## Gottfried Wilhelm (von) Leibni[t]z
### Born: July 1, 1646;

Leipzig, Saxony
Died: Nov. 14, 1716

During the 1670s, Leibniz independently developed a very similar theory of calculus to that of Issac Newton. More importantly for us, at around the same time, in 1672, Leibniz cam up with the first practical calculating machine, which he called the "Step Reckoner". He had the initial idea from examining a pedometer.

It was the first calculator that could perform all four arithmetic operations, although the carry operation wasn't fully mechanized. By comparison, Pascal's [June 19] earlier Pascaline could only add and subtract.



A Stepped Reckoner, on display in the very interesting Technische Sammlungen museum in Dresden. Photo by Kolossos. CC BY-SA 3.0.

He remarked in 1671: "It is unworthy of excellent men to lose hours like slaves in the labor of calculation which could safely be relegated to anyone else if machines were used."

Leibniz is also credited with the development of the binary number system, which he described in "Explication de l'Arithmétique Binaire" in 1703. Leibniz even mentioned the "I Ching" in the article, noting how its hexagrams correspond to the binary numbers from 0 to 111111. However, the Reckoner used decimal digits, with an 8 digit input section on the front.

The underlying technology, the Leibniz wheel, was reused a century and a half later by Thomas de Colmar [May 5] in his arithmometer, the first mass-produced mechanical calculator.

In 1961, Norbert Wiener [Nov 26] suggested that Leibniz should be considered the patron saint of cybernetics.

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## Hans Peter Luhn
### Born: July 1, 1896;

Barmen, Germany
Died: August 19, 1964

Luhn is sometimes called "the father of information retrieval", due to his invention of the Luhn algorithm, KWIC (Key Words In Context) indexing, and Selective Dissemination of Information ("SDI")

The Luhn algorithm is a checksum formula used to validate ID numbers, such as those found on credit cards. A KWIC index is formed by sorting the words within an article title to allow each word to be searchable alphabetically in the index.

Although he was most prolific in information retrieval, Luhn also invented a new kind of raincoat, an enhanced gaming table, and coined the term *business intelligence*; this latter achievement may be explained by the fact that he worked for IBM for many years.

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## Fernando (Corby) José Corbató
### Born: July 1, 1926;

Oakland, California
Died: July 12, 2019

Corbató was a pioneer in the development of time-sharing OSes; in particular, he was responsible for MIT's Compatible Time-Sharing System (CTSS) [May 3]

After CTSS, he moved onto Multics [Nov 30] during the mid-1960s. That OS is often deemed a commercial failure, but nevertheless had an enormous influence on the design of later systems. For example, UNIX was written by two ex-Multics programmers, Ken Thompson [Feb 4] and Dennis Ritchie [Sept 9].

Corbató is credited with the first use of passwords (to secure access to CTSS), although he himself suggested that they first appeared in IBM's SABRE ticketing system [Nov 5].

He probably also coined the phrase *daemon* as an abbreviation for the Disk And Executive MONitor which automatically made tape backups of the file system. He was inspired by Maxwell's daemon (his background was in physics).

*Corbató's Law*: The number of lines of code a programmer can write in a fixed period of time is the same independent of the language used.

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## Project MAC
### July 1, 1963

Project MAC (the Project on Mathematics and Computation) was launched at MIT with a generous $2 million grant from DARPA [Feb 7]. Its initial goal was to develop a computer system that was accessible to a large number of people, but it would arguably become more famous for its AI research.

The first Project MAC members included Robert Fano (the first director) [Nov 11], Marvin Minsky [Aug 9], J.C.R. Licklider [March 11], and Fernando J. Corbató [previous entry].

Corbató brought CTSS [May 3], with him from the MIT Computation Center, and one of the early focuses of Project MAC was the development of a successor, which became Multics [Nov 30].

Project MAC was initially located on the 8th and 9th floors of

MIT's Tech Square, a building now excitingly renamed NE-43. The ninth floor was reserved for the project's computer systems, which in 1964, included an IBM 7094 [Nov 30], and a PDP-6 which was purchased by Minsky specifically for the AI group within MAC.

Fano decided to call MAC a "project" rather than a "laboratory" because of MIT's languorous politics. It was also much easier to 'poach' staff from other departments to a project rather than to a new lab.

The MAC part of the name was sometimes expanded to stand for "Multiple Access Computer", "Machine Aided Cognitions", and "Man and Computer". Insiders preferred, "Minsky Against Corbató", due to the differences in mission and culture between the groups headed by the two, and not least that Minsky's AI Group [Sept 00] received roughly one third of MAC's total funding. It was hardly surprising when Minsky split the AI Group off from MAC in 1970, creating the MIT AI Lab. Most of the remaining MAC members went on to form the Laboratory for Computer Science (LCS) in 1975.
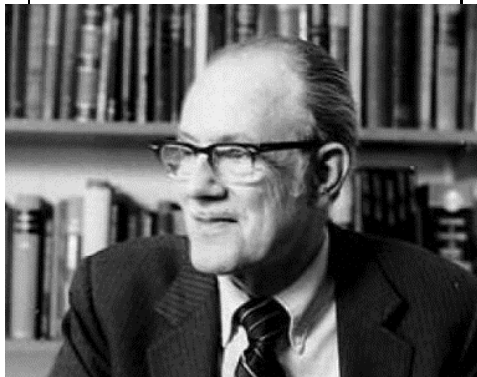
## Xerox PARC Opens
### July 1, 1970

At the end of the 1960's, the CEO of Xerox, Charles Peter McColough's epiphany was that the copier company must enter the business computing market. In May 1969 Xerox purchased SDS [July 21], renaming it Xerox Data Systems, and Jack Goldman, Xerox's Chief Scientist, asked George Edward Pake to start a second research center for the company, which became Xerox PARC (Palo Alto Research Center).

Pake hired ARPA's Bob Taylor [Feb 10], who had overseen Project GENIE [Nov 30], to head PARC's computer science lab. Taylor in turn  hired 20 employees, 11 of them from BCC, a company formed by ex-members  of Project GENIE, including Butler Lampson [Dec

23], Charles Thacker [Feb 26], and L. Peter Deutsch [Aug 7].

PARC 's location in Palo Alto, meant it was a goodly 3,000 miles away from the stuffy Xerox headquarters in Rochester, New York. The distance both increased research freedom, and made it possible to attract employees from nearby SRI



George E. Pake. (c) Xerox PARC

(Stanford Research Institute), UC Berkeley, DARPA [Feb 7], NASA, and others. In addition, the lab opened just as "Silicon Valley," led by Robert Noyce's newly founded Intel, was taking shape.

Pake's successful employment drive was helped by the 1970 Military Procurement Authorization Bill [Nov 19], which appeared to threaten DARPA funding to major universities such as MIT, Carnegie Mellon, and Stanford; researchers from nearly every one ended up at PARC.

The end result was that PARC was responsible (in large part ) for the development of laser printing [Jan 21], Ethernet [May 22], bitmap graphics, the graphical user interface (GUI), object-oriented programming (Smalltalk [May 17]), word processing (Bravo [Oct 00]), Interpress, a precursor to PostScript [Sept 11], non-erasable, magneto-optical storage device, electronic reusable paper, and ubiquitous computing.

Many of these developments were brought together in the Xerox Alto in [March 1] 1973, its successor the Dorado [May 6],

and the Xerox Star 8010 in [April 27] 1981. All of them were commercial disasters.

## 8088 Introduced
### July 1, 1979

Intel engineer Stephen Morse memorably described the 8088 as "a castrated version of the 8086 [June 8]." Both processors had the same architecture, the only difference being that the 8088 used an 8-bit external data bus rather than 16-bits present in the 8086.

Despite the harsh description, this modification (by Rafi Retter and Dany Star) proved to a good decision. As a result, the 8088 required fewer, less expensive support chips than the 8086, and was fully compatible with existing 8-bit hardware. It also offered a smooth transition to 16-bit processors.

These factors were why IBM chose the 8088 for its first PC in [Aug 12] 1981.

## Tramiel Buys Atari
### July 1, 1984

Six months after resigning from Commodore [Jan 16], Jack Tramiel [Dec 13] formed a new company named Tramel Technology, Ltd. (TTL). The company was called "Tramel" not "Tramiel" to help ensure that it would be pronounced correctly (i.e., as "tra - mel" instead of "tra - meal").

On this day, TTL bought the Consumer Division of Atari [June 27] from Warner Communications. The division had fallen on hard times, due to the video game crash [Dec 7] of 1983. TTL was quickly renamed Atari Corporation, and under Tramiel's guidance, developed the 16/32-bit Atari ST computer line [Jan 10] which was very successful in Europe, and globally influential in the professional music business.

However, negative stories about Tramiel kept circulating, not

least the one about Steve Arnold of LucasArts [Sept 12] comparing Tramiel to *Jabba the Hutt*, while within Atari, *Darth Vader* was considered a more suitable analogy.

In the late 1980s, Tramiel stepped down from day-to-day running of Atari, naming his son, Sam, President and CEO. However in 1995, Sam Tramiel suffered a heart attack, and his father returned to oversee operations, which led to its sale in 1996 [Feb 29].

## Duke Nukem Released
### July 1, 1991

Apogee Software released the side-scrolling shooter *Duke Nukem* for IBM-compatibles, which, along with *Commander Keen* [Dec 14], helped make the shooter genre extremely popular. Sales of *Duke Nukem 3D* (1996) were greatly enhanced by its alleged promotion of pornography and murder, and the most recent installment, *Duke Nukem Forever*, is best known for spending 15 years in development hell. Promotional information for the game was released in 1997, 1998, 1999, 2001, 2007, 2008 and 2009.  As a result, the title won several vaporware awards [Nov 28], and garnered several alternative names, including *Duke Nukem Taking Forever*. Many gaming wits noted that the  initials, DNF, could stand for "Did Not Finish", an acronym used in motorsports for cars which didn't reach the finish line.

## Unreal Engine Released
### July 1, 1998

The Unreal game engine was developed by Epic Games [Jan 15] originally for the 1998 first-person shooter Unreal. It features include hardware rendering, collision detection, AI, networking, scripting, and a level editor.

The engine has been employed in a variety of game genres, including stealth and other RPGs [July 27], and ported to numerous platforms. In 2014, it received the Guinness World Record award for "Most Successful Videogame Engine".

Until mid-2008, development was exclusively carried out by Tim Sweeney, the founder of Epic Games.

On March 19, 2014, Epic released the complete C++ source code for Unreal Engine 4 and all of its tools through a subscription model. From March 2, 2015, it was made available for free.