



A BEST-SELLING REFERENCE WORK FOR
ALL COMPUTER USERS

Oxford



DICTIONARY OF Computing



The most authoritative and up-to-date reference books for both students and the general reader.

ABC of Music
 Accounting
 Allusions
 Animal Behaviour
 Archaeology
 Architecture and Landscape
 Architecture
 Art and Artists
 Art Terms
 Arthurian Literature and Legend
 Astronomy
 Battlefield*
 Better Wordpower
 Bible
 Biology
 British History
 British Place-Names
 Buddhism
 Business and Management
 Card Games
 Catchphrases
 Chemistry
 Christian Art
 Christian Church
 Century of New Words
 Classical Literature
 Classical Myth and Religion
 Classical World
 Computing
 Contemporary World History
 Countries of the World
 Dance
 Dynasties of the World
 Earth Sciences
 Ecology
 Economics
 Education
 Encyclopedia
 Engineering*
 English Etymology
 English Folklore
 English Grammar
 English Language
 English Literature
 English Surnames
 Environment and Conservation
 Euphemisms
 Everyday Grammar
 Family and Local History
 Finance and Banking
 First Names
 Food and Drink
 Food and Nutrition
 Foreign Words and Phrases
 Geography
 Humorous Quotations
 Idioms
 Internet
 Irish History
 Islam
 Kings and Queens of Britain
 Language Toolkit
 Law
 Law Enforcement
 Linguistics
 Literary Terms
 London Place-Names
 Mathematics
 Medical
 Medicinal Drugs
 Modern Design
 Modern Quotations
 Modern Slang
 Music
 Musical Terms
 Musical Works
 Nicknames
 Nursing
 Ologies and Isms
 Philosophy
 Phrase and Fable
 Physics
 Plant Sciences
 Plays
 Pocket Fowler's Modern English Usage
 Political Quotations
 Politics
 Popes
 Proverbs
 Psychology
 Quotations
 Quotations by Subject
 Reverse Dictionary
 Rhymes
 Rhyming Slang
 Saints
 Science
 Scientific Quotations
 Scottish History
 Shakespeare
 Ships and the Sea
 Slang
 Sociology
 Space Exploration
 Statistics
 Superstitions
 Synonyms and Antonyms
 Weather
 Weights, Measures, and Units
 Word Histories
 World History
 World Mythology
 World Religions
 Zoology

*forthcoming

A Dictionary of Computing

SIXTH EDITION

OXFORD
UNIVERSITY PRESS

OXFORD
UNIVERSITY PRESS

Great Clarendon Street Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide in

Oxford New York

Auckland Cape Town Dar es Salaam Hong Kong Karachi
Kuala Lumpur Madrid Melbourne Mexico City Nairobi
New Delhi Shanghai Taipei Toronto

With offices in

Argentina Austria Brazil Chile Czech Republic France Greece
Guatemala Hungary Italy Japan Poland Portugal Singapore
South Korea Switzerland Thailand Turkey Ukraine Vietnam

Oxford is a registered trade mark of Oxford University Press
in the UK and in certain other countries

Published in the United States

by Oxford University Press Inc., New York

© Market House Books Ltd, 1983, 1986, 1990, 2004, 2008

The moral rights of the author have been asserted
Database right Oxford University Press (maker)

First edition 1983

Second edition 1986

Third edition 1990

Fourth edition 1996

Fifth edition 2004

Sixth edition 2008

All rights reserved. No part of this publication may be reproduced,
stored in a retrieval system, or transmitted in any form or by any means,
without the prior permission in writing of Oxford University Press,
or as expressly permitted by law, or under terms agreed with the appropriate
reprographics rights organization. Enquiries concerning reproduction
outside the scope of the above should be sent to the Rights Department,
Oxford University Press, at the address above

You must not circulate this book in any other binding or cover
and you must impose this same condition on any acquirer

British Library Cataloguing in Publication Data
Data available

Library of Congress Cataloging in Publication Data
Data available

Typeset by Market House Books Ltd.
Printed in Great Britain
on acid-free paper by
Clays Ltd, St Ives plc

ISBN 978-0-19-923400-4

3

R0429520283

Contents

Credits	vi
Preface	vii
Guide to the Dictionary	viii
A Dictionary of Computing	1
Computer Graphics (Feature)	100
The Anatomy of an Internet Address (Feature)	260
Object-oriented Programming (Feature)	350
Quantum Computing (Feature)	416
SQL (Feature)	484
XML (Feature)	564
Appendices	
Generic Domain Names	573
Country-Code Domain Names	574
File Extensions	577
Character Set	580
Greek Alphabet	581
Chronology	582
Useful Web Sites	584

identifier

ing how a control parameter influences a system.

identifier A string of characters used to identify (or "name") some element of a program. The kind of element that may be named depends on the programming language; it may be a variable, a data structure, a procedure, a statement, a higher-level unit, or the program itself. See TAPE FORMAT.

identity burst See TAPE FORMAT.

identity element of a *set S on which some *dyadic operation $\circ$ is defined. An element e with the property that

$$a \circ e = e \circ a = a$$

for all elements a in S . It can be shown that e is unique. In normal arithmetic, 0 and 1 are the identity elements associated with addition and multiplication respectively. In a *Boolean algebra, 0 and 1 are the identities associated with the OR and the AND operations respectively.

identity function A *function

$$f: S \rightarrow S$$

with the property that

$$f(s) = s \text{ for all } s \text{ in } S$$

Such a function leaves every element in its domain unaltered. Identity functions are needed for such purposes as the definition of *inverses of functions.

identity matrix (unit matrix) A *diagonal matrix, symbol I , with each diagonal element equal to one.

idle time See AVAILABLE TIME.

IDMS A database management system based on the *CODASYL network model.

IDP Abbrev. for integrated data processing. See DATA PROCESSING.

IEC International Electrotechnical Commission, an international body concerned with the standardization of electrical and electronic components.

 SEE WEB LINKS

• The IEC home page

IEEE Institute of Electrical and Electronics Engineers, formed in 1963 by the merger of the IRE (Institute of Radio Engineers) and the AIEE (American Institute of Electrical Engineers). Though based in the USA, it represents electrical and electronics engineers

throughout the world. The IEEE Computer Society (IEEE-CS) is one of several special-interest groups.

The IEEE is an accredited organization for writing US national standards in telecommunications and computing (see ANSI). For example, Project 802 is a long-running project that manages the production of standards for the physical layer of local area networks, ensuring that standards are produced quickly whenever new technologies such as wireless or infrared become available.

 SEE WEB LINKS

• The IEEE home page

IEEE1394 See FIREWIRE.

IESG Abbrev. for Internet Engineering Steering Group. See INTERNET SOCIETY.

IETF Abbrev. for Internet Engineering Task Force. See INTERNET SOCIETY.

if and only if statement A well-formed formula of the form

$$A \equiv B$$

where A and B are also appropriate well-formed formulas. See BICONDITIONAL, PROPOSITIONAL CALCULUS.

IFE Abbrev. for intelligent front end.

iff Short for if and only if.

IFIP International Federation for Information Processing, founded in 1959 under the auspices of UNESCO and coming into official existence in 1960. It is a multinational federation of professional/technical societies, or groups of such societies, concerned with information processing. Each member country has only one such society or group as a full member. IFIP aims to "promote information science and technology, advance international cooperation in the field of information processing, stimulate research, development, and application of information processing, further dissemination and exchange of information on information processing, and encourage education in information processing."

 SEE WEB LINKS

• The IFIP home page

IFS Abbrev. for iterated function system.

if then else statement The most basic conditional construct in a programming lan-

illumination The distribution of light falling on a surface. See LOCAL ILLUMINATION, GLOBAL ILLUMINATION.

iMac Any of a range of Apple Macintosh personal computers first introduced in 1998. The monitor, CPU, and CD drive are all contained in a single unit and stylish design is a characteristic feature.

image 1. A copy in memory of data that exists elsewhere. 2. See DIGITAL IMAGE. 3. See FUNCTION.

image capture (image acquisition) The process of obtaining a digital image from a vision sensor, such as a video camera. Usually this entails a hardware interface known as a frame grabber, which captures single frames of video, converts the analogue values to digital, and feeds the result into the computer memory. The conversion process is often accompanied with *image compression.

image compression The reduction of the number of bits used to define an image.

Many techniques are available. For example, run-length encoding allows a set of pixels having the same color to be specified by the color and number of pixels with that color in a sequence. Other techniques include *fractional image compression and *wavelet image compression. Compression can produce an approximation of the image, in which case it is not possible to decompress the image and retrieve the original form. See ALSO LOSSY COMPRESSION, LOSSLESS COMPRESSION, DISCRETE COSINE TRANSFORM.

image display The process of displaying an image on a *display.

image file format A format for defining an image. Examples are *TIFF, *JPEG, and *GIF.

image grabber See VIDEO SCANNER.

image management system (IMS) A management system for handling digital images. An example is Starlink, used in astronomy.

image map An image on a web page that can function as a hyperlink. The term is particularly used for an image in which different parts give different links. For instance, clicking on different rooms in a plan of a house might link to photographs of each room. Originally image maps were executed on the

guage, allowing selection between two alternatives, dependent on the truth or falsity of a given condition. Most languages also provide an *if ... then* construct to allow conditional execution of a single statement or group of statements. Primitive languages, such as Basic in its original form, restrict the facility to a conditional transfer of control, e.g.

"IF A = 0 THEN 330"

which is reminiscent of the conditional jump provided in the order code of every CPU. See ALSO CONDITIONAL.

IGBT Abbrev. for insulated-gate *bipolar transistor; usually applied in the computerized control of high-power systems such as traction motors.

IGES Acronym for initial graphics exchange specification. An *ANSI standard developed in 1980 for exchanging product data between applications. Although *STEP was intended to replace the IGES standard, it is still widely used.

ignore character (fill character) A character used in transmission to fill an otherwise empty position and whose value is thus ignored.

IH Abbrev. for interrupt handler.

iLink See FIREWIRE.

ill-conditioned See CONDITION NUMBER.

illegal character Any character not in the *character set of a given machine or not allowed by a given programming language or protocol.

illegal instruction An instruction that has an invalid *operation code. It is sometimes deliberately inserted in an instruction stream when debugging in order to have a program halt, or interrupt, at a particular point.

ILLIAC IV An *array processor that was designed by Daniel Slotnick and used a 16-by-16 array of processing units (PUs), each interconnected to its four nearest neighbors. The array of PUs was regulated by a single processor that controlled the flow of instructions to the PUs. The ILLIAC IV was sponsored by ARPA and built by Burroughs Corporation. It became operable at the Ames Research Center of NASA in the early 1970s, and was finally dismantled in 1981.

Computing

This leading dictionary for computer specialists with everything from network graphics and webcams and jargon-free definitions, it is as valuable for home and office users as it is indispensable for students and teachers of computing.

CHICAGO PUBLIC LIBRARY



R0429520283

ALTGELD

Oxford Paperback Reference

THE WORLD'S MOST TRUSTED
REFERENCE BOOKS

- Over 6,500 entries—150 of them new to this fully revised and updated edition
- New feature spreads on key topics, including XML
- Full coverage of the internet, multimedia, and computer applications
- Includes recent advances in artificial intelligence, security, and personal computing

Sixth
Edition

Recommended web links for many entries updated via the *Dictionary of Computing* companion website: www.oup.com/uk/reference/resources/computing

Cover photographs: Main image © Stockbyte/Punchstock

Many books in the Oxford Paperback Reference series are available as e-books. Visit www.askoxford.com/shoponline/ebooks/ for details

OXFORD
UNIVERSITY PRESS

www.oup.com

ISBN 978-0-19-923400-4



9 780199 234004

£10.99 RRP \$18.95 USA
\$21.95 CAN