Computing Timeline

This timeline is drawn from sources focused on the development of computing in the United States.

> **Indian Removal Act** (all indig. lands east of Mississippi) - May 28, 1830
> **Trail of Tears** April 5, 1838
> **Emancipation Proclamation** 1863
> **US Civil War** Apr 12, 1861 – Apr 9, 1865
> **Wounded Knee Massacre** Dec 29, 1890
> **WWI** July 28, 1914 to Nov 11, 1918
> **19th Amendment** (white women's right to vote) - passed June 4, 1919, ratified Aug 18, 1928
> **The Great Depression** Stock market crash 1929 - 1939
> **Hitler takes power** January 1933
> **WWII** Sept 1, 1939 - Sept 2, 1945
> **Jim Crow** (according to Google) end of reconstruction in 1877 - beginning of civil rights movement in 1950s
> **Japanese internment** Feb 19, 1942 - March 20, 1946
> **Korean war** June 25, 1950 - July 27, 1953
> **Brown v Board of Education** Dec 9, 1952 - May 17, 1954
> **Montgomery Bus Boycott** Dec 5, 1955 – Dec 20, 1956
> **Tuskegee study** 1932-1972
> **MLK assassinated** 1968
> **Vietnam War** 1955-1975
> **The Cold War** 1947-1991
> **Berlin Wall demolished** November 9, 1989
>
> *Some important dates for context*

999 Pope Sylvester (rumored to be a wizard and necromancer!) made the first counting device in Europe and was "first Christian to teach math using 9 Arabic numerals and a zero" (marie brown, 2015) AND apparently made a a statue with a talking head that responded when spoken to and "spoke truth" (McCorduck, 2004, p. 8)

1370 A modern clock built in Paris (Mumford, 2010)

1591 Francois Viète uses variables in mathematical equations (Priestley, 2011, p. 7)

1623 Wilhelm Shickard invents the first calculating machine (Moreau, 1984, p. 10)

1642 Pascal (independent of Shickard) invents an adding/subtracting/converting machine. (Moreau, 1984, p. 11)

1690s Germany. Gottfried Leibniz works out kinks with binary number system. Leibniz also invented an add/subtract/mult/divide machine to help astronomers (Moreau, 1984, p. 11) (Bolter, 1984, p. 32) and a sort of universal language (following Bacon and a precursor to programming langs) (Priestley, 2011, p. 6)

1725 Basile Bouchon makes semiautomatic loom, controlled by hole-punched paper tape (Rawlins, 1996, p. 115). People were pretty mad and they totally ignored him.

1805 Francois Jaquard invents (based on Bouchon's work) the textile loom that uses perforated cards to store the instructions (Moreau, 1984, p. 13)

1820 "first commercially-produced adding machine was the Arithmometer developed by Thomas de Colmar of Alsace" (Campbell-Kelly, Aspray, Ensmenger, & Yost, 2013, p. 29)

1822 Babbage builds a small version of the "difference engine" (Borgmann, 1999, p. 142) (Grier, 2005, p. 40) (Stein, 1987) (Priestley, 2011)

1820s In London, Bankers Clearing House was clearing checks at the end of the day in an elaborate and organized way. Large-scale data processing predates modern computing. (Campbell-Kelly et al., 2013)

1836 Samuel Morse and pals invent telegraph system (sometimes called the start of the information age.)

1842 Lovelace releases translation of Menabrea's work + Babbage notes. (Stein, 1987)

1854 George Boole invents Boolean algebra. (McCorduck, 2004)

1871 James Clerk Maxwell introduces the "Demon Paradox" (Aspray, 1990, p. 174) (see: 1929)

1874 France. H. Pottin invents cash register that prints results on paper (Moreau, 1984, p. 20)

1874 Remington produces and sells the first QWERTY typewriter, invented by Christopher Sholes. By 1900, there were a dozen manufacturers and it was a fairly common office machine.

1881 Human ("lady") computers are working at Harvard on star charts (Grier, 2005)

1884 Hollerith has first demo of punch card prototype to help count dead people (Black, 2012, p. 25)

1885 William S Burroughs invents adding machine that can print its results. (Campbell-Kelly et al., 2013)

1887 Dorr E Felt gets partner and starts manufacture of Comptometer, a key-driven adding machine that allowed for super fast data entry. There were schools, and of course, men and women spent a few months training intensely. (Campbell-Kelly et al., 2013). This company did not survive the transition to electric computers and was acquired in the 1960s.

1895 O. Steiger built the Millionaire, using direct multiplication (rather than multiplication as a series of additions), as a calculating machine. Over many years, it sold thousands. (Moreau, 1984, p. 19)

1896 Hollerith incorporates business as Tabulating Machine Company. (Campbell-Kelly et al., 2013)

1898 Rand forms the Rand Ledger System to market his invention of the vertical filing system. (Campbell-Kelly et al., 2013)

1906 James Powers gets 1910 census contract (over Hollerith) (Black, 2012, p. 29) (Yates, 2009)

1910 Lewis Fry Richardson invents numerical meteorology and has idea about the Forecast Factory. This idea models parallel computing

1911 Computer-Tabulating-Recording Company is founded as a merger between Hollerith's Tabulating Machine Company and The Computing Scale company (mfg scales), and International Time Recording Company (produced employee clockin/clockouts) (Yost, 2017, p. 21) (Campbell-Kelly et al., 2013) (Black, 2012)

1915 Rand, Jr forms Rand Kardex Company to sell his indexing methods.
British Navy ships had mechanical calculators (Dreyer Tables) that were precursor to electronic calculators.

WW1

1921 Destruction of "Black Wall Street" in Tulsa, OK.

1921 between 1921 and 1922 over 500 radio stations launched. Before this, it was a hobby for radio enthusiasts. (Campbell-Kelly et al., 2013)

1924 C-T-R becomes IBM.

1927 Rand and Remington merge to become Remington Rand and thus the largest "business-machine company in the world" (Campbell-Kelly et al., 2013, p. 29)

1929 Szilard solves the Demon paradox (from 1871) by using "information" as scientific concept. (Aspray, 1990, p. 174)

1930s Differential Analyzer invented by Vannever Bush's team at MIT

1936 Alan Turing publishes "On Computable Numbers," a "manifesto of the new electronic order of things" (Bolter, 1984, p. 12)

1937 Claude Shannon writes paper linking Boolean algebra to digital calculation.

1937 H.G. Wells tours the US and gives lecture on "the Brain Organization of the Modern World" (Campbell-Kelly et al., 2013, p. 257) as a way of protesting the extreme specialization in knowledge that he thought was leading to barbarism and fighting.

1937 ABC computer - Atanasoff-Berry - worked on at Iowa State Univ/Ames Laboratory. (Rojas & Hashagen, 2000, p. 91) (Grier, 2005, p. 200)

1938 Konrad Zuse creates the Z1 (Rojas & Hashagen, 2000) (Priestley, 2011)

1938-1948 Mathematical Tables project was "largest scientific computing organization in the United States" (Grier, 2005, p. 242). Employed many Works Progress Administration workers.

19xx LINE ITEM HERE FOR ALL THE BULLSHIT THAT IBM PULLED DURING THIS TIME.

1940 George Stibitz develops floating-point arithmetic (allowing for storage of v large/small numbers) (Moreau, 1984, p. 29) (Priestley, 2011)

1941 US Army's Ballistics Research Laboratory took over the electronics laboratories of National Cash Register (NCR) (Hendry, 1990, p. 24)

1943-1946 John Mauchly, John Presper Eckert, Jr develop ENIAC at Univ of Pennsylvania. Electronic Numerical Integrator and Computer. (ENIAC) is considered the grandfather of digital computers, it fills a 20-foot by 40-foot room and has 18,000 vacuum tubes. (Hendry, 1990, p. 24) (Yates, 2009, p. 117) (Haigh, Priestley, & Rope, 2018) (Edwards, 2013, p. 114)

1944 Havard Mark I built and operating.

1944 "Sometime in 1944, computers became 'girls'". (Grier, 2005, p. 276)

1945 Vannevar Bush proposes the memex

1945 First cohort of "ENIAC girls" hired, including Frances Bilas, Kathleen Rita McNulty, Frances Elizabeth "Betty" Snyder

WWWII

1946 The Moore School (at U Penn) lectures gathered ~30 young engineers and taught them about ENIAC and EDVAC (after security clearances were granted) (Campbell-Kelly et al., 2013)

1946 Ekert and Mauchly get Census Bureau contract for $300k and form Electronic Control Company. They start work on what will become UNIVAC.

1946 Howard Aiken publishes *Manual of Operation of The Automatic Sequence Controlled Calculator*, "effectively the first book on digital computing ever published. (Campbell-Kelly et al., 2013, p. 64)

1946 The first of the Macy Conferences is held. They covered a wide variety of topics including medicine, cybernetics (in separate track), computing. (Turner, 2006, p. 26) and described as "an experiment in using conceptual models—drawn from the field of 'feedback' mechanics—to think about human behavior." (Kline, 2017, p. 45)

1947 Eckert and Mauchly get Northrop Aircraft Corp contract to build BINAC. They're working also with Jean Bartik on stored programming mode.

1947 Adele Katz Goldstein drafted early plan for ENIAC conversion.

1947-1949 IBM starts experimenting with more advanced card processing and tape processing devices.

1948 The IBM SSEC is considered the world's first computer by (Moreau, 1984, p. 39).

1948 John Bardeen invents the *transistor* (a semiconductor device with three connections, capable of amplification in addition to rectification.)

1948 Claude Shannon publishes "A Mathematical Theory of Communication". (Kline, 2017, p. 10) (in competition with Weiner...)

1948 Norbert Weiner publishes *Cybernetics, or Control and Communication in the Animal and the Machine* (Aspray, 1990, p. 209) (Turner, 2006) (Kline, 2017, p. 10)

1948, November RAND corporation launched as non-profit in Santa Monica, CA. "outgrowth of an Air Force-funded project called RAND-initially a $10 million Air Force contract to Douglas Aircraft Company"

1949, August "U.S. intelligence revealed that the Russians had exploded a nuclear bomb and that they possessed bomber aircraft capable of carrying such a weapon over the North Pole and into the United States." (Campbell-Kelly et al., 2013, p. 148) This revelation was more fuel to get real-time radar detection working.

1949 "Card Programmed Electronic Calculator" for Northrop Aircraft Company "based on the 604 calculator" ... done by Palmer and Phelps at IBM

1949, May EDSAC becomes first computer in the world to be "fully commissioned with automatic input" (Hendry, 1990, p. 36)

1950, January Harvard Mark III appears on the cover of *Time* magazine. (Kline, 2017, p. 78)

1950 ENIAC used to predict weather (Edwards, 2013, p. 123)

1950 Alan Turing publishes "Computing Machinery and Intelligence" in which he argues that no computer will be able to perfectly imitate human intelligence before 2000 (aka, pass the Turing Test) (Bolter, 1984, p. 12)

1951 *Whirlwind* completed - Navy flight simulator, but precursor for SAGE SAGE. Whirlwind leader was Robert Everett, director was Jay W Forrester

Feb 1951 Ferranti Mark 1 delivered as first self-contained computer.

1952 Grace Hopper invents COBOL (does work abstracting instructions into higher-level languages) OR... the committee for COBOL decides to invent a new language and takes it's high-level syntax and other structures from Hopper's FLOWMATIC language (Moreau, 1984, p. 175). Hopper was given more credit for it in (Ceruzzi, 1998, p. 92)

1952 Remington Rand (after acquiring Eckert-Mauchly Computer Corporation (formerly known as Electronic Control Company) in 1950) releases UNIVAC (Universal Automatic Computer) (Yost, 2017, p. 53) (Yates, 2009, p. 122)

1952 UNIVAC predicts Eisenhower becomes president on CBS evening television (Campbell-Kelly et al., 2013, p. 108)

1952 John Diebold publishes *Automation: The Advent of the Automatic Factory* which popularized the term automation (Yost, 2017, p. 29) (Ceruzzi, 1998, p. 32)

1952 "Magnetronic Reservisor" installed at La Guardia Airpprt (NYC). (Campbell-Kelly et al., 2013, p. 154). American Airlines was trying to automate its reservation system. First Reservisor developed in the 1940s

1952 Betty Holberton develops the first software routine (Ceruzzi, 1998, p. 90)

1952, December 29 National Security Agency formed by exec order from President Truman. (Rawlins, 1996, p. 14)

Korean War

1952-1954 Brown v. Board of Education

1953 Start of the "computer consulting services business" (Yost, 2017, p. 45)

1953 CRC102A begins selling (it is a prod version of CADAC built for the Air Force), made by Computer Research Corporation (Ceruzzi, 1998, p. 40)

1953 IBM announces the 702 scientific computer (though doesn't ship them until 1955), but begins taking orders (Campbell-Kelly et al., 2013, p. 110)

1954 UNIVAC installed at General Electric's Appliance Park (Louisville, KY). This "has become famous as the first of a stored-program electronic computer for a nongovernment customer (although the LEO, built for the J. Lyons Catering Company in London, predated it by three years)" (Ceruzzi, 1998, p. 32)

1954 Anderson and Company provides outsourced programming to GE (making it probably the first company to do so) (Yost, 2017, p. 28)

1956 The Dartmouth workshop is held. Seminal AI event and marks split from cybernetics.

1956 Richard Canning publishes *Electronic Data Processing for Business and Industry* which is "the first high-quality textbook detailing state-of-the-art knowledge about applying computers" to a variety of business applications. (Yost, 2017, p. 38)

1956ish John Backus and team develop FORTRAN, write specs and try to sell it to manufacturing companies. (Ceruzzi, 1998, p. 90)

1957 the 'Shockley Eight' form Fairchild Semiconductor. The 8 were recruited years earlier by William Shockley to start a west-coast microelectronics company that failed.

1957ish During this time, floating point hardware, internal addressing, and i/o buffers were introduced (Ceruzzi, 1998)

1957 Honeywell releases Datamatic 1000 (Ceruzzi, 1998, p. 54)

1957 IBM releases spinning disk hardware (during this time, others were still using punch card batch processing) (Ceruzzi, 1998, p. 69)

1957 "Automatic data processing" happening at US armed services' Joint Numerical Weather Prediction Unit as one of the first instances of removing human labor from initial processing of incoming data. (Edwards, 2013, p. 254)

1959 "turning point for IBM" (Campbell-Kelly et al., 2013, p. 117) as they announce Model 1401, the first "computer system"

1959-1960 The term *software* enters popular use.

1960 Manfred Clynes and Nathan Kline invent the term "cyborg" (Haraway, 2004, p. 299)

1960 Algol language developed, a key milestone in the evolution of programming languages. (Priestley, 2011)

1960-1963 American Airlines-IBM develop SABRE, an automatic airlines reservation system. $40 million. "easily the largest civilian computerization task ever undertaken, involving some 200 technical personnel producing a million lines of program code" (Campbell-Kelly et al., 2013, p. 156)

1962 John Glenn enters orbit, flight is guided by Atlas guidance computer (Ceruzzi, 1998, p. 92)

1962 Ross Perot forms Electronic Data Systems (EDS)

1962 IBM starts work on OS/360 ... the idea of an operating system is in play, and apparently 360 is a big fuck up (Campbell-Kelly et al., 2013)

1962, July Mariner I spacecraft takes off and has to be shot down - its erratic movements were caused by a bug in the software.

1963 General Electric releases IDS, possibly the first commercial reference to a database.

1963 Human Factors Research Center formed by Douglas Engelbart at Stanford Research Institute. Worked on user-friendliness of interfaces.(Campbell-Kelly et al., 2013)

1963 ARPANET development is in progress. JCR Licklider calls it his "Intergalactic Computer Network" (Campbell-Kelly et al., 2013)

1964 Dartmouth Time Sharing System (DTSS) starts and the team invents the BASIC programming language. (Rankin, 2018) (Ceruzzi, 1998, p. 203) *Dartmouth didn't admit women until 1972.*

1965 Moore and John Noyce offer Moore's Law. (Noyce not credited in (Campbell-Kelly et al., 2013))

1965 DEC releases the PDP-8, called the first 'minicomputer.' (The miniskirt gained popularity in 1964) (Ceruzzi, 1998, p. 134)

1966 Joseph Weizenbaum creates ELIZA (Aspray, 1990; Borgmann, 1999; Ceruzzi, 1998; Weizenbaum, 1976)

1966, May Stephen Gray starts Amateur Computer Society.

1967 Informatics launches Mark IV database system. Has top-selling db products until 1983. (Campbell-Kelly et al., 2013)

1967ish "computer science" as a discipline is introduced (Ceruzzi, 1998, p. 90)

1968 Stewart Brand & team launch *Whole Earth Catalog* (Turner, 2006)

1968 First software patent in USA.

1968 Engelbert demos the mouse, keyboard

1968 Intel founded by Moore and Noyce, VPs of Fairchild.

1968 There is a "software engineering crisis" (MacKenzie, 2001, p. 34) leading to...

1968 "Software Engineering" term invented and name of conference (in Garmisch-Partenkirchen, Germany) held to discuss the clusterf of managing software projects and failing. (Campbell-Kelly et al., 2013)

1969 Xerox establishes Palo Alto Research Center.

1969-1974 UNIX developed at Bell Labs by Ken Thompson and Dennis M. Ritchie. (Campbell-Kelly et al., 2013) (including gross commentary about their bodies and their beards.)

1969-1971 Intel developed microprocessor. (though it was simultaneously developed elsewhere, Intel most important.) (Campbell-Kelly et al., 2013, p. 208)

1970 four-node ARPANET up and working. (Campbell-Kelly et al., 2013, p. 263)

1971 Pascal invented, as part of structured programming craze. popular for many years.

1971 Nolan Bushnell founds Atari. Pong released in 1974

1972 "Intel releases the 8-bit 8008, soon replaced by the 8080, microprocessor. This was the first true microprocessor which led to the PC revolution."

1973 First digital watches in US market

1974 First delivery of "bar-coded merchandise" as part of deployment of Universal Product codes (started on food, then on everything) (Campbell-Kelly et al., 2013, p. 160). *The Black Panthers ran their free breakfast program from 1969-1971.*

1974 Ted Nelson publishes *Computer Lib* influenced by Stewart Brand and the *Whole Earth Catalog* (Ceruzzi, 1998, p. 216)

1975 The Homebrew Computer Club meets until 1986 in/around Silicon Valley (Ceruzzi, 1998, p. 216)

1975, January First personal computer, Altair 8800, debuted on cover of *Popular Electronics* (Ceruzzi, 1998, p. 226)

1975 email was limited to MIT, but by 1975, there were over 1,000 registered email addresses. (Campbell-Kelly et al., 2013)

1975 Whitfield Diffie and Martin Hellman invent public-key systems (Rawlins, 1996, p. 7)

1976 Apple company formed by Jobs and Wozniak

1977, April West Coast Computer Faire, at which Apple II and Commodore PET were launched.

1978 Usenet is formed (Campbell-Kelly et al., 2013, p. 265)

1979 First commercial spreadsheet - VisiCalc.

1983 Domain name system recommended by Paul Mockapetris of USC and adopted

1981 IBM launches personal computer Costing $1 565 the IBM 5150 had 40K of read-only memory and 16K of user memory, running MSDOS1.0

1983 Stallman launches GNU / free software movement

1983 Apple releases The Lisa, a copycat-ish of Xerox Star. (Campbell-Kelly et al., 2013, p. 240)

1984, January Apple introduces Macintosh. Airs one Superbowl ad (Campbell-Kelly et al., 2013)

1984 Stewart Brand & team create first Hackers' Conference (Turner, 2006, p. 132) (Kline, 2017)

1984 By summer, CompuServe has 130,000 subscribers who connect and chat with each other and play games (Campbell-Kelly et al., 2013)

1985 Microsoft launches first version of Windows, signs agreement to look like Mac. (Campbell-Kelly et al., 2013). lawsuit ensues.

1985 Stewart Brand & Larry Brilliant form WELL - Whole Earth 'Lectronic Link, an important early "virtual community"(Turner, 2006, p. 141)

1986, January Space shuttle *Challenger* explodes 73 seconds after takeoff. The incident was/is a crucial moment in the consideration of engineering ethics and responsibility.

1989 Tim Berners-Lee submits proposal for first www at CERN.

1990 Windows 3.0 launches

1991 World Wide Web introduced by Tim Berners-Lee in paper at Hypertext '91 conference (Campbell-Kelly et al., 2013) (Evans, 2018) (Greenstein et al., 2010, p. 162)

1991, November Fall of Berlin Wall

1992 Broderbund launches "Grandma and me" on CD-ROM and becomes most popular title of the time. (Campbell-Kelly et al., 2013)

1993, November Mosaic (first commercial web browser) launches, built by Marc Andreesen (Campbell-Kelly et al., 2013, p. 271)

1993 Archie, the first "search engine" launches.

1993 Julian Dibbell publishes "cyber rape" piece in the *Village Voice*

1993 *Wired* magazine launched by New Communalists (Turner, 2006) (Kline, 2017)

1994 The "New Communalists" and the "New Right" together publish "Cyberspace and the American Dream: A Magna Carta for the Knowledge Age", a deregulationist approach to new tech. (Turner, 2006, p. 223)

1995, August Microsoft launches Windows 1995

1998 ICANN registry founded

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