

LATHAM & WATKINS
NY LIBRARY

IEEE 100
The Authoritative Dictionary of
IEEE Standards Terms

Seventh Edition

Ref. TK9.I28 7th ed
IEEE 100 The Authoritative
Dictionary of IEEE Standards Terms

LATHAM & WATKINS LLP
NY LIBRARY

DIMCO



 **IEEE**
Published by
Standards Information Network
IEEE Press

IEEE believes the information in this publication is accurate as of its publication date; such information is subject to change without notice. IEEE is not responsible for any inadvertent errors.

Other tradenames and trademarks in this document are those of their respective owners.

The Institute of Electrical and Electronics Engineering, Inc.
3 Park Avenue, New York, NY, 10016-5997, USA

Copyright © 2000 by the Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Published December 2000. Printed in the United States of America.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

To order IEEE Press publications, call 1-800-678-IEEE.

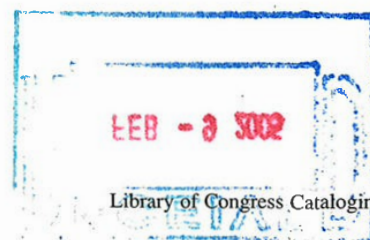
Print: ISBN 0-7381-2601-2

SP1122

See other standards and standards-related product listings at: <http://standards.ieee.org/>

The publisher believes that the information and guidance given in this work serve as an enhancement to users, all parties must rely upon their own skill and judgement when making use of it. The publisher does not assume any liability to anyone for any loss or damage caused by any error or omission in the work, whether such error or omission is the result of negligence or any other cause. Any and all such liability is disclaimed.

This work is published with the understanding that the IEEE is supplying information through this publication, not attempting to render engineering or other professional services. If such services are required, the assistance of an appropriate professional should be sought. The IEEE is not responsible for the statements and opinions advanced in this publication.



Library of Congress Cataloging-in-Publication Data

IEEE 100 : the authoritative dictionary of IEEE standards terms.—7th ed.
p. cm.

ISBN 0-7381-2601-2 (paperback : alk. paper)

1. Electric engineering—Dictionaries. 2. Electronics—Dictionaries. 3. Computer engineering—Dictionaries. 4. Electric engineering—Acronyms. 5. Electronics—Acronyms. 6. Computer engineering—Acronyms. I. Institute of Electrical and Electronics Engineers.

TK9 .I28 2000
621.3'03—dc21

00-050601

Contents

Introduction	v
How to Use This Dictionary	vi
Categories	vi
Trademarks	ix
The Authoritative Dictionary of IEEE Standards Terms	1
Abstracts and Sources	1294
Non-IEEE Standards Sources	1351

stored programs, and that can perform substantial computations, including numerous arithmetic operations, or logic operations, without human intervention during a run. *Note:* May be stand alone, or may consist of several interconnected units. (C) 610.10-1994w

computer-aided design (CAD) (computer graphics) The use of computers to aid in design layout and analysis. May include modeling, analysis, simulation, or optimization of designs for production. Often used in combinations such as CAD/CAM. *See also:* computer-aided engineering; computer-aided manufacturing; computer-aided design and drafting; design automation. (C) 610.2-1987, 610.6-1991w

computer-aided design and drafting (CADD) The use of computers to aid in design layout, drafting, and analysis. Often used as a synonym for computer-aided design. (C) 610.6-1991w

computer-aided education (CAE) *See:* computer-assisted instruction.

computer-aided engineering (CAE) (1) (computer graphics) The use of computers to aid in engineering analysis and design. May include solution of mathematical problems, process control, numerical control, and execution of programs performing complex or repetitive calculations. *See also:* computer-aided manufacturing; computer-aided design. (C) 610.2-1987, 610.6-1991w

(2) The application of computers to the engineering process. The term now commonly applies to any computer system or program that manipulates data for the purpose of assisting engineering, design, procurement, maintenance, etc. (PE/EDPG) 1150-1991w

(3) A computer-based set of tools to assist in the design and development of integrated circuits. (C/TT) 1450-1999

computer-aided inspection (CAI) The use of computers to inspect manufactured parts. *Synonym:* mechanical inspection. (C) 610.2-1987

computer-aided instruction (CAI) The use of computers to present instructional material and to accept and evaluate student responses. *See also:* computer-assisted instruction; computer-based instruction. (C) 610.2-1987

computer-aided management (CAM) The application of computers to business management activities. For example, database management, control reporting, and information retrieval. *See also:* decision support system; management information system. (C) 610.2-1987

computer-aided manufacturing (CAM) (computer graphics) The use of computers and numerical control equipment to aid in manufacturing processes. May include robotics, automation of testing, management functions, control, and product assembly. Often used in combinations such as CAD/CAM. *See also:* computer-aided design; computer-aided engineering. (C) 610.2-1987, 610.6-1991w

computer-aided page makeup The use of computers to automate the formation of text and graphics into discrete camera-ready pages. *See also:* computer-aided typesetting; photo-composition. (C) 610.2-1987

computer-aided software engineering (CASE) The use of computers to aid in the software engineering process. May include the application of software tools to software design, requirements, tracing, code production, testing, document generation, and other software engineering activities. (C/SE) 1348-1995, 610.12-1990

computer-aided testing (CAT) The use of computers to test manufactured parts. (C) 610.2-1987

computer-aided typesetting The use of computers at any stage of the document composition process. This may involve text formatting, input from a word processing system, or computer-aided page makeup. *Synonym:* computer typesetting. (C) 610.2-1987

Computer and Business Equipment Manufacturers Association The Secretariat for ASC X3-series standards on information technology. (C) 610.7-1995, 610.10-1994w

computer architecture The organizational structure of a computer system, including the hardware and the software. *Contrast:* computer network architecture. (C) 610.10-1994w

computer-assisted instruction (CAI) The use of computers to present instructional material and to accept and evaluate student responses. *Synonyms:* computer-assisted learning; computer-aided instruction; computer-aided education; computer-augmented learning. *See also:* computer-based instruction. (C) 610.2-1987, 610.6-1991w

computer-assisted learning (CAL) *See:* computer-assisted instruction.

computer-assisted system A system that utilizes separate and standalone computers or processors for arithmetic computational and logic functions. All data manipulation and evaluation (e.g., alarm condition annunciation) functions are performed by the system. (IA/MT) 45-1998

computer-assisted tester (test, measurement, and diagnostic equipment) A test not directly programmed by a computer but that operates in association with a computer by using some arithmetic functions of the computer. (MIL) [2]

computer-assisted tomography (CAT) *See:* computed tomography.

computer-augmented learning (CAL) *See:* computer-assisted instruction.

computer automated measurement and control (CAMAC) (1) A standard modular instrumentation and digital interface system. (NPS) 583-1982r

(2) (FASTBUS acquisition and control) An internationally standardized modular instrumentation and digital interface system as defined in IEEE Std 583-1982, *IEEE Standard Modular Instrumentation and Digital Interface System (CAMAC)*, and the corresponding documents EUR 4100-1972, *CAMAC: A Modular Instrumentation System for Data Handling*, and IEC Pub 516-1975, *A Modular Instrumentation System for Data Handling; CAMAC System*; Compiler Automated Measurement and Control. (NID) 960-1986s

computer-based education (CBE) *See:* computer-based instruction.

computer-based instruction The use of computers to support any process involving human learning. *Synonyms:* computer-based education; computer-based learning. (C) 610.2-1987

computer-based learning (CBL) *See:* computer-based instruction.

computer-based simulation A simulation that is executed on a computer. *Synonym:* machine-centered simulation. *Contrast:* human-centered simulation. (C) 610.3-1989w

computer-based system A system that utilizes one or more embedded computers or processors to perform its functions. (IA/MT) 45-1998

computer channel *See:* input-output channel.

computer code A machine code for a specific computer. (C) [20], [85]

computer component (analog computer) Any part, assembly, or subdivision of a computer, such as resistor, amplifier, power supply, or rack. (C) 165-1977w

computer conferencing A form of teleconferencing that allows one or more users to exchange messages on a computer network. *See also:* video conferencing. (C) 610.2-1987

computer control (electric power system) (physical process) A mode of control wherein a computer, using as input the process variables, produces outputs that control the process. *See also:* power system. (PE/PSE) [54]

computer-control state (1) (analog computer) One of several distinct and selectable conditions of the computer-control circuits. *See also:* potentiometer set; hold; reset; operate; balance check; static test. (C) 165-1977w

(2) In an analog computer, one of several distinct and selectable conditions of the control circuit. *See also:* operate; balance check; static test; hold; reset; potentiometer set. (C) 610.10-1994w

computer control unit *See:* instruction control unit.

computer data (software) Data available for communication between or within computer equipment. Such data can be external (in computer-readable form) or resident within the computer equipment and can be in the form of analog or digital signals. *See also:* computer. (C/SE) 729-1983s

computer database *See:* database.

computer description language *See:* hardware description language.

Computer Design Language A design language for describing or designing computer architectures at the register level. (C) 610.13-1993w

computer diagram (analog computer) A functional drawing showing interconnections between computing elements, such interconnections being specified for the solution of a particular set of equations. *See also:* computer program; problem board. (C) 165-1977w

computer equation (machine equation) (analog computer) An equation derived from a mathematical model for use on a computer which is equivalent or proportional to the original equation. *See also:* scale factor. (C) 165-1977w

computer generated force (CGF) Simulation of entities on the virtual battlefield. CGF entities may be fully autonomous (needing no human direction) or semi-autonomous (requiring some direction by a human controller who is not a participant in the virtual events). CGF entities represent friendly, opposing forces (OPFOR), and neutral battlefield participants not portrayed by manned simulators. (DIS/C) 1278.3-1996

computer graphics (A) The branch of computer science concerned with methods of creating, modifying, or analyzing pictorial data. (B) The use of a computer in any discipline to create, modify, or analyze images. (C) 610.6-1991

Computer Graphics Interface (CGI) (A) A computer graphics standard that provides a method for exchanging device-independent data between graphics systems or device-dependent parts of a graphics system. It is under development by the American National Standards Institute (ANSI) and the International Standards Organization (ISO). (B) A method for exchanging device-independent data between graphics systems or device-dependent parts of a graphics system. (C) 610.6-1991

Computer Graphics Metafile (CGM) (A) A computer graphics standard that provides a method for recording graphical information in a metafile. It was developed by the American National Standards Institute (ANSI) and the International Standards Organization (ISO). (B) A method for recording graphical information in a metafile. (C) 610.6-1991

computer hardware Devices capable of accepting and storing computer data, executing a systematic sequence of operations on computer data, or producing control outputs. Such devices can perform substantial interpretation, computation, communication, control, or other logical functions. (C/SE) J-STD-016-1995

computer hardware description language *See:* hardware description language.

computer input microfilm (CIM) The input to a process that converts data contained on microform into machine-readable data. (C) 610.2-1987

computer instruction A machine instruction for a specific computer. (C) [20], [85]

(2) (A) (software) A statement in a programming language, specifying an operation to be performed by a computer and the addresses or values of the associated operands; for example, Move A to B. *See also:* instruction set; instruction format. (B) (software) Loosely, any executable statement in a computer program. (C) 610.12-1990, 610.10-1994

(3) (A) A statement in a computer language; specifying an operation to be performed by a computer and the address or values of the associated operands; for example, MOVE A to B. *See also:* machine instruction; operation field; operand field; address field. (B) An instruction expressed in machine language. (C) 610.10-1994

computer instruction code A code used to represent the instruction within an instruction set. *See also:* machine code. (C) 610.10-1994w

computer instruction set The collection of computer instructions possible on a given computer. *Synonym:* machine instruction set. (C) 610.10-1994w

computer-integrated manufacturing (CIM) Use of an integrated system of computer-controlled manufacturing centers. The centers may use robotics, design automation, or CAD/CAM (computer-aided design/computer-aided manufacturing) technologies. *See also:* flexible manufacturing system. (C) 610.2-1987

computer interface equipment (1) (surge withstand capability) A device that interconnects a protective relay system to an independent computer, for example, an analog to digital converter, a scanner, a buffer amplifier. (PE/PSR) C37.90-1978s

(2) A device that interconnects a protective relay system to an independent computer, for example, a scanner or a buffer amplifier. (SWG/PE) C37.100-1992

computer interface unit A device used to connect peripheral devices with a computer. (C) 610.10-1994w

computerized axial tomography (CAT) *See:* computed tomography.

computerized healthcare information systems *See:* patient care information system.

computer language A language designed to enable humans to communicate with computers. *See also:* system profile; workload model; programming language; design language. (C) 610.12-1990

(2) (A) A language designed to enable humans to communicate with computers and computer systems. (B) A language that is used to control, design, or define a computer or computer program. (C) 610.13-1993, 610.10-1994

computer literacy An understanding of the capabilities, operation, and applications of computers. (C) 610.2-1987

computer-managed instruction (CMI) The use of computers for management of student progress. Activities may include record keeping, progress evaluation, and lesson assignment. *See also:* computer-based instruction. (C) 610.2-1987

computer network (1) (software) A complex consisting of two or more interconnected computers. *See also:* computer. (C/SE) [20], 729-1983s, [85]

(2) An interconnection of assemblies of computer systems, terminals and communications facilities. (LM/COM) 168-1956w

(3) A structured connection of computer systems and peripheral devices that exchange data as necessary to perform the specific function of the network. *See also:* hierarchical computer network; homogeneous computer network; heterogeneous computer network; centralized computer network; decentralized computer network; distributed computer network. (C) 610.7-1995, 610.10-1994w

computer network architecture The logical structure and the operating principles, including those concerning services, functions, and protocols, of a computer network. *Contrast:* computer architecture. (C) 610.7-1995, 610.10-1994w

computer numerical control (CNC) Numerical control in which one or more machines that produce manufactured parts are linked together via a single computer. (C) 610.2-1987

computer operation (A) An operation which can be performed by a computer with a single instruction. (B) An operation performed by a functional unit within a computer. For example: an instruction fetch, or an addition. *Synonym:* machine operation. (C) 610.10-1994

computer output microfilm (COM) The end result of a process that converts and records data from a computer directly to a microform. (C) 610.2-1987

computer output microfilmer A device for producing computer output microfilm. *Synonym:* COM device. (C) 610.2-1987

conductor, so that there are only three terminals of entry, the point of entry of one of the phase conductors may be chosen as the common voltage point, and the voltages from that conductor to the common point become zero. If, in the preceding, the terminal of entry of phase conductor *b* is chosen as the common point, E_a is replaced by E_{ab} in the first line, E_c is replaced by E_{cb} in the third line, and the second line, being zero, is omitted. 4. If both the voltages and currents in the preceding equations constitute symmetrical polyphase sets of the same phase sequence, then $p = 3E_a I_a \cos(\alpha_a - \beta_a)$. Because this expression and similar expressions for *m* phases are independent of time, it follows that the instantaneous power is constant when the voltages and currents constitute polyphase symmetrical sets of the same phase sequence. 5. However, if the polyphase sets have single-phase symmetry or zero-phase symmetry rather than polyphase symmetry, the higher frequency terms do not cancel, and the instantaneous power is not a constant. 6. In general, the instantaneous power *p* at the (*m* + 1) terminals of entry of a polyphase circuit of *m* phases to a delimited area, when one of the terminals is that of the neutral conductor, is expressed by the equation

$$p = \sum_{s=1}^m e_s i_s \\ = \sum_{s=1}^m \sum_{r=1}^{\infty} \sum_{q=1}^{\infty} E_{sr} I_{sq} \cos[(r-q)\omega t + \alpha_{sr} - \beta_{sq}] \\ + \cos[(r+q)\omega t + \alpha_{sr} + \beta_{sq}]$$

where e_s is the instantaneous alternating voltage between the *s*th terminal entry and the terminal of voltage reference, which may be the true neutral point, the neutral conductor, or another point in the boundary surface. i_s is the instantaneous alternating current through the *s*th terminal of entry. E_{sr} is the root-mean-square amplitude of the *r*th harmonic of voltage e_s . I_{sq} is the root-mean-square amplitude of the *q*th harmonic of current i_s . α_{sr} is the phase angle of the *r*th harmonic of e_s with respect to a common reference. β_{sq} is the phase angle of the *q*th harmonic of i_s with respect to the same reference as the voltages. The index *s* runs through the phase letters identifying the *m*-phase conductor of an *m*-phase system, *a*, *b*, *c*, etc., and then concludes with the neutral conductor *n*, if one exists. The indexes *r* and *q* identify the order of the harmonic term in each e_s and i_s , respectively, and run through all the harmonics present in the Fourier series representation of each alternating voltage and current. If the terminal voltage reference is that of the neutral conductor, the terms for *s* = *n* will vanish. If the voltages and current are quasi-periodic, of the form given in "power, instantaneous (two-wire circuit)," this expression is still valid but E_{sr} and I_{sq} become periodic functions of time. 7. Instantaneous power is expressed in watts when the voltages are in volts and the currents in amperes. See also: zero-phase symmetrical set; single-phase symmetrical set. (Std100) 270-1966w

(3) (two-wire circuit) At the two terminals of entry into a delimited region, the product of the instantaneous voltage between one terminal of entry and the second terminal of entry, considered as the reference terminal, and the current through the first terminal. Notes: 1. The entire path selected for the determination of each voltage must lie in the boundary surface of the delimited region or be so selected that the voltage is the same as that analog such a path. 2. Mathematically the instantaneous power *p* is given by $p = ei$ in which *e* is the voltage between the first terminal of entry and the second (reference) terminal of entry and *i* is the current through the first terminal of entry in the reference direction. 3. If both the voltage and current are sinusoidal and of the same period, the instantaneous power at any instant *t* is given by the equation

$$p = ei = [(2)^{1/2} E \cos(\omega t + \alpha)] \\ \times [(2)^{1/2} I \cos(\omega t + \beta)] \\ = 2EI \cos(\omega t + \alpha) \cos(\omega t + \beta) \\ = EI[\cos(\alpha - \beta) + \cos(2\omega t + \alpha + \beta)]$$

in which *E* and *I* are the root-mean-square amplitudes of voltage and current, respectively, and α and β are the phase angles of the voltage and current, respectively, from the same reference. 4. If the voltage is an alternating voltage and the current is an alternating current of the same primitive period [see alternating voltage; alternating current; and period (primitive period) of a function], the instantaneous power is given by the equation

$$p = ei \\ = E_1 I_1 [\cos(\alpha_1 - \beta_1) + \cos(2\omega t + \alpha_1 + \beta_1)] \\ + E_2 I_2 [\cos(\omega t + \alpha_2 - \beta_1) + \cos(3\omega t + \alpha_2 + \beta_1)] \\ = E_1 I_2 [\cos(\omega t - \alpha_1 + \beta_2) + \cos(3\omega t + \alpha_1 + \beta_2)] \\ + E_2 I_2 [\cos(\alpha_2 - \beta_2) + \cos(4\omega t + \alpha_2 + \beta_2)] \\ + \dots$$

This equation can be written conveniently as a double summation

$$p = \sum_{r=1}^{\infty} \sum_{q=1}^{\infty} E_r I_q \cos[(r-q)\omega t + \alpha_r - \beta_q] \\ + \cos[(r+q)\omega t + \alpha_r + \beta_q]$$

in which *r* is the order of the harmonic component of the voltage and *q* is the order of the harmonic component of the current (see "harmonic components (harmonics)"), and *E*, *I*, α , and β apply to the harmonic denoted by the subscript. 5. If the voltage and current are quasi-periodic functions of the form

$$e = (2)^{1/2} \sum_{r=1}^{\infty} E_r(t) \cos(r\omega t + \alpha_r)$$

$$i = (2)^{1/2} \sum_{q=1}^{\infty} I_q(t) \cos(q\omega t + \beta_q)$$

where $E_r(t)$, $I_q(t)$ are aperiodic functions of *t*, the instantaneous power is given by the equation

$$p = ei \\ = E_1(t) I_1(t) [\cos(\alpha_1 - \beta_1) \\ + \cos(2\omega t + \alpha_1 + \beta_1)] \\ + E_2(t) I_1(t) [\cos(\omega t + \alpha_2 - \beta_1) \\ + \cos(3\omega t + \alpha_2 + \beta_1)] \\ + E_1(t) I_2(t) [\cos(\omega t - \alpha_1 + \beta_2) \\ + \cos(3\omega t + \alpha_1 + \beta_2)] \\ + E_2(t) I_2(t) [\cos(\alpha_2 - \beta_2) \\ + \cos(4\omega t + \alpha_2 + \beta_2)] \\ + \dots$$

6. Instantaneous power is expressed in watts when the voltage is in volts and the current in amperes. 7. See "reference direction of energy." The sign of the energy will be positive if the flow of power is in the reference direction and negative if the flow is in the opposite direction. (Std100) 270-1966w

instantaneous power output The rate at which energy is delivered to a load at a particular instant. See also: radio transmitter. (AP/ANT) 145-1983s

instantaneous Poynting vector ($\vec{P}(t, \vec{r})$) (of an electromagnetic wave) The vector product of the instantaneous electric and magnetic field vectors. The integral of $\vec{P}(t, \vec{r})$ over a surface is the instantaneous electromagnetic power flow through the surface. (AP/PROP) 211-1997

instantaneous recording (mechanical recording) A phonograph recording that is intended for direct reproduction without further processing. See also: phonograph pickup. (SP) [32]

instantaneous relay recovery time Recovery time of a thermal relay measured when the heater is de-energized at the instant of contact operation. (EEC/REE) [87]

instantaneous relay reoperate time Reoperate time of a thermal relay measured when the heater is de-energized at the instant of contact operation. (EEC/REE) [87]

instantaneous sampling The process for obtaining a sequence of instantaneous values of a wave. Note: These values are called instantaneous samples. (AP/ANT) 145-1983s

instantaneous sound pressure (at a point) The total instantaneous pressure at that point minus the static pressure at that point. Note: The commonly used unit is the newton per square meter. (SP) [32]

instantaneous storage See: immediate access storage.

instantaneous suppression with automatic current regulation (thyristor) A combination of instantaneous trip or suppression and current regulation in which suppression is followed immediately by a regulated current. (IA/IPC) 428-1981w

instantaneous trip (1) (as applied to Circuit Breakers) A qualifying term indicating that no delay is purposely introduced in the tripping action of the circuit breaker. (NESC) [86] (2) The means to sense an overload and reduce the output current to zero, as fast as practicable. (IA/IPC) 428-1981w

instantiation (software) The process of substituting specific data, instructions, or both into a generic program unit to make it usable in a computer program. (C) 610.12-1990

instant of chopping The instant when the initial discontinuity appears. (PE/PSIM) 4-1995

instant start fluorescent lamp (illuminating engineering) A fluorescent lamp designed for starting by a high voltage without preheating of the electrodes. (EEC/IE) [126]

Institute of Electrical and Electronics Engineers (1) An organization that, among other functions, sponsors standards development. (C/BA) 14536-1995

(2) An international professional organization that is accredited by American National Standards Institute to develop standards for them. (C) 610.7-1995, 610.10-1994w

institutional design Emphasizes reliability, resistance to wear and use, safety to public, and special aesthetic considerations, such as the "agelessness" of the structure. (IA/PSE) 241-1990r

instruction (1) (programmable digital computer systems in safety systems of nuclear power generating stations) A meaningful expression in a computer programming language that specifies an operation to a digital computer. 554-1990

(2) (bit interface circuits) A binary data word shifted serially into the test logic defined by this standard in order to define its subsequent operation. (TT/C) 1149.1-1990

(3) (software) See also: computer instruction. (C) 610.12-1990

(4) A statement or expression consisting of an operation and its operands (if any), which can be interpreted by a computer in order to perform some function or operation. See also: computer instruction; microinstruction; macroinstruction. (C) 610.10-1994w

instruction address (A) The address of an instruction. (B) The address that must be used to fetch an instruction. (C) 610.10-1994

instruction address register An address register used to hold the address of an instruction. Synonyms: instruction pointer register; program register. See also: P register. (C) 610.10-1994w

instruction address stop An instruction address that, when it is fetched, causes execution to stop. See also: address stop. (C) 610.10-1994w

instructional character See: control character.

instructional game An instruction method employed by some computer-assisted instruction systems, in which a game is used to instruct the student on some subject. Contrast: simulation. (C) 610.2-1987

instructional simulation (modeling and simulation) A simulation intended to provide an opportunity for learning or to evaluate learning or educational potential; for example, a simulation in which a mock-up of an airplane cockpit is used to

train student pilots. Synonyms: academic simulation; tutorial simulation. (C) 610.3-1989w

instruction cache A cache that stores instructions for fast access by the processor. Contrast: data cache. (C) 610.10-1994w

instruction code See: computer instruction code.

instruction control unit In a processor, the part that retrieves instructions in proper sequence, interprets each instruction, and applies the proper signals to the arithmetic and logic unit and other parts in accordance with this interpretation. Synonym: computer control unit. (C) 610.10-1994w

instruction counter (IC) (software) A register that indicates the location of the next computer instruction to be executed. Synonym: program counter. (C) 610.12-1990

instruction cycle (software) The process of fetching a computer instruction from memory and executing it. See also: instruction time. (C) 610.12-1990, 610.10-1994w

instruction decoder (A) The portion of the computer that determines which functions of the execution unit and the operand handler must be performed to execute the instruction. Note: Often implemented as part of the instruction fetch unit. (B) A functional component that analyzes the operation to be performed, as indicated in an instruction. See also: instruction processor. (C) 610.10-1994

instruction fetch unit The portion of a computer that reads the next instruction word from memory and converts the commands to the internal format used by the instruction decoder. (C) 610.10-1994w

instruction field A bit field within an instruction word. (C/MM) 1754-1994

instruction format The number and arrangement of the fields (operand, operation, and address) in a computer instruction. See also: address format. (C) 610.10-1994w, 610.12-1990

instruction length (software) The number of words, bytes, or bits needed to store a computer instruction. (C) 610.12-1990

instruction modifier (software) A word or part of a word used to alter a computer instruction. (C) 610.12-1990

instruction pointer register See: instruction address register.

instruction processor A functional component that carries out the action indicated by the instruction decoder, resulting in a possible change of machine or data state; for example, instruction decision and execution. (C) 610.10-1994w

instruction register A register that is used to hold an instruction for interpretation. (C) 610.10-1994w

instruction repertoire See: instruction set.

instruction set The complete set of instructions recognized by a given computer or provided by a given programming language. Note: In computer hardware, this term is considered to be synonymous with a computer's architecture. Synonym: instruction repertoire. See also: computer instruction set. (C) 610.10-1994w, 610.12-1990

instruction set architecture (1) (software) An abstract machine characterized by an instruction set. See also: abstract machine; instruction set. (C/SE) 729-1983s

(2) An ISA defines instructions, registers, instruction and data memory, the effect of executed instructions on the registers and memory, and an algorithm for controlling instruction execution. An ISA does not define clock-cycle times, cycles per instruction, data paths, etc. This standard defines an ISA. (C/MM) 1754-1994

instruction time (1) (software) The time it takes a computer to fetch an instruction from memory and execute it. See also: instruction cycle. (C) 610.12-1990, 610.10-1994w

(2) The time it takes to perform one instruction cycle. (C) 610.10-1994w

instruction trace See: trace.

instruction word A word that represents an instruction. See also: very long instruction word. (C) 610.10-1994w

instrument (1) (plutonium monitoring) A complete system designed to quantify a particular type of ionizing radiation. (NI) N317-1980r