Intro to OS: Web Scraped

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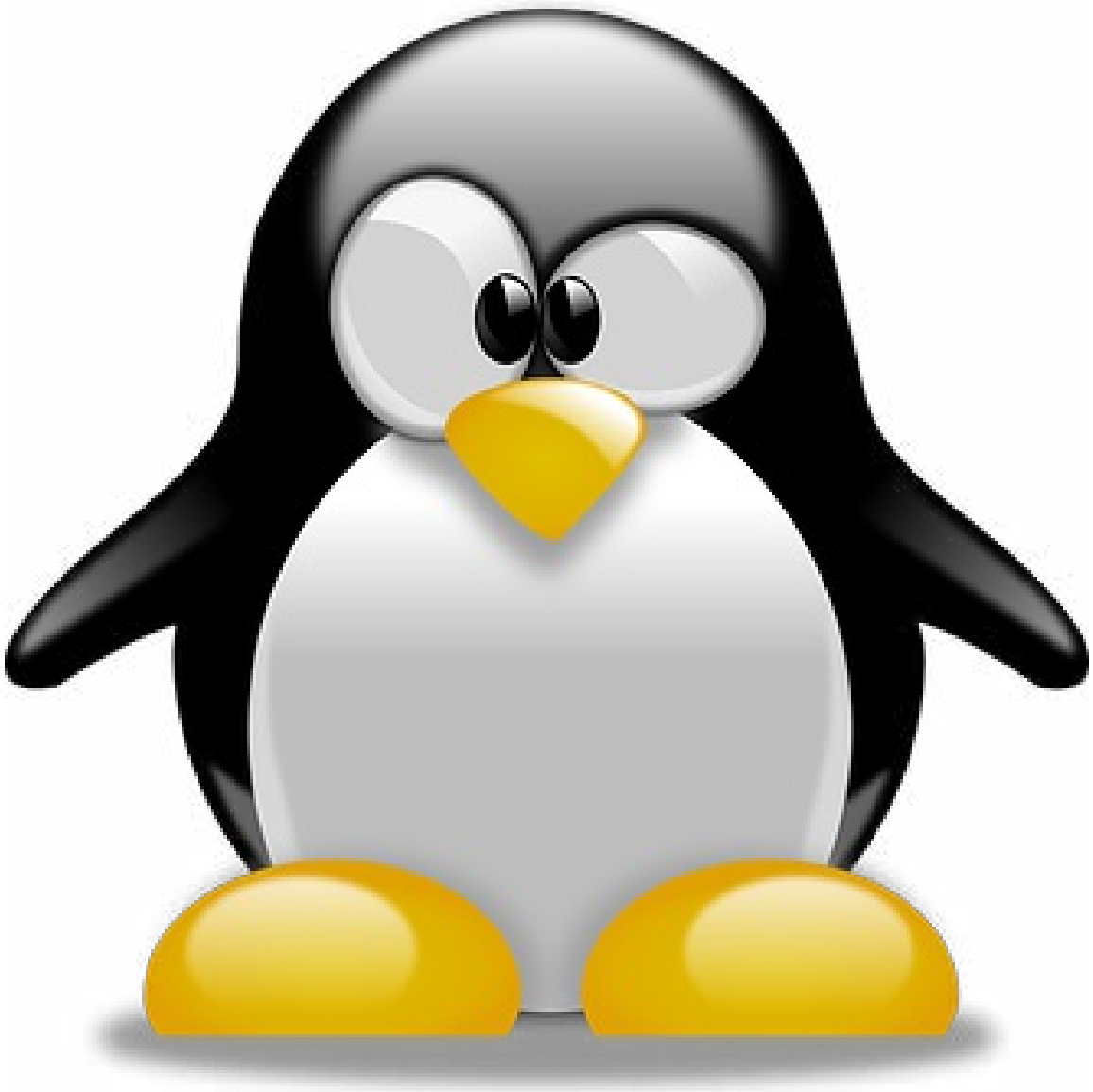

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Berkeley Software Distribution
Biological system
Block device
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Burroughs Corporation
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Burroughs large systems
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Busy waiting
B�la H. B�n�thy
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CDC Kronos
CERN httpd
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CP/M
Call stack
Case sensitivity
Central processing unit
Channel I/O
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Charles A. S. Hall
ChromeOS
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Classic Mac OS
Classified information
Claude Shannon
Command-line interface
Common Desktop Environment
Common Open Software Environment
Compact disc
Comparison of operating systems
Comparison of user features of operating systems
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Compiler construction
Complex adaptive system
Complex system
Complex systems
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Computational biology
Computational chemistry
Computational complexity theory
Computational engineering
Computational geometry
Computational mathematics
Computational physics
Computational social science
Computer accessibility
Computer animation
Computer architecture
Computer data storage
Computer file
Computer graphics
Computer hardware
Computer monitor
Computer mouse
Computer multitasking
Computer network
Computer program
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Computer security
Computer security compromised by hardware failure
Computer vision
Computing platform
Conceptual system
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Concurrent computing
Context switch
Control Data Corporation
Control flow

Control theory
Control variable (programming)
Control-C
Cooperative multitasking
Coupled human?environment system
Crash (computing)
Credit card
Cross-validation (statistics)
Cryptography
Curlie
Cursor (user interface)
Cybernetics
Cyberwarfare
DECnet
DOS/360
DVD
Daemon (computing)
Data buffer
Data mining
Data storage
Database
Dave Cutler
Debian
Decision support system
Defense Advanced Research Projects Agency
Defragmentation
Dependability
Deterministic system
Device driver
Device file
Device register
Digital Equipment Corporation
Digital art
Digital library
Digital marketing
Direct memory access
Directory (computing)
Directory structure
Discrete mathematics
Disk operating system
Disk partitioning
Distributed artificial intelligence
Distributed computing
Distributed operating system
Division by zero
Document management system
Doi (identifier)
Domain Name System
Domain-specific language
Donella Meadows
Doubling time
Dynamical system
E-commerce
ECos
ESound
ETH Z�rich
EXEC 8
Earth system science
Economic system
Ecosystem
Edsger W. Dijkstra
Educational technology
Edward Norton Lorenz
Electronic design automation
Electronic publishing
Electronic voting
Embedded operating system
Embedded system
Emulator
Energy system
Enterprise information system
Enterprise software
Eric Trist
Event (computing)
Exception handling
Executive Systems Problem Oriented Language
Exokernel
Ext3
Ext4
Faina Mihajlovna Kirillova
Federal Information Processing Standards
File attribute
File locking
File system
File transfer protocol
Firewall (networking)
Firmware
Fixed-priority pre-emptive scheduling
Forensic software engineering
Formal language
Formal methods
Formal system
Francisco Varela
Fred Emery
Free Software Foundation
Free software
FreeBSD
FreeMint
GM-NAA I/O
GNOME
GNU Hurd
GNU Project
General Comprehensive Operating System
General Electric
General protection fault
Geographic information system
George Dantzig
George Klir
Glossary of operating systems terms
Google
Government of the United States
Graphical user interface
Graphics processing unit
Green computing
Green500
Gregory Bateson
HP-UX
Haiku (operating system)
Hard disk drive
Hard disk drives

Hardware abstraction
Hardware acceleration
Health informatics
Heinz von Foerster
Hexadecimal
History of IBM mainframe operating systems
History of operating systems
Hobbyist operating system
Holon (philosophy)
Homebrew Computer Club
Honeywell
Howard T. Odum
Human body
Human?computer interaction
Humberto Maturana
Hybrid kernel
Hypervisor
IA-32
IBM
IBM 1410
IBM 7010
IBM 704
IBM 7040
IBM 709
IBM 7090
IBM 7090/94 IBSYS
IBM AIX
IBM Airline Control Program
IBM Personal Computer
IBM Power Systems
IBM System/360
IBM System/360 Model 67
IBM i
INT (x86 instruction)
IOS
IP address
ISBN (identifier)
ISO 9660
Ilya Prigogine
Image compression
Infinite loop
Information retrieval
Information security
Information system
Information theory
Inode
Input and output
Input device
Input/Output
Input/output
Institution of Engineering and Technology
Integrated circuit
Integrated development environment
Intel 80386
Intel Corporation
Inter-process communication
Interaction design
Interpreter (computing)
Interrupt
Interrupt handler
Interrupt request (PC architecture)
Interrupt vector table
Interruptible operating system
Intrusion detection system
Itanium
James Grier Miller
James J. Kay
Java (software platform)
Jay Wright Forrester
Jennifer Wilby
John Seddon
John Wiley & Sons
Journaling file system
Just enough operating system
J�rg Gutknecht
KDE
KDE Plasma 5
Kathleen Carley
Katia Sycara
Keith Bostic (software engineer)
Ken Thompson
Kenneth E. Boulding
Kernel (operating system)
Kevin Warwick
Keyboard (computing)
Knowledge representation and reasoning
Library (computing)
Light-weight Linux distribution
Lightweight Directory Access Protocol
Limiting factor
Linker (computing)
Linus Torvalds
Linux
Linux Mint
Linux distribution
Linux kernel
List of important publications in computer science
List of national legal systems
List of operating systems
List of pioneers in computer science
List of systems sciences organizations
List of systems scientists
Live CD
Live USB
Living systems
Loadable kernel module
Logic in computer science
Ludwig von Bertalanffy
Lydia Kavraki
MCP (Burroughs Large Systems)
MCP/ClearPath
MINIX
MIT
MKS Inc.
MOS Technology 6502
MS-DOS
MULTICS
MUSIC/SP
MVS
MVS/ESA

Mac OS X Lion
Mac OS X Server 1.0
Mac OS X v10.0
MacOS
MacOS Server
Mach (kernel)
Machine code
Machine learning
Macintosh
Magnetic tape
Mainframe computer
Mainframe computers
Manchester Mark 1
Manfred Clynes
Manuela M. Veloso
Margaret Boden
Margaret Mead
Mary Cartwright
Mass storage
Mathematical analysis
Mathematical optimization
Mathematical software
Memory address
Memory allocation
Memory management
Memory management (operating systems)
Memory paging
Memory protection
Memory segmentation
Message transfer agent
Metric system
Michigan Terminal System
Microcode
Microcomputer
Microcontroller
Microkernel
Microprocessor
Microsoft
Microsoft Windows
Middleware
Midrange computer
Mihajlo D. Mesarovic
Mike Jackson (systems scientist)
Minicomputer
Minix 3
Mixed reality
Mnemonic
Mobile device
Mobile operating system
Model of computation
Modeling language
Modular programming
Monolithic kernel
MontaVista
MorphOS
Motherboard
Mouse (computing)
Multi-agent system
Multi-task learning
Multi-user
Multics
Multikernel
Multilevel feedback queue
Multimedia database
Multiprocessing
Multithreading (computer architecture)
Murray Bowen
NEXTSTEP
NOS (software)
NTFS
NTFS-3G
Natural language processing
NeXT
NeXTSTEP
Negative feedback
Nervous system
NetBSD
Network File System
Network architecture
Network operating system
Network performance
Network protocol
Network scheduler
Network security
Network service
Networking hardware
Niklas Luhmann
Niklaus Wirth
Non-volatile memory
Non-volatile storage
Nonlinear system
Norbert Wiener
Numerical analysis
OEM
ORVYL
OS 2200
OS/2
OS/360
OS/360 and successors
Oberon (operating system)
Object-oriented operating system
Open core
Open-source software
OpenBSD
OpenVMS
Operating System Projects
Operating environment
Operating system
Operating system abstraction layer
Operations research
Outline of computer science
Output device
P-code machine
PC DOS
PDP-11
PLATO (computer system)
POSIX
Page fault
Paging
Palm OS

Parallel computing
Penguin
Per Brinch Hansen
Peripheral
Personal computer
Personal computer hardware
Personal digital assistant
Peter Senge
Philosophy of artificial intelligence
Photo manipulation
PikeOS
Plan 9 from Bell Labs
Planetary system
Plugboard
Political system
Polling (computer science)
Popek and Goldberg virtualization requirements
Ported
Positive feedback
Preboot Execution Environment
Preemption (computing)
Preemptive multitasking
Prentice Hall
Principia Cybernetica
Printed circuit board
Printer (computing)
Probability
Process (computing)
Process control
Process control block
Process identifier
Process management (computing)
Processor register
Program counter
Programmable Interrupt Controller
Programming language
Programming language theory
Programming paradigm
Programming team
Programming tool
Proprietary software
Protected mode
Protection ring
Punched tape
QNX
Qian Xuesen
Qt (software)
RISC OS
RSX-11
RT-11
RTLinux
Radhika Nagpal
Random access memory
Random-access memory
Randomized algorithm
ReactOS
Read-only memory
Readers?writers problem
Real-time computing
Real-time operating system
Red Hat Enterprise Linux
Reinforcement learning
Reiser4
ReiserFS
Remote procedure call
Rendering (computer graphics)
Requirements analysis
Resident monitor
Richard E. Bellman
Richard Stallman
Round-robin scheduling
Rump kernel
Runtime library
Russell L. Ackoff
Ruzena Bajcsy
S2CID (identifier)
SCOPE (software)
SCSI RDMA Protocol
SHARE Operating System
SIGBUS
SIGSEGV
SPARC
Sabre (computer system)
Samba (software)
Sandbox (computer security)
Scheduler (computing)
Scheduling (computing)
Secure Shell
Security service (telecommunication)
Security-focused operating system
Segmentation fault
Segmentation violation
Semantics (computer science)
Sensory system
Server (computing)
Server message block
Shell (computing)
Shortest job next
Signal (IPC)
Single address space operating system
Single-board computer
Singularity (operating system)
Smartphone
Smartwatch
Social computing
Social software
Social system
Sociotechnical system
Software
Software architecture
Software configuration management
Software construction
Software deployment
Software design
Software development
Software development process
Software engineering
Software framework
Software interrupt
Software maintenance

Software platform
Software portability
Software quality
Software repository
Solaris (operating system)
Solid modeling
Solid state drives
Sorting algorithm
Sperry Rand
Spooling
Stack machine
Star system
Statistics
Status message
Status register
Stephanie Forrest
Steve Jobs
Sun Microsystems
Supercomputer
Supercomputer operating system
Supervised learning
Supervisor mode
Syllable Desktop
Symbian
Synthography
System
System Commander
System V
System call
System dynamics
System image
System library
System of measurement
System on a chip
System resource
System software
Systemics
Systems Network Architecture
Systems analysis
Systems art
Systems biology
Systems ecology
Systems engineering
Systems neuroscience
Systems pharmacology
Systems philosophy
Systems psychology
Systems science
Systems theory
Systems theory in anthropology
Systems theory in archaeology
Systems theory in political science
Systems thinking
TOPS-10
TOPS-20
TOS/360
TSS/360
Tablet computer
Talcott Parsons
Tandem
TempleOS
The Open Group
Theoretical computer science
Theory of computation
Thomas E. Anderson
Thread (computing)
Tim Berners-Lee
Time slice
Time-sharing
Timeline of operating systems
Transaction Processing Facility
Trusted Computer System Evaluation Criteria
Trusted operating system
Tux (mascot)
Twelve leverage points
UNIVAC
UNIVAC 1108
UNIX
UNIX System Services
USB flash drive
Ubiquitous computing
Ubuntu (operating system)
Unikernel
Unisys
United States Department of Defense
Universal Disk Format
Universal Turing machine
University of California, Berkeley
Unix
Unix-like
Unsupervised learning
Urban metabolism
Usage share of operating systems
Usenet newsgroup
User (computing)
User interface
User mode
User space
User space and kernel space
VAX
VMS Software Inc
Very Large Scale Integration
Video game
Virtual file system
Virtual machine
Virtual memory
Virtual reality
Virtual tape library
Visualization (graphics)
Vkernel
VxWorks
WIMP (computing)
Wayback Machine
Web server
Webserver
William Ross Ashby
Windows 11
Windows 3.x
Windows 95
Windows 9x

Windows CE
Windows ME
Windows NT
Windows NT 4.0
Windows Server 2003
Windows Server 2008 R2
Windows Vista
Windows XP
Windows shell
Windows shell replacement
Word processor
Workstation
World Wide Web
World-systems theory
Writing system
X Window System
X86
X86-64
XTS-400
Z/Architecture
Z/OS
Z/VM

16-bit computing

In computer architecture, 16-bit integers, memory addresses, or other data units are those that are 16 bits (2 octets) wide. Also, 16-bit central processing unit (CPU) and arithmetic logic unit (ALU) architectures are those that are based on registers, address buses, or data buses of that size. 16-bit microcomputers are microcomputers that use 16-bit microprocessors.

32-bit computing

In computer architecture, 32-bit computing refers to computer systems with a processor, memory, and other major system components that operate on data in 32-bit units. Compared to smaller bit widths, 32-bit computers can perform large calculations more efficiently and process more data per clock cycle. Typical 32-bit personal computers also have a 32-bit address bus, permitting up to 4 GB of RAM to be accessed; far more than previous generations of system architecture allowed.32-bit designs have been used since the earliest days of electronic computing, in experimental systems and then in large mainframe and minicomputer systems. The first hybrid 16/32-bit microprocessor, the Motorola 68000, was introduced in the late 1970s and used in systems such as the original Apple Macintosh. Fully 32-bit microprocessors such as the HP FOCUS, Motorola 68020 and Intel 80386 were launched in the early to mid 1980s and became dominant by the early 1990s. This generation of personal computers coincided with and enabled the first mass-adoption of the World Wide Web. While 32-bit architectures are still widely-used in specific applications, their dominance of the PC market ended in the early 2000s.

64-bit computing

In computer architecture, 64-bit integers, memory addresses, or other data units are those that are 64 bits wide. Also, 64-bit CPUs and ALUs are those that are based on processor registers, address buses, or data buses of that size. A computer that uses such a processor is a 64-bit computer.

80286

The Intel 80286 (also marketed as the iAPX 286 and often called Intel 286) is a 16-bit microprocessor that was introduced on February 1, 1982. It was the first 8086-based CPU with separate, non-multiplexed address and data buses and also the first with memory management and wide protection abilities. The 80286 used approximately 134,000 transistors in its original nMOS (HMOS) incarnation and, just like the contemporary 80186, it could correctly execute most software written for the earlier Intel 8086 and 8088 processors.The 80286 was employed for the IBM PC/AT, introduced in 1984, and then widely used in most PC/AT compatible computers until the early 1990s. In 1987, Intel shipped its five-millionth 80286 microprocessor.

ACM Computing Classification System

The ACM Computing Classification System (CCS) is a subject classification system for computing devised by the Association for Computing Machinery (ACM). The system is comparable to the Mathematics Subject Classification (MSC) in scope, aims, and structure, being used by the various ACM journals to organize subjects by area.

ALGOL

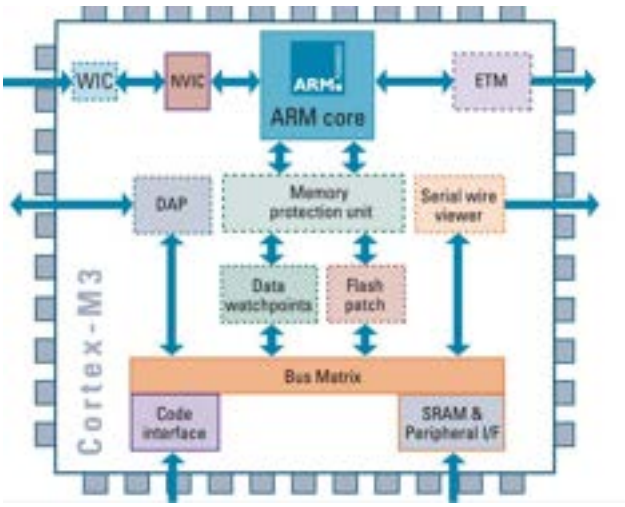
ALGOL (; short for "Algorithmic Language") is a family of imperative computer programming languages originally developed in 1958. ALGOL heavily influenced many other languages and was the standard method for algorithm description used by the Association for Computing Machinery (ACM) in textbooks and academic sources for more than thirty years.In the sense that the syntax of most modern languages is "Algol-like", it was arguably more influential than three other high-level programming languages among which it was roughly contemporary: FORTRAN, Lisp, and COBOL. It was designed to avoid some of the perceived problems with FORTRAN and eventually gave rise to many other programming languages, including PL/I, Simula, BCPL, B, Pascal, and C.

API

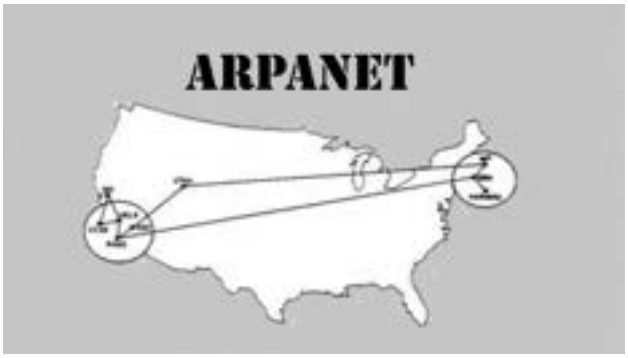
An application programming interface (API) is a way for two or more computer programs to communicate with each other. It is a type of software interface, offering a service to other pieces of software. A document or standard that describes how to build or use such a connection or interface is called an API specification. A computer system that meets this standard is said to implement or expose an API. The term API may refer either to the specification or to the implementation.

ARM architecture

ARM (stylised in lowercase as arm, formerly an acronym for Advanced RISC Machines and originally Acorn RISC Machine) is a family of reduced instruction set computer (RISC) instruction set architectures for computer processors, configured for various environments. Arm Ltd. develops the architectures and licenses them to other companies, who design their own products that implement one or more of those architectures, including system on a chip (SoC) and system on module (SOM) designs, that incorporate different components such as memory, interfaces, and radios. It also designs cores that implement these instruction set architectures and licenses these designs to many companies that incorporate those core designs into their own products.

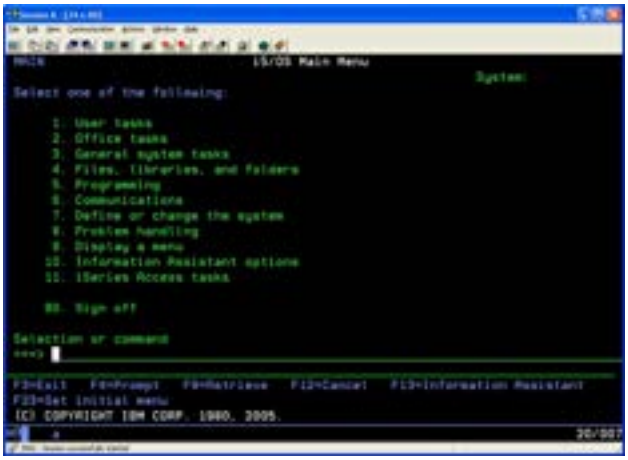


ARPANET



The Advanced Research Projects Agency Network (ARPANET) was the first wide-area packet-switched network with distributed control and one of the first networks to implement the TCP/IP protocol suite. Both technologies became the technical foundation of the Internet. The ARPANET was established by the Advanced Research Projects Agency (ARPA) of the United States Department of Defense.Building on the ideas of J. C. R. Licklider, Bob Taylor initiated the ARPANET project in 1966 to enable resource sharing between remote computers. Taylor appointed Larry Roberts as program manager. Roberts made the key decisions about the network design. He incorporated Donald Davies' concepts and designs for packet switching, and sought input from Paul Baran. ARPA awarded the contract to build the network to Bolt Beranek & Newman who developed the first protocol for the network. Roberts engaged Leonard Kleinrock at UCLA to develop mathematical methods for analyzing the packet network technology.The first computers were connected in 1969 and the Network Control Protocol was implemented in 1970. The network was declared operational in 1971. Further software development enabled remote login, file transfer and email. The network expanded rapidly and operational control passed to the Defense Communications Agency in 1975.

AS/400



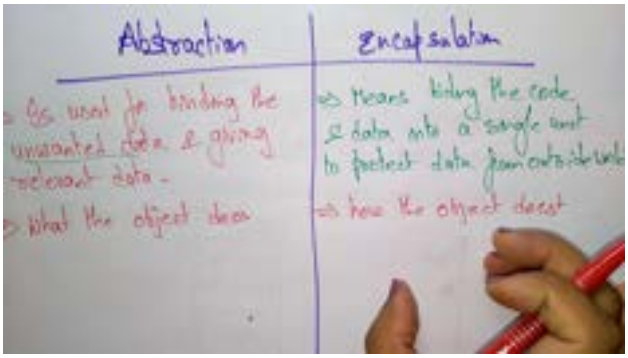
The IBM AS/400 (Application System/400) is a family of midrange computers from IBM announced in June 1988 and released in August 1988. It was the successor to the System/36 and System/38 platforms, and ran the OS/400 operating system. Lower-cost but more powerful than its predecessors, the AS/400 was extremely successful at launch, with an estimated 111,000 installed by the end of 1990 and annual revenue reaching $14 billion that year, increasing to 250,000 systems by 1994, and about 500,000 shipped by 1997.A key concept in the AS/400 platform is Technology Independent Machine Interface (TIMI), a platform-independent instruction set architecture (ISA) that is compiled along with the native machine language instructions. The platform has used this capability to change the underlying processor architecture without breaking application compatibility. Early systems were based on a 48-bit CISC instruction set architecture known as the Internal Microprogrammed Interface (IMPI), originally developed for the System/38. In 1991, the company introduced a new version of the system running on a 64-bit PowerPC-derived CPU, the IBM RS64. Due to the use of TIMI, applications for the original CISC-based programs continued to run on the new systems without modification. The RS64 was replaced with POWER4 processors in 2001, which was followed by POWER5 and POWER6 in later upgrades.

Abort (computing)

In a computer or data transmission system, to abort means to terminate, usually in a controlled manner, a processing activity because it is impossible or undesirable for the activity to proceed or in conjunction with an error. Such an action may be accompanied by diagnostic information on the aborted process.In addition to being a verb, abort also has two noun senses. In the most general case, the event of aborting can be referred to as an abort. Sometimes the event of aborting can be given a special name, as in the case of an abort involving a Unix kernel where it is known as a kernel panic. Specifically in the context of data transmission, an abort is a function invoked by a sending station to cause the recipient to discard or ignore all bit sequences transmitted by the sender since the preceding flag sequence.

Abstraction (software engineering)

In software engineering and computer science, abstraction is:



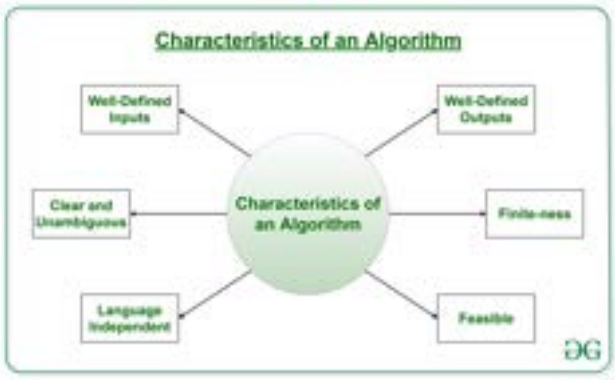
Alan Turing

Alan Mathison Turing (; 23 June 1912 ? 7 June 1954) was an English mathematician, computer scientist, logician, cryptanalyst, philosopher, and theoretical biologist. Turing was highly influential in the development of theoretical computer science, providing a formalisation of the concepts of algorithm and computation with the Turing machine, which can be considered a model of a general-purpose computer. He is widely considered to be the father of theoretical computer science and artificial intelligence.Born in Maida Vale, London, Turing was raised in southern England. He graduated at King's College, Cambridge, with a degree in mathematics. Whilst he was a fellow at Cambridge, he published a proof demonstrating that some purely mathematical yes?no questions can never be answered by computation and defined a Turing machine, and went on to prove that the halting problem for Turing machines is undecidable. In 1938, he obtained his PhD from the Department of Mathematics at Princeton University. During the Second World War, Turing worked for the Government Code and Cypher School (GC&CS) at Bletchley Park, Britain's codebreaking centre that produced Ultra intelligence. For a time he led Hut 8, the section that was responsible for German naval cryptanalysis. Here, he devised a number of techniques for speeding the breaking of German ciphers, including improvements to the pre-war Polish bomba method, an electromechanical machine that could find settings for the Enigma machine. Turing played a crucial role in cracking intercepted coded messages that enabled the Allies to defeat the Axis powers in many crucial engagements, including the Battle of the Atlantic.

Alexander Bogdanov

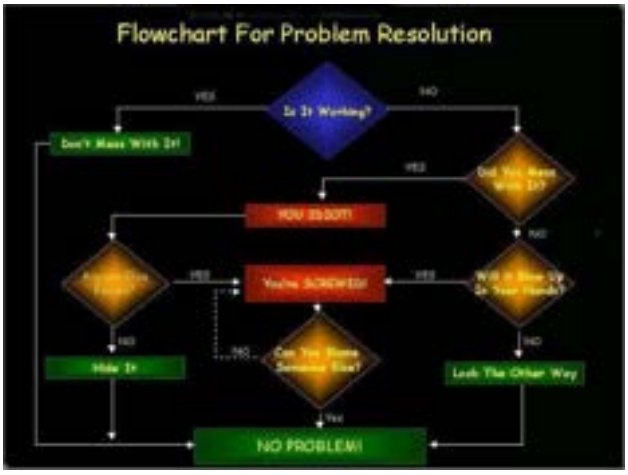
Alexander Aleksandrovich Bogdanov (Russian: ?????????? ????????????? ?????????; 22 August 1873 [O.S. 10 August] ? 7 April 1928), born Alexander Malinovsky, was a Russian and later Soviet physician, philosopher, science fiction writer, and Bolshevik revolutionary.

Algorithm



In mathematics and computer science, an algorithm ((listen)) is a finite sequence of rigorous instructions, typically used to solve a class of specific problems or to perform a computation. Algorithms are used as specifications for performing calculations and data processing. More advanced algorithms can use conditionals to divert the code execution through various routes (referred to as automated decision-making) and deduce valid inferences (referred to as automated reasoning), achieving automation eventually. Using human characteristics as descriptors of machines in metaphorical ways was already practiced by Alan Turing with terms such as "memory", "search" and "stimulus".In contrast, a heuristic is an approach to problem solving that may not be fully specified or may not guarantee correct or optimal results, especially in problem domains where there is no well-defined correct or optimal result.As an effective method, an algorithm can be expressed within a finite amount of space and time, and in a well-defined formal language for calculating a function. Starting from an initial state and initial input (perhaps empty), the instructions describe a computation that, when executed, proceeds through a finite number of well-defined successive states, eventually producing "output" and terminating at a final ending state. The transition from one state to the next is not necessarily deterministic; some algorithms, known as randomized algorithms, incorporate random input.

Algorithm design



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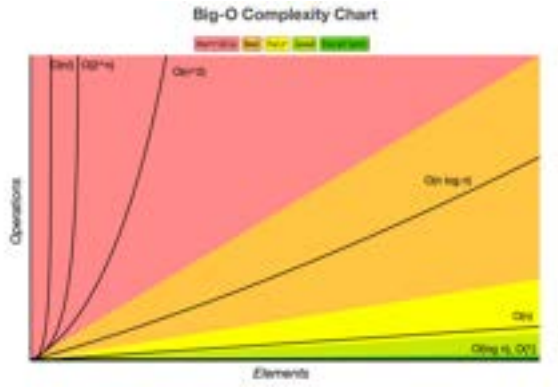
Algorithmic efficiency

In computer science, algorithmic efficiency is a property of an algorithm which relates to the amount of computational resources used by the algorithm. An algorithm must be analyzed to determine its resource usage, and the efficiency of an algorithm can be measured based on the usage of different resources. Algorithmic efficiency can be thought of as analogous to engineering productivity for a repeating or continuous process.



Allenna Leonard

Allenna Leonard is an American cyberneticist, consultant and director of Team Syntegrity International, specializing in the application of Stafford Beer's Viable System Model and Syntegration. She was president of the International Society for the Systems Sciences in 2009?2010, and led the organization of its 54th annual meeting in Waterloo, Canada.

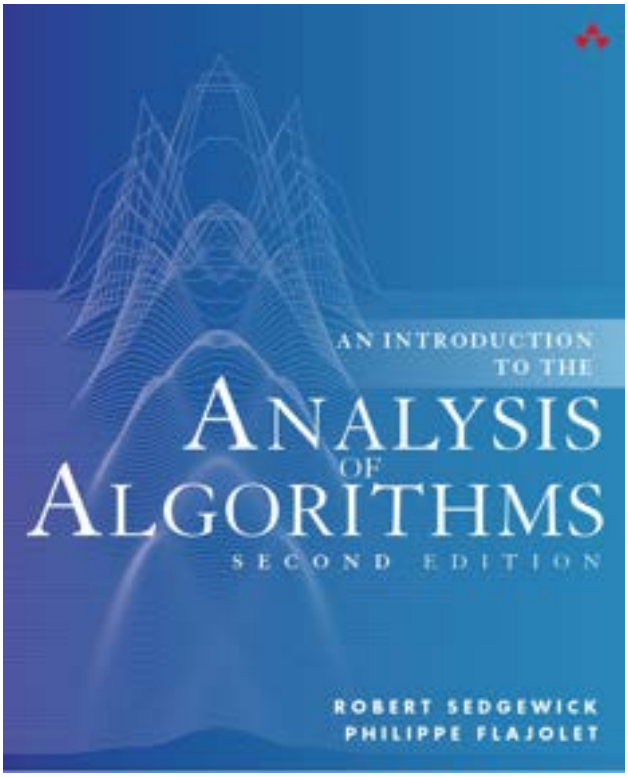
American Airlines

American Airlines is a major US-based airline headquartered in Fort Worth, Texas, within the Dallas?Fort Worth metroplex. It is the largest airline in the world when measured by fleet size, scheduled passengers carried, and revenue passenger mile. American, together with its regional partners and affiliates, operates an extensive international and domestic network with almost 6,800 flights per day to nearly 350 destinations in more than 50 countries. American Airlines is a founding member of the Oneworld alliance, the third-largest airline alliance in the world. Regional service is operated by independent and subsidiary carriers under the brand name American Eagle.American Airlines and American Eagle operate out of 10 hubs, with Dallas/Fort Worth (DFW) being its largest. The airline handles more than 200 million passengers annually with an average of more than 500,000 passengers daily. As of 2021, the company employs 123,400 staff members.

AmigaOS

AmigaOS is a family of proprietary native operating systems of the Amiga and AmigaOne personal computers. It was developed first by Commodore International and introduced with the launch of the first Amiga, the Amiga 1000, in 1985. Early versions of AmigaOS required the Motorola 68000 series of 16-bit and 32-bit microprocessors. Later versions were developed by Haage & Partner (AmigaOS 3.5 and 3.9) and then Hyperion Entertainment (AmigaOS 4.0-4.1). A PowerPC microprocessor is required for the most recent release, AmigaOS 4.

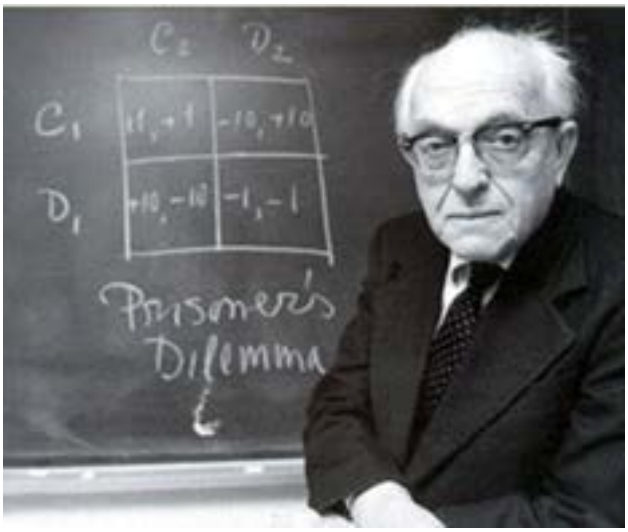
Analysis of algorithms



In computer science, the analysis of algorithms is the process of finding the computational complexity of algorithms?the amount of time, storage, or other resources needed to execute them. Usually, this involves determining a function that relates the size of an algorithm's input to the number of steps it takes (its time complexity) or the number of storage locations it uses (its space complexity). An algorithm is said to be efficient when this function's values are small, or grow slowly compared to a growth in the size of the input. Different inputs of the same size may cause the algorithm to have different behavior, so best, worst and average case descriptions might all be of practical interest. When not otherwise specified, the function describing the performance of an algorithm is usually an upper bound, determined from the worst case inputs to the algorithm.

Anatol Rapoport

Anatol Rapoport (Ukrainian: ???????? ????????? ?????????; Russian: ????????? ?????????? ?????????; May 22, 1911 ? January 20, 2007) was an American mathematical psychologist. He contributed to general systems theory, to mathematical biology and to the mathematical modeling of social interaction and stochastic models of contagion.

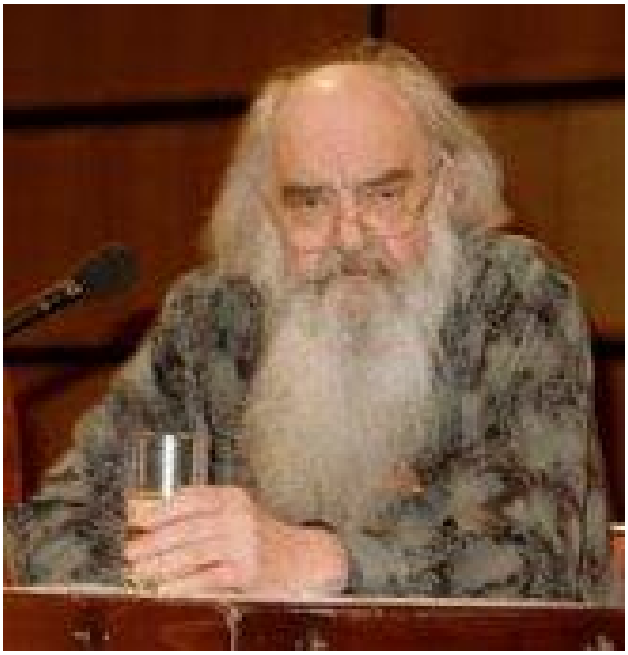


Android (operating system)

Android is a mobile operating system based on a modified version of the Linux kernel and other open-source software, designed primarily for touchscreen mobile devices such as smartphones and tablets. Android is developed by a consortium of developers known as the Open Handset Alliance, though its most widely used version is primarily developed by Google. It was unveiled in November 2007, with the first commercial Android device, the HTC Dream, being launched in September 2008.

Anthony Stafford Beer

Anthony Stafford Beer (25 September 1926 ? 23 August 2002) was a British theorist, consultant and professor at the Manchester Business School. He is best known for his work in the fields of operational research and management cybernetics.



Anthony Wilden

Anthony George Wilden (14 December 1935 ? 29 December 2019) was a writer, social theorist, college lecturer, and consultant. Wilden published numerous books and articles which intersect a number of fields, including systems theory, film theory, structuralism, cybernetics, psychiatry, anthropological theory, water control projects, urban ecosystems, resource conservation, and communications and social relations.Wilden is credited with one of the first significant introductions to the work of Jacques Lacan in the English-speaking world, particularly in his role as one of Lacan's early English translators. Today Wilden's work (and consequent reputation) is arguably more influential in the fields of communication theory, ecology and social interaction. These fields of study evolved out of a long scholarly tradition of "interactional semiotics" that originated with Plato's Cratylus. Along with such figures as Gregory Bateson (i.e., Steps to an Ecology of Mind), R. D. Laing (i.e., Sanity, Madness and the Family), and Walker Percy (i.e., Lost in the Cosmos), Wilden is considered one of this tradition's contemporary (modern and postmodern) pioneers.With the appearance of System and Structure (1972), Wilden sought "to establish the necessity of an ecosystemic or ecological approach to communication and exchange in open systems of all types", to use his own words. In hindsight it is recognized that System and Structure was an early contribution to a "theory of self-referential systems".

Apollo program

The Apollo program, also known as Project Apollo, was the third United States human spaceflight program carried out by the National Aeronautics and Space Administration (NASA), which succeeded in preparing and landing the first humans on the Moon from 1968 to 1972. It was first conceived in 1960 during President Dwight D. Eisenhower's administration as a three-person spacecraft to follow the one-person Project Mercury, which put the first Americans in space. Apollo was later dedicated to President John F. Kennedy's national goal for the 1960s of "landing a man on the Moon and returning him safely to the Earth" in an address to Congress on May 25, 1961. It was the third US human spaceflight program to fly, preceded by the two-person Project Gemini conceived in 1961 to extend spaceflight capability in support of Apollo.

Apple II

The Apple II (stylized as apple][) is an 8-bit home computer and one of the world's first highly successful mass-produced microcomputer products. It was designed primarily by Steve Wozniak; Jerry Manock developed the design of Apple II's foam-molded plastic case, Rod Holt developed the switching power supply, while Steve Jobs's role in the design of the computer was limited to overseeing Jerry Manock's work on the plastic case. It was introduced by Jobs and Wozniak at the 1977 West Coast Computer Faire, and marks Apple's first launch of a personal computer aimed at a consumer market?branded toward American households rather than businessmen or computer hobbyists.

Apple Inc.

Apple Inc. is an American multinational technology company headquartered in Cupertino, California, United States. Apple is the largest technology company by revenue (totaling US$365.8 billion in 2021) and, as of June 2022, is the world's biggest company by market capitalization, the fourth-largest personal computer vendor by unit sales and second-largest mobile phone manufacturer. It is one of the Big Five American information technology companies, alongside Alphabet (Google), Amazon, Meta (Facebook), and Microsoft.

Application programming interface

An application programming interface (API) is a way for two or more computer programs to communicate with each other. It is a type of software interface, offering a service to other pieces of software. A document or standard that describes how to build or use such a connection or interface is called an API specification. A computer system that meets this standard is said to implement or expose an API. The term API may refer either to the specification or to the implementation.

Application security

Application security (short AppSec) includes all tasks that introduce a secure software development life cycle to development teams. Its final goal is to improve security practices and, through that, to find, fix and preferably prevent security issues within applications. It encompasses the whole application life cycle from requirements analysis, design, implementation, verification as well as maintenance.

Application software

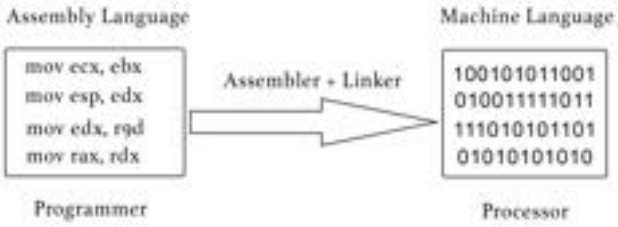
An application program (software application, or application, or app for short) is a computer program designed to carry out a specific task other than one relating to the operation of the computer itself, typically to be used by end-users. Word processors, media players, and accounting software are examples. The collective noun "application software" refers to all applications collectively. The other principal classifications of software are system software, relating to the operation of the computer, and utility software ("utilities").

Artificial intelligence

Artificial intelligence (AI) is intelligence? perceiving, synthesizing, and inferring information?demonstrated by machines, as opposed to intelligence displayed by non-human animals and humans. Example tasks in which this is done include speech recognition, computer vision, translation between (natural) languages, as well as other mappings of inputs.

Assembly language

In computer programming, assembly language (or assembler language, or symbolic machine code), often referred to simply as Assembly and commonly abbreviated as ASM or asm, is any low-level programming language with a very strong correspondence between the instructions in the language and the architecture's machine code instructions. Assembly language usually has one statement per machine instruction (1:1), but constants, comments, assembler directives, symbolic labels of, e.g., memory locations, registers, and macros are generally also supported.



Atlas (computer)

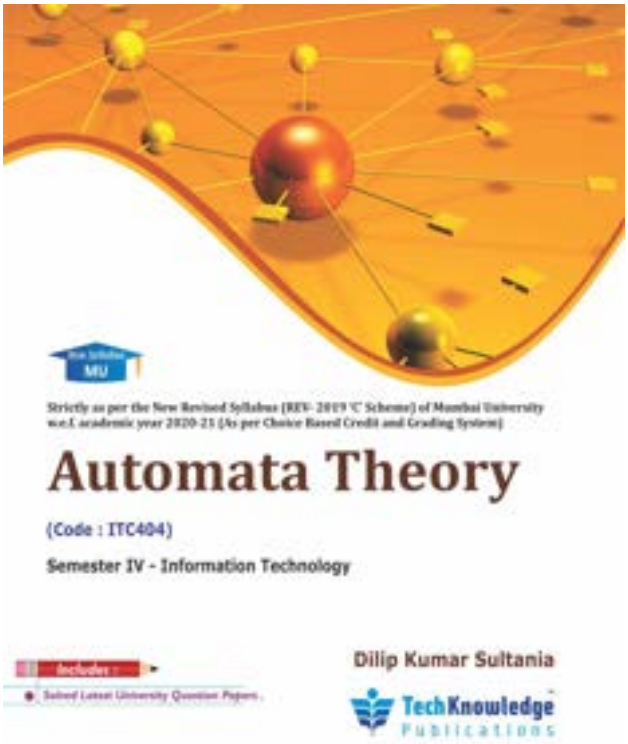
The Atlas Computer was one of the world's first supercomputers, in use from 1962 (when it was claimed to be the most powerful computer in the world) to 1972. Atlas' capacity promoted the saying that when it went offline, half of the United Kingdom's computer capacity was lost. It is notable for being the first machine with virtual memory (at that time referred to as 'one-level store') using paging techniques; this approach quickly spread, and is now ubiquitous.

Atlas Supervisor

The Atlas Supervisor was the program which managed the allocation of processing resources of Manchester University's Atlas Computer so that the machine was able to act on many tasks and user programs concurrently.

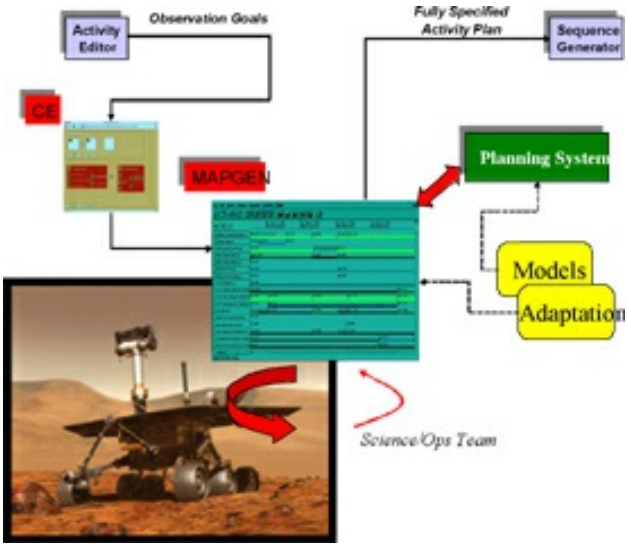
Automata theory

Automata theory is the study of abstract machines and automata, as well as the computational problems that can be solved using them. It is a theory in theoretical computer science. The word automata comes from the Greek word ?????????, which means "self-acting, self-willed, self-moving". An automaton (automata in plural) is an abstract self-propelled computing device which follows a predetermined sequence of operations automatically. An automaton with a finite number of states is called a Finite Automaton (FA) or Finite-State Machine (FSM). The figure on the right illustrates a finite-state machine, which is a well-known type of automaton. This automaton consists of states (represented in the figure by circles) and transitions (represented by arrows). As the automaton sees a symbol of input, it makes a transition (or jump) to another state, according to its transition function, which takes the previous state and current input symbol as its arguments.



Automated planning and scheduling

Automated planning and scheduling, sometimes denoted as simply AI planning, is a branch of artificial intelligence that concerns the realization of strategies or action sequences, typically for execution by intelligent agents, autonomous robots and unmanned vehicles. Unlike classical control and classification problems, the solutions are complex and must be discovered and optimized in multidimensional space. Planning is also related to decision theory.



B (programming language)

B is a programming language developed at Bell Labs circa 1969 by Ken Thompson and Dennis Ritchie.

B5000

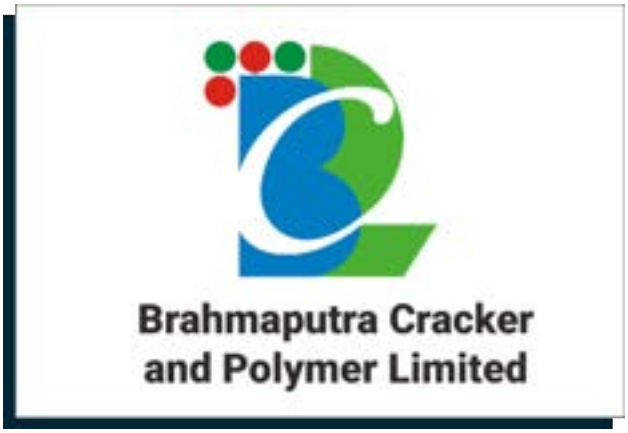
The Burroughs Large Systems Group produced a family of large 48-bit mainframes using stack machine instruction sets with dense syllables. The first machine in the family was the B5000 in 1961. It was optimized for compiling ALGOL 60 programs extremely well, using single-pass compilers. It evolved into the B5500. Subsequent major redesigns include the B6500/B6700 line and its successors, as well as the separate B8500 line.

BASIC

BASIC (Beginners' All-purpose Symbolic Instruction Code) is a family of general-purpose, high-level programming languages designed for ease of use. The original version was created by John G. Kemeny and Thomas E. Kurtz at Dartmouth College in 1963. They wanted to enable students in non-scientific fields to use computers. At the time, nearly all computers required writing custom software, which only scientists and mathematicians tended to learn.

BCPL

BCPL ("Basic Combined Programming Language") is a procedural, imperative, and structured programming language. Originally intended for writing compilers for other languages, BCPL is no longer in common use. However, its influence is still felt because a stripped down and syntactically changed version of BCPL, called B, was the language on which the C programming language was based. BCPL introduced several features of many modern programming languages, including using curly braces to delimit code blocks. BCPL was first implemented by Martin Richards of the University of Cambridge in 1967.



BOS/360

Basic Operating System/360 (BOS/360) was an early IBM System/360 operating system.

Backward compatible

Backward compatibility (sometimes known as backwards compatibility) is a property of an operating system, product, or technology that allows for interoperability with an older legacy system, or with input designed for such a system, especially in telecommunications and computing.

Barbara J. Grosz

Barbara J. Grosz CorrFRSE (Philadelphia, July 21, 1948) is an American computer scientist and Higgins Professor of Natural Sciences at Harvard University. She has made seminal contributions to the fields of natural language processing and multi-agent systems. With Alison Simmons, she is co-founder of the Embedded EthiCS programme at Harvard, which embeds ethics lessons into computer science courses.

BareMetal

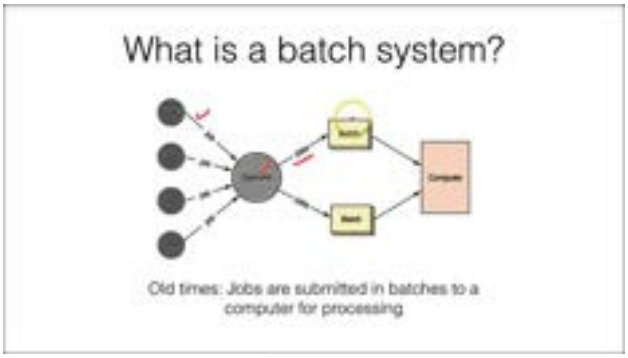
BareMetal is an exokernel-based single address space operating system (OS) created by Return Infinity.

Bash (Unix shell)

Bash is a Unix shell and command language written by Brian Fox for the GNU Project as a free software replacement for the Bourne shell. First released in 1989, it has been used as the default login shell for most Linux distributions. Bash was one of the first programs Linus Torvalds ported to Linux, alongside GCC. A version is also available for Windows 10 and Windows 11 via the Windows Subsystem for Linux. It is also the default user shell in Solaris 11. Bash was also the default shell in versions of Apple macOS from 10.3 (originally, the default shell was tcsh) to 10.15 (macOS Catalina), which changed the default shell to zsh, although Bash remains available as an alternative shell.Bash is a command processor that typically runs in a text window where the user types commands that cause actions. Bash can also read and execute commands from a file, called a shell script. Like most Unix shells, it supports filename globbing (wildcard matching), piping, here documents, command substitution, variables, and control structures for condition-testing and iteration. The keywords, syntax, dynamically scoped variables and other basic features of the language are all copied from sh. Other features, e.g., history, are copied from csh and ksh. Bash is a POSIX-compliant shell, but with a number of extensions.

Batch processing

Computerized batch processing is a method of running software programs called jobs in batches automatically. While users are required to submit the jobs, no other interaction by the user is required to process the batch. Batches may automatically be run at scheduled times as well as being run contingent on the availability of computer resources.



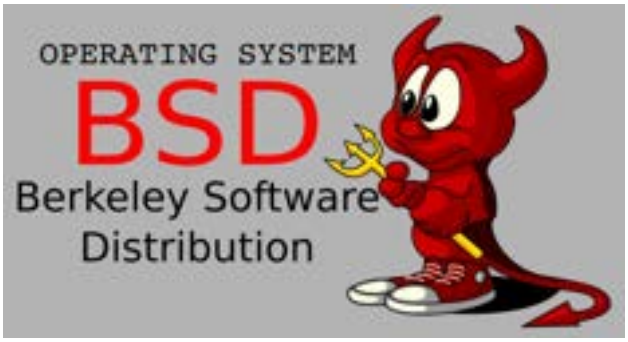
BeOS

BeOS is an operating system for personal computers first developed by Be Inc. in 1990. It was first written to run on BeBox hardware.

Bell Labs

Nokia Bell Labs, originally named Bell Telephone Laboratories (1925?1984),

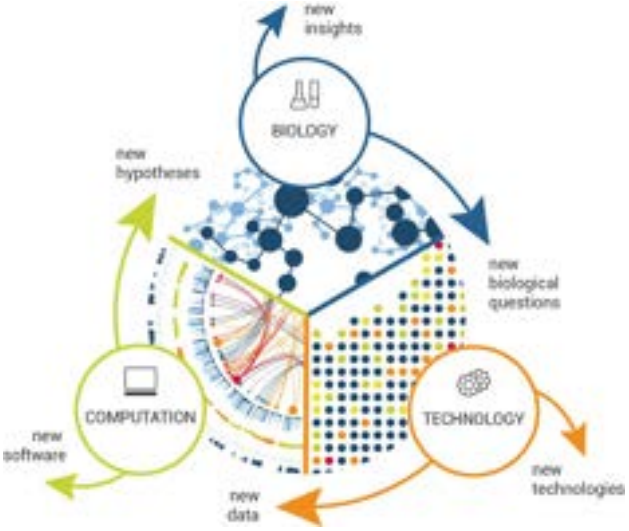
Berkeley Software Distribution



The Berkeley Software Distribution or Berkeley Standard Distribution (BSD) is a discontinued operating system based on Research Unix, developed and distributed by the Computer Systems Research Group (CSRG) at the University of California, Berkeley. The term "BSD" commonly refers to its open-source descendants, including FreeBSD, OpenBSD, NetBSD, and DragonFly BSD.

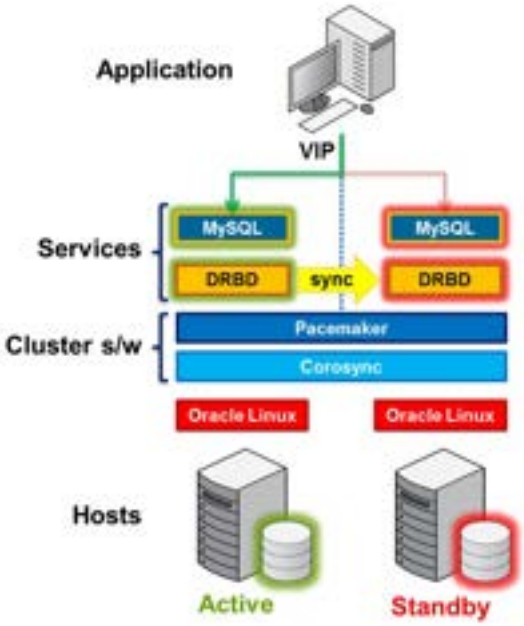
Biological system

A biological system is a complex network which connects several biologically relevant entities. Biological organization spans several scales and are determined based different structures depending on what the system is. Examples of biological systems at the macro scale are populations of organisms. On the organ and tissue scale in mammals and other animals, examples include the circulatory system, the respiratory system, and the nervous system. On the micro to the nanoscopic scale, examples of biological systems are cells, organelles, macromolecular complexes and regulatory pathways. A biological system is not to be confused with a living system, such as a living organism.



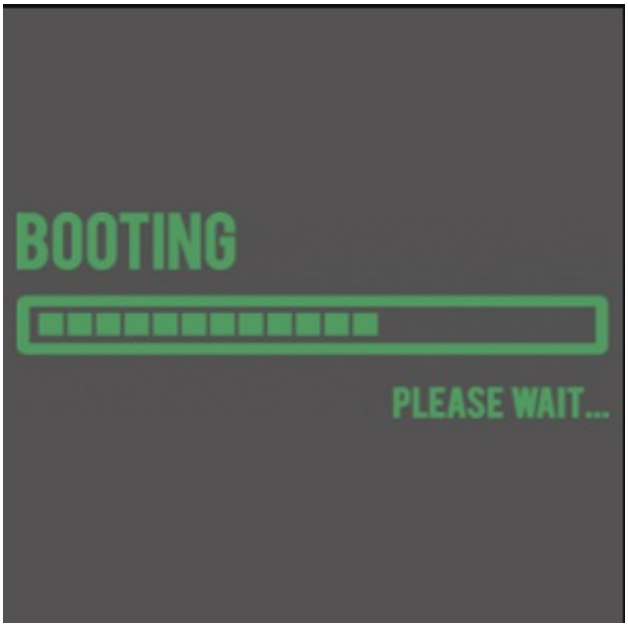
Block device

In Unix-like operating systems, a device file or special file is an interface to a device driver that appears in a file system as if it were an ordinary file. There are also special files in DOS, OS/2, and Windows. These special files allow an application program to interact with a device by using its device driver via standard input/output system calls. Using standard system calls simplifies many programming tasks, and leads to consistent user-space I/O mechanisms regardless of device features and functions.

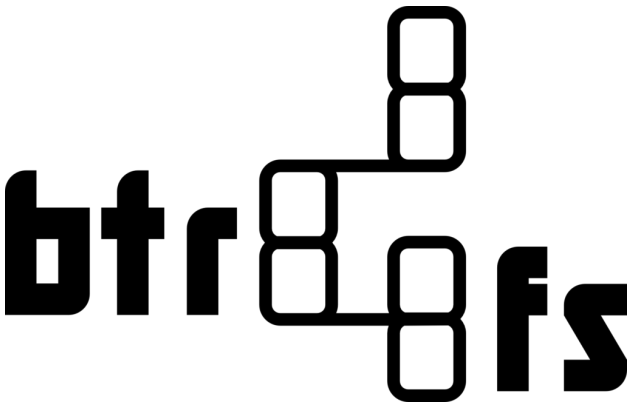


Booting

In computing, booting is the process of starting a computer as initiated via hardware such as a button or by a software command. After it is switched on, a computer's central processing unit (CPU) has no software in its main memory, so some process must load software into memory before it can be executed. This may be done by hardware or firmware in the CPU, or by a separate processor in the computer system.



Btrfs



Btrfs (pronounced as "better F S", "butter F S", "b-tree F S", or simply by spelling it out) is a computer storage format that combines a file system based on the copy-on-write (COW) principle with a logical volume manager (not to be confused with Linux's LVM), developed together. It was initially designed at Oracle Corporation in 2007 for use in Linux, and since November 2013, the file system's on-disk format has been declared stable in the Linux kernel. According to Oracle, Btrfs "is not a true acronym".Btrfs is intended to address the lack of pooling, snapshots, checksums, and integral multi-device spanning in Linux file systems. Chris Mason, the principal Btrfs author, stated that its goal was "to let [Linux] scale for the storage that will be available. Scaling is not just about addressing the storage but also means being able to administer and to manage it with a clean interface that lets people see what's being used and makes it more reliable".

Burroughs Corporation

The Burroughs Corporation was a major American manufacturer of business equipment. The company was founded in 1886 as the American Arithmometer Company. In 1986, it merged with Sperry UNIVAC to form Unisys. The company's history paralleled many of the major developments in computing. At its start, it produced mechanical adding machines, and later moved into programmable ledgers and then computers. It was one of the largest producers of mainframe computers in the world, also producing related equipment including typewriters and printers.

Burroughs MCP

The MCP (Master Control Program) is the operating system of the Burroughs small, medium and large systems, including the Unisys Clearpath/MCP systems.

Burroughs large systems

The Burroughs Large Systems Group produced a family of large 48-bit mainframes using stack machine instruction sets with dense syllables. The first machine in the family was the B5000 in 1961. It was optimized for compiling ALGOL 60 programs extremely well, using single-pass compilers. It evolved into the B5500. Subsequent major redesigns include the B6500/B6700 line and its successors, as well as the separate B8500 line.

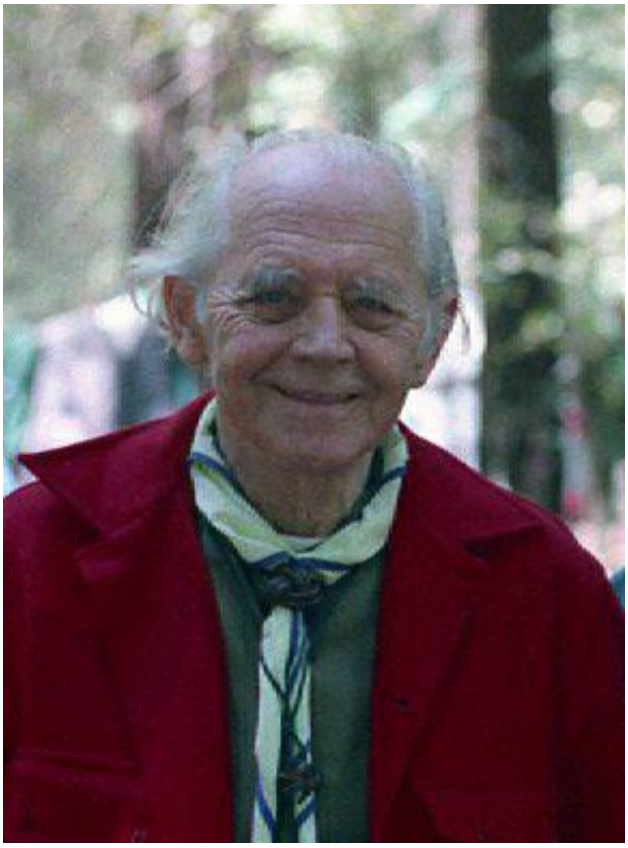
Bus error

In computing, a bus error is a fault raised by hardware, notifying an operating system (OS) that a process is trying to access memory that the CPU cannot physically address: an invalid address for the address bus, hence the name. In modern use on most architectures these are much rarer than segmentation faults, which occur primarily due to memory access violations: problems in the logical address or permissions.

Busy waiting

In computer science and software engineering, busy-waiting, busy-looping or spinning is a technique in which a process repeatedly checks to see if a condition is true, such as whether keyboard input or a lock is available. Spinning can also be used to generate an arbitrary time delay, a technique that was necessary on systems that lacked a method of waiting a specific length of time. Processor speeds vary greatly from computer to computer, especially as some processors are designed to dynamically adjust speed based on current workload. Consequently, spinning as a time-delay technique can produce unpredictable or even inconsistent results on different systems unless code is included to determine the time a processor takes to execute a "do nothing" loop, or the looping code explicitly checks a real-time clock.

B?la H. B?n?thy



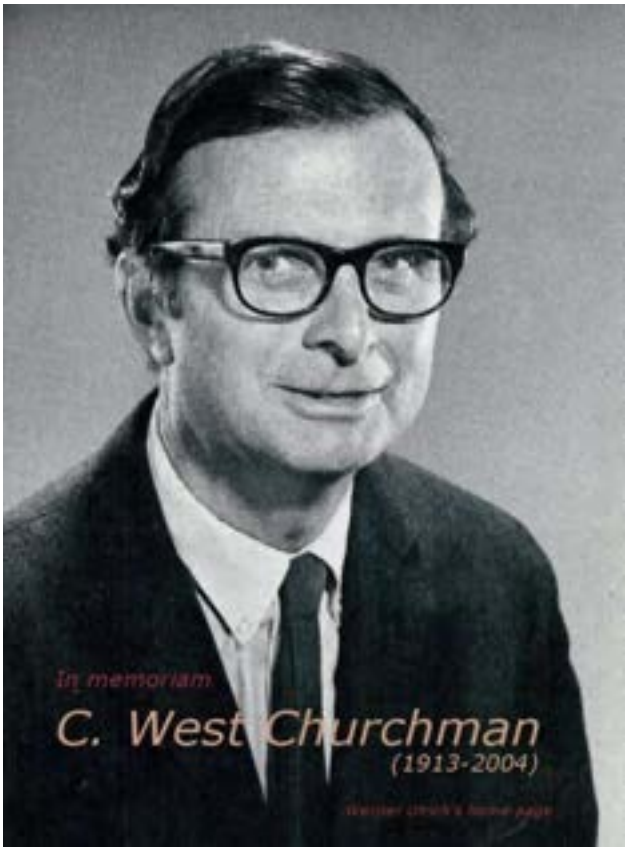
B?la Heinrich B?n?thy (Hungarian: B?n?thy B?la; December 1, 1919 ? September 4, 2003) was a Hungarian-American linguist, and Professor at San Jose State University and UC Berkeley. He is known as founder of the White Stag Leadership Development Program, established the International Systems Institute in 1982, and was co-founder of the General Evolutionary Research Group in 1984.He grew up in largely rural Hungary and served in the Hungarian military during World War II. When Russia invaded Hungary in April 1945, he and his family fled to Allied-occupied Austria and lived in a displaced persons camp for six years. In 1951, they emigrated to Chicago, sponsored by the Presbyterian church. Within the year his former commanding officer suggested to the U.S. government that they hire B?n?thy as a Hungarian instructor at the Army Language School in Monterey, California. While living in Monterey, he founded the White Stag Leadership Development Program.

C (programming language)

C (pronounced ? like the letter c) is a general-purpose computer programming language. It was created in the 1970s by Dennis Ritchie, and remains very widely used and influential. By design, C's features cleanly reflect the capabilities of the targeted CPUs. It has found lasting use in operating systems, device drivers, protocol stacks, though decreasingly for application software. C is commonly used on computer architectures that range from the largest supercomputers to the smallest microcontrollers and embedded systems.

C. West Churchman

Charles West Churchman (29 August 1913 ? 21 March 2004) was an American philosopher and systems scientist, who was Professor at the School of Business Administration and Professor of Peace and Conflict Studies at the University of California, Berkeley. He was internationally known for his pioneering work in operations research, system analysis and ethics.



CDC Kronos

Kronos is an operating system with time-sharing capabilities, written by Control Data Corporation in the 1970s. Kronos ran on the 60-bit CDC 6000 series mainframe computers and their successors. CDC replaced Kronos with the NOS operating system in the late 1970s, which were succeeded by the NOS/VE operating system in the mid-1980s.The MACE operating system and APEX were forerunners to KRONOS. It was written by Control Data systems programmer Greg Mansfield, Dave Cahlander, Bob Tate and three others.

CERN httpd

CERN httpd (later also known as W3C httpd) is an early, now discontinued, web server (HTTP) daemon originally developed at CERN from 1990 onwards by Tim Berners-Lee, Ari Luotonen and Henrik Frystyk Nielsen. Implemented in C, it was the first web server software.

CP-67

CP-67 was the control program portion of CP/CMS, a virtual machine operating system developed for the IBM System/360-67 by IBM's Cambridge Scientific Center. It was a reimplementation of their earlier research system CP-40, which ran on a one-off customized S/360-40. CP-67 was later reimplemented (again) as CP-370, which IBM released as VM/370 in 1972, when virtual memory was added to the System/370 series. Details on the development and circumstances of CP-67 can be found in the article History of CP/CMS.

CP/M

CP/M, originally standing for Control Program/Monitor and later Control Program for Microcomputers, is a mass-market operating system created in 1974 for Intel 8080/85-based microcomputers by Gary Kildall of Digital Research, Inc. Initially confined to single-tasking on 8-bit processors and no more than 64 kilobytes of memory, later versions of CP/M added multi-user variations and were migrated to 16-bit processors.

Call stack

In computer science, a call stack is a stack data structure that stores information about the active subroutines of a computer program. This kind of stack is also known as an execution stack, program stack, control stack, run-time stack, or machine stack, and is often shortened to just "the stack". Although maintenance of the call stack is important for the proper functioning of most software, the details are normally hidden and automatic in high-level programming languages. Many computer instruction sets provide special instructions for manipulating stacks.

Case sensitivity

In computers, case sensitivity defines whether uppercase and lowercase letters are treated as distinct (case-sensitive) or equivalent (case-insensitive). For instance, when users interested in learning about dogs search an e-book, "dog" and "Dog" are of the same significance to them. Thus, they request a case-insensitive search. But when they search an online encyclopedia for information about the United Nations, for example, or something with no ambiguity regarding capitalization and ambiguity between two or more terms cut down by capitalization, they may prefer a case-sensitive search.

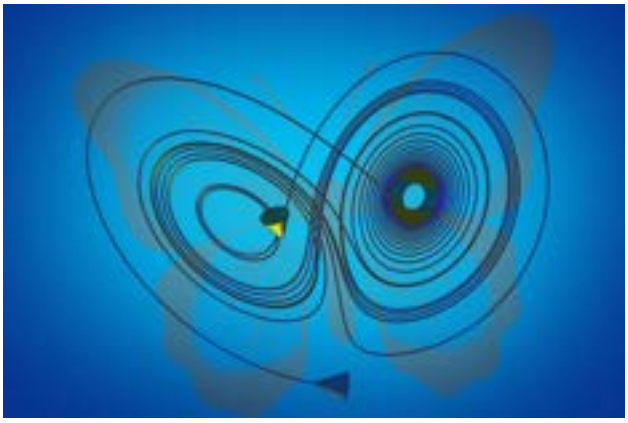
Central processing unit

A central processing unit (CPU), also called a central processor or main processor, is the most important processor in a given computer. Its electronic circuitry executes instructions of a computer program, such as arithmetic, logic, controlling, and input/output (I/O) operations. This role contrasts with that of external components, such as main memory and I/O circuitry, and specialized coprocessors such as graphics processing units (GPUs).

Channel I/O

In computing, channel I/O is a high-performance input/output (I/O) architecture that is implemented in various forms on a number of computer architectures, especially on mainframe computers. In the past, channels were generally implemented with custom devices, variously named channel, I/O processor, I/O controller, I/O synchronizer, or DMA controller.

Chaos theory



Chaos theory is an interdisciplinary area of scientific study and branch of mathematics focused on underlying patterns and deterministic laws of dynamical systems that are highly sensitive to initial conditions, and were once thought to have completely random states of disorder and irregularities. Chaos theory states that within the apparent randomness of chaotic complex systems, there are underlying patterns, interconnection, constant feedback loops, repetition, self-similarity, fractals, and self-organization. The butterfly effect, an underlying principle of chaos, describes how a small change in one state of a deterministic nonlinear system can result in large differences in a later state (meaning that there is sensitive dependence on initial conditions). A metaphor for this behavior is that a butterfly flapping its wings in Brazil can cause a tornado in Texas.Small differences in initial conditions, such as those due to errors in measurements or due to rounding errors in numerical computation, can yield widely diverging outcomes for such dynamical systems, rendering long-term prediction of their behavior impossible in general. This can happen even though these systems are deterministic, meaning that their future behavior follows a unique evolution and is fully determined by their initial conditions, with no random elements involved. In other words, the deterministic nature of these systems does not make them predictable. This behavior is known as deterministic chaos, or simply chaos. The theory was summarized by Edward Lorenz as:

Charles A. S. Hall

Charles A. S. Hall (born 1943) is an American systems ecologist and ESF Foundation Distinguished Professor at State University of New York in the College of Environmental Science & Forestry.

ChromeOS

ChromeOS, sometimes styled as chromeOS and formerly styled as Chrome OS, is a Linux-based operating system developed and designed by Google. It is derived from the open-source ChromiumOS and uses the Google Chrome web browser as its principal user interface.

ChromiumOS

ChromiumOS (formerly styled as Chromium OS) is a free and open-source operating system designed for running web applications and browsing the World Wide Web. It is the open-source version of ChromeOS, a Linux-based operating system made by Google.

Classic Mac OS

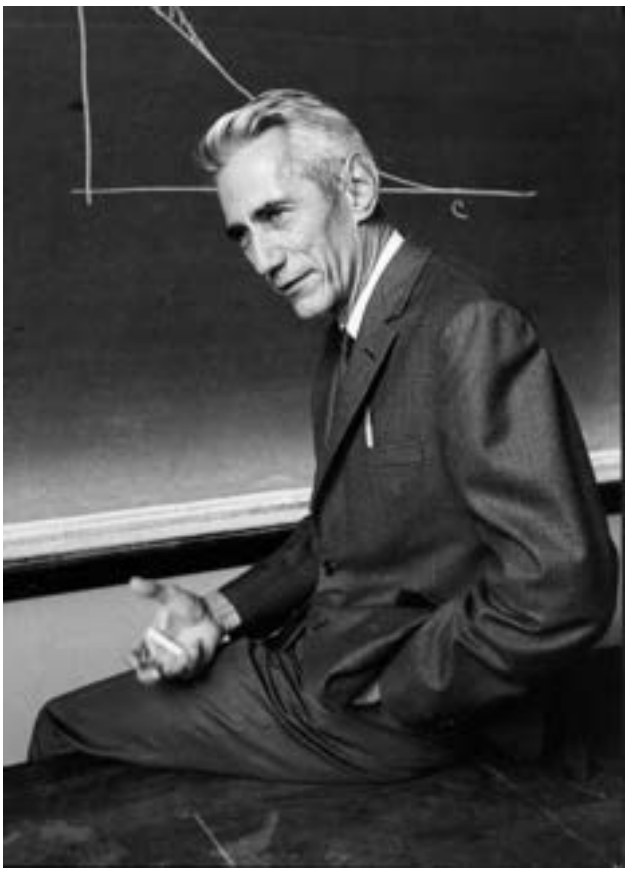
Mac OS (originally System Software; retronym: Classic Mac OS) is the series of operating systems developed for the Macintosh family of personal computers by Apple Computer from 1984 to 2001, starting with System 1 and ending with Mac OS 9. The Macintosh operating system is credited with having popularized the graphical user interface concept. It was included with every Macintosh that was sold during the era in which it was developed, and many updates to the system software were done in conjunction with the introduction of new Macintosh systems.

Classified information

Classified information is material that a government body deems to be sensitive information that must be protected. Access is restricted by law or regulation to particular groups of people with the necessary security clearance and need to know, and mishandling of the material can incur criminal penalties.

Claude Shannon

Claude Elwood Shannon (April 30, 1916 ? February 24, 2001) was an American mathematician, electrical engineer, and cryptographer known as a "father of information theory".As a 21-year-old master's degree student at the Massachusetts Institute of Technology (MIT), he wrote his thesis demonstrating that electrical applications of Boolean algebra could construct any logical numerical relationship. Shannon contributed to the field of cryptanalysis for national defense of the United States during World War II, including his fundamental work on codebreaking and secure telecommunications.



Command-line interface

A command-line interpreter or command-line processor uses a command-line interface (CLI) to receive commands from a user in the form of lines of text. This provides a means of setting parameters for the environment, invoking executables and providing information to them as to what actions they are to perform. In some cases the invocation is conditional based on conditions established by the user or previous executables. Such access was first provided by computer terminals starting in the mid-1960s. This provided an interactive environment not available with punched cards or other input methods.

Common Desktop Environment

The Common Desktop Environment (CDE) is a desktop environment for Unix and OpenVMS, based on the Motif widget toolkit. It was part of the UNIX 98 Workstation Product Standard, and was for a long time the Unix desktop associated with commercial Unix workstations. It helped to influence early implementations of successor projects such as KDE and GNOME desktop environment, which largely replaced CDE following the turn of the century.

Common Open Software Environment

The Common Open Software Environment (COSE) was an initiative formed in March 1993 by the major Unix vendors of the time to create open, unified operating system (OS) standards.

Compact disc

The compact disc (CD) is a digital optical disc data storage format that was co-developed by Philips and Sony to store and play digital audio recordings. In August 1982, the first compact disc was manufactured. It was then released in October 1982 in Japan and branded as Digital Audio Compact Disc.

Comparison of operating systems

These tables provide a comparison of operating systems, of computer devices, as listing general and technical information for a number of widely used and currently available PC or handheld (including smartphone and tablet computer) operating systems. The article "Usage share of operating systems" provides a broader, and more general, comparison of operating systems that includes servers, mainframes and supercomputers.

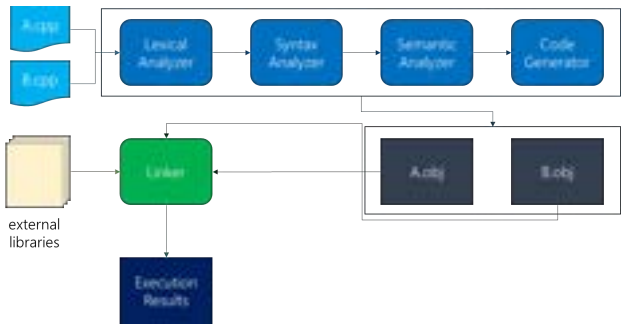
Comparison of user features of operating systems

Comparison of user features of operating systems refers to a comparison of the general user features of major operating systems in a narrative format. It does not encompass a full exhaustive comparison or description of all technical details of all operating systems. It is a comparison of basic roles and the most prominent features. It also includes the most important features of the operating system's origins, historical development, and role.

Mobile operating system	Apple iOS	Google Android	RIM BlackBerry	Microsoft Windows Phone
Device Manufacturer	Apple	OEMs	RIM	OEMs
Latest OS Version*	iOS 6	Android 4.2	BlackBerry 7	Windows Phone 8
Heavily-Managed Older OS Versions	iOS 4-5	Android 2.3-3	Many	Windows Phone 7-7.5, Windows Mobile 6.5
Remote Administration Interface and Method	Native agent uses iOS MDM protocol	Third-party agents use Android Device Admin API	Native agent uses BES protocol	Native agent uses EAS protocol
Native MDM Products	None	None	BlackBerry Enterprise Server, BlackBerry Mobile Fusion	Exchange Server, Office 365, System Center, Windows Intune
Third-Party MDM Products	Many	Many	Limited	Many for Windows Mobile; limited for Windows Phone
Single-OS Management	No	No	Yes	Yes
Multi-OS Management	Yes	Yes	Yes, via BES Pass-Through	Yes
EAS Management	Yes	Yes	No	Yes

Compiler

In computing, a compiler is a computer program that translates computer code written in one programming language (the source language) into another language (the target language). The name "compiler" is primarily used for programs that translate source code from a high-level programming language to a low-level programming language (e.g. assembly language, object code, or machine code) to create an executable program.:?p1?There are many different types of compilers which produce output in different useful forms. A cross-compiler produces code for a different CPU or operating system than the one on which the cross-compiler itself runs. A bootstrap compiler is often a temporary compiler, used for compiling a more permanent or better optimised compiler for a language.



Compiler construction

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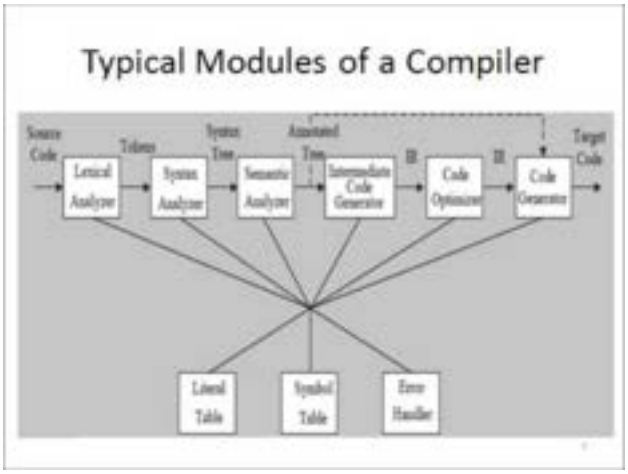
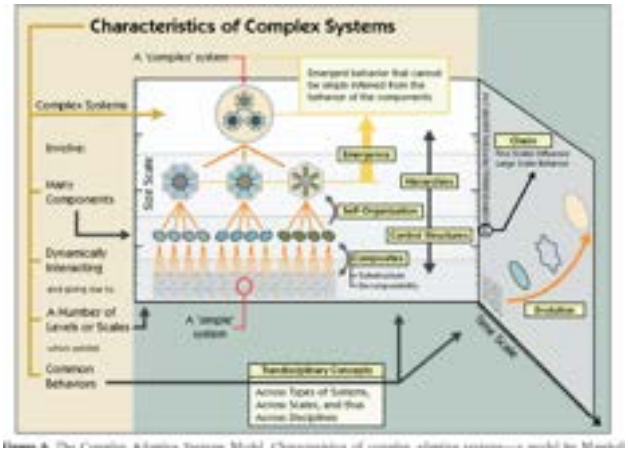


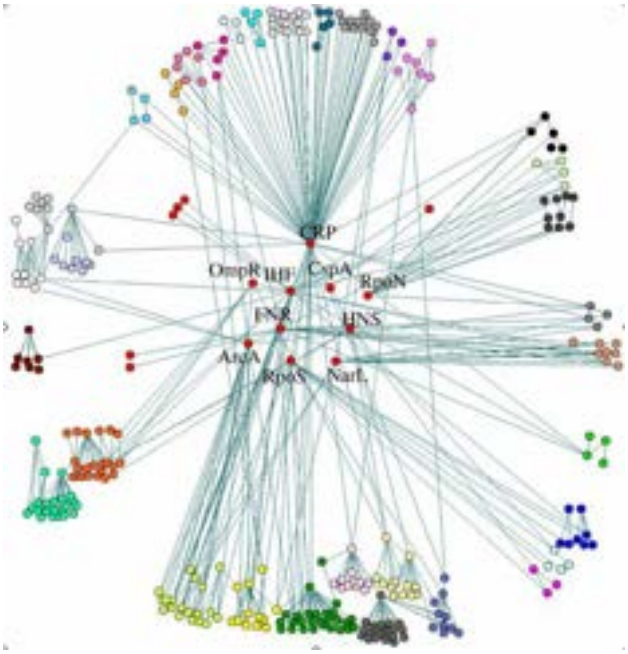
Complex adaptive system

A complex adaptive system is a system that is complex in that it is a dynamic network of interactions, but the behavior of the ensemble may not be predictable according to the behavior of the components. It is adaptive in that the individual and collective behavior mutate and self-organize corresponding to the change-initiating micro-event or collection of events. It is a "complex macroscopic collection" of relatively "similar and partially connected micro-structures" formed in order to adapt to the changing environment and increase their survivability as a macro-structure. The Complex Adaptive Systems approach builds on replicator dynamics.The study of complex adaptive systems, a subset of nonlinear dynamical systems, is an interdisciplinary matter that attempts to blend insights from the natural and social sciences to develop system-level models and insights that allow for heterogeneous agents, phase transition, and emergent behavior.



Complex system

A complex system is a system composed of many components which may interact with each other. Examples of complex systems are Earth's global climate, organisms, the human brain, infrastructure such as power grid, transportation or communication systems, complex software and electronic systems, social and economic organizations (like cities), an ecosystem, a living cell, and ultimately the entire universe.



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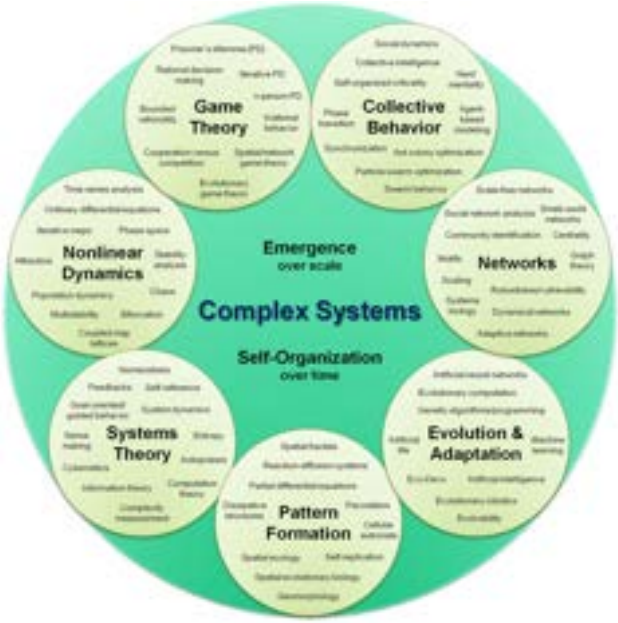
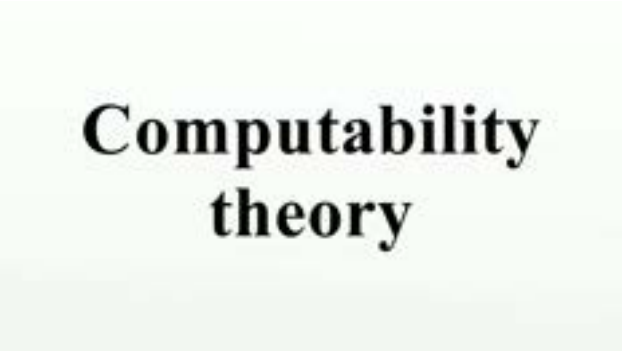


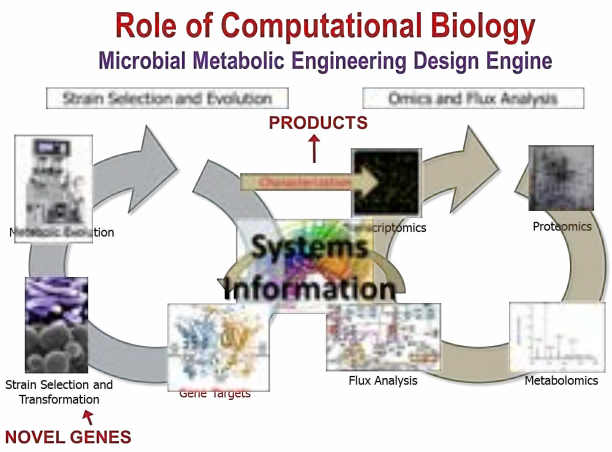
Computability theory

Computability theory, also known as recursion theory, is a branch of mathematical logic, computer science, and the theory of computation that originated in the 1930s with the study of computable functions and Turing degrees. The field has since expanded to include the study of generalized computability and definability. In these areas, computability theory overlaps with proof theory and effective descriptive set theory.



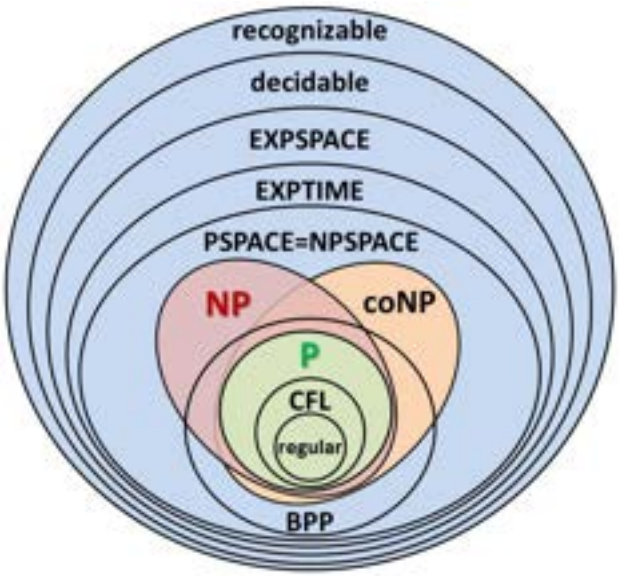
Computational biology

Computational biology refers to the use of data analysis, mathematical modeling and computational simulations to understand biological systems and relationships. An intersection of computer science, biology, and big data, the field also has foundations in applied mathematics, chemistry, and genetics. It differs from biological computing, a subfield of computer engineering which uses bioengineering to build computers.



Computational chemistry

Computational chemistry is a branch of chemistry that uses computer simulation to assist in solving chemical problems. It uses methods of theoretical chemistry, incorporated into computer programs, to calculate the structures and properties of molecules, groups of molecules, and solids. It is essential because, apart from relatively recent results concerning the hydrogen molecular ion (dihydrogen cation, see references therein for more details), the quantum many-body problem cannot be solved analytically, much less in closed form. While computational results normally complement the information obtained by chemical experiments, it can in some cases predict hitherto unobserved chemical phenomena. It is widely used in the design of new drugs and materials.

Computational complexity theory

In theoretical computer science and mathematics, computational complexity theory focuses on classifying computational problems according to their resource usage, and relating these classes to each other. A computational problem is a task solved by a computer. A computation problem is solvable by mechanical application of mathematical steps, such as an algorithm.