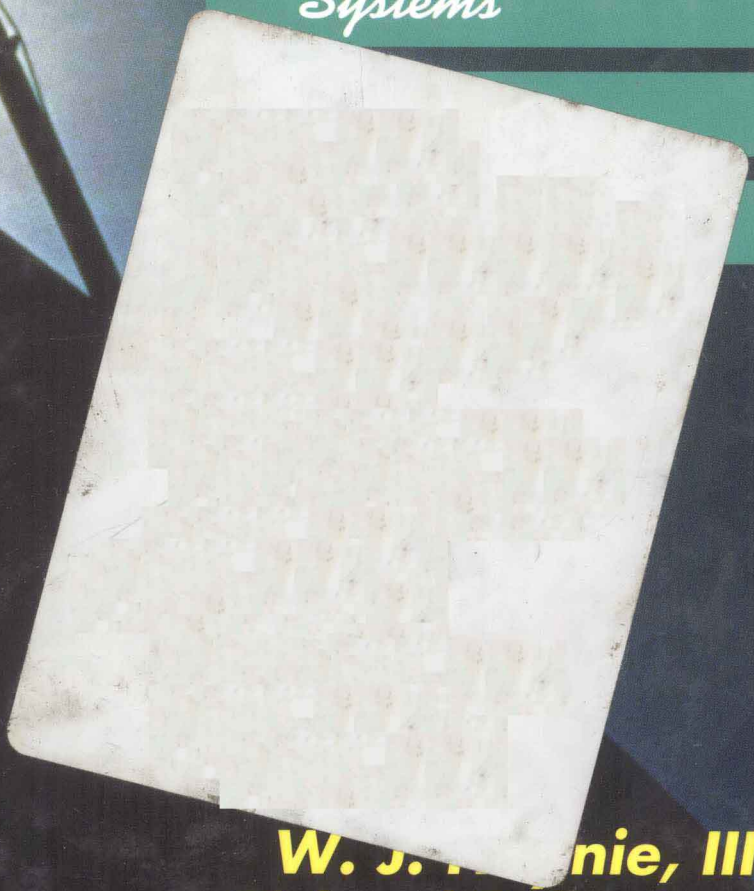
The Technology of COMMUNICATION

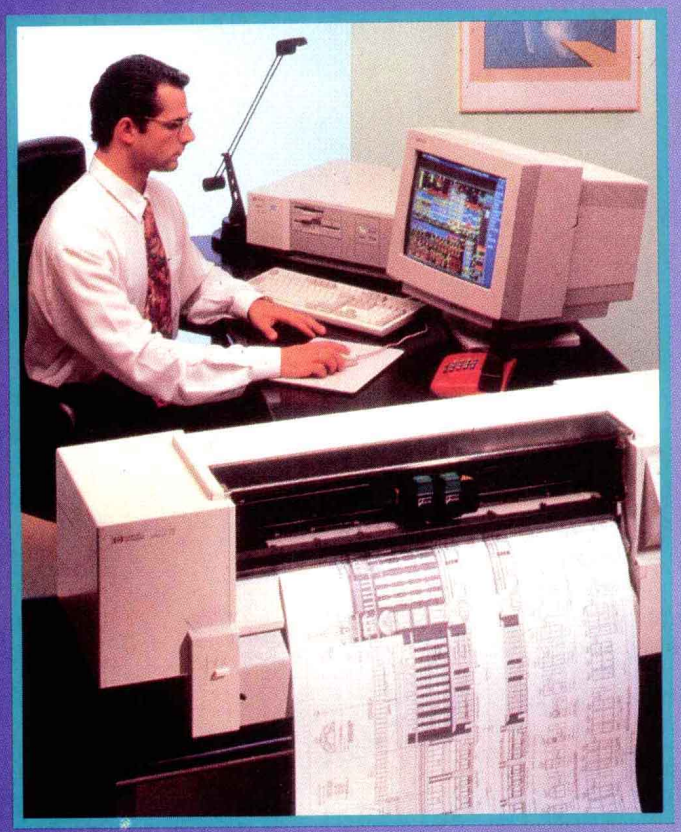
- ✔ Drawing
- ✔ Photographic and Optical Systems



W. J. [illegible]nie, III
Richard E. Peterson

The Technology of Communication

Drawing, Photographic and Optical Systems, Print, and Electronic Media



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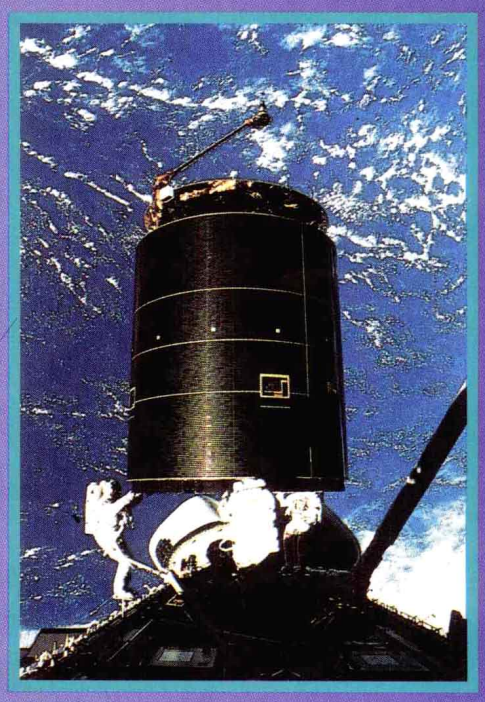

Preface

Welcome to the study of communication technology. There are four broad areas of technology that are generally taught in American schools today: manufacturing technology, which is about mass production of durable goods; construction technology, which considers the building of structures such as homes, bridges, shopping malls, and others; transportation technology, including energy and power as well as the study of vehicles and methods of moving people and materials; and communication technology, the topic of this course. You may have some existing concept of what communication technology is. Perhaps a friend has told you it is about printing. Or maybe when you hear communication technology the first thing that comes to mind is television or computers. Perhaps you think of drafting. Telephones certainly seem to fit as part of communication technology. The truth is, communication technology is all of these and much more. There are thousands of occupations that involve communication technology. There are interesting hobbies such as photography, calligraphy, screen printing, electronics, and many others you might discover as a result of studying a course in communication technology. This course should help you become more technologically literate. It is hoped that you will learn how to cooperate in a group more effectively to reach a common goal. You should leave this course as a more well-informed consumer of technology and its products. In short, this study of communication technology should help you understand technology, how it developed, what it has to do with communication, how to use it, how people organize to use or develop technology, the impacts of technology, and how to prepare for careers in technology. It should make you aware of technological developments that will affect the future. Join us now for a closer look at the many different aspects of communication technology. ■

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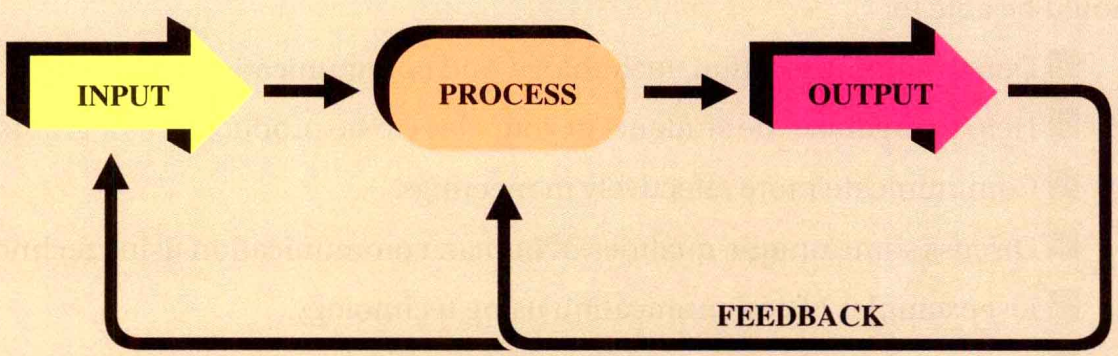
Contents

The Technology of Communication: Drawing, Photographic and Optical Systems, Print, and Electronic Media

UNIT 1

Getting Started in Communication Technology

We're doing it now! What is it? How are we doing it if you don't even know it's being done? We're communicating, of course, and we're doing it with technology. We are using a system of communication technology which has the printed word (this book) as its ***process***. The ***input*** to this system was developed by the authors of the book and you are receiving the ***output***. In this particular system, the ***feedback*** will occur when you take tests and do laboratory work in your class — then your teacher will be able to tell how effective our communication system has been. Maybe this is all a bit confusing just now, but keep communicating with us by reading on and you will soon see how we customize this ***universal systems model*** to better fit complex communication technology systems.



A Universal Systems Model

CHAPTER 1

Communication Technology Today

KEY TERMS

amendment
ASCII
bulletin board
CD-ROM
central processing unit
channel
CIM
communication
communication techology
computer
effective
efficient
e-mail
feedback
floppy disk
hard disk
hardware
icons
interference
keyboard
LAN

OBJECTIVES

After studying this chapter and completing the activities selected by your teacher, you should be able to:

- Define communication, technology, and communication technology.
- Help to organize the students in your class to be productive as a group,
- Communicate more effectively in meetings.
- Discuss some unique qualities of human communication using technology.
- List examples of communication using technology.
- Explain why it is important to learn about communication technology.

message
motion
mouse
networks
on-line database
plotter
programmed
Random Access Memory
Read Only Memory
Robert's Rules of Order
second
software
storage
systems model
technology
text scanner
touch screen
transmit
understanding
universal systems model
virus
WAN

FIGURE 1-1 Do you understand what the dog on the left is communicating? (Courtesy Wendt World Wide.)

What Is Communication?

What is ***communication***? Several elements must be present for communication to happen. Communication begins when one person, animal, or machine ***transmits*** or sends a ***message*** to another person, animal, or machine. The sending of messages alone, however, is not communication. Communication also requires ***understanding***. The message must be received and understood for communication to occur. ***Interference*** is present in all systems. Interference makes communication difficult. There are many types of interference, one of which is noise. Other types of interference will be discussed in later chapters. ***Feedback*** is the last element in the process of communication. It is the observable behavior that demonstrates that understanding has occurred. When the process has been completed, then we have communicated. The complete process is known as communication.

The Process of Communication

A ***systems model*** shows how the parts of any system relate to each other. The systems model in figure 1-2 shows the relationship between the elements of the communication process. Notice how similar it is to the ***universal systems model***, which appears in the introduction to Unit I. This model may be expanded or have more details added to fit any individual communication system and various forms of it will be used to describe communication throughout this book.

Human Communication

People in early societies did not have the advantages of the communication technologies that we have today. They communicated information among themselves and received information

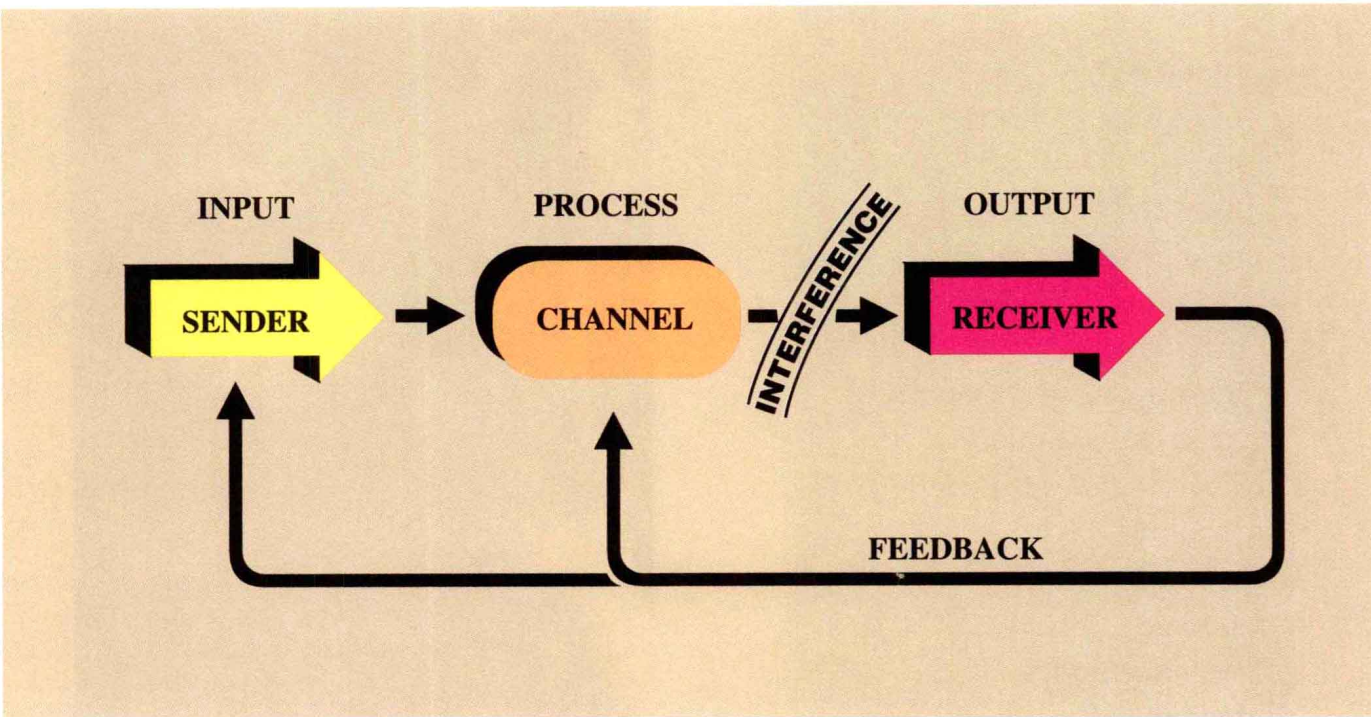


FIGURE 1-2 This diagram is a systems model for communication technology systems. Notice that feedback shows the effectiveness of the communication.

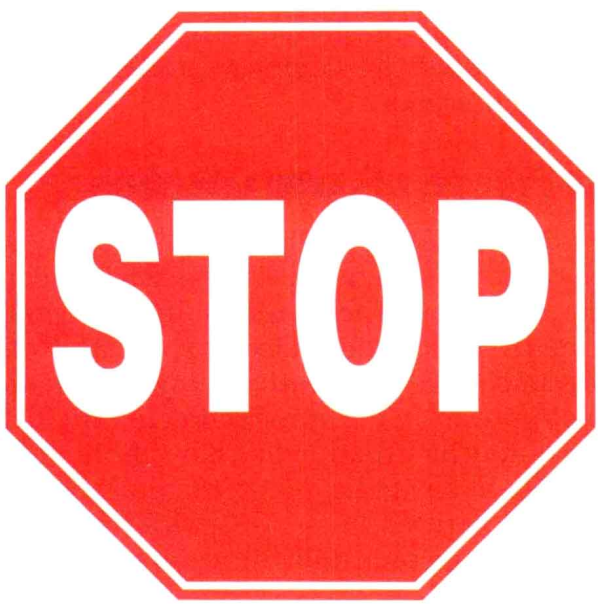


FIGURE 1-3 This is a good example of communication through the visual channel only. What would be the feedback in this system?

from the environment through their senses (sight, sound, smell, taste, and touch). Societies that depended upon hunting and gathering for food did have highly developed communication systems — they relied upon their natural senses for survival — but they did not have machines to help them communicate. Early societies depended upon voice, touch, facial and body expressions, and they understood the common meanings of different smells, sounds, and tastes. Human communication is possible through the use of each of these senses.

Each sense provides a ***channel*** through which communication can occur. We use some channels much more than the others. The primary channels we use today are visual (sight) and auditory (hearing). The largest portion of the information we communicate is transmitted through the visual channel and most of the rest is through the auditory channel. We still use all our senses for communication; however, it would be difficult to imagine our society today if communication were limited to only our human senses and abilities.

What Is Technology?

The key words in answering this question are "tools" and "processes." Humans create and use ***technology*** to satisfy their basic physical needs, their wants, and desires. Food, shelter, and clothing are often identified as the basic human needs, and each has a technology that was developed to help meet that need. The particular knowledge, ways of doing something (skills and processes), along with the tools and machines used to accomplish a particular task (meet a need or solve a problem) are known collectively as a technology. The tools alone do not make a technology, they must be understood and used properly. Technology is effectively using tools and processes. A technology (or field of technology) is created to accomplish a particular purpose and meet a need of society. Technology changes and evolves depending upon how well it satisfies the original purpose for which it was developed and as the needs of the society change.

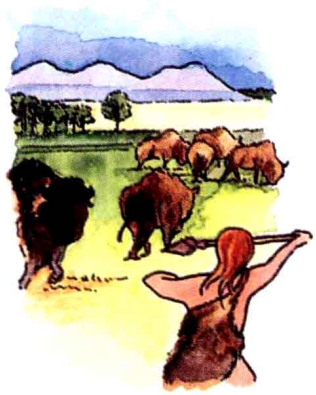


FIGURE 1-4 The spear this cave man used was an example of technology that was appropriate for his day. What would he have done with an electronic supermarket price scanner? (Courtesy Thode, *Technology*, copyright 1994 by Delmar Publishers Inc.)

What Is Communication Technology?

Communication has been identified as an essential need of all societies. Society could not exist without communication. ***Communication technology*** is the technology (the knowledge of tools, materials, methods, and processes) that makes it possible for people to communicate (transmit, receive, store, process, and understand information) more ***efficiently*** and more ***effectively***. The distinction between history and prehistory marks an important point in the development of communication technology. History includes all of the period of time during which society could record and store important information about the culture. What we know about the period called prehistory was not communicated to us directly by the people of the period, but much of history was.

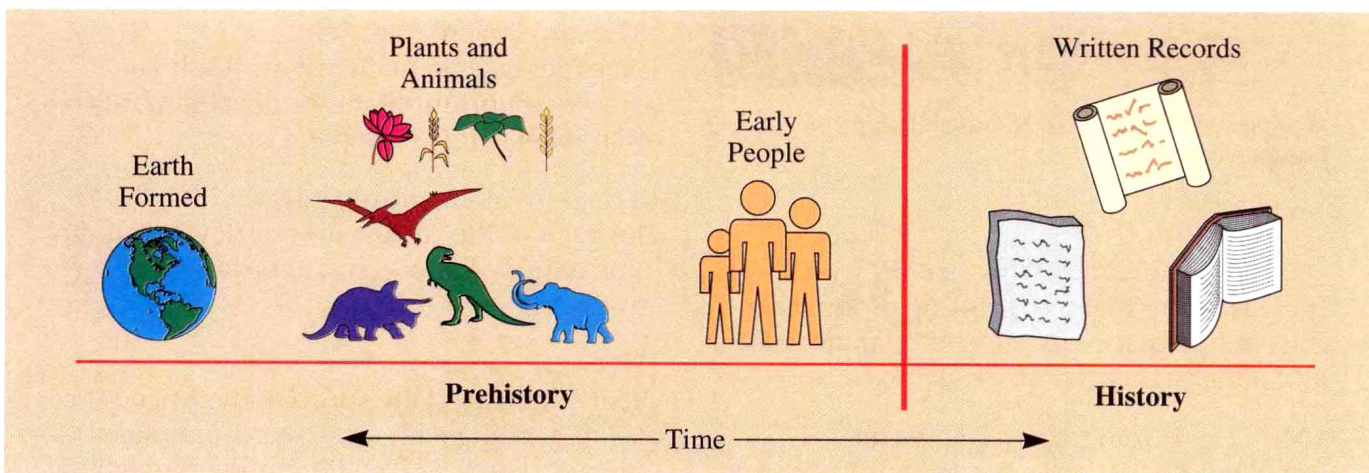
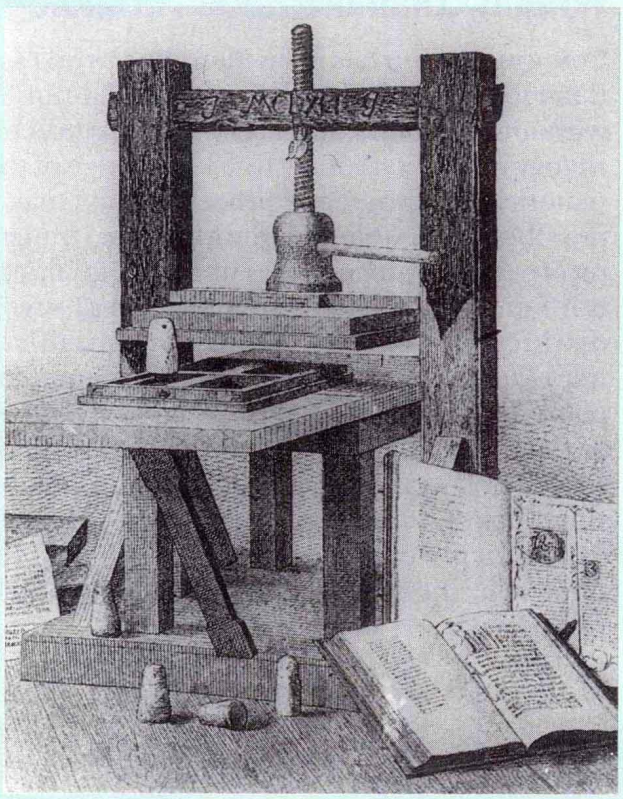


FIGURE 1-5 We have no documented history of what happened before people learned to use communication technologies (cave drawings, scrolls, books) to keep records of events.

KEY TECHNICAL DEVELOPMENTS

1200 BC Alphabet, Phoenician
Enabled people to store information and communicate with each other without having to be physically present.

1450 AD Movable Type, Guttenburg
Enabled the mass distribution of books and the sharing of knowledge.



Gutenberg printing press. (Courtesy Library of Congress.)

1650 Cylinder Press, Koenig
Increased the speed of printing production, thus reducing the cost of printed materials and making them more available.

1840 Photography, Daguerre
Provided the first commercially useful way to produce actual pictures (not drawings) of people, places, and events.

(Courtesy Delmar Publishers.)

1840 Telegraph, Morse
The basis for transmitting electronic signals over wire. Coded information could now be transmitted at the speed of light!

1875 Telephone, Bell
Voice messages sent electronically. It has been so important that new developments often incorporate or depend upon it.

1877 Phonograph, Edison
The basis of the storing and retrieval of audio information. A successful entertainment enterprise.

1880 Linotype, Mergenthaller
Greatly increased the speed and reduced the cost of printing with a keyboard-operated machine, which solved the problem of having to set characters of type one at a time by hand.

(Courtesy Meade, *Foundations of Electronics*, copyright 1994 by Delmar Publishers.)

1890 Census
Provided the need for a system to process the information created by the census. This technology was also used in later information processing technology.

1898 Magnetic Tape, Poulsen
The basis for an inexpensive system of storing and retrieving information (audio and video cassettes and floppy disks).

1910 Radio, Marconi
Eliminated the need for wires to communicate. Reduced the cost of communicating and created the possibility for broadcasting and communicating with anyone who had a radio receiver.

1940 Television, Farnsworth
Increased the impact of mass communication by providing picture and sound communication to everyone with a television receiver.

1945 Transistor
Enabled electronic devices to be reduced in size with increased reliability.

1958 Microchip
Enabled the computer and smart electronic systems to be developed.

1970 Satellite Communication
Instantaneous network of worldwide communications (cable TV and news events).

RECENT EVENTS

Laser Disc
Interactive retrieval of information.

Holography
Three-dimensional images (models, simulations, and prototypes).

Interactive Television
Access to personalized communication and information.

FUTURE

Further advances in artificial intelligence, ability to increase human abilities and decrease human limitations.

The reason for the development of these inventions began with a need or problem that existed in society.

It is important for society to be able to keep records and to establish a continuing record of knowledge. People must be able to retrieve the knowledge that is important in order to live successfully in their culture. Communication technology has evolved to meet the particular needs of society to share information and to develop a common understanding. Some of the basic communication problems of society that have led to the development and growth of communication technology are:

- How can messages be transmitted over distances to others?
- How can information be communicated clearly and organized most effectively to eliminate miscommunication and promote a common understanding?
- How can information be stored, analyzed, and retrieved for later use?
- How do the messages we receive persuade us and influence our behavior?
- How can abstract ideas, concepts, and feelings

be communicated to others?
- How can we communicate better, more efficiently, and more effectively?

The technology of communication has evolved greatly over time in response to the needs of society. Each new development has had a significant impact upon our lives.

Why Study Communication Technology?

This course is an overview of the communication technology that is used most often in society today. When you study communication technology, the concepts you learn can be applied now to develop your talents and help you become a more ***effective*** communicator. You may also discover individual interests, become more aware of the technology that is available, learn about potential career choices related to communication, and understand more about how communication technology works and its impact on society.

Introduction to Computers

Computers are both a common and important part of our lives today. They touch almost everything we do. And they play an important role in communication technology. Following is some basic information on computers to help you become computer literate.

CONSTITUTIONAL RIGHTS TO FREE SPEECH

Constitutional rights to free speech are essential to our democratic way of life. The power of communication is recognized and protected in various documents and laws. The first amendment to the constitution (part of the Bill of Rights) is an example of government efforts to protect the freedom of speech.

Amendment I: "Congress shall make no law respecting an establishment of religion, or prohibiting free exercise thereof; or abridging the freedom of the press, or the right of the people peaceably to assemble, and to petition the government for a redress of grievances."

The right to freedom of speech and freedom of the press comes with responsibility. Freedoms are not absolute and must be balanced with other rights. For example, an individual's right to privacy must be balanced with the public's right to know. Slander and the malicious defamation of an individual's character are likewise not protected by the freedom of speech.

Censorship interferes with the freedom of speech. Censorship includes any restrictions, regulations, and controls placed on communication to protect the values and security of the country. There is considerable judgment required in matters of censorship. Cases of obscenity and the classification of top secret documents concerning sensitive national defense issues are often subject to interpretation. Democratic governments rarely use censorship as compared to autocratic or dictatorial governments.

FREEDOM OF INFORMATION

This federal act was passed in 1966. It is designed to ensure that the public has access to government information. With the exception of documents that relate to nine subject areas, such as the national defense, trade secrets, and other similar issues, individuals have the right to obtain copies of documents kept by agencies of the federal government. A written request must be made to the appropriate agency and a charge can be made for copying and search time.

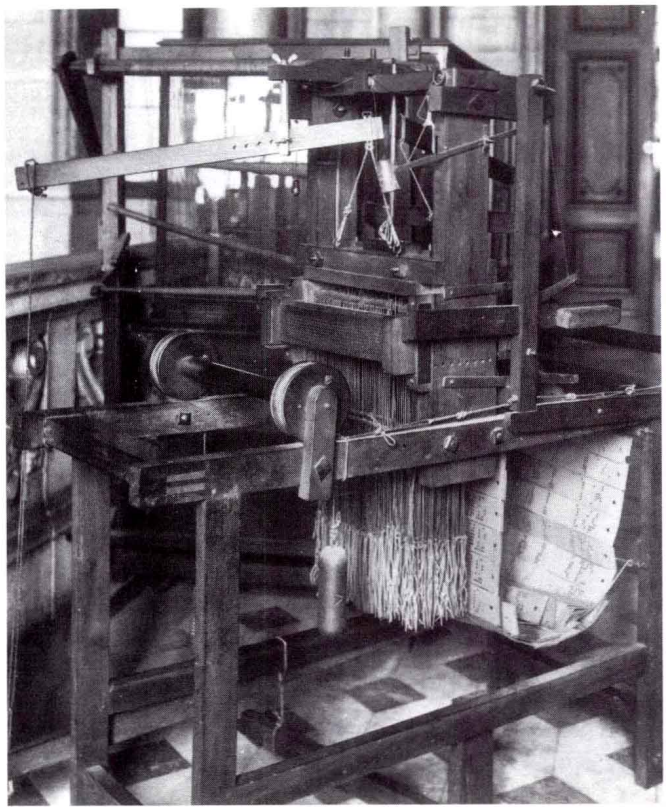


FIGURE 1-6 The Jaquard loom was the first example of a machine that could be programmed to do an intricate task on its own, so it was an early forerunner of the computer. (Courtesy Bettman Archive.)

The Machine Remembers?!!

The year is 1805, motors haven't been dreamed of, automobiles and tape recordings are nearly 100 years away, and the first crude computers lie almost 150 years in the future; but textile factory workers stare in amazement as a machine weaves an intricate pattern without a person directing each action! Skilled weavers using hand-operated looms were slow, but they were the only way to weave cloth with complicated patterns. Joseph Marie Jacquard changed that when he invented his Jacquard attachment. The Jacquard loom was the very first machine that enabled humans to instruct a machine through mechanical means and store the instructions for reuse. It used no electricity, it had no transistors or integrated circuit chips, but it did the main job of a computer. It was ***programmed*** (instructed in a logical sequence by the people who arranged cards with holes that indicated weaving instructions), it remembered its instructions, it made decisions on the basis of those instructions, and it directed the actions of a machine to accomplish the goals of the programmer.

Today, electronic computers control almost all aspects of the textiles industry from the chemical processing operations to design, layout, and then finishing garments. Jacquard knew how important his invention was for its time, but he could not possibly have foreseen how much more important the principles he demonstrated were than the invention itself.

Jacquard's loom set the stage for much of what computers can do. A ***computer***, as we know it, is an electronic machine that can input, output, store, and use information to make decisions, control other machines, or solve problems.

Inputs from Humans to the Computer

Since modern computers are electronic machines, their most important input devices are switches. The power switch turns the machine on and off, but other switches supply information. The ***keyboard*** is the most important input from humans to most computers. It is nothing but a series of switches that works together to send digital information to the computer. Each key has a specific meaning, but the meaning may be altered by pressing other special keys at the same time. Examples are the "CONTROL" key, the "APPLE" key on a Macintosh, the "SHIFT" key, and on some computers the "ALTERNATE" key.

Another very popular input device is the ***mouse***. The mouse is a digital input device. Inside the mouse, two slotted disks are turned by the rolling ball. The disks are 90 degrees apart, so moving the mouse vertically turns one disk. Horizontal movements turn the other disk and movements at other angles turn both disks, but generally they turn one disk faster than the other one. The slots are counted by a photodiode as they turn past a light-emitting diode (LED). Each slot allows light from the LED to strike the photodiode, which acts as an electronic switch. Each pulse, triggered by moving the mouse, is a digital input; but when they are all combined and considered by the computer they carry analog information.

The development of the mouse has had a great effect on the acceptance and potential uses of the computer. It allows certain types of information, such as drawings, to be entered into the