



The **Illustrated**
Computer
Dictionary
Donald D. Spencer

THE ILLUSTRATED COMPUTER DICTIONARY

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**THE
ILLUSTRATED
COMPUTER
DICTIONARY**

Introductory Learning Materials from Merrill

General

- Data Processing and the Computer: A Survey* (16 full color videotapes with workbook)
- Spencer—*Computer Science Mathematics*
- Spencer—*Data Processing: An Introduction*
- Spencer—*Introduction to Information Processing, Third Edition* (1981)
- Thierauf / Reynolds—*Systems Analysis and Design: A Case Study Approach*

Languages

- Richards / Cheney—*COBOL: A Structured Approach* (1981)
- Thompson—*BASIC: A First Course* (1981)

to my daughter,
Sherrie,
who is just starting her
formal education in
computer science

PREFACE

Our lives have become increasingly involved with computer uses in which we have an active part or which affect our daily activities in both obvious and subtle ways. Computer-processed information aids in medical diagnosis, solves problems in social sciences, forms the basis for business management decisions, points the way in scientific research, maintains the records of businesses, helps in educating students, aids engineers in designing supersonic aircraft, guides space vehicles to distant planets, creates new types of art forms, aids police in law enforcement activities, and serves in countless other ways. Today, hundreds of thousands of small computers can be found in homes, precollege schools, and small businesses. Low-cost microcomputers are being used by more and more people to do everything from playing chess to performing accounting functions for small businesses.

Despite the sophistication of modern information-processing systems, the words and mental images that they produce have contributed the most toward making progress possible. Considering the flood of technical developments that results in millions of pages of computer-related publications each year, we cannot wonder that computer scientists and engineers have had to coin words at an unprecedented rate merely to express the thoughts involved in people's penetration into the mysteries surrounding them. Nowhere has this occurred more prolifically than in the field of computer science.

As the field of computer science evolves, fresh terminology must be developed to communicate, describe, and define the heretofore unknown concepts, components, and techniques. This book provides a glossary of about 3000 words, phrases, and acronyms used in connection with computers.

The Illustrated Computer Dictionary is intended for several kinds of readers. This is a basic reference book for all students of computer science, data processing, and computer literacy in university, college, and school programs. Managers, educators, technical people, professionals, and others should also find it a handy reference book.

The keynote of this book is clarity—without any sacrifice of authority or definitional precision. All definitions are simply stated, and they stand as independent units of explanation. Many important terms, such as data, microcomputer, BASIC, source program, software, hardware, and network, are explained in nontechnical language, simply and tersely. In those few cases that require special terminology, the expressions used are carefully defined, and cross-references indicate related terms or concepts. The book also contains many illustrations that will aid the reader to understand many of the terms presented.

The author of this book has been in the front lines of the computer revolution since the late 1950s. Computer models, programming languages, computer manufacturers, and programming techniques have come and gone since those

days of “vacuum tube” computers and machine language programming. Today’s computer-based systems and equipment have progressed literally generations beyond the effectiveness of their early predecessors. Because of the author’s close involvement with computer science education and the design and use of computer-based systems, he has long recognized the need for a current and comprehensive dictionary of computer terminology that would present the terms in a simple, understandable manner.

Special features of the book include the following:

COMPUTER ORGANIZATIONS Short descriptions are given to acquaint the reader with professional organizations such as ACM, AEDS, AFIPS, BEMA, DPMA, IFIPS, and SPA.

METRIC SYSTEM Since the United States will eventually go metric, it is essential that everyone learn how to use metric measurements. This book contains definitions of important metric terms and uses metric values throughout.

BIOGRAPHIES This book presents notes on the life histories of the most important people of computer science, with emphasis given to their influence on the development of computer techniques and equipment. Examples: Aiken, Atanasoff, Babbage, Boole, Eckert, Hollerith, Hopper, Leibniz, Mauchly, Napier, Pascal, Turing, von Neumann, Watson, Wiener, and Zuse.

PROGRAMMING LANGUAGES Included in the book are definitions of the important languages, ADA, APL, BASIC, COBOL, COGO, JOVIAL, LOGO, FORTRAN, GPSS, PASCAL, PILOT, PL/C, PL/I, RPG, SNOBOL, Tiny BASIC, WATFOR, as well as many other programming languages.

HISTORICAL In addition to short sketches of famous people, the book also includes descriptions of many famous computers. Examples: ABC, COLASSUS, EDSAC, EDVAC, ENIAC, MARK I, and UNIVAC I.

COMPUTERS IN SOCIETY Readers will become aware of the effects of computers on society by reading the definitions of terms such as *cashless society*, *computer applications*, and *computer literacy*.

MANAGEMENT Business people will find terms to aid them in their everyday activities. Examples: centralized data processing, computer security, data base, distributed data processing, feasibility study, information retrieval, management information system, and microcomputer.

EDUCATION Computers are now being used in all aspects of education—administrative and instructional. Educators will find descriptions for many useful terms and acronyms.

COMPUTER PROFESSIONALS Programmers and analysts will find many useful terms. Examples: algorithm, byte, data base, heuristic, intelligent terminals, laser storage, multiprocessing, operating system, point-of-sale terminal, simulation, structured programming, time-sharing, and virtual storage.

Birth and death dates, where available, are given for people who made their contributions in past history.

I am indebted to my wife, Rae, for typing the manuscript and to John R. Beatty, who drew most of the illustrations that appear in the book. I also thank the many engineers, scientists, researchers, and writers who have identified new terms and written about new computer equipment and techniques. Only through the works of these people can I keep up-to-date with the ever-growing vocabulary of computer terminology. Finally, I should like to express the hope that readers who find mistakes will be so kind as to let the publisher or author know so that errors may be corrected in future printings and editions.

Donald D. Spencer

HOW TO USE THIS DICTIONARY

Most terms appear in alphabetical order rather than under a general heading. For example, the terms **floppy disk** and **moveable-head disk unit** appear under *F* and *M*, although they are mentioned and cross-referenced under the general description of **magnetic disk**.

All *italicized* words within this dictionary are defined within. Cross-references that are important to an understanding of any term are usually given in italics. If you are unfamiliar with descriptions of modern computer terms, you might find it helpful to begin by looking up some of these words that appear over and over again, although not always as cross-references.

assembler	microcomputer
binary	microprocessor
cathode ray tube	object program
central processing unit	off-line
compiler	on-line
computer	output
data	program
debug	programming language
digital	PROM
flowchart	RAM
hardware	simulation
input	software
instruction	source program
loop	symbolic programming
machine language	terminal

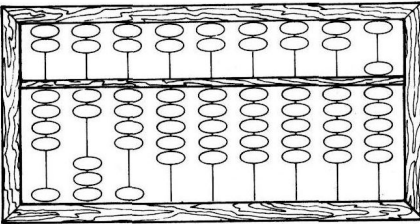
If you cannot find a word, it might be listed in a slightly different form. For example, you might try looking for the term *flowcharting* and find your description under the term *flowchart*.

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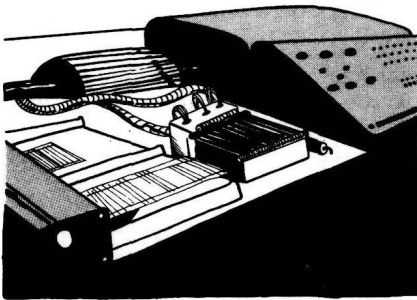
A1A An acronym for the Automation 1 Association.

abacus An ancient device for doing simple calculations that uses movable beads threaded on a grid of wires.



abacus

ABC An acronym for the Atanasoff-Berry Computer. An early electronic digital computer built in 1942 by Dr. John V. Atanasoff and his assistant, Clifford Berry.



ABC Machine

absolute address An address that is permanently assigned by the machine designer to a particular storage location. For example, the addresses, 0000, 0001, 0002, and 0003 might be assigned to the first four locations in a computer's storage. Also called *machine address*.

absolute coding Coding that uses machine instructions and absolute addresses; therefore, it can be directly executed by a computer without prior translation to a different form. Contrast with *symbolic coding*.

absolute value The magnitude of a number without regard to sign.

abstract A summary of a document.

AC An acronym for *Automatic Computer*.

acceptance test A test used to demonstrate the capabilities and workability of a new computer system. It is usually conducted by the manufacturer to show the customer that the system is in working order.

access Generally, the obtaining of data.

access arm A mechanical device in a disk file storage unit that positions the reading and writing mechanisms.

access method Any of the data management techniques available to the user for transferring data between internal storage and an input/output device.

access time The time interval between the instant data are called for from the storage unit and the instant data are delivered. The time interval between the instant data are requested to be stored and the instant at which storage is completed. See also *seek time* and *transfer rate*.

accounting The interpretation and organized method of recording all the transactions affecting the financial condition of a business.

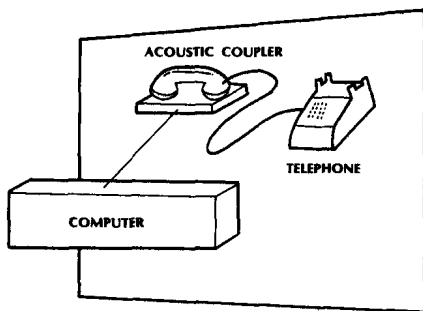
accumulator A register or storage location that forms the result of an arithmetic or logic operation.

accuracy

accuracy The degree of exactness of an approximation or measurement. Accuracy normally denotes absolute quality of computed results; precision usually refers to the amount of detail used in representing those results. Thus, four-place results are less precise than six-place results; nevertheless a four-place table might be more accurate than an erroneously computed six-place table. See *precision*.

ACM An acronym for Association for Computing Machinery, a professional computer science organization. Its function is to advance the design, development, and application of information processing and to promote the interchange of such techniques between computer specialists and users.

acoustic coupler A data communications device that converts electrical data signals to/from tones for transmission over a telephone line using a conventional telephone headset.



acoustic coupler

ACPA An acronym for Association of Computer Programmers and Analysts, a professional computer science organization.

acronym A word formed from the first letter (or letters) of each word in a phrase or name (e.g., BASIC from Beginner's All-purpose Symbolic Instruction Code; RPG from Report Program Generator; CPU from Central Processing Unit).

action (1) The performance of a parti-

cular operation or set of operations in response to a stimulus. (2) The resulting activity of a given condition.

activity A term used to indicate that a record in a master file is used, altered, or referred to.

activity ratio When a file is processed, the ratio of the number of records in a file that have activity to the total number of records in that file.

ADA A programming language named after Ada Augusta Lovelace, a helper and close friend of Charles Babbage. ADA was specifically designed to be useful for realtime, distributed processing networks, and mainframe multiprocessing applications. The language will eventually become a Department of Defense standard programming language.

ADAPSO An acronym for Association of Data Processing Service Organizations, an association of commercial institutions. ADAPSO offers data-processing services through systems its members operate on their own premises.

adapter A device that allows compatibility between different equipment.

adaptive systems Systems displaying the ability to learn, change their state, or otherwise react to a stimulus. Any system capable of adapting itself to changes in its environment.

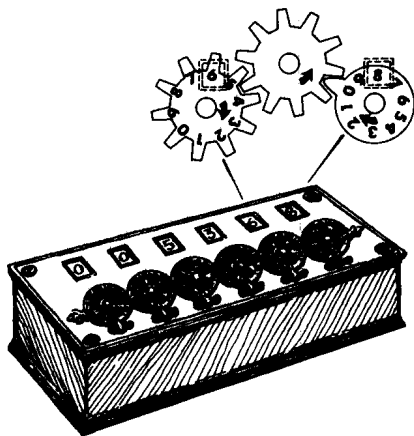
A-D converter See *analog-to-digital converter*.

addend A number of quantity to be added to another, the augend, to obtain a result called the sum.

adder A device capable of forming the sum of two or more quantities. See *parallel adder* and *serial adder*.

adding wheel A toothed gear that allows the process of "carrying" to be accomplished mechanically. Adding wheels were used in Blaise Pascal's

GEAR ARRANGEMENT FOR AUTOMATIC CARRYING



adding wheel

addition record A record that results from the creation of a new record during the processing of a file.

address An identification (e.g., a label, number, or name) that designates a particular location in storage or any other data destination or source.

address modification An operation that causes an address to be altered in a prescribed way by a stored program computer.

address register A register containing the address of the instruction currently being executed.

address space The complete range of addresses that is available to a computer user.

address translation The process of changing the address of an instruction or item of data to the address in internal memory at which it is to be loaded or relocated.

add time The time required for a computer to perform an addition, exclusive of the time required to obtain the quantities from storage and put the sum back into storage.

administrative data processing The field of data processing concerned with the management or direction of an organization. See *business data processing*.

ADP An acronym for Automatic Data Processing. Data processing performed largely by automatic means.

AEDS An acronym for Association for Educational Data Systems. A professional organization interested in sharing information related to the effect of data processing on the educational process.

AFIPS An acronym for American Federation of Information Processing Societies. A society whose primary purpose is to advance understanding and knowledge of the information processing sciences through active engagement in various scientific activities and through cooperation with state, national, and international (called *IFIPS*) organizations on information processing.

Aiken, Howard (1900–1973) Headed the team of people who designed and built the first electromechanical computer, the Automatic Sequence Con-



Howard Aiken

trolled Calculator (commonly called the Mark I), at Harvard University. See *Mark I*.

airline reservation system An on-line, direct access application in which a computing system is used to keep track of seat inventories, flight schedules; and other information required to run an airline. The reservation system is designed to maintain up-to-date data files and to respond, within seconds or less, to inquiries from ticket agents at locations remote from the computing system.



airline reservation system

aleatoric music Music, usually composed by computer, in which all or many of the most important characteristics are chosen randomly. See *computer music*.

algebra The study of mathematical structure. Elementary algebra is the study of numeral systems and their properties. Algebra solves problems in arithmetic by using letters or symbols to stand for quantities.

ALGOL An acronym for ALGORithmic Language—an international high-level programming language used to code problem-solving algorithms

according to internationally recognized standards. The language also allows standardized communication of arithmetic procedures among individual programmers.

algorithm A prescribed set of well-defined, unambiguous rules or processes for the solution of a problem in a finite number of steps; for example, a full statement of an arithmetic procedure for evaluating cosine x to a stated precision. Contrast with *heuristic*.

algorithmic language A language designed for expressing algorithms.

aligning edge That edge of a form which, in conjunction with the leading edge, serves to correctly position the document that is to be scanned by an OCR device.

allocate To assign a resource for use in performing a specific job.

allocation The process of reserving computer storage areas for instructions or data.

alphabetic Pertaining to a character set that includes the letters of the alphabet.

alphanumeric A contraction of alphanumeric.

alphanumeric A general term for alphabetic letters (A through Z), numerical digits (0 through 9), and special characters (—, /, *, \$, (,), +, etc.) that are machine-processable.

alteration switch An actual switch on the computer console or a program-simulated switch that can be set on or off to control coded machine instructions.

alternate routing Assignment of a secondary communications path to a destination if the primary path is unavailable.

ALU Abbreviation for Arithmetic Logic Unit—a computational subsystem that performs the mathematical and logical operations of a digital

system. A basic element of a central processing unit (CPU). Same as *arithmetic unit*.

ambient temperature The temperature of the environment surrounding an element of a computer system.

American Standard Code for Information Interchange See *ASCII*.

ampere Base unit of electric current in the SI metric system.

amplifier An electronic circuit that increases the voltage, current, or power of an input signal, or that isolates one part of a system from another.

analog Pertaining to representation by means of continuously variable physical quantities. Contrast with *digital*.

analog channel A channel on which the information transmitted can take any value between the defined limits of the channel.

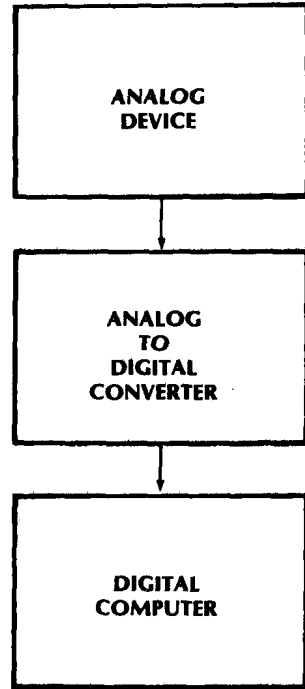
analog computer A computer that mainly uses analog representations of data. For example, voltages or currents might be used to represent the variables in a differential equation to be solved by an analog computer. See *computer*.

analog data A physical representation of information such that the representation bears an exact relationship to the original information. For example, the electrical signals on a telephone channel are analog data representation of the original voice data.

analog model A model that relates physical similarity to the actual situation.

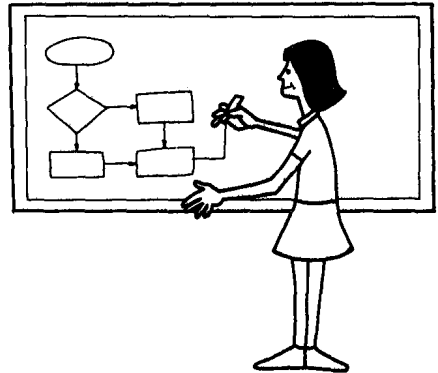
analog-to-digital converter A mechanical or electrical device used to convert continuous analog signals to discrete digital numbers. Abbreviated A-D converter. Opposite of *digital-to-analog converter*. See *digitize*.

analysis The investigation of a problem by some consistent, systematic procedure. See *systems analysis*.



analog-to-digital converter

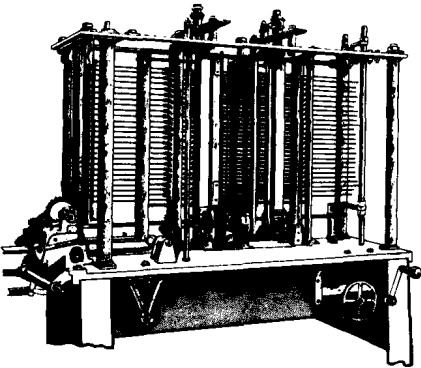
analyst A person skilled in the definition of and development of techniques for solving a problem, especially those techniques for solutions on a computer. See *programming analyst* and *systems analyst*.



analyst

analytical engine

analytical engine A device invented in the mid 1800s by Charles Babbage, a British mathematician, to solve mathematical problems. This machine was a forerunner of the modern digital computer. See *Babbage, Charles*.



analytical engine

AND A logical connection, as in the statement A AND B, which means that the statement is true if, and only if, A is true and B is true simultaneously.

AND-gate (1) A binary circuit with two or more inputs and a single output, in which the output is logic 1 only when all inputs are logic 1, and

the output is logic 0 if any one of the inputs is logic 0. (2) In a computer, a gate circuit with more than one input terminal. No output signal will be produced unless a pulse is applied to all inputs simultaneously.

annotation A description or explanation usually in the form of a comment or note.

annotation symbol A flowcharting symbol used to add messages or notes to a flowchart.

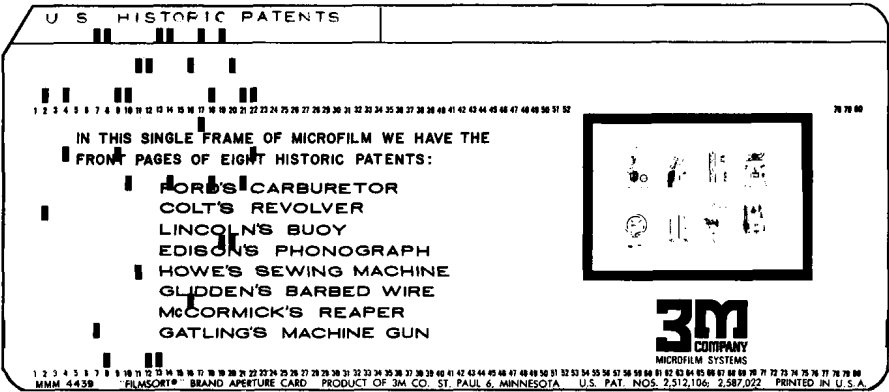
ANSI An acronym for American National Standards Institute. An organization that acts as a national clearinghouse and coordinator for voluntary standards in the United States.

A1A (See p. 1.)

A/P An acronym for Accounts Payable.

aperture card A punched card with an opening specifically prepared for the mounting of a frame or frames of microfilm.

APL An acronym for A Programming Language. A mathematically-structured programming language developed by IBM Corporation. In its simplest mode of operation, APL performs the functions of an intelligent calculator. The power of the language



aperture card