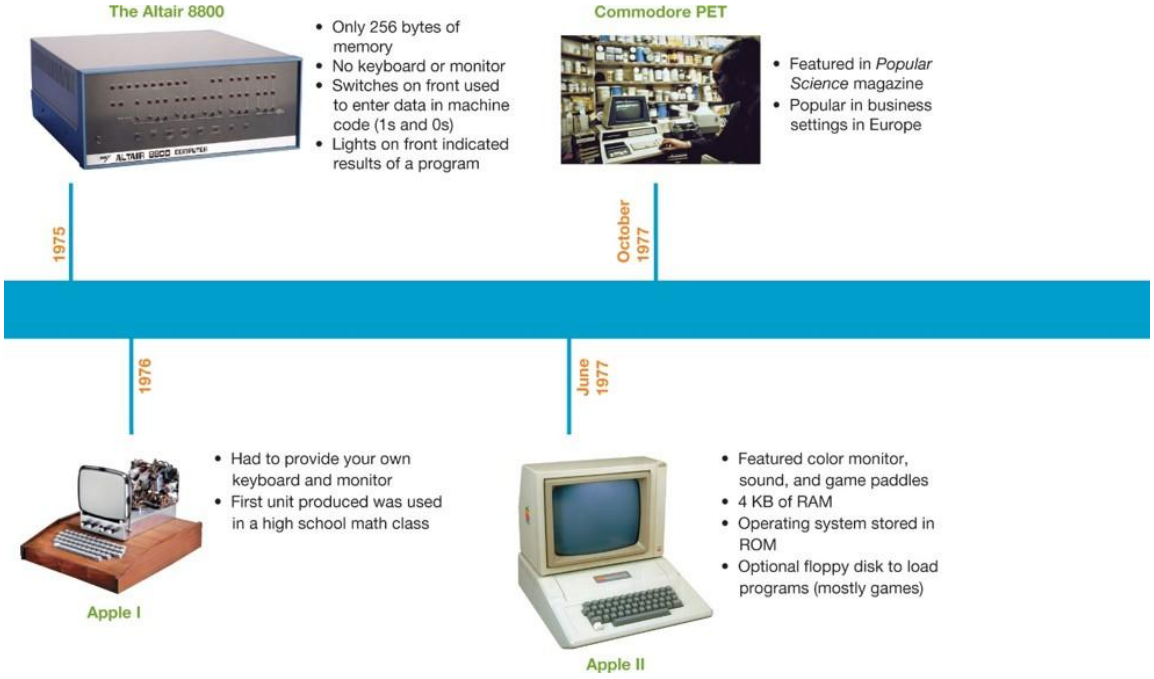
The First Personal Computer: The Altair (Objective A.1)

- 1975
  - Sold as a kit
  - No keyboard—used switches for input
  - No monitor—used lights for output
- Bill Gates and Paul Allen among first owners
  - Wrote compiling program

Early Personal Computers

The Apple I and II (Objective A.2)

- Built by Steve Jobs and Steve Wozniak
- Operating system stored in ROM3



Enter the Competition

The Osborne: The Birth of Portable Computing (Objective A.3)

- Introduced in 1981
- Weighed 24.5 pounds
- 5-inch screen
- Cost $1,795
- Overnight success

Enter the Competition

IBMPCs (Objective A.4)

- Prior to 1980—IBM known for mainframes
- 1981—entered small-computer market with IBM PC
  - Started at $1,565
  - Sold at retail outlets
  - Named “1982 Machine of the Year”

Other Important Advancements (1 of 2)

The Importance of BASIC (Objective A.5)

- Programming languages in the 1950s
  - FORTRAN, ALGOL, and COBOL
  - Used mainly by businesses
  - Used to create financial, statistical, and engineering programs

Other Important Advancements (2 of 2)

The Importance of BASIC (Objective A.5)

- Beginners All-Purpose Symbolic Instruction Code (BASIC)
  - Introduced in 1964
  - Revolutionized software industry
  - Easily learned by beginning programmers
  - Became key language for PC
  - Led to creation of Microsoft

Other Important Advancements (1 of 2)

The Advent of Operating Systems (Objective A.6)

- Early programs and data saved on audiocassettes
- Programs needed to be rewritten each time
- Floppy disk drive was introduced in 1978
- Programs could be saved so operating systems were developed

Other Important Advancements (2 of 2)

The Advent of Operating Systems (Objective A.6)

- Operating systems coordinate with specific processor chip
  - Apple computers—Motorola chips: Disk Operating System (DOS)
  - PCs—Intel 8080 chips: Control Program for Microcomputers (CP/M)
  - Microsoft—Intel chips: MS-DOS
    - Operating system for IBM PCs
    - Created by Bill Gates

Other Important Advancements

Software Application Explosion: VisiCalc and Beyond (Objective A.7)

- Spreadsheets
  - VisiCalc
  - Lotus 1-2-3
  - Microsoft Excel
- Word processing
  - WordStar
  - Word for MS-DOS
  - WordPerfect

The Graphical User Interface and the Internet Boom (1 of 3)

Xerox and Apple's Lisa and Macintosh (Objective A.8)

- Graphical user interface (GUI) allowed users to interact with computer more easily
- Previously used command- or menu-driven interfaces
- Apple the first company to use the GUI

The Graphical User Interface and the Internet Boom (2 of 3)

Xerox and Apple's Lisa and Macintosh (Objective A.8)

- Xerox Alto (1972)
  - Introduced What You See Is What You Get (WYSIWYG)
  - File management system with directories and folders
  - Mouse and network connectivity
  - Never sold commercially

The Graphical User Interface and the Internet Boom (3 of 3)

Xerox and Apple's Lisa and Macintosh (Objective A.8)

- Apple Lisa (1983)
  - First successful PC using GUI
  - Windows, drop-down menus, icons, a file system with folders and files
  - Very expensive
- Apple Macintosh (1984)
  - 1/3 cost of Lisa
  - Introduced 3.5-inch floppy disk

The Graphical User Interface and the Internet Boom

The Internet Boom (Objective A.9)

- 1993—Mosaic browser introduced
- 1994—Netscape launched
- 1995—Internet Explorer introduced by Microsoft
- 1998—Netscape became open source

Making the Personal Computer Possible: Early Computers (1 of 2)

The Pascalene Calculator and the Jacquard Loom (Objective A.10)

- Pascalene
  - First accurate mechanical calculator
  - Created by Blaise Pascal in 1642
  - Used revolutions of gears to count by tens
  - Could be used to add, subtract, multiply, and divide
  - Basic design used in mechanical calculators for 300 years

Making the Personal Computer Possible: Early Computers (2 of 2)

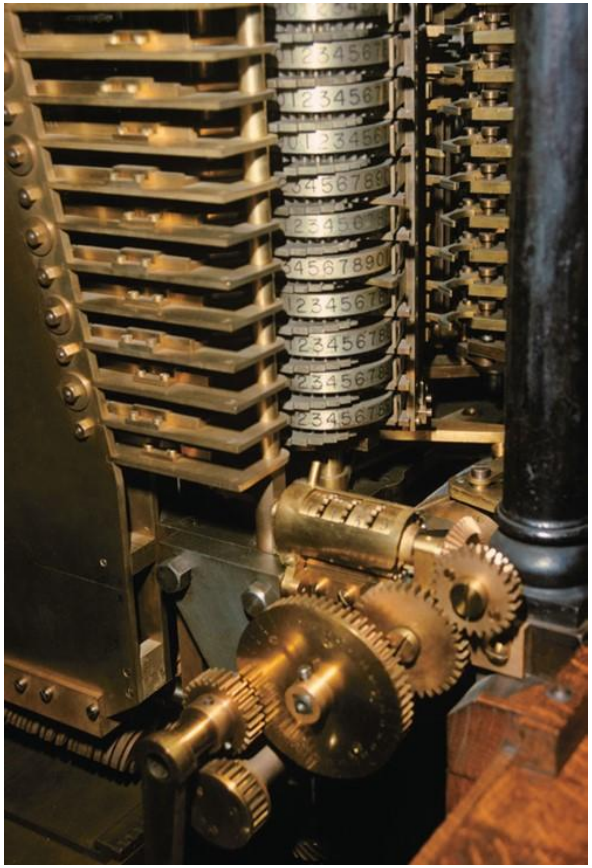
The Pascalene Calculator and the Jacquard Loom (Objective A.10)

- Jacquard loom
  - Created by Joseph Jacquard
  - Revolutionized fabric industry
  - Cards had punched holes, automated weaving complex patterns
  - Process adopted later to record and read data in computers using punch cards

Making the Personal Computer Possible: Early Computers (1 of 2)

Babbage's Engines and the Hollerith Tabulating Machine (Objective A.11)

- 1834: Analytical Engine
  - Designed by Charles Babbage
  - First automatic calculator
  - Never developed
  - Drawings and descriptions similar to today's computers



Making the Personal Computer Possible: Early Computers (2 of 2)

Babbage's Engines and the Hollerith Tabulating Machine (Objective A.11)

- 1890: Hollerith Tabulating Machine
  - Created by Herman Hollerith
  - U.S. Census Bureau tabulated census data
  - Automatically reads data from punch cards
- 1896: Hollerith started Tabulating Machine Company
  - Later became International Business Machines (IBM)

Making the Personal Computer Possible: Early Computers (1 of 3)

The Z1, the Atanasoff–Berry Computer, and the Harvard Mark I (Objective A.12)

- 1936: Z1
  - Created by Konrad Zuse
  - Mechanical calculator
  - Included control unit and separate memory functions
  - Important breakthrough for future computer design

Making the Personal Computer Possible: Early Computers (2 of 3)

The Z1, the Atanasoff–Berry Computer, and the Harvard Mark I (Objective A.12)

- 1939: Atanasoff–Berry Computer (ABC)
  - Created by John Atanasoff and Clifford Berry
  - First electrically powered digital computer
  - Used vacuum tubes to store data
  - First computer to use the binary system

Making the Personal Computer Possible: Early Computers (3 of 3)

The Z1, the Atanasoff–Berry Computer, and the Harvard Mark I (Objective A.12)

- 1930s–1950s: Mark series of computers
  - Created by Howard Aiken and Grace Hopper
  - Used by U.S. Navy for ballistic and gunnery calculations
  - Aiken designed the computer
  - Hopper did the programming

Making the Personal Computer Possible: Early Computers (1 of 3)

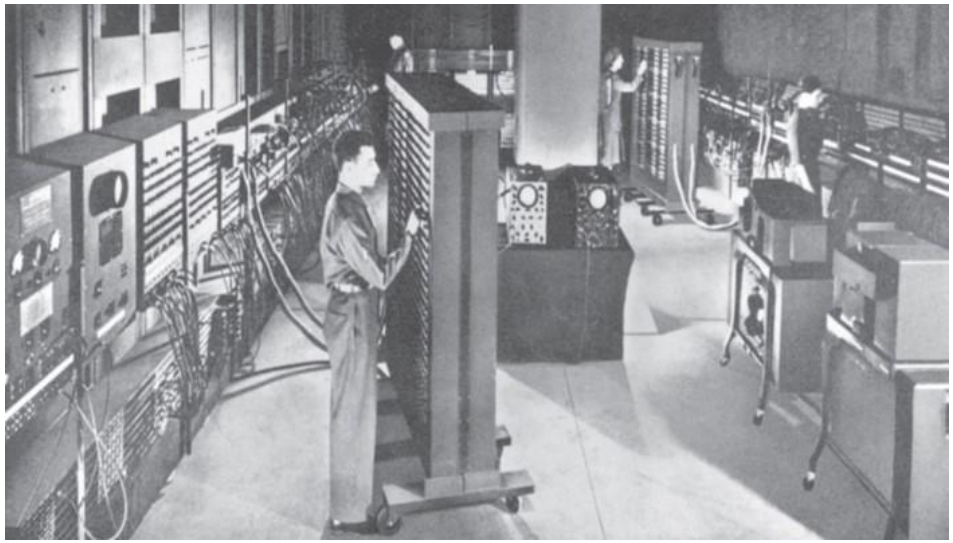
The Turing Machine, the ENIAC, and the UNIVAC (Objective A.13)

- 1936: Turing Machine
  - Abstract computer model—could perform logical operations
  - Hypothetical model—mathematically defined a mechanical procedure
  - Infinite tape that could be read, written to, and erased—precursor to today's RAM

Making the Personal Computer Possible: Early Computers (2 of 3)

The Turing Machine, the ENIAC, and the UNIVAC (Objective A.13)

- 1944: Electronic Numerical Integrator and Computer (ENIAC)
  - First successful high-speed electronic digital computer
  - Big and clumsy
  - Used 18,000 vacuum tubes
  - Filled 1,800 square feet



Making the Personal Computer Possible: Early Computers (3 of 3)

The Turing Machine, the ENIAC, and the UNIVAC (Objective A.13)

- 1951: Universal Automatic Computer (UNIVAC)
  - First commercially successful digital computer
  - Operated on magnetic tape, not punch cards
  - Considered first-generation computer
  - Last to use vacuum tubes to store data

Making the Personal Computer Possible: Early Computers (1 of 4)

Transistors and Beyond (Objective A.14)

- 1945: Transistors
  - Invented at Bell Laboratories
  - Replaced vacuum tubes
  - Considered second generation computers

Making the Personal Computer Possible: Early Computers (2 of 4)

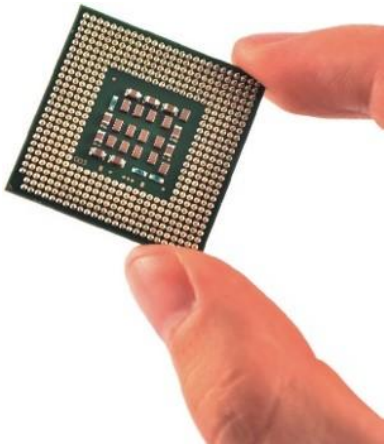
Transistors and Beyond (Objective A.14)

- 1958: Integrated circuits
  - Invented by Jack Kilby of Texas Instruments
  - Small chip containing thousands of transistors
  - Enabled computers to become smaller and lighter
  - Considered third-generation computers

Making the Personal Computer Possible: Early Computers (3 of 4)

Transistors and Beyond (Objective A.14)

- 1971: Microprocessor
  - Introduced by Intel Corporation
  - Small chip containing millions of transistors
  - Functions as the central processing unit (CPU)
  - Considered fourth-generation computers



Making the Personal Computer Possible: Early Computers (4 of 4)

Transistors and Beyond (Objective A.14)

- First-generation (1944)
  - Used vacuum tubes to store data
- Second-generation (1945)
  - Used transistors to store data
- Third-generation (1958)
  - Used integrated circuits
- Fourth-generation (1971–today)
  - Uses microprocessor chip

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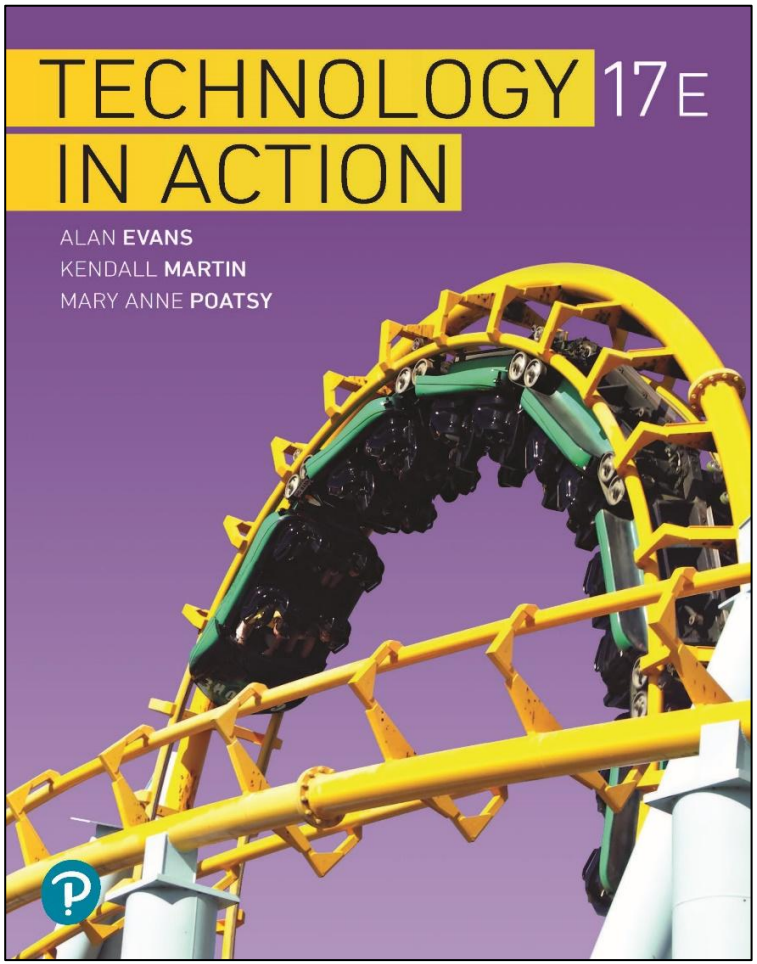


Appendix B

Careers in IT

Learning Objectives

B.1 List the reasons why IT fields are attractive to students pursuing bachelor's degrees.

B.2 Explain the various challenges of IT careers.

B.3 List and describe the various IT careers for which you can train.

B.4 Explain the various ways you can prepare for a career in IT.

B.5 Explain the various ways you can find a career in IT.

Rewards of Working in Information Technology (1 of 2)
(Objective B.1)

- IT Workers Are in Demand
- IT Jobs Pay Well
- IT Jobs Are Not Going "Offshore"
  - Outsourcing
  - Offshoring
- Women Are in High Demand in IT Departments

Rewards of Working in Information Technology (2 of 2)
(Objective B.1)

- You Have a Choice of Working Location
- You Constantly Meet New Challenges
- You Work in Teams
- You Don’t Need to Be a Mathematical Genius
- IT Skills Are Transferable

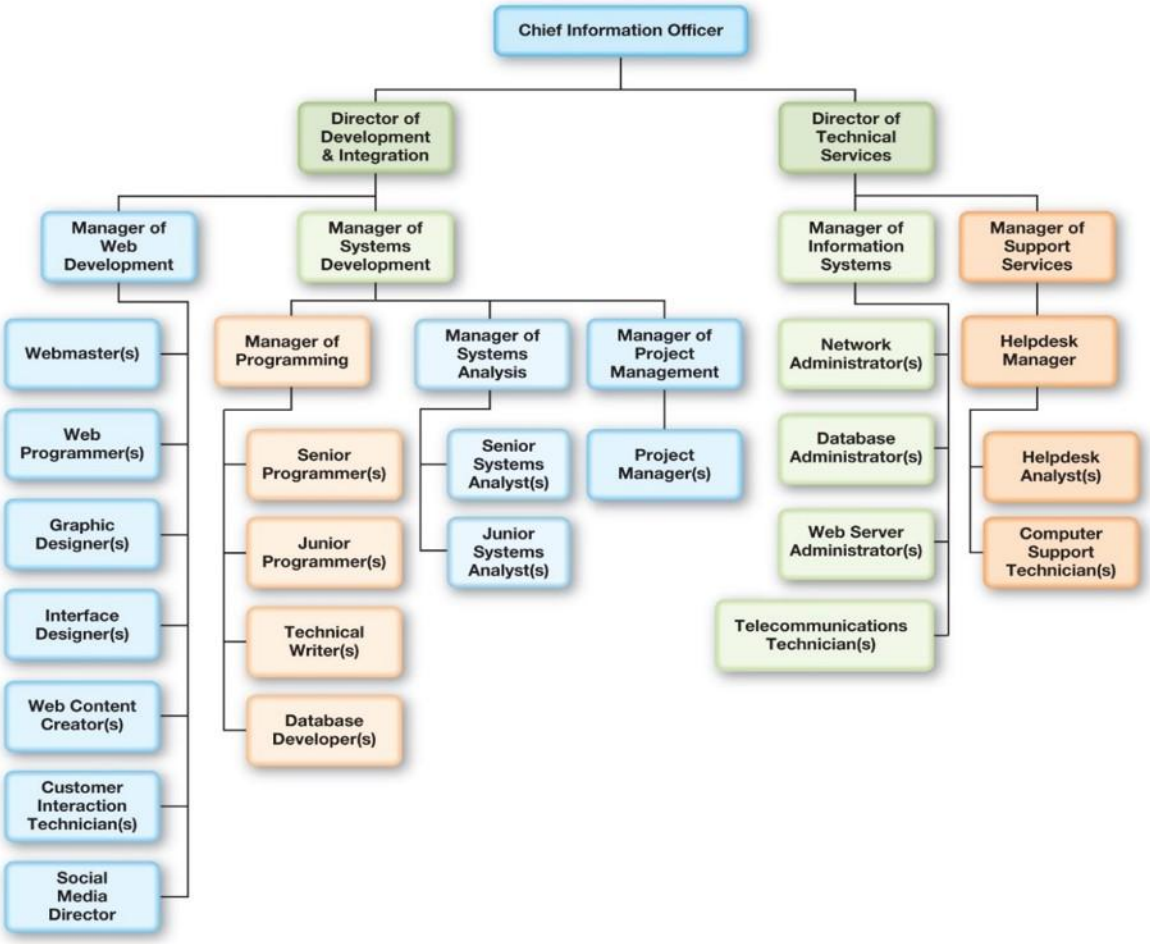
Challenges of IT Careers

(Objective B.2)

- Stress
- Women Are in the Minority
- Lifelong Learning Is Required

Choosing Your Realm of IT (1 of 4)

(Objective B.3)



Choosing Your Realm of IT (2 of 4)
(Objective B.3)

Web development

- Web content creators
- Interface designers
- Web programmers
- Customer interaction technicians
- Social media directors

Choosing Your Realm of IT (3 of 4)
(Objective B.3)

Systems development

- Systems analysts
- Programmers
- Project managers
- Technical writers
- Network administrators
- Database developers

Choosing Your Realm of IT (4 of 4)
(Objective B.3)

- Information systems
  - Network administrators
  - Database administrators (DBAs)
  - Web server administrators
  - Telecommunications technicians
- Support services
  - Helpdesk analysts
  - Computer support technicians

Preparing for a Job in IT
(Objective B.4)

- Get educated
  - Best to attend a degree-granting college or university
- Investigate professional certifications
- Get experience
- Do research

Getting Started in an IT Career
(Objective B.5)

- Use career resources at your school
- Develop relationships with your instructors
- Start networking
- Use online career tools
- Check corporate websites for jobs
- Visit online employment sites