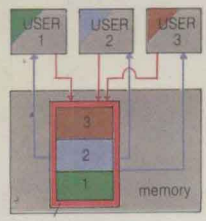
LONGMAN ILLUSTRATED DICTIONARY OF COMPUTING SCIENCE

computers and their application

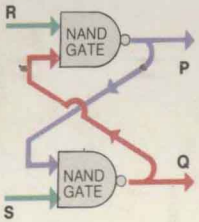
re-entrant program

one program for 3 users

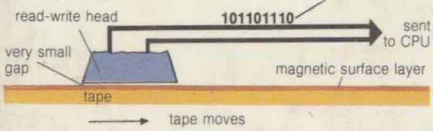


1 copy of program

part of a circuit diagram



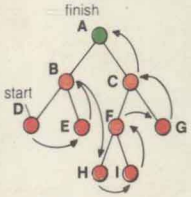
reading a magnetic tape



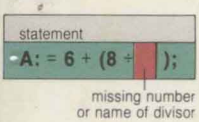
block diagram

suffix walk

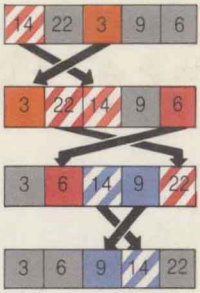
order in which nodes are visited **D E B H I F G C A**



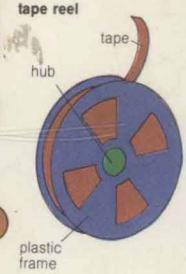
syntax error



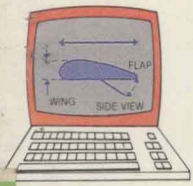
selection sort



tape reel



computer aided design



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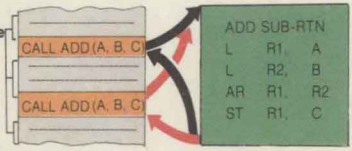
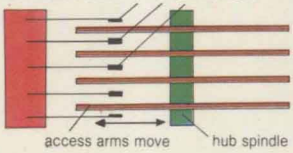
ub-routine



ain-line
structions

read-write heads — 1 for each surface



R D QUENTIN

LONGMAN ILLUSTRATED DICTIONARY OF COMPUTING SCIENCE

computers and their application

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Contents

How to use the dictionary

This dictionary contains nearly 1500 words used in computing science. These are arranged in groups under the main headings listed on pp. 3-4. The entries are grouped according to the meaning of the words to help the reader to obtain a broad understanding of the subject.

At the top of each page the subject is shown in bold type and the part of the subject in lighter type. For example, on pp. 90 and 91:

90 · LANGUAGES/ASSEMBLER

LANGUAGES/COBOL · **91**

In the definitions the words used have been limited so far as possible to about 1500 words in common use. These words are those listed in the 'defining vocabulary' in the *New Method English Dictionary* (fifth edition) by M. West and J. G. Endicott (Longman 1976). Words closely related to these words are also used: for example, *characteristics*, defined under *character* in West's *Dictionary*.

The dictionary has an appendix entitled *Note on computer working* which contains an introduction to computers and their methods of working. If you are not familiar with the basic ideas involved in computing you may find it helpful to read this appendix before using the dictionary.

1. To find the meaning of a word

Look for a word in the alphabetical index at the end of the book, then turn to the page number listed.

In the index you may find words with a number at the end. These only occur where the same word appears more than once in the dictionary in different contexts. For example, **chain**

chain[1] is a set of slugs in a printer;

chain[2] is a method of dealing with collisions.

The description of the word may contain some words with arrows in brackets (parentheses) after them. This shows that the words with arrows are defined near by.

(↑) means that the related word appears above or on the facing page;

(↓) means that the related word appears below or on the facing page.

A word with a page number in brackets after it is defined elsewhere in the dictionary on the page indicated. Looking up the words referred to may help in understanding the meaning of the word that is being defined.

In some cases more than one meaning is given for the same word. Where this is so, the first definition given is the more (or most) common usage of the word. The explanation of each word usually depends on knowing the meaning of a word or words above it. For example, on p. 21 the meaning of *AND gate*, *NOT gate*, and the words that follow depends on the meaning of the word *gate*, which appears above them. Once the earlier words are understood those that follow become easier to understand. The illustrations have been designed to help the reader understand the definitions but the definitions are not dependent on the illustrations.

2. To find related words

Look at the index for the word you are starting from and turn to the page number shown. Because this dictionary is arranged by ideas, related words will be found in a set on that page or one near by. The illustrations will also help to show how words relate to one another.

For example, words relating to systems analysis are on pp. 191-194. On p. 191 *systems analysis* is followed by words used to describe analysis and data flow and illustrations showing the steps in the life of a system and a data flow diagram; p. 192 continues to explain and illustrate systems analysis, explaining problem definition and system specification; p. 193 explains and illustrates parallel and pilot runs and p. 194 gathers together the remaining words relating to systems analysis.

3. As an aid to studying or revising

The dictionary can be used for studying or revising a topic. For example, to revise your knowledge of memory, you would look up *memory* in the alphabetical index. Turning to the page indicated, p. 41, you would find *main memory*, *internal memory*, *immediate access store*, *core memory*, and so on. Turning over to p. 42 you would find *cache memory*, *scratch pad*, *associative memory*, and so on; on p. 43 you would find non-destructive read out etc.

In this way, by starting with one word in a topic you can revise all the words that are important to this topic.

4. To find a word to fit a required meaning

It is almost impossible to find a word to fit a meaning in most dictionaries, but it is easy with this book. For example, if you had forgotten the word for the first or top entry in a tree, all you would have to do would be to look up *tree* in the alphabetical index and turn to the page indicated, p. 149. There you would find the word *root* with a diagram to illustrate its meaning.

5. Abbreviations used in the definitions

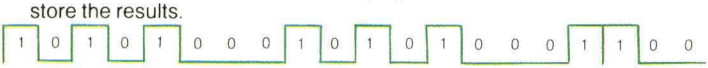
abbr	abbreviated as	p.	page
adj	adjective	pl	plural
e.g.	*exempli gratia* (for example)	pp.	pages
etc	*et cetera* (and so on)	sing.	singular
i.e.	*id est* (that is to say)	v	verb
n	noun	=	the same as

THE DICTIONARY

general purpose computer a computer which can be used for a number of different types of work rather than one which is mainly intended for a special purpose such as scientific calculation.

digital computer the commonest type of computer, dealing with data in the form of numbers or characters rather than continuous signals (p. 22). It contains a CPU (p. 31) in which the control and calculation functions (p. 18) are performed. Connected to the CPU are one or more peripheral devices (p. 12) used to feed data to the CPU and display or store the results.

digital watch



digital

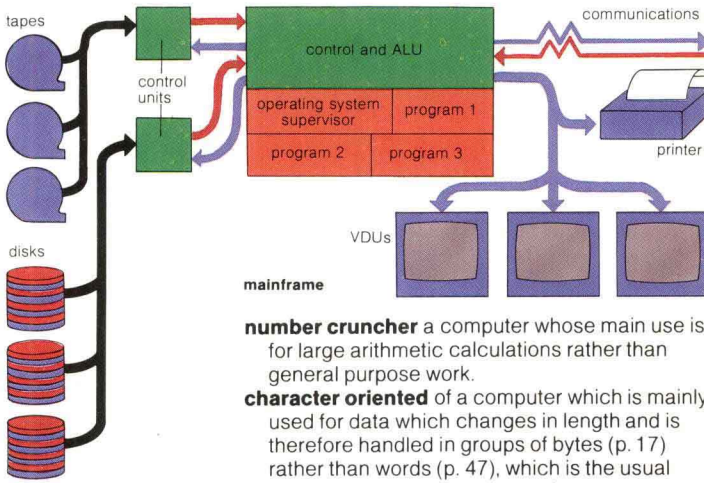

analog

analog computer a computer which deals with data in the form of continuous signals (p. 22) that measure the changing size of something, e.g. the amount of electricity flowing through a circuit, rather than data in the form of numbers or letters.

hybrid computer a computer which combines in some manner the ability to handle the data partly as if it were a digital computer (↑) and partly as if it were an analog computer (↑). It often consists of several small computers, analog and digital connected together, whose main purpose is to control the operation of another machine.

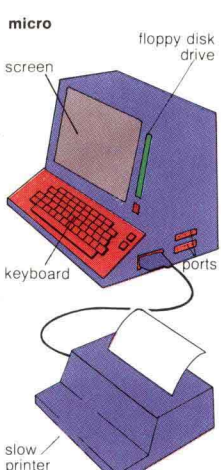
mainframe (*n*) a medium to large-sized computer, usually with a number of peripheral devices (p. 12), rather than a mini (↓) or micro-computer (↓). It can usually run several programs at the same time and may have several smaller computers connected to it.


analog watch



number cruncher a computer whose main use is for large arithmetic calculations rather than general purpose work.

character oriented of a computer which is mainly used for data which changes in length and is therefore handled in groups of bytes (p. 17) rather than words (p. 47), which is the usual manner for handling numbers. Some computers can handle data easily only when it is in the form of computer words, others can handle either characters or words equally well.



mini-computer (*n*) a computer which is usually larger than a micro-computer (↓) but with not so much power as a mainframe (↑) and with fewer peripheral devices (p. 12). The word size (p. 47) can be 8, 16 or 32 bits (p. 17) and it can be used by more than one person at a time.

mini (*n*) = mini-computer (↑).

micro-computer (*n*) a small computer usually used by only one person at a time. The word size (p. 47) is usually 8 or 16 but can be 32 bits (p. 17). It may have a printer, one or two floppy disks (p. 67) and perhaps a hard disk (p. 67) but sometimes just a keyboard and a screen (p. 84).

micro (*n*) = micro-computer (↑).

PC Personal Computer. A micro-computer (↑) intended for a single user.

host (*n*) a computer with one or more computers connected to it. It is the main computer and controls the others which usually do less important work, such as preparing data for processing by the host computer, or printing out the results.

slave computer a computer connected to, and controlled by, a larger computer called the host (p. 9). It does work such as reading cards (p. 52), printing results, etc, which would waste the time of the host computer.

multi-access (*adj*) of a computer which is used by two or more persons at the same time. Each person usually has the use of a terminal (p. 79).

generation (*n*) (1) a class of computers made about the same time and using similar ideas. The early computers were first generation, present-day computers, using micro chips (p. 24), are either third or fourth generation. Also applied to languages; (2) the process of taking programs, or parts of programs, and joining them to make a working system - usually an operating system (p. 130); (3) a copy of a file (p. 153). Successive copies are numbered in the order they are produced.

configuration (*n*) a list or diagram of all the parts of a computer, e.g. CPU (p. 31), tapes (p. 71), disks (p. 66), etc, which may also show the way in which they are connected. **configure** (*v*).

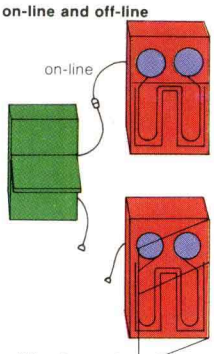
compatible (*adj*) of computers, devices, or programs, which can be connected without any special arrangements having to be made. The programs written for one computer will run on the other, either without change or with only small changes. Files (p. 153) from one computer can be read on another, etc. **compatibility** (*n*).

computer installation (1) all the units which are part of a computer, including units which are not connected to the computer but are needed to support its work, e.g. card punches (p. 54), tape library (p. 190), etc.; (2) the room or building in which a computer, especially a mainframe (p. 8), is placed.

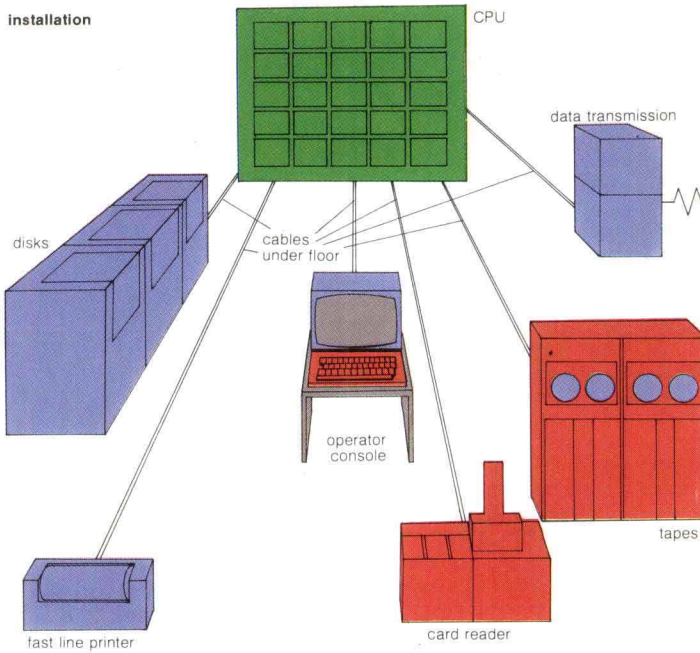
installation (*n*) (1) = computer installation (1); (2) the act of putting together all the parts of a computer at the place where it is going to be used. **install** (*v*).

plug-in unit a device which can be attached to a computer or another device as a complete unit without the need for any change to the device or the computer.

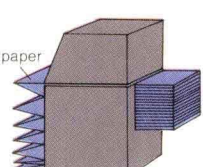
on-line and off-line



installation



off-line



guillotine always off-line

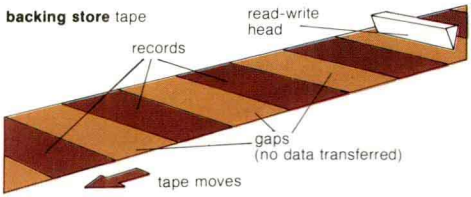
plug compatible of a plug-in unit (↑) which has been made by a different manufacturer from the one who made the device that the unit is replacing.

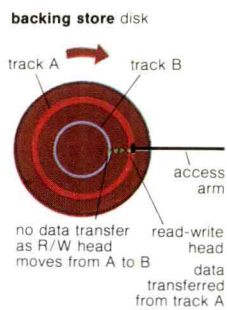
off-line (*adj*) of a device which is either not connected to a computer or is not controlled by it. Devices can be off-line all the time, or may be taken off-line for small periods of time for maintenance (p. 188).

on-line (*adj*) of a device which is connected to and controlled by a computer.

ancillary equipment equipment such as a key punch (p. 56) or burster (p. 63) which is part of a computer installation (↑) but is not connected to the computer.

auxiliary equipment = ancillary equipment (↑).





backing store storage other than memory. It means storage on units such as tapes (p. 71) or disks (p. 66). These hold much more data than memory but the data has to be read into memory before it can be used by a computer.

backing storage = backing store (↑).

auxiliary storage = backing store (↑).

secondary storage = backing store (↑).

peripheral device a device, such as a printer or a disk (p. 66), which is a part of a computer but is separate from the CPU (p. 31) although connected to it and controlled by it. The device can be used to feed data to the CPU, or to store the data for further processing at a later time, or to produce results in a form which can be read by human beings, e.g. printing.

peripheral equipment peripheral devices (↑) which are, or can be, connected to the CPU (p. 31).

peripheral transfer the movement of data between two peripheral devices (↑).

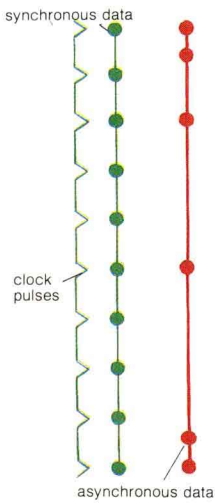
actual transfer rate the amount of data which can be transferred to or from a peripheral device (↑) divided by the time taken, provided that the transfer of data is continuous, i.e. there are no pauses while some part of the device, such as a disk access arm (p. 70), is moved.

effective transfer rate the total amount of data transferred to or from a peripheral device (↑) divided by the total time taken, including any time during which data is not being moved, for example, during a seek (p. 70).

input device a peripheral device (↑) which can hold or accept data in a form which can be read by a computer. Some devices can only provide input, e.g. card readers (p. 54). Some input devices can also accept output, e.g. a disk (p. 66).

input unit = input device (↑).

synchronous and asynchronous



output device a peripheral device (↑) which can accept data from a computer either for storage, e.g. disk (p. 66), or for display on a screen (p. 84) or printer.

output unit = output device (↑).

port (*n*) a point where it is possible to connect an input-output device to a computer or a channel (p. 27).

synchronous (*adj*) of a method of working in which operations, such as transferring data, are done at fixed intervals of time rather than as soon as the preceding operation is completed. The times are controlled by some form of clock (p. 23) or timer (p. 24). **synchronize** (*v*).

asynchronous (*adj*) of a method of working in which an operation, such as transferring data, is started as soon as the preceding one is finished.

feed (*v*) to enter data into a computer. **feed** (*n*).

volume (*n*) (1) a single tape reel (p. 71) or disk pack (p. 66) or any other device, on which data can be stored, and which can be treated as a single unit. In a computer installation (p. 10) each reel or pack is usually given a separate number called the volume number; (2) the amount of something such as the number of transactions (p. 162), or the number of source documents (p. 183).

error correction the process of correcting data which has been found to be in error, usually on transmission (p. 76) between two devices. It can sometimes be carried out by a device without the need for any action by a human.

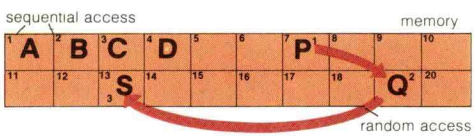
error detection the process of testing or checking data, usually on transmission (p. 76) between two devices, to find out whether the data has been transferred correctly. It does not mean that the error is corrected.

redundancy check extra data added to a record (p. 154) or other data so that a device can detect any errors in reading or writing the data. The use of a parity bit (p. 29) is a simple example and the idea is widely used on tapes (p. 71) and disks (p. 66) both to detect and correct errors.

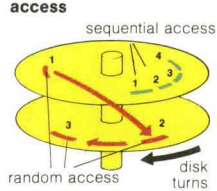
sequential access a method of access where it is necessary to examine every address or record (p. 154) in sequence, i.e. one after the other, in order to find the one you want.

random access[1] a method of access to a single memory location, or a single record (p. 154) on a direct access device (p. 67), either by the use of an address or a key (p. 156), without having to access any other memory location or record.

direct access[1] = random access (1).



sequential and random access

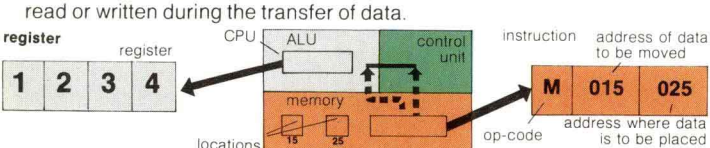


hardware (*n*) the parts of a computer made from materials such as metal, glass, etc and which can be seen and handled, i.e. not programs.

software (*n*) the programs which a computer needs and uses in order to carry out its work.

firmware (*n*) the special programs which are fixed in ROM (p. 42) and usually allow a machine to perform specific actions. The machine need not be a computer, it could, for example, be a printer.

register (*n*) a part of a computer, usually in the control unit (p. 27) or the ALU (p. 31), which can be used for calculations rather than just the storing of data. The calculations can be performed on quantities which may be binary numbers (p. 49) or the addresses of memory locations. Some registers are for general use, others are used only for special purposes. Registers are also used in the control units of peripheral devices (p. 12) for special purposes such as counting the number of characters read or written during the transfer of data.



accumulator (*n*) (1) = a register (↑); (2) = a part of memory which is being used to hold the results of a calculation. **accumulate** (*v*).

instruction format the way an instruction is set out, usually consisting of an op-code (↓) with one or more addresses. The format depends on the particular computer and, for a particular computer, it usually depends on the op-code.

counter (*n*) a register (↑) or an accumulator (↑) being used to keep a count of the number of times something is done in a program. For example, it may count the number of lines printed or the number of times a group of instructions is performed.

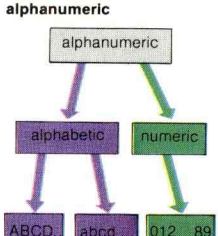
op-code (*n*) a part of an instruction which says what action is to be carried out, e.g. an addition or a move of some data. A computer usually has between 40–150 op-codes, depending on size, one for each instruction in its instruction set (p. 34).

operation code = op-code (↑).

operand (*n*) (1) the part of an instruction which says where the data is to be found or where the result is to be placed. There may be several operands, usually two, and they are normally addresses which point to the location of the data. Only occasionally are the operands the actual data themselves; (2) one of the things on which an operation is done. For example, if we add the numbers 3 and 4 then the operation is addition, and the operands are the numbers.

reverse Polish notation a method of writing arithmetic expressions in which the operation follows the operands (↑), e.g. a + b would be written as a b +. The method is commonly used in computing to handle arithmetic expressions held as binary trees (p. 149).

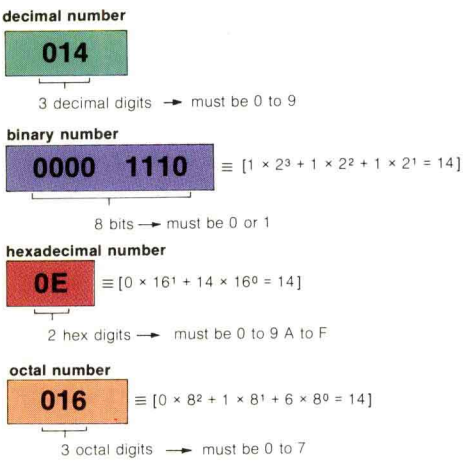
alphanumeric



alphanumeric (*adj*) of a set of characters consisting of all the letters A to Z, the digits (p. 16) 0 to 9 and blank. It does not include special characters (p. 46) such as $, & : + [? etc.

alphameric (*adj*) = alphanumeric (↑).

numeric (*adj*) of data held in the form of numbers, usually either decimal (p. 16) or binary (p. 16).



decimal number a number which uses the decimal digits (↓) 0 to 9. It is the common form of number which people use every day.

decimal digit any one of the numbers 0 to 9.

decimal (*n*) (1) a decimal number (↑) as opposed to a number in one of the other forms, binary (↓), octal (↓) or hexadecimal (↓); (2) the part of a number which is between two whole numbers, e.g. the number 1.25 lies between 1 and 2 and .25 is the decimal part. **decimal** (*adj*).

decimal point the character which separates the two parts of a decimal number (↑). In some countries a full stop is used, e.g. 1.25 but in others a comma is used e.g. 1,25.

digit (*n*) a single number. The possible values of a digit depend upon the range of radix (p. 48) being used. For example, for decimal numbers (↑) the values are 0 to 9, but for binary numbers (p. 49) a digit is either 0 or 1.

binary (*adj*) two. It is often used to mean binary arithmetic or binary numbers (p. 49).

binary digit one of the two digits 0 and 1, which are used in binary (↑) arithmetic. It is commonly called a bit (↓).