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Dictionary of Data Processing

Second Edition

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Preface to First Edition

The data processing industry suffers from two problems, at least as far as terminology is concerned. First, it is a young and fast growing area and is constantly being presented with new ideas, new methods

and new technologies, many of which do not have a name.

Secondly, the data processing industry is one in which a great deal of money is to be made and is subject therefore to high pressure selling and advertising. In the constant battle to keep ahead of the rest the admen 'invent' new ideas simply by creating new words. The newcomer to data processing or the outsider wanting an insight has the usual problem of learning the established terminology of his new interest as well as the more difficult task of understanding the buzzwords and jargon.

Compounding these problems are the unwillingness of some data processing people to communicate, the influx into the vocabulary of Americanisms, the ever-changing nature of the industry and the

lack of inter-manufacturer standardisation on terminology.

In my approach to preparing this dictionary, I have tried to overcome these difficulties by taking an objective stand and ignoring any

bias or loyalty towards a particular sector of the industry.

Some terms have entirely different meanings when used by different people, some conflict alarmingly with normal everyday usage and others are simply a product of the data processing man's desire to maintain a mystique about his profession. I have not set out to decree the words that should be used or the definitions that should apply. Instead I have given alternatives, even if conflicting, without comment except that the most used of conflicting definitions appears first.

This book is designed mainly as a source of reference and is extensively cross-referenced for that purpose. However, the page-by-page reading of the script will demonstrate some of the conflict that exists within the industry. Great strides are being made towards standardisation of hardware, consumables, and interface methods. I hope this dictionary will be the catalyst for a standardisation of terminology throughout the data processing industry.

J.M.

Preface to Second Edition

Since this dictionary was first published there has been a tremendous growth in the computer industry. But this growth has not been just in volume terms, although those figures are themselves impressive.

The computer and data processing industry has expanded its sphere of influence to encompass just about every walk of life directly or indirectly. The catalyst, and sometimes primemover, for this has

been the ubiquitous silicon chip.

The cost performance of integrated circuits has been improving almost exponentially for the last few years and there is no sign of any flattening of this growth. The microprocessor seems to centre in most current electronic development and has led to expansion in three main areas and has precipitated a convergence of technologies.

Firstly, the microprocessor and associated developments has increased the processing power (and memory size and backing store transfer speeds and so on) of commercial computers. This has enabled organisations large and small to introduce complex and detailed

business systems.

Secondly, the single application chip or chips has extended computing to a great variety of everyday and industrial equipment including washing machines, traffic lights, and simple processes. A manifestation of this is the increasing incidence of automation in factories.

Thirdly, the computer has spread to the home. This started with pocket calculators and digital watches and has progressed through television games to computer systems. Many such systems (including, for example, Apples and Pets) have all the sophistication in

peripherals and operating systems of their larger brothers.

A consequence of much of the abovementioned expansion has been the integration or convergence of three technologies much used in business: computing, telecommunications and office automation. This convergence, with its implications for the office of the future, may yet lead to an even greater change before another edition of this work is required.

J. M.

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abacus A device for performing arithmetic calculations by sliding beads along rows.

abend Abnormal job termination following an error condition.

aberration A malfunction in the electronic lens component of a CATHODE RAY TURE

abort To terminate a job or system in the event of some malfunction. abscissa The horizontal, or x, axis of a graph. Contrasted with ORDINATE

absolute address The actual, physical, address of a location in MEMORY. Usually expressed in MACHINE CODE.

absolute addressing The use of absolute addresses to reference locations in MEMORY.

absolute code The programming code used to express absolute addresses and operations, e.g. MACHINE CODE, ACTUAL CODE, ONE LEVEL CODE and SPECIFIC CODE.

absolute coding Program statements or instructions written in ABSOLUTE or MACHINE CODE, and requiring no further processing prior to computer execution.

absolute error The magnitude of an error irrespective of arithmetic

absolute value computer A computer processing absolute values rather than changes in values. Contrasted with INCREMENTAL COMPLITER

abstract (1) A short form or precis of a document. (2) To shorten or precis a document.

abstract, automatic Same as AUTOABSTRACT.

abstract symbol In OPTICAL CHARACTER RECOGNITION, a symbol

whose shape does not suggest its meaning and use.

acceleration time The elapsed time between the issuance of a peripheral read or write instruction and the commencement of data transfer between the unit and MEMORY.

accepting The process in which a TERMINAL receives a message from a computer.

access (1) To retrieve data from a peripheral unit or a storage media. (2) To fetch an instruction from memory and obey it.

access, direct See DIRECT ACCESS.

access. immediate Same as DIRECT ACCESS.

access, parallel Same as ACCESS, SIMULTANEOUS.

access, random Early term now generally replaced by DIRECT ACCESS.

access, serial Access to data records in a file in the order in which they occur in the storage medium.

access, simultaneous The movement of data in which all the

elements of each unit of data are transferred in parallel.

access arm A device, containing the read/write mechanism of a storage device, which can be positioned over different areas of the storage medium.

access line A line which continuously connects a remote station to a switch centre of exchange.

access mode In COBOL, a technique used to obtain specific LOGICAL RECORDS, or place specific logical records into a direct access storage device.

access time The delay between the issuance, to a peripheral unit, of a read command and the completion of the data transfer to a specified storage location. See also ACCELERATION TIME.

account catalogue A DIRECTORY which resides on an ACCOUNT VOLUME and contains entries that point to the permanent files that the owner has in his account.

account volume A disc-pack or PSEUDO-VOLUME (an area on the system disc) that belongs to an authorised account, and on which resides the ACCOUNT CATALOGUE.

accounting machine (1) A general term to describe a keyboard machine used for preparing accounting records. (2) A specific term to describe a punched card tabulator used to read cards and produce lists and totals.

accumulator (1) A storage location or REGISTER in which arithmetic results are kept. (2) An electronic unit for performing arithmetic.

accumulator register Same as ACCUMULATOR (1).

accuracy (1) The degree with which a result conforms to a given rule. (2) The specification of the size or range of an error in a computed result.

acknowledgement In DATA TRANSMISSION, the signal from a receiving terminal confirming receipt of a message. Abbreviated ACK. See

also Appendix B.

acoustic coupler A form of MODEM connected to a telephone line without making electrical connection (usually accomplished by placing the telephone handset in contact with appropriate TRANSDUCERS).

acoustic delay line A DELAY LINE using the propagation of sound waves as its active medium.

acoustic memory A storage medium using the properties of an ACOUSTIC DELAY LINE. See also REGENERATIVE.

acoustic store Same as ACOUSTIC MEMORY.

acronym A word or group of letters formed from the initial letters of the words in a phrase. For examples see Appendix A.

active (1) Pertaining to any device or system currently in use. (2) In ELECTRONICS, pertaining to a circuit using semiconductors or thermionic valves. See also PASSIVE.

active element That part of a computer system able to perform operations at the time it is ACTIVE.

active line A LINE which is currently available for the transmission

of data

activity (1) An indication that an element of a file has been referenced or transferred. (2) On a critical path (or PERT) network, the representation of an actual time or resource consuming task. An activity is necessary to progress from one EVENT to another.

activity ratio The ratio of the number of updated records in a file

to the total number of records in that file.

actual address Same as ABSOLUTE ADDRESS.

actual code Same as ABSOLUTE CODE.

actual decimal point A decimal point for which a storage location is reserved and which appears in a print-out. See also ASSUMED DECIMAL POINT.

actual key In COBOL, a data-item expressing the physical location of a record on a DIRECT ACCESS STORAGE device.

adaptive control system A CONTROL SYSTEM that continuously monitors its own operation and is capable of changing its status to suit its environment.

adaptor, on-line A device which permits high-speed, memory-tomemory linkage between two computer systems. See also DIRECT

MEMORY ACCESS.

addend An OPERAND used in the arithmetic addition function. The addend is added to the AUGEND to form the SUM which replaces the original value of the AUGEND.

adder An electronic adding device which receives three digital inputs, the ADDEND, the AUGEND and the CARRY, and produces two outputs, the SUM and the CARRY. Also called FULL ADDER.

adder, binary half A HALF-ADDER which receives two binary inputs

and produces two binary outputs.

adder, half- Part of an ADDER which can receive two digital inputs. representing AUGEND and ADDEND or CARRY, producing SUM and CARRY outputs.

addition An arithmetic operation; the arithmetic combination of an ADDEND and an AUGEND to form a SUM.

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

addition table The area of memory holding a table of numbers to be added by the TABLE LOOK-UP method.

address (1) The identification of the position of an area or location in a storage medium. (See also ABSOLUTE ADDRESS, SYMBOLIC ADDRESS.) (2) That part of a program instruction which specifies. absolutely or symbolically, the location, or address, of an OPERAND. (3) To reference a specific location in a storage medium. (4) To call

a piece of information from storage or place it in storage.

address, base See BASE ADDRESS.

address direct Same as ABSOLUTE ADDRESS.

address, effective See EFFECTIVE ADDRESS.

address, floating Same as RELATIVE ADDRESS.

address, immediate See IMMEDIATE ADDRESS.

address, indexed See INDEXED ADDRESS.

address, indirect See INDIRECT ADDRESSING.

address, instruction The address of a MEMORY LOCATION containing an instruction.

address, machine Same as ABSOLUTE ADDRESS.

address, multiple See MULTI-ADDRESS.

address, one Same as SINGLE ADDRESS.

address, one-plus-one See ONE-PLUS-ONE ADDRESS.

address, reference Same as BASE ADDRESS.

address, specific Same as ABSOLUTE ADDRESS.

address, symbolic See SYMBOLIC ADDRESS.

address, three See THREE ADDRESS.

address, variable Same as INDEXED ADDRESS.

address, zero-level See ZERO-LEVEL ADDRESS.

address computation The calculation, during program execution, of an OPERAND address. See also ADDRESS MODIFICATION.

address format The manner in which the ADDRESS PART of an instruction is arranged.

address generation Same as RANDOMISATION.

address modification (1) The process of changing the address part of an instruction by means of a coded instruction or MODIFIER. (2) A change in the address of an instruction such that subsequent

execution of the instruction will cause reference to a new location for data.

address part The part of an instruction in which is given the LOCATION of an OPERAND.

address register A REGISTER which is used to store or manipulate addresses.

address track A track (or BAND) on a DIRECT ACCESS STORAGE device containing the addresses of data stored on other tracks.

addressee The intended recipient of a message.

addressing The act of referring to the address of an item. See also ABSOLUTE ADDRESS, INDIRECT ADDRESSING, ADDRESS MODIFICATION.

add-subtract time The time required by a computer to add or subtract, exclusive of FETCH time.

add time The time required by a computer to perform a single addition, exclusive of FETCH time.

adjacency In CHARACTER RECOGNITION, a condition in which the character spacing lines of two consecutively printed characters on the same line are separated by less than the specified distance.

adjacent-channel interference Interference or noise generated via the SIDEBANDS of two CARRIER FREQUENCIES too close together in

the transmission spectrum.

agenda (1) In LINEAR PROGRAMMING, a group of programs used to manipulate a problem matrix. (2) A set of operations which specify the procedure required to solve a problem (corresponding with the 'agenda' of a meeting).

aggregate An assemblage of parts to form a whole.

algebra, Boolean See BOOLEAN ALGEBRA.

Algol A problem oriented PROGRAMMING LANGUAGE for scientific and mathematical use, in which the SOURCE STATEMENTS are specified as ALGORITHMS. The high level format of the source language is related to the specification of algebraic formulae.

algorithm A defined process or set of rules for solving a given

problem.

algorithm, convergence An algorithm which is certain to yield its

result within a finite number of steps.

algorithmic Pertaining to the use of ALGORITHMS for problem solving. **alias** (1) An alternate name for a member of a PARTITIONED data set. (2) An alternate LABEL or tag for a DATA ITEM.

allocate (1) To place a PERIPHERAL unit or area of MEMORY under control of a program. (2) To assign storage locations to main and sub programs thereby fixing the ACTUAL ADDRESS of a SYMBOLIC reference. See also ASSIGN.

allocation (1) The placing of PERIPHERAL units or MEMORY areas under program control. (2) The assignment of storage locations to

main and sub programs. See also ALLOCATE.

allocation, dynamic storage The allocation of MEMORY, by the SUPERVISOR, to a program or sub program as and when it is required. Storage so allocated may be de-allocated during execution of the program and allocated to another program. In a multi-programming environment MEMORY may be dynamically reallocated, during execution, to achieve a more efficient utilisation of MEMORY.

allocation, storage The process of reserving areas of storage to specific blocks of data.

alpha Abbreviation for ALPHABETIC.

alphabet The CHARACTER SET, excluding numerals, used in NATURAL LANGUAGE.

alphabetic Pertaining to ALPHABET.

alphabetic code (1) A CODING SYSTEM using combinations of alphabetic characters to represent data. (2) A coding system used to represent alphabetic characters.

alphabetic string A STRING (2) composed of alphabetic characters. alphameric Pertaining to a CHARACTER SET containing ALPHABETIC

and NUMERIC characters. Also called ALPHANUMERIC.

alphameric code (1) A CODING SYSTEM using combinations of ALPHABETIC and NUMERIC characters to represent data. (2) A coding system used to represent alphameric characters.

alphanumeric Same as ALPHAMERIC.

alphanumeric code Same as ALPHAMERIC CODE.

alteration switch A manual switch on a computer console used to set on or off coded machine instructions. See also SENSE SWITCH.

alternate routing In TELECOMMUNICATIONS, an alternative communication path used when the normal one is not available.

alternative route A COMMUNICATIONS CHANNEL used as a secondary route for communication in the event of the PRIMARY ROUTE being unavailable.

amendment Shortened form of AMENDMENT RECORD.

amendment file A collection of AMENDMENT RECORDS used to update a master file in a batch processing environment. Also called TRANSACTION FILE, CHANGE FILE.

amendment record A file record whose function is to reflect changes required in a corresponding MASTER RECORD. Also called TRANS-ACTION RECORD, CHANGE RECORD.

amendment tape A magnetic tape or paper tape containing an AMENDMENT FILE.

amplifier A device capable of receiving an input signal in wave form and delivering a current or voltage magnified output signal. amplifier, buffer See BUFFER AMPLIFIER.

amplitude The magnitude of a VARIABLE, usually its maximum value

whether or not it varies with time.

amplitude modulation A method of modulating a sine wave signal in order to make it carry information. The amplitude of the sine wave carrier is modified in accordance with the information to be transmitted.

analog Same as ANALOGUE.

analogue The representation of numerical values by means of physical variables, such as rotation, voltage, current, etc. Contrasted with DIGITAL.

analogue channel A channel (e.g. a VOICE CHANNEL) on which transmitted data can take any value between the limits of the channel.

analogue comparator A device for checking the digital output of an ANALOGUE-DIGITAL CONVERTER.

analogue computer A computer that operates by translating variables into measurable physical quantities, such as voltages, rotations of gear wheels, etc.

analogue-digital converter A device which converts the output signals of an ANALOGUE COMPUTER or analogue values into a digital representation for input to a DIGITAL COMPUTER.

analogue network A circuit representing physical variables in such a way that mathematical relationships between the variables can be expressed, thus permitting the solution of the expressions by ALGORITHMIC means.

analogue representation The representation of a variable by a physical means (such as voltage) whose magnitude varies continuously with the variable.

analyser, digital differential See DIGITAL DIFFERENTIAL ANALYSER.

analyser, electronic differential See ELECTRONIC DIFFERENTIAL ANALYSER.

analysis The methodic investigation of a system in order to break that system down into its separate units, which can be examined

further to express their inter-relationships.

analysis, systems The examination of a business, procedure, method or activity to determine what must be accomplished and in what manner. In general use relates to the analysis of a problem in order to specify the ideal computerised solution.

analyst In general use the same as ANALYST, SYSTEMS.

analyst, systems An individual trained in the art of SYSTEMS ANALYSIS, and able to specify problem solutions in ALGORITHMIC terms.

analytical engine A forerunner of the modern computer invented by Charles Babbage in 1833.

analytical function generator A FUNCTION GENERATOR in which the FUNCTION (2) follows a physical law.

AND A logic operator having the property that if a, b and c are statements then the 'and' of a, b, c, is true if all the statements are true and false if any or all statements are false. Also called PRODUCT.

AND circuit Same as AND ELEMENT.

AND element A logic element operating with BINARY DIGITS which provides one output signal from two input signals according to the rules for an AND OPERATION (2).

AND gate Same as AND ELEMENT.

and-not Same as NAND.

AND operation (1) The BOOLEAN OPERATION that gives a truth table value of true only if both input variables are true. (2) A logical operation applied to two OPERANDS which will produce an output depending on the bit patterns of the OPERANDS according to the rules shown in *Figure A.1*. See also BOOLEAN ALGEBRA.

anisochronous Pertaining to a MODULATION system in which signal

elements may be of variable length.

annotation Added descriptive comments or explanatory notes (used in FLOWCHARTING).

annunciator A visual or audible warning device, used to indicate the

Input		Output
1	0	0
1	1	1
0	1	0
0	0	0

Figure A.1. AND operation

status of circuits or systems.

answerback (1) The response of a terminal to remote control signals.(2) The transmission of station identification in response to a who-are-you character.

answerback drum A mechanical component in a TELETYPEWRITER used to generate ANSWERBACK (2). The station identification is determined by removing teeth from the rim of the drum, generally replaced by PROM.

anticoincidence Same as EXCLUSIVE-OR.

anti-logarithm The number whose LOGARITHM is the given number. application The specific problem or system to which data processing techniques are applied. Applications are often referred to as either computational (requiring a high level of computing) or data processing (requiring a high level of data handling).

area A part of a storage medium designated as holding data of a specific type; may be designated by the programmer or by hard-

ware.

area, common See COMMON AREA.

area, constant See CONSTANT AREA.

area, input See INPUT AREA.

area, search That part of a storage medium used during a search operation.

area, working Same as WORK AREA.

area code In the USA, the equivalent of an STD code.

area search The examination of a large group of documents to select those which pertain to one GROUP, such as one CATEGORY or one CLASS.

argument (1) A VARIABLE used as the SUBSCRIPT to reference a TABLE entry. (2) A VARIABLE upon whose value the value of a FUNCTION depends; in programming usage a list of arguments will follow a FUNCTION REFERENCE. (3) The fixed point part of a FLOATING POINT NUMBER.

arithmetic, floating-point See FLOATING-POINT ARITHMETIC.

arithmetic address An ADDRESS derived from computations performed on another address. See also ADDRESS COMPUTATION.

arithmetic and logic unit That part of a CENTRAL PROCESSOR dealing with arithmetic and logical operations. Abbreviated ALU.

arithmetic check The verification of an ARITHMETIC OPERATION by

means of an additional arithmetic process, e.g. multiplying x by y to produce an arithmetic check of the result obtained by multiplying

y by x.

arithmetic expression A combination of DATA-NAMES, NUMERIC LITERALS and named CONSTANTS joined by one or more ARITHMETIC OPERATORS in such a way that the whole can be reduced to a single numeric value.

arithmetic instruction A MACHINE INSTRUCTION which specifies an ARITHMETIC OPERATION upon data. Arithmetic instructions form a SUBSET of the MACHINE INSTRUCTION set. See also LOGICAL INSTRUCTIONS.

arithmetic mean The value computed by totalling the values of the items of a SET and dividing by the number of ITEMS. Expressed thus

$$\bar{x} = \frac{\sum (x)}{n}$$

where \bar{x} is the arithmetic mean of the *n* numbers *x*. See also AVERAGE. **arithmetic operation** An operation performing any of the basic arithmetic functions of ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION, and for BINARY values, complementation. See also LOGICAL OPERATION.

arithmetic operators The characters which designate the ARITH-METIC OPERATIONS, such as $+, -, \times$, etc.

arithmetic overflow See OVERFLOW.

arithmetic register A register, contained within an arithmetic unit, for storing the operands and/or results of arithmetic operations. Same as accumulator.

arithmetic section Same as ARITHMETIC UNIT.

arithmetic shift To multiply or divide a number by a power of the number base, e.g. if binary 110 (equivalent to decimal 6) is shifted two places left the result is 11000 (equivalent to decimal 24), which represents a multiplication factor of 2² (equivalent to decimal 4).

arithmetic statement A statement in a PROGRAMMING LANGUAGE

which specifies a numeric computation.

arithmetic unit A unit within a computer that performs ARITHMETIC OPERATIONS on specified OPERANDS; may also perform ARITHMETIC SHIFTS and LOGICAL SHIFTS.

arithmetical instruction Same as ARITHMETIC INSTRUCTION.

arithmetical operation Same as ARITHMETIC OPERATION.

arithmetical shift Same as ARITHMETIC SHIFT.

array A series of items arranged in a meaningful pattern such that each item is identified by a SUBSCRIPT or KEY. Each item in an array has positional significance relative to each other item; all items in an array are of equal level. See also DIMENSION, TABLE.

artificial intelligence (1) Referring to the operation of machines

that can improve their ability to perform a particular function. (2) Referring to the use of computers to perform tasks analogous to human behaviour.

artificial language A language that is based on a set of rules prescribed prior to the use of the language. Contrasted with NATURAL

LANGUAGE.

assemble (1) To translate a SOURCE PROGRAM into an OBJECT PROGRAM by means of an ASSEMBLER, the translation being on a one for one basis. (2) To integrate SUBROUTINES into a MAIN ROUTINE by resolving any RELATIVE OF SYMBOLIC ADDRESSES. See also COMPILE.

assembler A program to produce an OBJECT PROGRAM from a SOURCE PROGRAM by means of the ASSEMBLY process. See also

COMPILER.

assembler directive See DIRECTIVE.

assembly The operation of translating a SOURCE PROGRAM into an OBJECT PROGRAM on a one for one basis. See also COMPILATION.

assembly language A SYMBOLIC PROGRAMMING LANGUAGE which can be processed by a particular ASSEMBLER to produce an OBJECT PROGRAM.

assembly list The printed output of the ASSEMBLY process showing the input SOURCE CODE, the corresponding translated OBJECT CODE and diagnostic messages.

assembly program Same as ASSEMBLER.

assembly unit A portion of a program that can be assembled into a

larger whole program. See also MODULE.

assign To allocate part of a computer system (usually a PERIPHERAL DEVICE) for a specific purpose or to a specific owner. An assignment usually extends for the duration of the program requesting it, except in the case of permanent assignments. See also ALLOCATE.

assignment, facilities The assignment of MEMORY and peripheral facilities to the requirements which are defined symbolically

for a given job.

associative store A storage media whose storage locations are identi-

fied by their content rather than their address.

assumed decimal point The position within a numeric item at which the decimal point is assumed to appear. This point will not occupy a storage location but will be used to align numeric values for computation.

asynchronous Without regular time relationship; unexpected or unpredictable with respect to the execution of programs instructions. See also ASYNCHRONOUS TRANSMISSION, SYNCHRONOUS.

asynchronous device A device working in the asynchronous mode. **asynchronous transmission** Transmission in which each information character is individually synchronised (usually by the use of START ELEMENTS and STOP ELEMENTS).