# Chapter 1: Terminology and Basic Concepts of Information Processing

## Overview

This chapter introduces students to basic concepts related to information processing, including terminology used in the field. Students will learn about the relationship between the information processing technology infrastructure and the information architecture of the organization. Be sure students understand the terminology used in the chapter; it is key to understanding the concepts. The information that students gain in this chapter is used throughout the unit.

## Lecture Notes

### A. The Information Processing Cycle

*Review the major function of processing: producing meaningful information from unorganized data.* The cycle has six steps, which are outlined and described in figure 1-1.

1. **Data Origination** organizes data for processing online, in batches (groups) or with a required source document.
2. **Data Input** can be entered in a batch or online.
3. **Processing** includes classifying, sorting, calculating, recording, and summarizing data to produce information (data that has been processed into a usable format) using the CPU. Turnaround time is an important consideration.
4. **Storage** is where data is stored electronically for future use using a secondary device. Capacity is measured in bytes.

| | |
|---|---|
| Kilobytes (KB) | About 1,000 bytes |
| Megabytes (MB) | About 1 million bytes |
| Gigabytes (GB) | About 1 billion bytes |
| Terabytes (TB) | About 1 trillion bytes |
| Petabytes (PB) | About 1 quadrillion bytes |

5. **Data Output** communicates the processed information to others in hard copy or soft copy formats.
6. **Distribution** of the information is done using reports in electronic or printed form.

### B. Information Processing Operations, Modes, and Concepts

1. **Basic Operations** are necessary in order for data to be processed. Review the operations: recording, duplicating, verifying, classifying, sorting, merging, calculating, storing and retrieving, summarizing, and report writing.
2. **Advantages of Using a Computer** relate to speed, accuracy, consistency, and reliability. Review these advantages while pointing out that downtime should be kept to a minimum.

3. **Operation Modes** are designed to facilitate specific business needs. Some of the modes discussed in the text include input and output operations (batch and online input), remote access (telecommuters), multiprocessing (requires two or more CPUs), multiprogramming to reduce the amount of idle computer time, multitasking, online operations, interactive operations (interchange between processor and user), time-sharing to allow a fixed amount of time to a user for processing, and networking to link computers together.

## C. Information System Types, Architecture, and Technology Infrastructure

1. **Information System Types –** *Discuss the six types of systems that serve the five organizational levels. Remind students to review the examples in their text (pp. 10–12)*.
   a. Transaction processing systems – basic-to-business operations, used to capture records of daily transactions; used by supervisors and operations personnel.
   b. Knowledge work systems – create new information and knowledge; used by professionals with advanced degrees.
   c. Office systems – manipulate and disseminate information using electronic office systems; applications designed to increase productivity by supporting the coordination and communication activities in the office.
   d. Management information systems – use internal data to create reports for management.
   e. Decision support systems – use sophisticated analytical models; use TPS and MIS data and external sources for what if analysis and decision making.
   f. Executive support systems – for senior management; use internal and external data to make future projections.

2. **Information Architecture** should include all functional areas and business processes (internally and externally).
   - Clarify the needs of the user for the information system analyst to make business processes more efficient and effective.
   - Be sure computer-based information system is integrated within the organization.

3. **Information Technology Infrastructure** includes all of the technical resources shared within the organization; it is used to support the architecture.
   a. Computer hardware
   b. Software
   c. Storage
   d. Data management
   e. Networks

## D. History of Computing

1. Charles Babbage, "**Father of Computers**" (1833). He designed the analytical engine; his son constructed one after his father's death (1871).

2. **Early Computers** included four major developments in the 1940s:
   a. Mark I was produced by Harvard University, IBM, and U.S. Department of War; based on Charles Babbage's analytical engine (1944).
   b. Antanasoff-Berry Computer (ABC) was an electronic device produced by John Antanasoff and Clifford Berry (1942). A Federal court named Antanasoff as the inventor of the first electronic computer in 1974.
   c. ENIAC stands for Electronic Numerical Integrator and Calculator; it is considered the first large-scale electronic digital computer. It had been considered the first electronic computer until the court decision.
   d. EDVAC was a stored program computer developed by Jon Von Neumann in the late 1940s. The EDSAC was the first computer of this type; it was completed several months earlier at Cambridge University in England.

3. A UNIVAC 1 was purchased for data processing in 1951 by the U.S. Census Bureau; General Electric Company was the first private firm to use the UNIVAC. The first **Business Computers** (1951–1958) included:
   a. Vacuum tubes made up the main logic element; they were large and generated a lot of heat.
   b. Internal storage consisted of a magnetic drum.
   c. Input utilized punch cards.
   d. Application programs were loaded and monitored by operators; there was little system software available. Applications utilized batch processing for payroll, billing, and accounting.

4. **A New Generation of Computers**

There were many changes since there were now business and scientific uses for the computer. Changes from 1959–1964 include:
   a. Logic element used transistors.
   b. Transistors caused computers to become faster, smaller, more reliable, and increased internal storage capacity.
   c. Internal storage had a magnetic core allowing for faster access; supplemented with secondary storage (magnetic tape and disks).
   d. Operating system and high-level languages were used.

5. **First Integrated Circuit** (1958).

6. **First Minicomputer** (1965)..

7. **Another Computing Era**

Computers become more affordable for smaller organizations (1965–1970). Characteristics of these computers include:

a. Integrated circuit (chip) allowed primary memory to store more information.

b. Internal storage moved toward metal-oxide semiconductor memory

c. Secondary storage moves toward magnetic disks, flexible

d. Advancements in operating systems increased abilities for business applications

e. High-level languages were standardized for easier programming

8. Ted Hoff of Intel Corp. introduced the **Microprocessor** (1971). Included the control unit and arithmetic/logic unit on a single chip.

9. **Microcomputer Evolution** began in the mid 1970s; three major advancements:
   a. MITS Altair, the first microcomputer (1975).
      - Intel 8080 with 256 bytes of RAM.
      - Kit available for $500 or assembled for $2500 (did not include keyboard or monitor).
   b. Apple computers are introduced (1976).
      - Apple I was a flop.
      - Apple II (MOS 6502 microprocessor, 16K RAM, 16K ROM, monitor and keyboard) became popular, followed by the Apple Macintosh.
   c. IBM PC, clones, and MS-DOS are introduced (1981) by Bill Gates.
      - More than 830,000 machines sold in one year.
      - Today it is a powerful standard for the microcomputer industry.

10. **ARPANET to WWW**
    a. ARPANET began as a government project in 1969 U.S. Department of Defense sponsored a project to connect a scientist at UCLA with one at Stanford University.
       - 20 sites in 1971; 200 sites in 1981; evolved into the Internet in 1990.
    b. Internet language (hypertext markup language – html) and Internet addresses (universal resource locator – URL) created by a team lead by Tim Berners-Lee in 1989.
       - By 1993, the Internet grew over 350,000 percent.

11. **Computing in the 21st Century**
    a. Very large-scale integrated circuits (VLSICs) allow computers to be smaller, faster, more reliable, and less expensive.
    b. Internal storage is mainly semiconductor.
    c. Secondary storage utilizes magnetic disks, optical discs, and portable USB flash drives to store data in a small physical space.
    d. Systems software is expanded to include database management, network management, and sophisticated security monitors to manage communications.

e. The Internet and World Wide Web have moved business and society into a cyber e-world.

## Additional Resources for Students

Recommended readings (no texts should be more than two years old):

- Fuller, Floyd and William Manning. *Computers and Information Processing*.
- Groneman, N. and J. Meroney. *Information Systems Applications, Evaluation, and Selection*. South-Western Publishing Co.
- Long, Larry and Nancy Long. *Introduction to Computers and Information Systems*. Prentice-Hall, Inc.
- Meyer, Marilyn and Roberta Baber. *Computers in Your Future*.
- Norton, Peter. *Introduction to Computers*.
- O'Leary, Timothy J. and Linda L. O'Leary. *Computing Essentials*. McGraw-Hill.
- Regan, Elizabeth A. and Bridget N. O'Connor. *Automating the Office – Office Systems and End-User Computing*. Macmillan City.
- Ricks, B., A. Swafford, and K. Gow. *Information and Image Management*. South-Western Publishing Co.
- Robek, Brown, and Stephens. *Information and Records Management*.
- Shelly, Gary and Thomas Cashman. *Learning to Use: Microcomputer Applications*. Boyd and Fraser Publishing Co.
- Silver, G. A. and M. L. Silver. *Data Communications for Business*.
- Tilton, R., J. Jackson, and S. Rigby. *The Electronic Office: Procedures and Administration*. South-Western Publishing Co.

Current issues of periodicals or business publications are also an excellent resource. Some of the following periodicals have an accompanying Web site.

| ***Current Periodical*** | ***Web Address*** |
|---|---|
| *Gregg Reference Manual* | |
| *IAAP Complete Office Handbook* | http://www.iaap-hq.org/products/handbook.htm |
| *Modern Office Technology* | |
| *Network Computing* | http://www.networkcomputing.com/ |
| *Networking Management* | |
| *OfficePro* | http://www.iaap-hq.org/officepro/toc.htm |

*PC Computing*

*PC Magazine* http://www.pcmag.com

*The Office*

*Windows Magazine* http://www.winmag.com

Additionally, the following Web sites may provide up-to-date information:

*Computer World* http://www.computerworld.com

*C-Net* http://news.com.com/

*Intranet Journal* http://news.com.com/

*Wired* http://www.wired.com/

*ZDNet* http://www.zdnet.com/zdnn/