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Alan Turing

23/6/12 – 7/6/54

Computability

The Church-Turing thesis states that *“everything algorithmically computable is computable by a Turing machine.”*

Cryptanalysis

Turing was instrumental in the British code breaking effort that cracked the German Enigma code during WWII. The impact of this effort was so great that it is said to have changed the outcome of WWII.

Turing Test and AI

Turing was a pioneer of the problem of artificial intelligence, and posed the Turing Test.





MIT

Margaret Hamilton

1936 –

Lead Developer, Apollo Flight Software

Hamilton was Director of the Software Engineering Division of the MIT Instrumentation Laboratory, which developed on-board flight software for the Apollo space program. This is the software that controlled the spacecraft on their passage to the moon. Her team also worked on the flight software for Skylab.

Software Engineering

Credit as one of three to have coined the term 'software engineering', in order that software development be taken seriously (during the Apollo mission).

Presidential Medal of Freedom 2016





euro-coins.info

Konrad Zuse

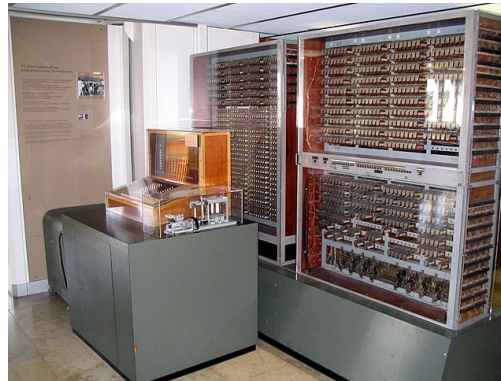
22/6/10 – 18/12/95

Z3

Zuse designed and built the world's first Turing-complete digital computer, May 1941.

Plankalkül

Realizing how impractical it was to write programs at a low level, Zuse developed the world's first high-level programming language (1941-1945). Unfortunately, the impact of this language was greatly reduced by the virtue of Zuse having made these developments in wartime Germany.



2600 relays
5-10 Hz
22 bit words
4 kW

* 3 seconds
+ 0.8 seconds

By Venusianer, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=3632073>





U.S. Army

Grace Hopper

9/12/06 – 1/1/92

First Compiler

Hopper developed the first compiler for a programming language (targeting the Harvard Mark I computer).

COBOL

She led to the development of COBOL through her ideas of machine-independent programming languages.

Bugs

Hopper is said to have popularised the term '*bug*' in computing after finding a moth stuck in an electrical relay which had caused the computer to malfunction.



9/9

0800 Antan started
 1000 " stopped - antan ✓

			{ 1.2700	9.037 847 025
				9.037 846 995 connect
	13°C (032)	MP - MC	1.982147000	
			2.130476415	4.615925059 (-2)
	(033)	PRO 2	2.130476415	
		connect	2.130676415	

Relays 6-2 in 033 failed special speed test
 in relay " " test.

Relay
 2145
 Relay 3370

1100 Started Cosine Tapc (Sine check)
 1525 Started Multy Adder Test.

1545  Relay #70 Panel F
 (moth) in relay.

First actual case of bug being found.
 1630 Antan started.
 1700 closed down.



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John von Neumann

28/12/03 – 8/2/57

The von Neumann Architecture

In 1945 Neumann described the first computer in which the program and data were stored in the same address space. This architecture prevails today.

Random Numbers

Von Neumann co-developed the Monte Carlo method and pioneered the generation of pseudorandom numbers.

Merge Sort

Knuth credits von Neumann with developing the merge sort algorithm in 1945.

Game Theory ... Mathematical Programming ...





Carnegie Mellon University

Jeanette Wing

Professor, Columbia University

Director of Data Sciences Institute

Microsoft VP, MSR International

From 2012-2017, Wing was vice president at Microsoft and head of Microsoft Research International.

CMU CSD Head

From 2010-2012, Wing was head of computer science at Carnegie Mellon University. She was also head from 2004-2007.

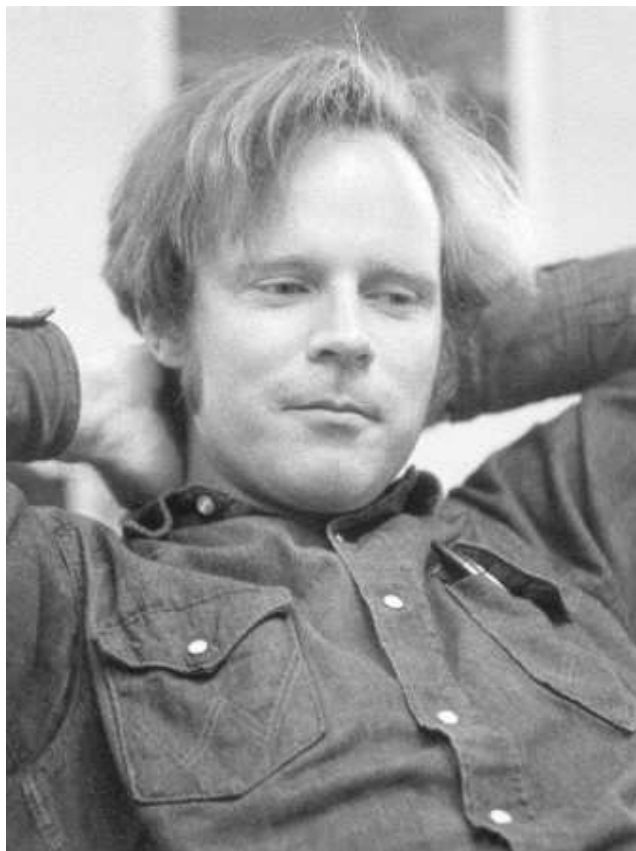
NSF Assistant Director

From 2007-2010, Wing was at the NSF as Assistant Director, responsible for Computer Information Science and Engineering (CISE).

Famous for:

- Formal methods
- OO programming
- computational thinking





IEEE Computer Society

Robert Floyd

8/6/36 – 25/9/2001

Program correctness

Floyd was a pioneer of the idea of applying mathematics to the problem of program correctness. His work contributed significantly to Hoare logic.

Software Engineering

Floyd is said to have been one of the first advocates of refactoring and the rewriting of working programs from scratch.

Turing Award 1978





Fran Allen

4/8/32 –

Optimizing Compilers

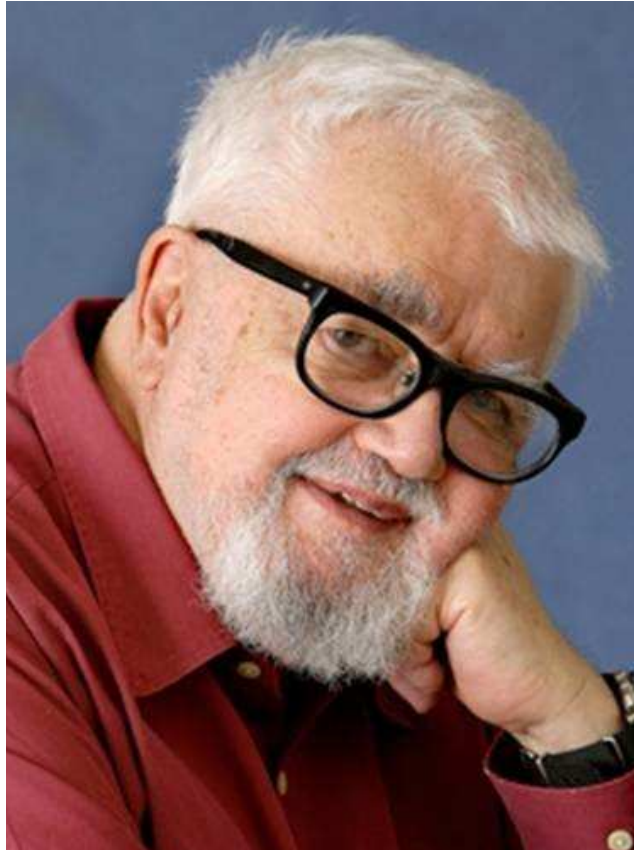
Allen pioneered the field of optimizing compilers. She introduced the application of graph theory to program optimization.

Parallelizing Compilers

Allen pioneered the development of automatic parallelizing compilers, with the development of PTRAN, a parallel compiler for FORTRAN.

Turing Award 2006





saildart.org/jcm2012.html

John McCarthy

4/9/27 – 24/10/11

Artificial Intelligence

McCarthy was a pioneer of AI, and coined the term 'artificial intelligence'.

ALGOL and Lisp

McCarthy worked on the committee that developed ALGOL. He then developed Lisp, the language of choice for AI at the time.

Garbage Collection

McCarthy invented garbage collection (automatic memory management), published in CACM in 1960.

Turing Award 1971





ACM

Barbara Liskov

7/11/39 –

CLU

Liskov and her students at MIT developed CLU in the 1970's. CLU extended ALGOL with data types that had code that operated on them; an important step in the development of object-oriented languages.

Argus

Liskov lead the development of Argus in the 1980's. Argus was the first high-level language to support distributed programs.

Turing Award 2008





Bell Labs

Ken Thompson

4/2/43 –

Multics and Unix

Thompson worked on Multics and upon leaving the project was instrumental in creating Unix with Dennis Ritchie.

Bon and B

Thompson created the Bon programming language while working on Multics and he created the B programming language, the precursor to C.

Regular Expressions, UTF-8

Thompson created an editor which included regular expressions. He also developed the UTF-8 character set.

Turing Award 1983

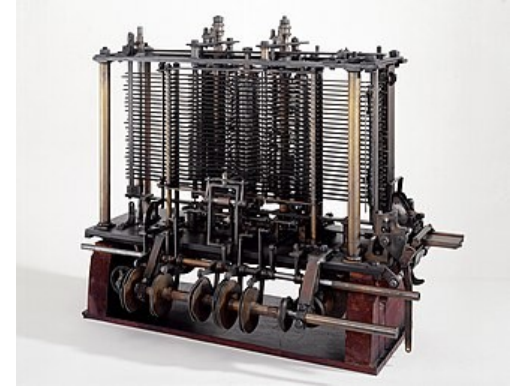




computerhistory.org

Ada Lovelace

1815 – 1852



Analytical Engine

Lovelace's notes on the translation of Menabrea's "*Notions sur la machine analytique de M. Charles Babbage*" includes the first published algorithm designed for processing by a machine, Babbage's proposed Analytical Engine (though there is some controversy over the extent to which the algorithm was her work or Babbage's). Her notes include many insightful comments on the potential and nature of the Analytical Engine, and the science of its use.



"In studying the action of the Analytical Engine, we find that the peculiar and independent nature of the considerations which in all mathematical analysis belong to operations, as distinguished from the objects operated upon and from the results of the operations performed upon those objects, is very strikingly defined and separated."

"[the operating mechanism] might act upon other things besides numbers, were objects found whose mutual fundamental relations could be expressed by those of the abstract science of operations, and which should also be susceptible of adaptations to the action of the operating notation and mechanism of the engine."

"The Analytical Engine has no pretension whatever to originate anything. It can do whatever we know how to order it to perform."



www.sdm.de

Fred Brooks

19/4/31 –

The Mythical Man Month

Brooks' reflections on the development of IBM's OS/360, and the errors he made as manager of that large project. Brooks called the book "*the Bible of Software Engineering*", because "everybody quotes it, some people read it, and a few people go by it."

"Adding manpower to a late software project makes it later"

No Silver Bullet

The *essential* complexity of software suggests that there will be no once-and-for-all fix to the problem of efficient software construction.

"... this irreducible essence of modern software systems: complexity, conformity, changeability, and invisibility."

Turing Award 1999





MIT

Shafi Goldwasser

1958 –

Zero-knowledge

Use the correctness of a statement rather than the correctness of a statement.

Other Cryptography

Goldwasser has made many contributions to cryptography, was awarded the Turing Award in 2012, and has the RSA Professorship at MIT.

Gödel Prize 1993, 2001
Turing Award, 2012

A diagram illustrating a zero-knowledge proof process. It features a yellow, irregularly shaped area with a thick black border. Inside this area, there is a large, dark grey, diamond-shaped region. To the left of the yellow area, there is a green person icon. To the right, inside the yellow area, there is another green person icon with a blue speech bubble containing the text "OK". Above the yellow area, there is a purple person icon. To the left of the yellow area, there is a blue circle containing a key icon. The background of the diagram is light grey with faint text from the slide.

Source: Dake, https://en.wikipedia.org/wiki/Zero-knowledge_proof



ACM

Robin Milner

13/1/34 – 20/3/10

Automated Theorem Proving

Milner led the development of LCF, one of the first human-assisted theorem provers.

ML

Milner developed ML (*metalanguage*), an early non-pure functional programming language. ML included the first parametric polymorphism (father of today's generics).

Pi-Calculus

Milner was one of the developers of the pi-calculus, a mathematical formalism for describing the properties of concurrent computation.

Turing Award
1991





salon

Anita Borg

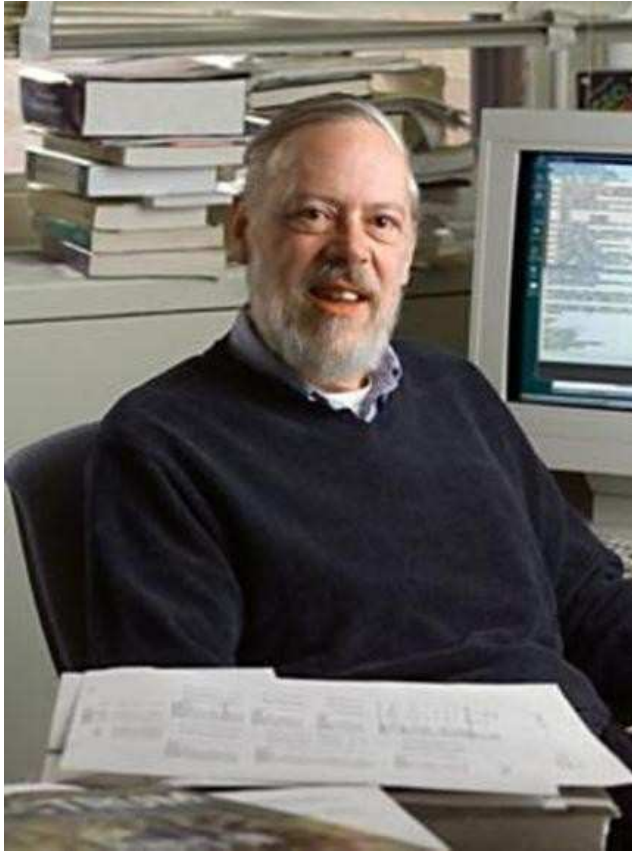
17/1/49 – 6/4/2003

Borg worked for DEC and XEROX PARC, PhD from NYU, focus on operating systems and memory performance.

Advocacy for Women in Technology

Borg founded the Institute for Women and Technology, the Grace Hopper Celebration of Women in Computing, and the Systems email network. Strong legacy today, including multiple awards named in her honor.





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Dennis Ritchie

9/9/41 – 10/12/11

Unix

With Ken Thompson, Ritchie was instrumental in the development of the Unix operating system.

“UNIX is very simple, it just needs a genius to understand its simplicity”

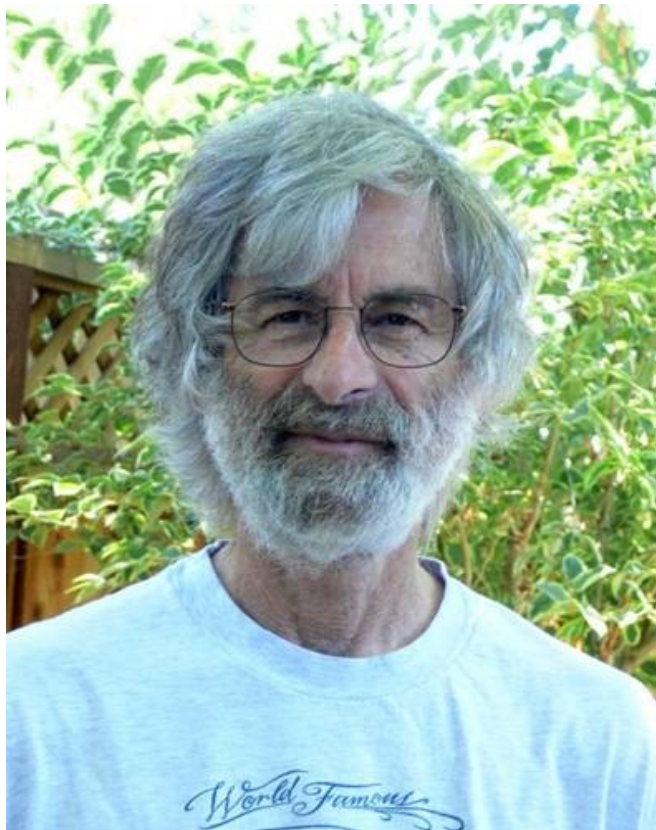
C

Ritchie created the C programming language to use with the Unix operating system (it followed Ken Thompson’s B language).

“[C has] the power of assembly language and the convenience of ... assembly language.”

Turing Award 1983





Leslie Lamport

Leslie Lamport

7/2/41 –

Concurrent Systems

Defined sequential consistency, the gold standard for memory consistency models

Developed Bakery Algorithm for mutual exclusion

Distributed Systems

Defined logical clocks to impose partial ordering on events
PAXOS algorithm for consensus in network of unreliable processors

LaTeX

A structured environment for Donald Knuth's TeX typesetting system



Robert McClure

Niklaus Wirth

15/2/33 –

Programming Languages

Chief designer of Euler, Algol W, Pascal, Modula, Modula-2, Oberon, Oberon-2 and Oberon-07

Wirth's Law

'Software is getting slower more rapidly than hardware becomes faster' (Reiser)

Extended Backus-Naur Form Wirth developed the first EBNF. Now an ISO standard (ISO/IEC 14977).

'Reliable and transparent programs are usually not in the interest of the designer.'

Turing Award 1984





Esquire

Carol Bartz

28/8/48 –

CEO Autodesk

From 1992-2006 Bartz was CEO of Autodesk. Credited with transforming the company into the leading vendor of design software.

CEO Yahoo!

From 2009-2011 was CEO of Yahoo! She was tasked with turning around a failing company.

Computer Science degree from University of Wisconsin, Madison

"I have a belief that life isn't about balance, because balance is perfection ... Rather, it's about catching the ball before it hits the floor."





vpri.org

Marissa Mayer

30/5/75 –

Google Vice President

Employee #20, an executive for many years, responsible for many things including Google's famously spare home page.

Yahoo! President and CEO

Youngest CEO among the Fortune 500 companies.

Stanford B.S. and M.S., AI. major.

