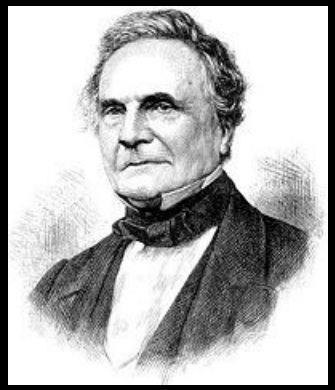
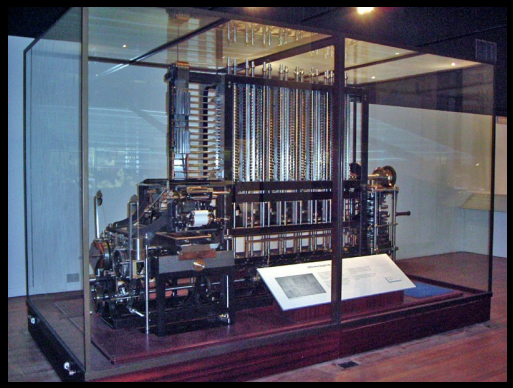
Computer Ethics
Historical Notes

Norberto Patrignani

1834: The Analytical Engine



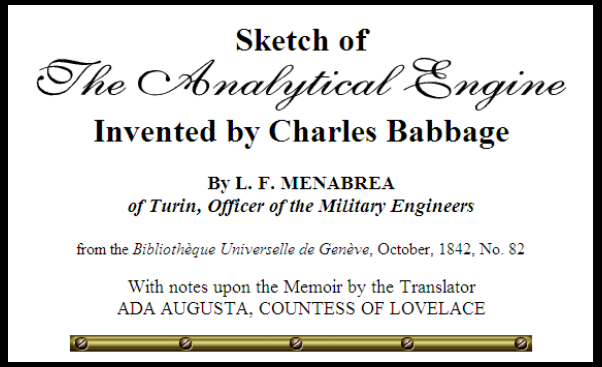
Charles Babbage
(London, England, 1791 - 1871)



Difference Engine (replica), London Science Museum

1843: The 1st Programmer in History

Ada Byron
(London, England, 1815 - 1852)

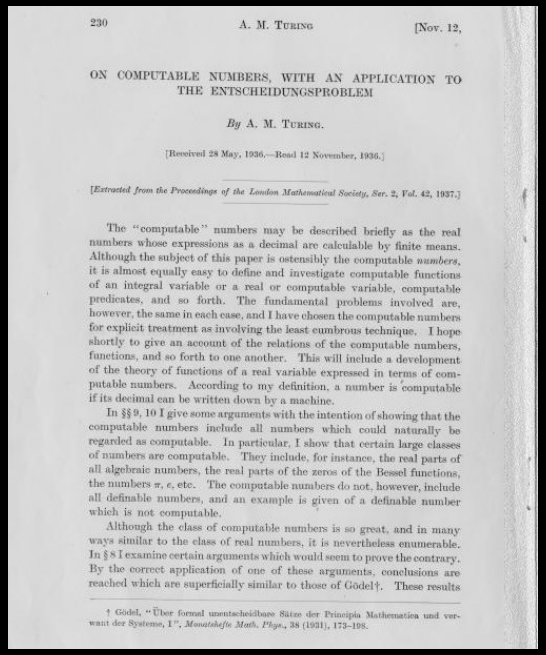

Sketch of
The Analytical Engine
Invented by Charles Babbage

By L. F. MENABREA
of Turin, Officer of the Military Engineers

from the *Bibliothèque Universelle de Genève*, October, 1842, No. 82

With notes upon the Memoir by the Translator
ADA AUGUSTA, COUNTESS OF LOVELACE

Source: Ada Byron, Notes by the Translator on L. F. Menabrea's Sketch of the Analytical Engine Invented by Charles Babbage. 1842.



230 A. M. TURING [Nov. 12,

ON COMPUTABLE NUMBERS, WITH AN APPLICATION TO THE ENTSCHEIDUNGSPROBLEM

By A. M. TURING.

[Received 28 May, 1936.—Read 12 November, 1936.]

[*Extracted from the Proceedings of the London Mathematical Society, Ser.* 2, *Vol.* 42, 1937.]

The "computable" numbers may be described briefly as the real numbers whose expressions as a decimal are calculable by finite means. Although the subject of this paper is ostensibly the computable *numbers*, it is almost equally easy to define and investigate computable functions of an integral variable or a real or computable variable, computable predicates, and so forth. The fundamental problems involved are, however, the same in each case, and I have chosen the computable numbers for explicit treatment as involving the least cumbrous technique. I hope shortly to give an account of the relations of the computable numbers, functions, and so forth to one another. This will include a development of the theory of functions of a real variable expressed in terms of computable numbers. According to my definition, a number is computable if its decimal can be written down by a machine.

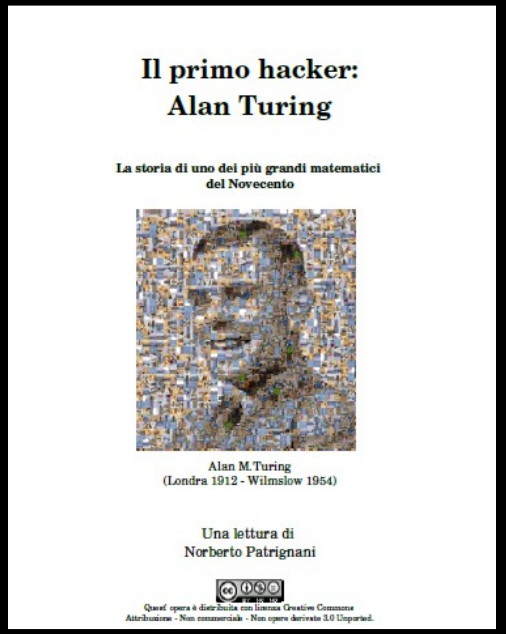
In §§ 9, 10 I give some arguments with the intention of showing that the computable numbers include all numbers which could naturally be regarded as computable. In particular, I show that certain large classes of numbers are computable. They include, for instance, the real parts of all algebraic numbers, the real parts of the zeros of the Bessel functions, the numbers π, e, etc. The computable numbers do not, however, include all definable numbers, and an example is given of a definable number which is not computable.

Although the class of computable numbers is so great, and in many ways similar to the class of real numbers, it is nevertheless enumerable. In § 8 I examine certain arguments which would seem to prove the contrary. By the correct application of one of these arguments, conclusions are reached which are superficially similar to those of Gödel†. These results

† Gödel, "Über formal unentscheidbare Sätze der Principia Mathematica und verwandt der Systeme, I", *Monatshefte Math. Phys.*, 38 (1931), 173–198.

1937: Turing Machine

Alan Turing
(London, UK, 1912 - Wilmslow, UK, 1954)



Il primo hacker: Alan Turing

La storia di uno dei più grandi matematici del Novecento

Alan M.Turing
(Londra 1912 - Wilmslow 1954)

Una lettura di
Norberto Patrignani

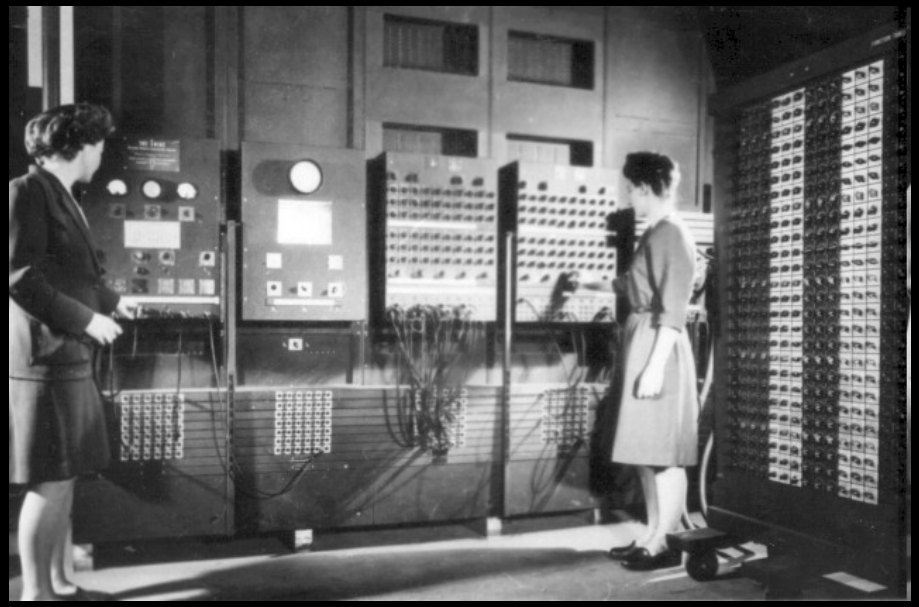
www.bookliners.com

1943: ENIAC

1943, US Army Ballistic Research Lab commissioned ENIAC (Electronic Numerical Integrator Analyzer and Computer) Commissioned to University of Pennsylvania

Source: Edwards, Paul. The Closed World: Computers and the Politics of Discourse in Cold War America. Cambridge, MA: MIT Press, 1997

1945, ENIAC's First 6 Programmers



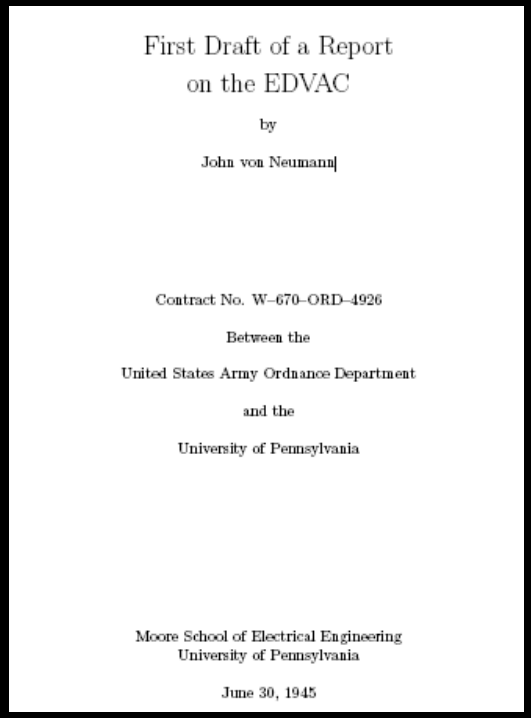
U.S.Army Photo - Left: Jean Bartik, Right: Frances Spence

WITI
build. empower. inspire.

Women in Technology International, 1997 WITI Hall of Fame Award

1945: Von Neumann Architecture

John Von Neumann
(Budapest, 1903 - Washington, USA, 1957)



First Draft of a Report
on the EDVAC

by

John von Neumann

Contract No. W–670–ORD–4926

Between the

United States Army Ordnance Department

and the

University of Pennsylvania

Moore School of Electrical Engineering
University of Pennsylvania

June 30, 1945

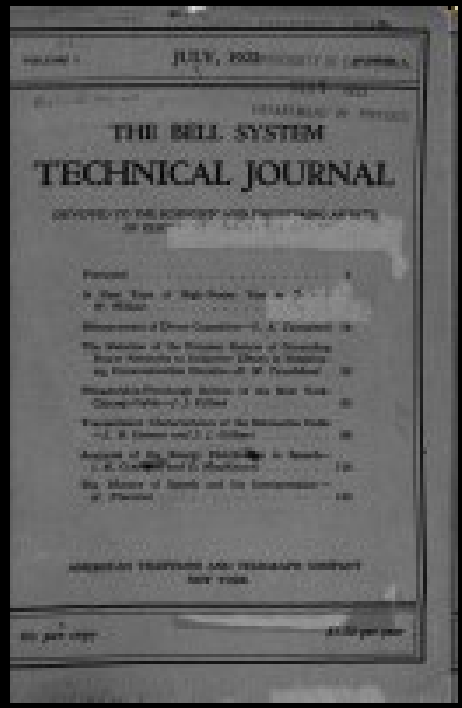
Source: "First Draft of a Report on the EDVAC", J.V.Neumann Moore School of Electrical Engineering, University of Pennsylvania, 1945

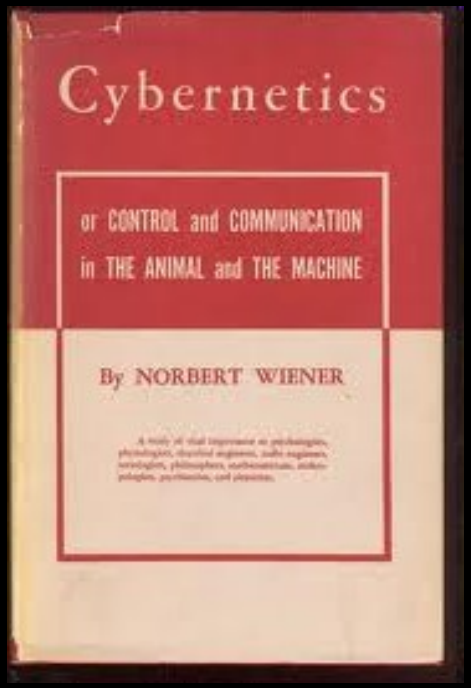
1947: Transistor

Source: 1947: December, Bell Labs First practical point-contact transistor, William Shockley, John Bardeen, Walter Brattain

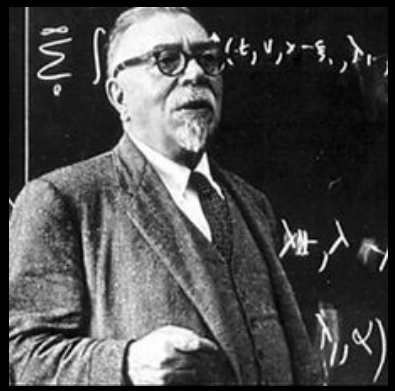
1948: Information Theory

Claude Shannon
(Petoskey, MI, USA, 1916 - Medford, MA, USA, 2001)

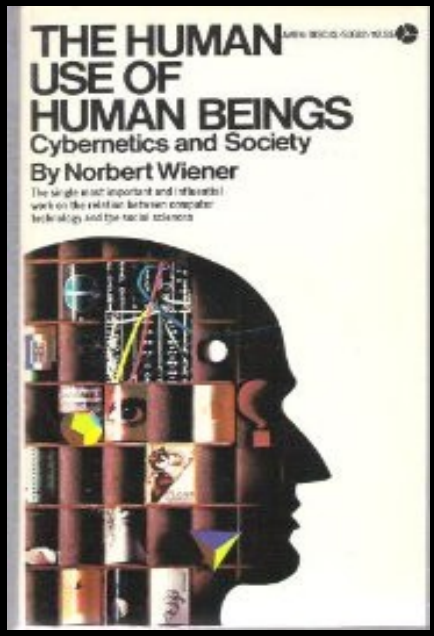

THE BELL SYSTEM
TECHNICAL JOURNAL



1950: Norbert Wiener



Norbert Wiener
(USA, 1894 - Sweden, 1964)



"*... the new industrial revolution is a two-edged sword.*
It may be used for the benefit of humanity. . . .
It may also be used to destroy humanity. . . .
There are, however, hopeful signs on the horizon. . . .
There are many dangers still ahead,
but the roots of good will are there."

N.Wiener, 1950

Source:
Wiener N., "Cybernetics: or Control and Communication in the Animal and the Machine", 2nd ed. Cambridge, MA: MIT Press, 1948
Wiener N., "The Human Use of Human Beings. The Riverside Press (Houghton Mifflin Co.), 1950

1951: UNIVAC-I

UNIVAC I (UNIVersal Automatic Computer I), First commercial computer made in the United States, Remington Rand

1952: 1st Compiler for Computer Languages

Grace Murray Hopper
(1906 - 1992)

"A ship in port is safe;
but that is not what ships are for
- sail out to see and do new things."
Grace Murray Hopper

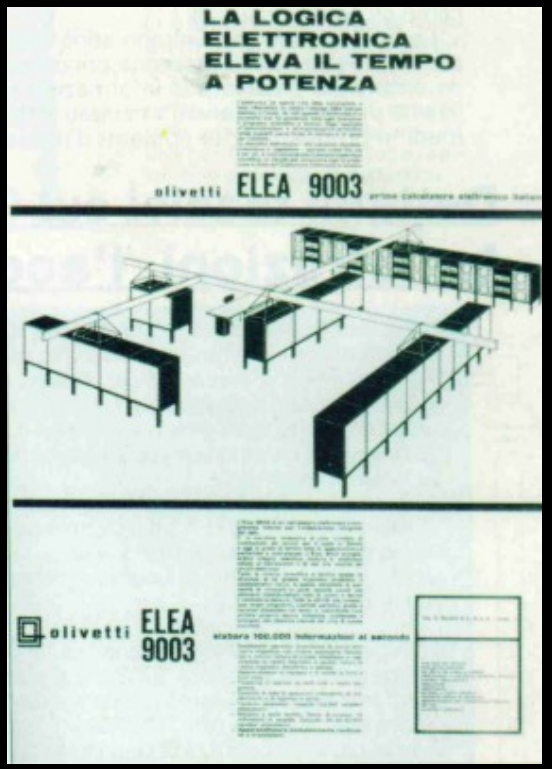
Source: 2006, The Yale Book of Quotations by Fred R. Shapiro, Section: John A. Shedd, Page 705, Yale University Press, New Haven.
http://amhistory.si.edu/archives/images/d8324-3.jpg

1958: Integrated Circuits

First Integrated Circuit, Jack Kilby, Texas Instruments

1959: Olivetti Elea 9003

Adriano Olivetti
(Ivrea, 1901 - Aigle, 1960)

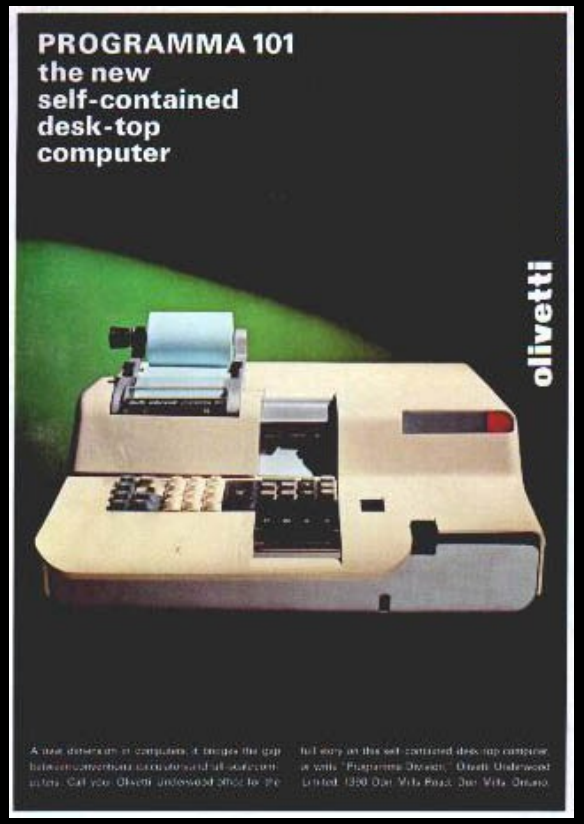


1964:
IBM System/360 DEC PDP-8

1965: Olivetti P101

Piergiorgio Perotto
(Torino, 1930 - Genova, 2002)

Engineering - 1955
Politecnico di Torino



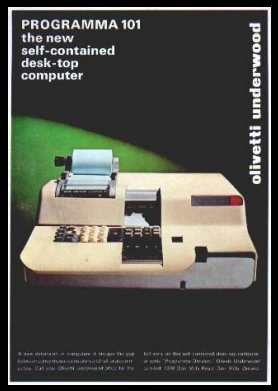
The 1st Personal Computer

Source: www.101project.eu

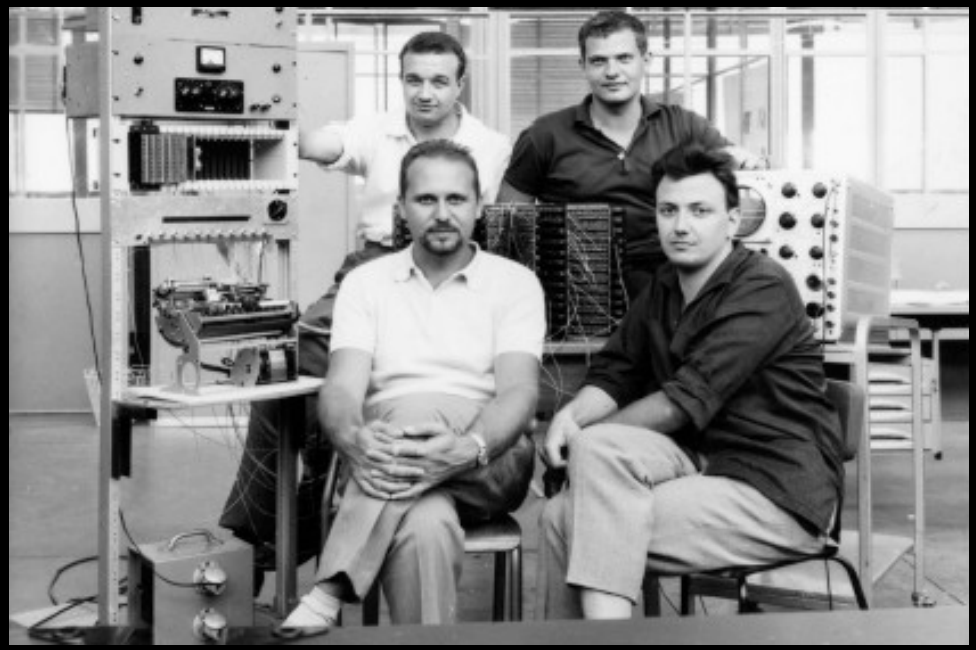
1965: the 1st Italian *bit-generation*

olivetti

Gastone Garziera

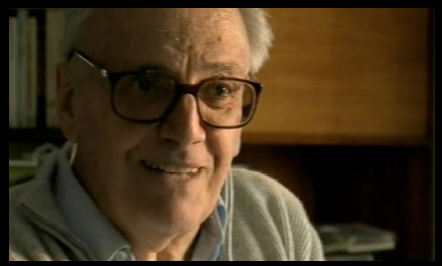


Mario Bellini



1963
Olivetti P101's *dream-team*

Piergiorgio Perotto



Giovanni De Sandre

Source: www.101project.eu

1968: Ethics in Computer Rooms

Donn Parker
(San Jose, California, c.1930)

"*It seemed that*
when people entered the computer center
they left their ethics at the door"
Donn Parker

"Rules of Ethics in Information Processing"
Communications of the ACM
March 1968 (Vol. 11, No. 3)

Source: Information Systems Security Association

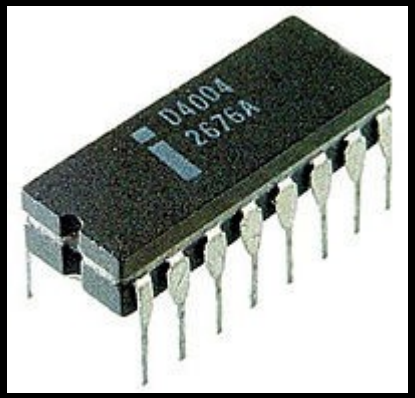
1969: Unix

Dennis Ritchie
(1941 - 2011)

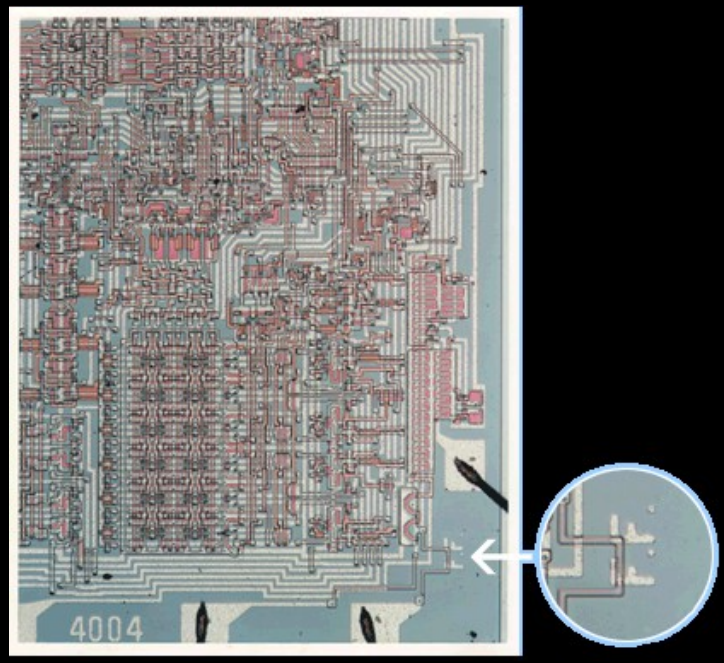
Ken Thompson
(1943 -)

Bill Joy
(1954 -)

1971: Intel 4004

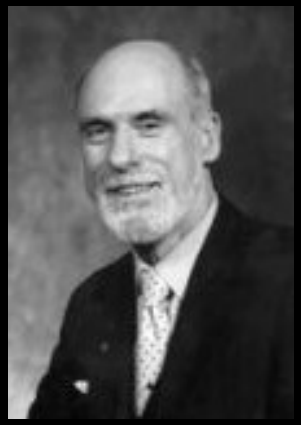


Federico Faggin
(Vicenza, 1941 -)



1973: Internet (TCP/IP)

Robert E.Kahn
(New York, 1938 -)



Vinton G.Cerf
(New Haven, 1943 -)

1975: Homebrew Computer Club, Menlo Park

Lee Felsenstein
(1945 -)

Steve Jobs (1955 - 2011) Steve Wozniak (1950 -)

1981: Osborne I
(1,795 $)

1976: Apple I
(666.66 $)

1975: Microsoft

Microsoft

Bill Gates
(Seattle, 1955 -)

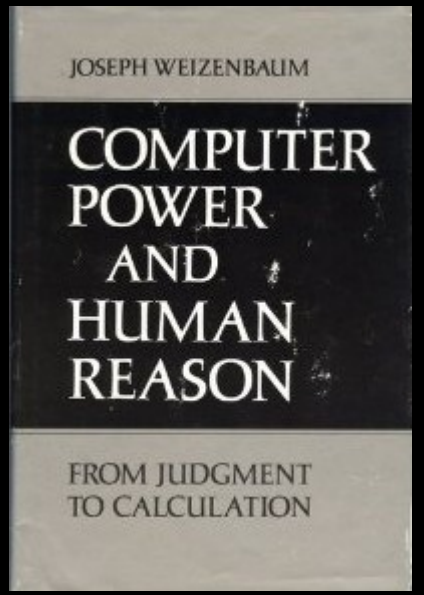
1976: Apple

Steve Jobs
(San Francisco, 1955 - Palo Alto, 2011)

Steve Wozniak
(San Jose', 1950 -)

1976: Apple I
1st Personal Computer?

1976: Joseph Weizenbaum



Joseph Weizenbaum
(Berlin, 1923 - Berlin, 2008)

"The key question is the control of the time.
We would need more time to take some decisions.
The rhythm of the computers and of the telecommunication systems
is not the rhythm of time which is needed to take meaningful decisions"
J.Weizenbaum, Namur Award Lecture, Namur, 11 January 1991

Source: Weizenbaum J., "Computer Power and Human Reason: From Judgment To Calculation", Freeman, 1976

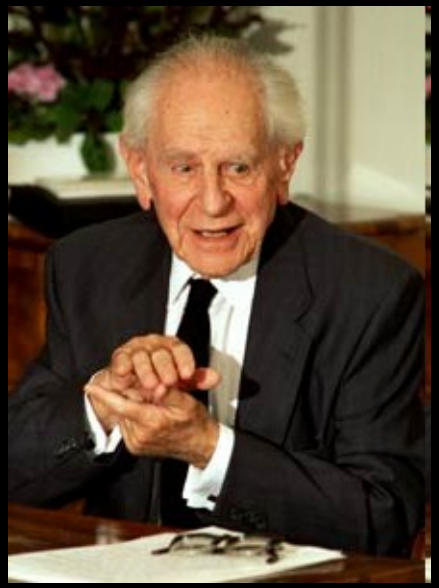
1978: Walter Maner

"Computers generate wholly new ethics problems
that would not have existed if computers had not been invented
... there should be a new branch of applied ethics ...
decided to name the proposed new field Computer Ethics ...
... a new field that studies ethical problems
aggravated, transformed or created by computer technology"

W.Maner, 1978

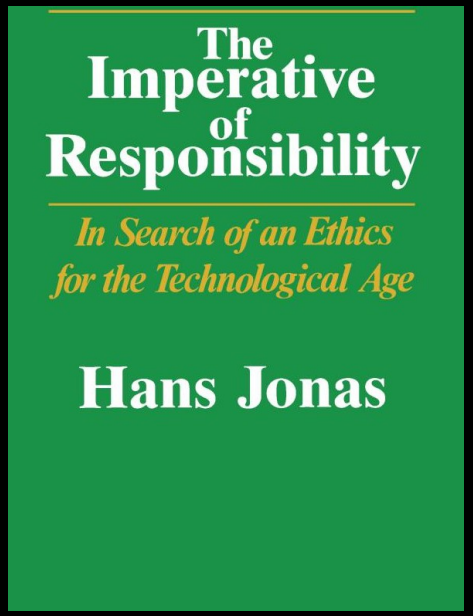
Source: Maner, W. (1980), *Starter Kit in Computer Ethics*, Hyde Park, NY: Helvetia Press and the National Information and Resource Center for Teaching Philosophy.

1979: Hans Jonas



Hans Jonas

(Germany, 1903 - New York, USA, 1993)



"Human survival
depends on our efforts
to care for our planet and its future"

H.Jonas

Hans Jonas, Chicago University Press; New edition edition (1 Oct 1985)

The Evolution of Computing

1963: 1st mouse
Douglas Engelbart,
Bill English

1973: 1st WIMP
Window, Icon, Menu e Pointing Computer
Xerox PARC

1981: April, Xerox Star 8010
(16,595 $)
1st Commercial WIMP
"Personal Computer"

1981: August 12, PC IBM
(1,565 $)
MS-DOS 1.0

1981:

Xerox Star

IBM PC

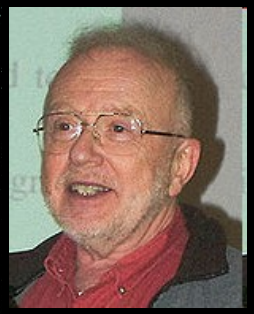
The "1984" Macintosh Ad

22 January 1984:
The half-time of the 1984 Super Bowl
featured a 45 second ad
that would be declared in 1995 the best ad of the last 50 years.
The commercial, directed by Ridley Scott
(The Duelist 1978, Alien, 1979, and Blade Runner, 1982)
for the Apple Corporation,
announced the imminent arrival of the Macintosh computer.
The ad cost $1.6 million to produce,
and Apple Corporation paid $500,000 for the one-minute time slot in which it ran.
It ran only once.

1984: January,
Apple MacIntosh (2,495 $)

1985: David Parnas

1984, SDI, Strategic Defense Initiative



"... an example of
<u>social, ethical and professional responsibility</u>
in refusing ... the work of the (SDI) panel ...
in his concern with public education ... for the public interest..."

Terry Winograd, 1987
CPSR President, Presents "1987-Norbert Wiener Award" to David Parnas

Source: Communications of the ACM, December 1985 (Vol. 28, No. 12)

1985: James Moor

"A typical problem in Computer Ethics arises because there is a policy vacuum about how computer technology should be used. Computers provide us with new capabilities and these in turn give us new choices for action. Often, either no policies for conduct in these situations exist or existing policies seem inadequate. A central task of Computer Ethics is to determine what we should do in such cases, that is, formulate policies to guide our actions …"

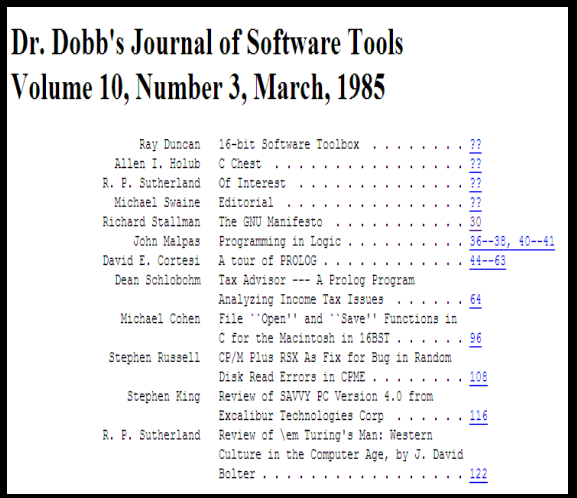
J.Moor, 1985

Source: Moor, J. (1985) "What Is Computer Ethics?" *Metaphilosophy*, 16(4): 266-75.

1985: Free Software (GNU Manifesto)

Free Software
is a matter of the
users' freedom to
run,
copy,
distribute,
study,
change and improve
the software.

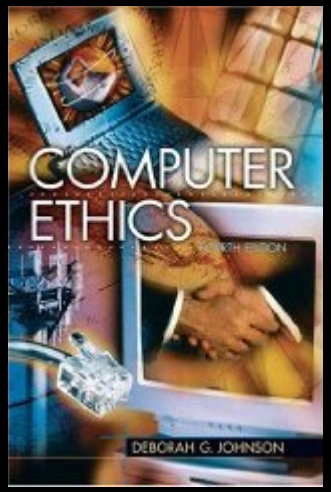
Richard M. Stallman
(New York, USA, 1953 -)



Dr. Dobb's Journal of Software Tools
Volume 10, Number 3, March, 1985

Source: www.fsf.org

1985: Deborah Johnson



"Recognition that technology is not just artifacts,
but rather artifacts embedded in social practices
and infused with social meaning,
is essential to understanding
the connection between Ethics and IT"

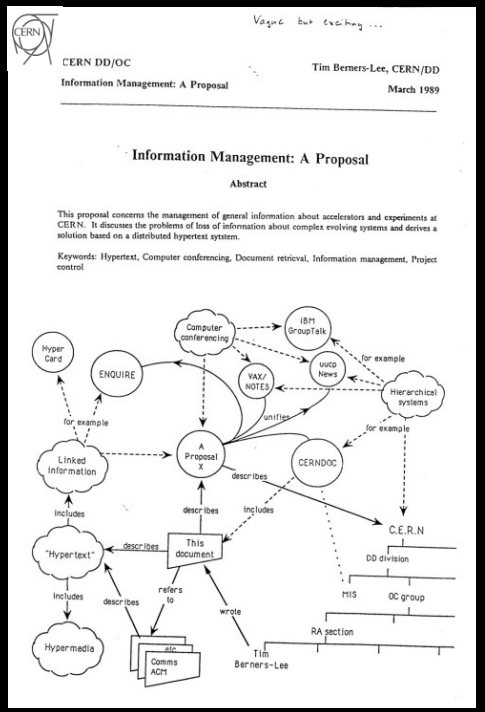
D.Johnson, 1985

Source: Johnson, D. (1985), *Computer Ethics*, First Edition, Englewood Cliffs, NJ: Prentice-Hall;

1988: Internet Worm

Robert Morris
(Massachussets, USA, 1965)

1989: The World Wide Web



CERN

Vague but exciting ...

CERN DD/OC

Tim Berners-Lee, CERN/DD

Information Management: A Proposal

March 1989

Information Management: A Proposal

Abstract

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext system.

Keywords: Hypertext, Computer conferencing, Document retrieval, Information management, Project control

Tim Berners Lee
(London, UK, 1955 -)

Robert Cailliau
(Belgium, 1947 -)

Source: public.web.cern.ch

1991: Linux

Linus Torvald
(Helsinki, Finland, 1969 -)

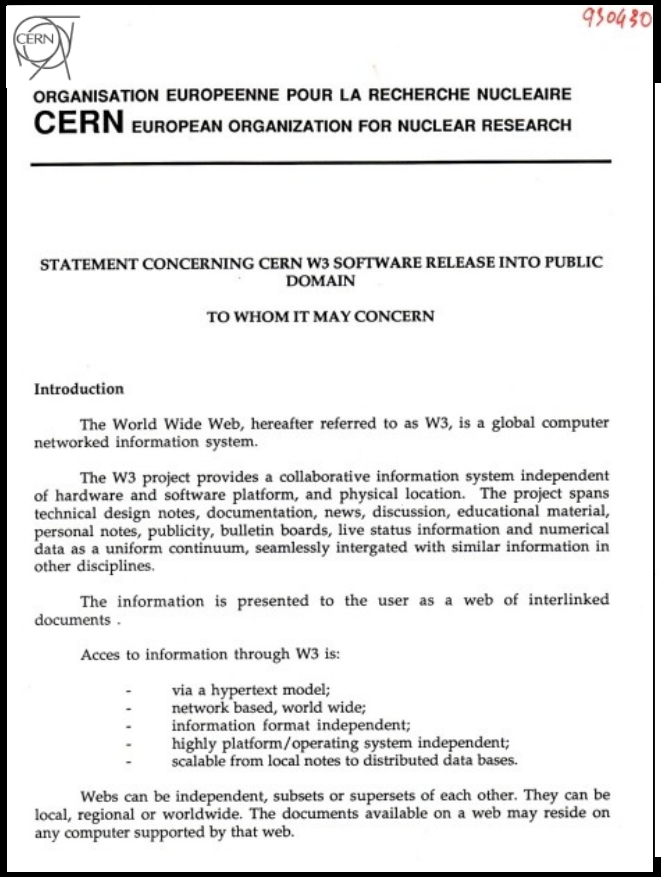
From: torva...@klaava.Helsinki.FI
(Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Keywords: 386, preferences
Message-ID: <1991Aug25.205708.9541@klaava.Helsinki.FI>
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki
Lines: 20

Hello everybody out there ...
I'm doing a (free) operating system, just a hobby, won't be big and professional ...
Linus Torvald

1991: Computer Ethics in Computer Science Curricula

Source; Turner, A.J. (1991), "Summary of the ACM/IEEE-CS Joint Curriculum Task Force Report: Computing Curricula, 1991," *Communications of the ACM*, 34(6): 69-84.

1993: The WWW enters the Public Domain



930430

ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

STATEMENT CONCERNING CERN W3 SOFTWARE RELEASE INTO PUBLIC DOMAIN

TO WHOM IT MAY CONCERN

Introduction

The World Wide Web, hereafter referred to as W3, is a global computer networked information system.

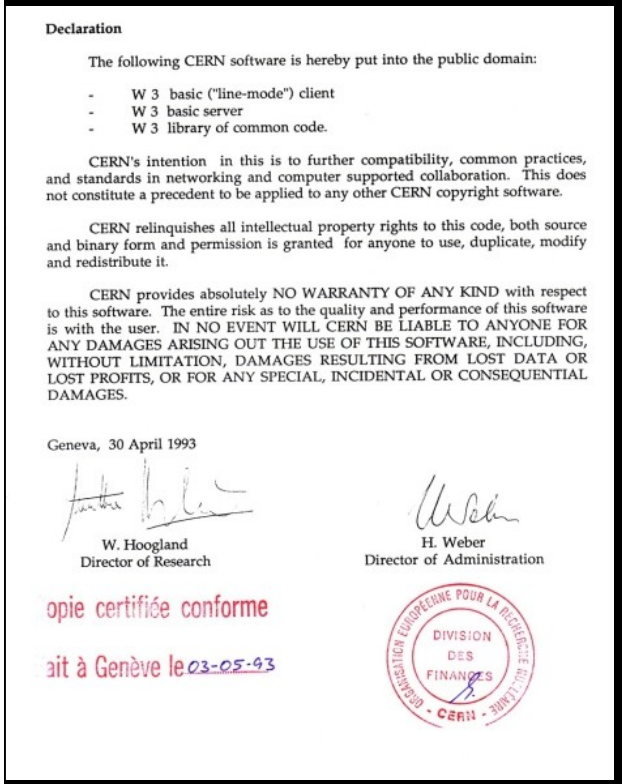
The W3 project provides a collaborative information system independent of hardware and software platform, and physical location. The project spans technical design notes, documentation, news, discussion, educational material, personal notes, publicity, bulletin boards, live status information and numerical data as a uniform continuum, seamlessly intergated with similar information in other disciplines.

The information is presented to the user as a web of interlinked documents .

Acces to information through W3 is:

- via a hypertext model;
- network based, world wide;
- information format independent;
- highly platform/operating system independent;
- scalable from local notes to distributed data bases.

Webs can be independent, subsets or supersets of each other. They can be local, regional or worldwide. The documents available on a web may reside on any computer supported by that web.



Declaration

The following CERN software is hereby put into the public domain:

- W 3 basic ("line-mode") client
- W 3 basic server
- W 3 library of common code.

CERN's intention in this is to further compatibility, common practices, and standards in networking and computer supported collaboration. This does not constitute a precedent to be applied to any other CERN copyright software.

CERN relinquishes all intellectual property rights to this code, both source and binary form and permission is granted for anyone to use, duplicate, modify and redistribute it.

CERN provides absolutely NO WARRANTY OF ANY KIND with respect to this software. The entire risk as to the quality and performance of this software is with the user. IN NO EVENT WILL CERN BE LIABLE TO ANYONE FOR ANY DAMAGES ARISING OUT THE USE OF THIS SOFTWARE, INCLUDING, WITHOUT LIMITATION, DAMAGES RESULTING FROM LOST DATA OR LOST PROFITS, OR FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Geneva, 30 April 1993

W. Hoogland
Director of Research

H. Weber
Director of Administration

opie certifiée conforme

ait à Genève le 03-05-93

ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE
DIVISION DES FINANCES
CERN

Source: public.web.cern.ch

1995: CCSR

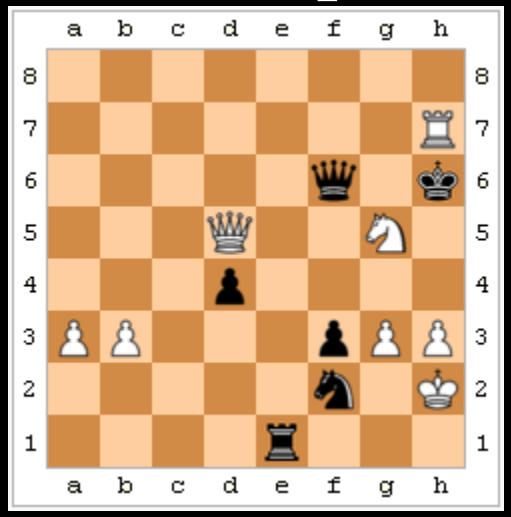
De Monfort University, Leicester, UK

Framework for Responsible Research and Innovation in ICT

Anticipate	*Is the planned research methodology acceptable?*
Reflect	*Which mechanisms are used to reflect on process?* *How could you do it differently?*
Engage	*How to engage a wide group of stakeholders?*
Act	*How can your research structure become flexible?* *What training is required?* *What infrastructure is required?*

Source: responsible-innovation-org.uk, 2014

1996: Deep Blue



White: Deep Blue
Black: Kasparov

1998: Google

Sergej Brin
(Moscow, RU, 1973 -)

Larry Page
(Ann Arbor, Michigan, 1973 -)

"... At the heart of the change,
the next 20 years will be
intelligence drawn from information
Information will be the 'oil of the 21st century'.
... It will be the resource running our economy
in ways not possible in the past."

Peter Sondergaard
Gartner Symposium/ITxpo 2010,
October 17-21, Orlando

2013: The 5 "Big-Clouds" (silos?)

1975: Microsoft

1976: Apple

1994: Amazon

1998: Google

2004: Facebook