io9.com

Alan Turing

23/6/12 – 7/6/54

Computability

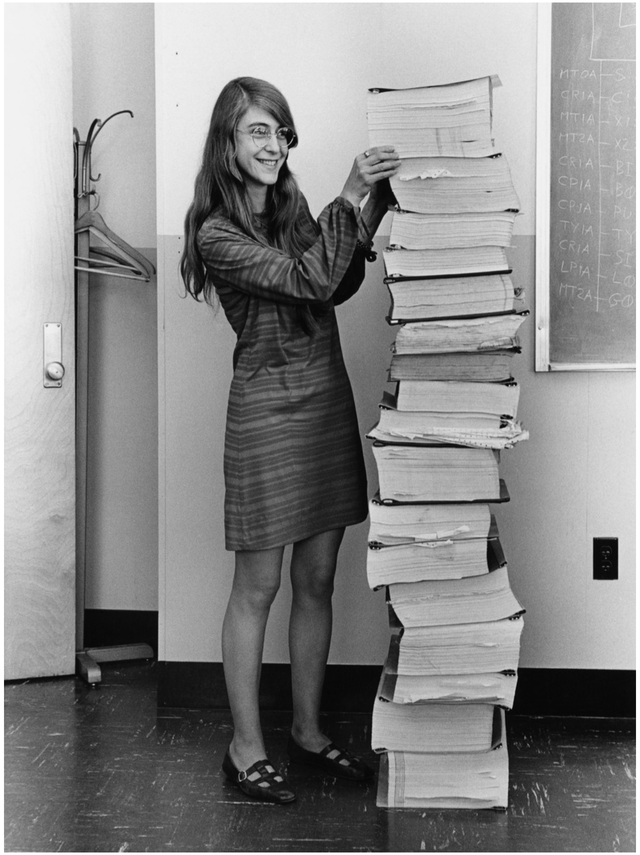
The Church-Turing thesis states that “*everything algorithmically computable is computable by a Turing machine.*” Turing proved there are things that cannot be computed by a Turing machine.

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.

The “Imitation Game”

Proposed to make the question “can machines think?” scientifically testable, by replacing it with the question, “can a machine behave (converse) in a way that is indistinguishable from a human?” This has become known as 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, and later also for Skylab.

Software Engineering

Working on Apollo, and later, Hamilton developed several ideas for improving software quality and reliability, such as error detection and recovery.

She is credited with being one to coined the term “software engineering”, in order that software development be taken seriously during the Apollo program.

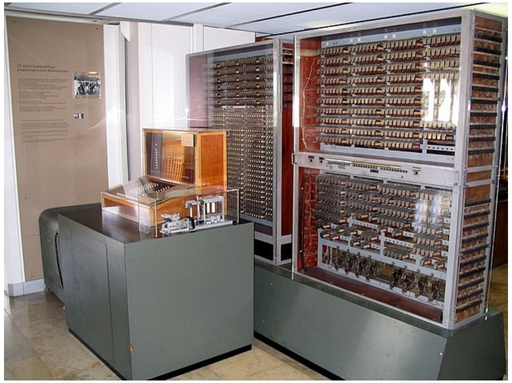
euro-coins.info

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.



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

2600 relays
5-10 Hz
22 bit words
4 kW

* 3 seconds
+ 0.8 seconds

U.S. Army

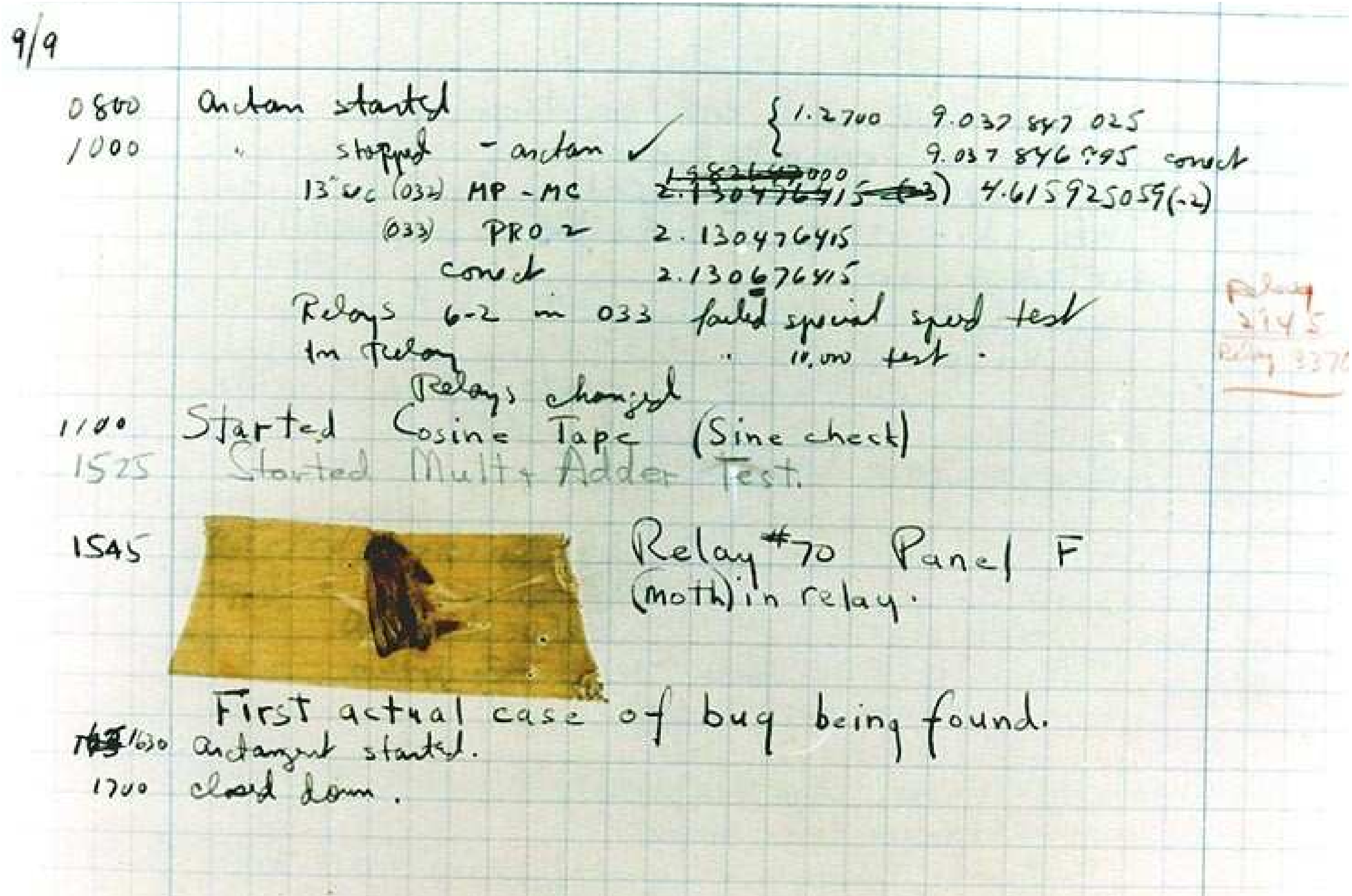
Grace Hopper

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 arctan started

1000 " stopped - arctan ✓ { 1.2700 9.037 847 025
9.037 846 995 correct

13" uc (032) MP - MC ~~1.982147000~~ ~~2.130476415~~ (~~-3~~) 4.615925059(-2)

(033) PRO 2 2.130476415

correct 2.130676415

Relays 6-2 in 033 failed special speed test
In relay " 10.000 test.

Relays changed

1100 Started Cosine Tape (Sine check)

1525 Started Mult + Adder Test.

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

First actual case of bug being found.

~~1630~~ 1630 Arctangent started.

1700 closed down.

Relay 2145
Relay 3370

io9.com

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 …

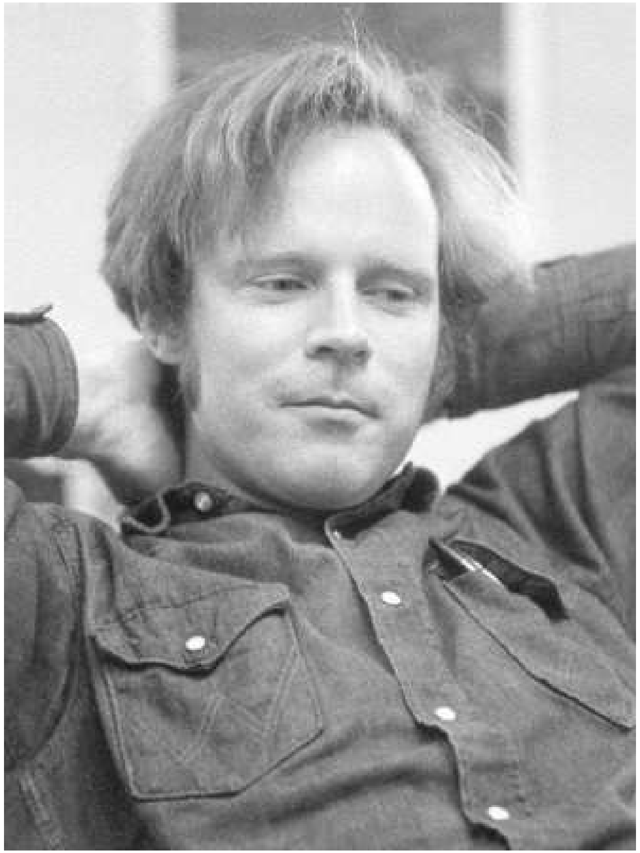
Carnegie Mellon University

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

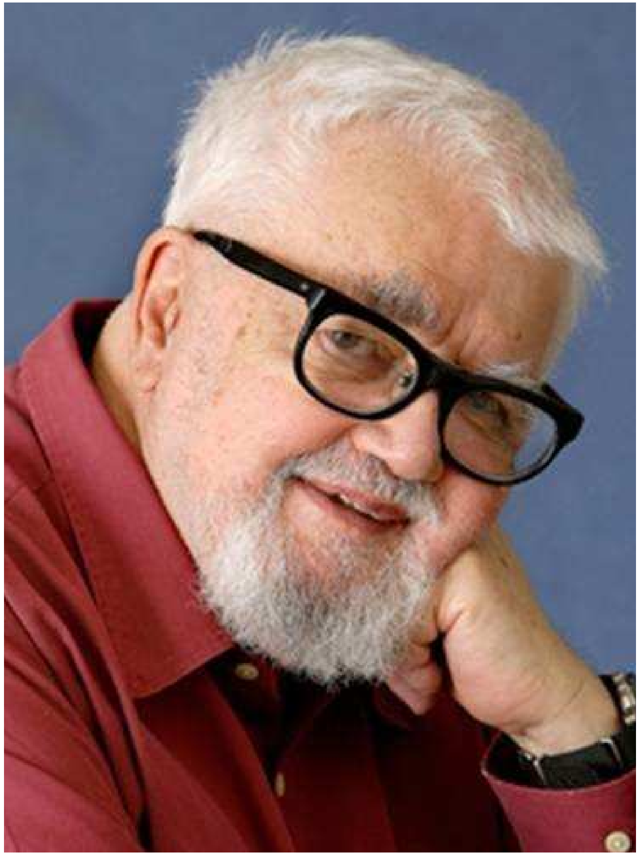
Fran Allen

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

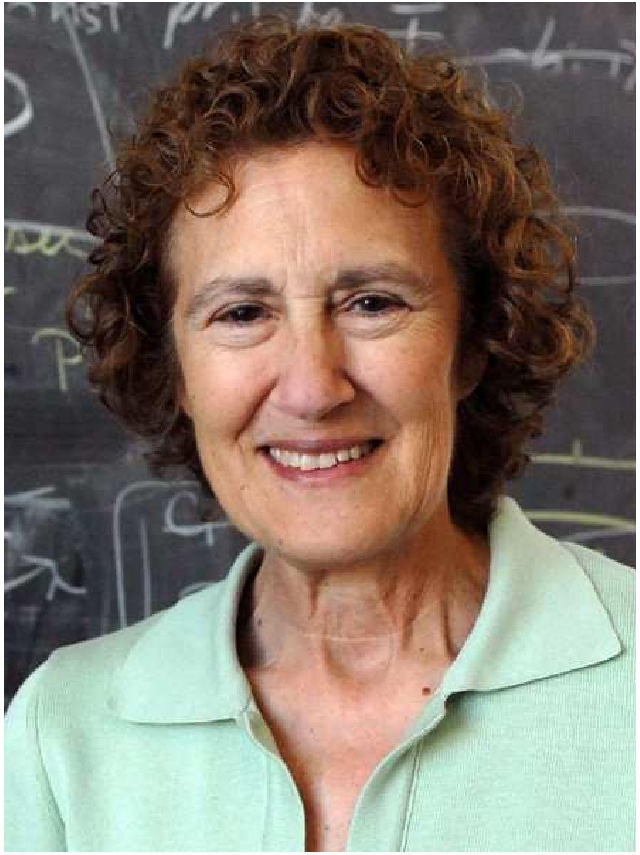
4/9/27 – 24/10/11

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

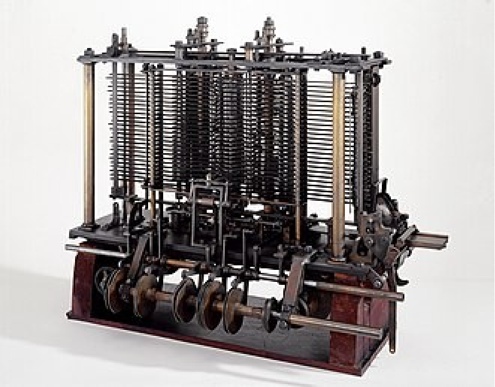
Thompson created the Bon programming language while working on Multics and he created the B programming language, the precursor to C.

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

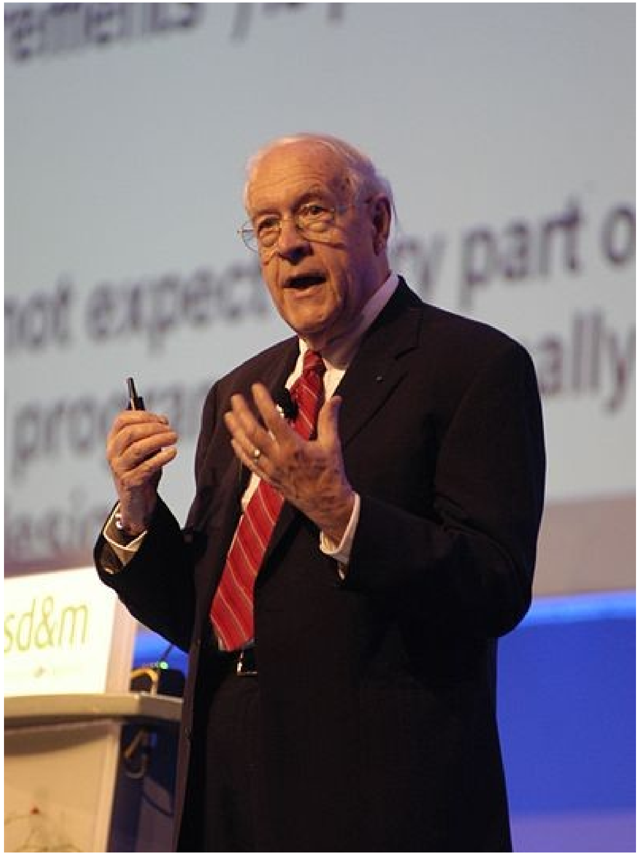
Analytical Engine

Lovelace’s notes on the translation of Menabrea’s "*Notions sur la machine anlytique 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 it’s 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 adaptions 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.

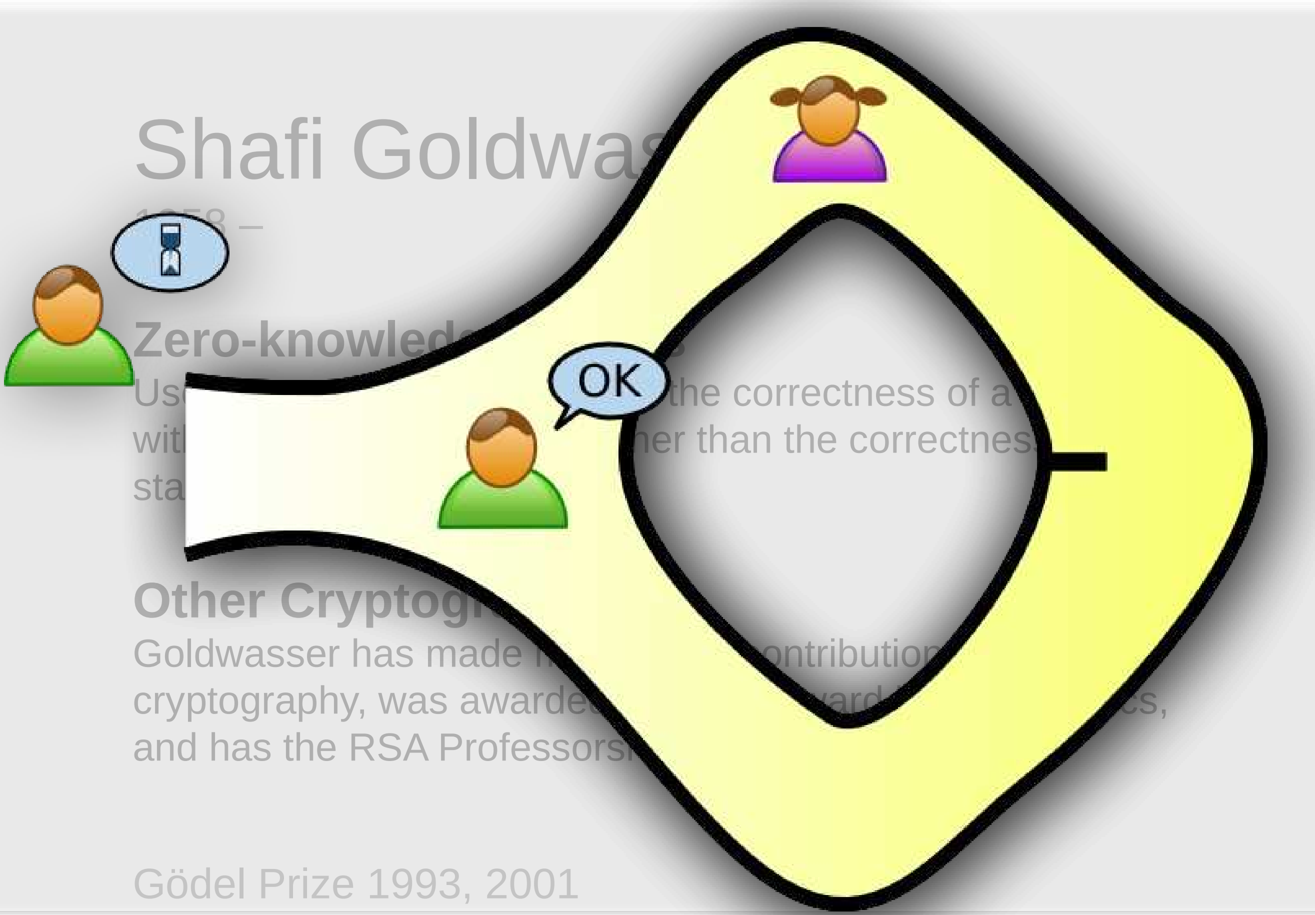
“… this irreducible essence of modern software systems: complexity, conformity, changeability, and invisibility.”

Turing Award 1999

MIT

Shafi Goldwas

1958 –



Zero-knowledg

Us the correctness of a wit her than the correctnes sta

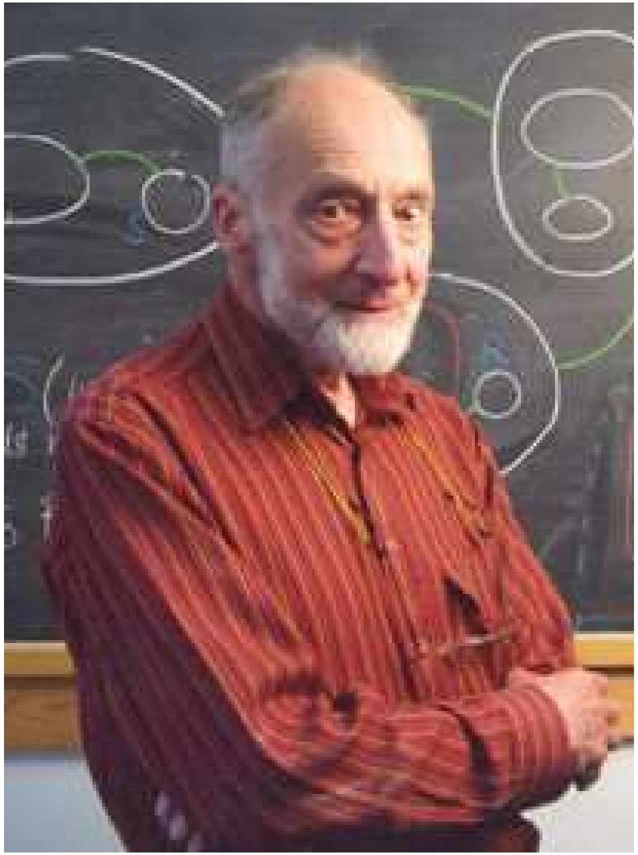
Other Cryptog

Goldwasser has made m ontribution cryptography, was awarde ard cs, and has the RSA Professors

Gödel Prize 1993, 2001

Turing Award, 2012

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



ACM

Robin Milner

13/1/34 – 20/3/10

Automated Theorem Proving

Milner lead 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

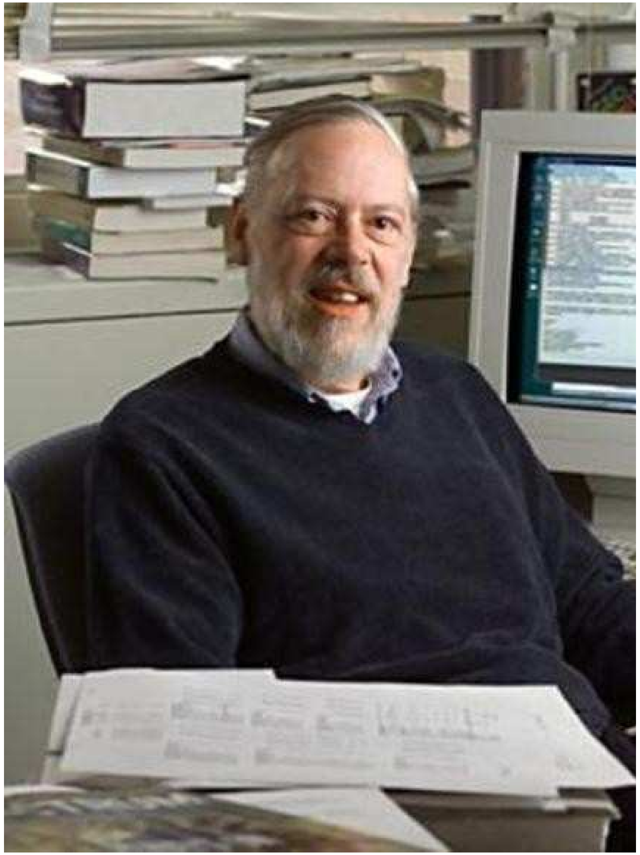
Anita Borg

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 Systers 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.

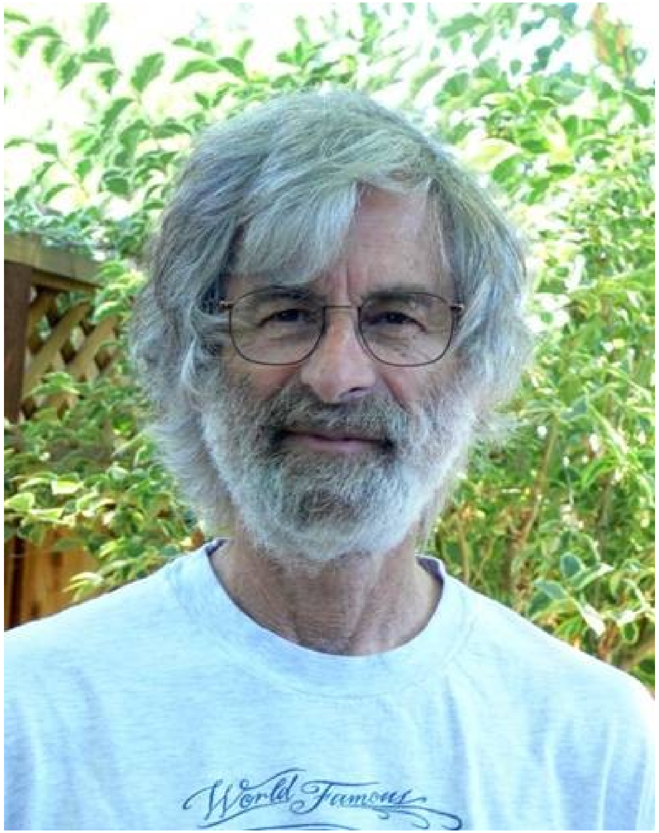
“UNIX is very simple, it just needs a genius to understand its simplicity”

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.