**The ABACUS:**

The **abacus**, also called a **Counting Frame**, is a calculating tool that was in use centuries before the adoption of the written modern numeral system and is still widely used by merchants, traders and clerks in Asia, Africa, and elsewhere. Today, abacus are often constructed as a bamboo frame with beads sliding on wires, but originally they were beans or stones moved in grooves in sand or on tablets of wood, stone, or metal. The user of an abacus is called an *abacist*.

The period 2700–2300 BC saw the first appearance of the Sumerian abacus, a table of successive columns which delimited the successive orders of magnitude of their sexagesimal number system. The use of the abacus in Ancient Egypt is mentioned by the Greek historian Herodotus, who writes that the Egyptians manipulated the pebbles from right to left, opposite in direction to the Greek left-to-right method.

During the Achaemenid Persian Empire, around 600 BC the Persians first began to use the abacus. Under the Parthian, Sassanian and Iranian empires, scholars concentrated on exchanging knowledge and inventions with the countries around them – India, China, and the Roman Empire, when it is thought to have been exported to other countries.

The Chinese abacus, known as the **Suanpan** is typically 20 cm (8 in) tall and comes in various widths depending on the operator. It usually has more than seven rods. There are two beads on each rod in the upper deck and five beads each in the bottom for both decimal and hexadecimal computation.

**Napier’s Logs & Bones:**

John Napier of Merchiston (1550 – 4 April 1617) — also signed as Neper, Nepair — nicknamed Marvellous Merchiston, was a Scottish landowner known as a mathematician, physicist, and astronomer. He was the 8th Laird of Merchiston. His Latinized name was Joanne Nepero or Joannis Neperi.

John Napier is best known as the discoverer of logarithms. He also invented the so-called "Napier's bones" and made common the use of the decimal point in arithmetic and mathematics. As was the common practice for members of the nobility at that time, John Napier did not enter schools until he was 13. He did not stay in school very long, however. It is believed that he dropped out of school in Scotland and perhaps travelled in mainland Europe to better continue his studies.

Napier made further contributions. He improved Simon Stevin's decimal notation. Lattice multiplication, used by Fibonacci, was made more convenient by his introduction of Napier's bones, a multiplication tool using a set of numbered rods.

|  |  |
| --- | --- |
| John Napier (1550–1617) | |
| Born | 1550 [Merchiston Tower](http://en.wikipedia.org/wiki/Merchiston_Castle), [Edinburgh](http://en.wikipedia.org/wiki/Edinburgh), Scotland |
| Died | 4 April 1617 (aged 66–67) Edinburgh, Scotland |
| Nationality | [Scottish](http://en.wikipedia.org/wiki/Scotland) |
| Fields | [Mathematician](http://en.wikipedia.org/wiki/Mathematician) |
| [Alma mater](http://en.wikipedia.org/wiki/Alma_mater) | [University of St Andrews](http://en.wikipedia.org/wiki/University_of_St_Andrews) |
| Known for | [Logarithms](http://en.wikipedia.org/wiki/Logarithm) [Napier's bones](http://en.wikipedia.org/wiki/Napier%27s_bones) [Decimal notation](http://en.wikipedia.org/wiki/Decimal_point) |
| Influenced | [Henry Briggs](http://en.wikipedia.org/wiki/Henry_Briggs_(mathematician)) |

**Blaise Pascal:**

Blaise Pascal (19 June 1623 – 19 August 1662) was a French mathematician, physicist, inventor, writer and Christian philosopher. Pascal's earliest work was in the natural and applied sciences where he made important contributions to the study of fluids, and clarified the concepts of pressure and vacuum by generalizing the work of Evangelista Torricelli. Pascal also wrote in defense of the scientific method.

In 1642, while still a teenager, he started some pioneering work on calculating machines. After three years of effort and fifty prototypes, he built 20 finished machines (called Pascal's calculators and later Pascalines) over the following ten years establishing him as one of the first two inventors of the mechanical calculator.

Pascal continued to influence mathematics throughout his life. His Treatise on the Arithmetical Triangle of 1653 described a convenient tabular presentation for binomial coefficients, now called Pascal's triangle.

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| --- | --- |
| Born | 19 June 1623 Clermont-Ferrand, Auvergne, France |
| Died | 19 August 1662 (aged 39) Paris, France |
| Residence | France |
| Religion | Roman Catholic |
| Main interests | Theology, Mathematics, Philosophy, Physics |
| Notable ideas | Pascal's Wager, Pascal's triangle, Pascal's law, Pascal's theorem |

**Leibnitz’s Calculator:**

Gottfried Wilhelm von Leibniz (July 1, 1646 – November 14, 1716) was a [German](http://en.wikipedia.org/wiki/Germans) [polymath](http://en.wikipedia.org/wiki/Polymath) and [philosopher](http://en.wikipedia.org/wiki/Philosopher).

He became one of the most prolific inventors in the field of [mechanical calculators](http://en.wikipedia.org/wiki/Mechanical_calculator). He was the first to describe a pinwheel calculator in 1685 and invented the Leibniz wheel, used in the arithmometer, the first mass-produced mechanical calculator. He also refined the [binary number](http://en.wikipedia.org/wiki/Binary_number) system, which is the foundation of virtually all digital [computers](http://en.wikipedia.org/wiki/Computer).

Leibniz is credited, along with Sir [Isaac Newton](http://en.wikipedia.org/wiki/Isaac_Newton), with the discovery of [calculus](http://en.wikipedia.org/wiki/Calculus) (differential and integral calculus). He introduced several notations used to this day, for instance the integral **sign ∫** representing an elongated S, from the Latin word summa and the d used for [differentials](http://en.wikipedia.org/wiki/Differential_(infinitesimal)), from the Latin word differentia.

Leibniz enunciated the principal properties of what we now call conjunction, disjunction, negation, identity, set inclusion, and the empty set. The principles of Leibniz's logic and, arguably, of his whole philosophy.

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| --- | --- | --- |
| Born | July 1, 1646 [Leipzig](http://en.wikipedia.org/wiki/Leipzig), [Electorate of Saxony](http://en.wikipedia.org/wiki/Electorate_of_Saxony), [Holy Roman Empire](http://en.wikipedia.org/wiki/Holy_Roman_Empire) | |
| Died | November 14, 1716 (aged 70) Hanover, Electorate of Hanover, Holy Roman Empire | |
| Nationality | [German](http://en.wikipedia.org/wiki/Germans) | |
|  | | |
| Era | | [17th-](http://en.wikipedia.org/wiki/17th-century_philosophy)/18th-century philosophy |
| Main interests | | [Mathematics](http://en.wikipedia.org/wiki/Mathematics), [metaphysics](http://en.wikipedia.org/wiki/Metaphysics), [logic](http://en.wikipedia.org/wiki/Logic" \o "Logic),[theodicy](http://en.wikipedia.org/wiki/Theodicy), [universal language](http://en.wikipedia.org/wiki/Universal_language) |
| Notable ideas | | Calculus, Monads, Best of all possible worlds, Leibniz formula for π, [Leibniz harmonic triangle](http://en.wikipedia.org/wiki/Leibniz_harmonic_triangle), [Leibniz formula for determinants](http://en.wikipedia.org/wiki/Leibniz_formula_for_determinants), [Leibniz integral rule](http://en.wikipedia.org/wiki/Leibniz_integral_rule), [Principle of sufficient reason](http://en.wikipedia.org/wiki/Principle_of_sufficient_reason), [Diagrammatic reasoning](http://en.wikipedia.org/wiki/Diagrammatic_reasoning), [Notation for differentiation](http://en.wikipedia.org/wiki/Notation_for_differentiation), [Proof of Fermat's little theorem](http://en.wikipedia.org/wiki/Fermat%27s_little_theorem), [Kinetic energy](http://en.wikipedia.org/wiki/Kinetic_energy), [Entscheidungs problem](http://en.wikipedia.org/wiki/Entscheidungsproblem), [AST](http://en.wikipedia.org/wiki/Alternating_series_test), [Law of Continuity](http://en.wikipedia.org/wiki/Law_of_Continuity), [Transcendental Law of Homogeneity](http://en.wikipedia.org/wiki/Transcendental_Law_of_Homogeneity), [Calculus ratiocinator](http://en.wikipedia.org/wiki/Calculus_ratiocinator) |
| Signature | | [Leibnitz signature.svg](http://en.wikipedia.org/wiki/File:Leibnitz_signature.svg) |

**Jacquard’s Loom:**

Joseph Marie Charles Jacquard (7 July 1752 – 7 August 1834) was a [French](http://en.wikipedia.org/wiki/French_people) weaver and merchant. He played an important role in the development of the earliest programmable loom (the "Jacquard loom"), which in turn played an important role in the development of other programmable machines, such as [computers](http://en.wikipedia.org/wiki/Computer).

The Jacquard Loom is a mechanical [loom](http://en.wikipedia.org/wiki/Loom) that has holes punched in pasteboard cards, each card corresponding to one row of the design. Multiple rows of holes are punched in the cards and the many cards that compose the design of the textile are strung together in order.

he loom was controlled by a "chain of cards", a number of [punched cards](http://en.wikipedia.org/wiki/Punched_card), laced together into a continuous sequence.[[5]](http://en.wikipedia.org/wiki/Jacquard_loom#cite_note-5) Multiple rows of holes were punched on each card, with one complete card corresponding to one row of the design. Several such paper cards, generally white in color, can be seen in the images below. Chains, like the much later [paper tape](http://en.wikipedia.org/wiki/Paper_tape), allowed sequences of any length to be constructed, not limited by the size of a card.

|  |  |
| --- | --- |
| Joseph Marie Jacquard | |
| Born | 7 July 1752 [Lyon](http://en.wikipedia.org/wiki/Lyon) |
| Died | 7 August 1834, Oullins (Rhône) |
| Nationality | French |
| Education | Worked as apprentice and learned bookbinding |
| Occupation | Merchant, weaver, inventor |
| Known for | Programmable loom |

**Charles Babbage:**

Charles Babbage, (26 December 1791 – 18 October 1871) was an English polymath. A mathematician, philosopher, inventor and mechanical engineer, Babbage is best remembered for originating the concept of a programmable computer. Considered a "**Father of the Computer**”.

Babbage began in 1822 with what he called the **Difference Engine**, made to compute values of polynomial functions. It was created to calculate a series of values automatically. By using the method of finite differences, it was possible to avoid the need for multiplication and division. In 1838, Babbage invented the pilot (also called a cow-catcher), the metal frame attached to the front of locomotives that clears the tracks of obstacles;[[121]](http://en.wikipedia.org/wiki/Charles_Babbage" \l "cite_note-lee95-121) he also constructed a dynamometer car.

Babbage also invented an ophthalmoscope, which he gave to Thomas Wharton Jones for testing. Jones, however, ignored it. The device only came into use after being independently invented by Hermann von Helmholtz.

The major innovation was that the **Analytical Engine** was to be programmed using punched cards: the Engine was intended to use loops of Jacquard's punched cards to control a mechanical calculator, which could use as input the results of preceding computations.

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| --- | --- |
| Born | 26 December 1791, London, England |
| Died | 18 October 1871 (aged 79) Marylebone, London, England |
| Nationality | English |
| Fields | Mathematics, engineering, political economy, computer science |
| Institutions | Trinity College, Cambridge |
| Alma mater | Peterhouse, Cambridge |
| Known for | Mathematics, computing |
| Signature  [http://upload.wikimedia.org/wikipedia/commons/thumb/0/09/Charles_Babbage_Signature.svg/128px-Charles_Babbage_Signature.svg.png](http://en.wikipedia.org/wiki/File:Charles_Babbage_Signature.svg) | |

**Herman Hollerith:**

Herman Hollerith (February 29, 1860 – November 17, 1929) was an American statistician and inventor who developed a mechanical tabulator based on punched cards to rapidly tabulate statistics from millions of pieces of data. He was the founder of the Tabulating Machine Company that later merged to become IBM. Hollerith is widely regarded as the father of modern machine data processing.[[3]](http://en.wikipedia.org/wiki/Herman_Hollerith#cite_note-Nix-3) His invention of the punched card evaluating machine marks the beginning of the era of automatic data processing systems, and his concept dominated the computing landscape for nearly a century.

At the urging of John Shaw Billings, Hollerith developed a mechanism using electrical connections to trigger a counter, recording information. A key idea was that data could be encoded by the locations of holes in a card. Hollerith determined that data punched in specified locations on a card, in the now-familiar rows and columns, could be counted or sorted mechanically. A description of this system, An Electric Tabulating System (1889), was submitted by Hollerith to Columbia University as his doctoral thesis, and is reprinted in Randell's book, on January 8, 1889.

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| --- | --- |
| Herman Hollerith | |
| Born | February 29, 1860 [Buffalo, New York](http://en.wikipedia.org/wiki/Buffalo,_New_York) |
| Died | November 17, 1929 (aged 69) [Washington, D.C.](http://en.wikipedia.org/wiki/Washington,_D.C.) |
| Resting place | [Oak Hill Cemetery](http://en.wikipedia.org/wiki/Oak_Hill_Cemetery_(Washington,_D.C.)) |
| Education | [City College of New York](http://en.wikipedia.org/wiki/City_College_of_New_York) (1875) [Columbia University School of Mines](http://en.wikipedia.org/wiki/Columbia_University_School_of_Mines) (1879) |
| Occupation | [Statistician](http://en.wikipedia.org/wiki/Statistics), [inventor](http://en.wikipedia.org/wiki/Inventor), [businessman](http://en.wikipedia.org/wiki/Businessman) |
| Known for | mechanical tabulation of punched card data and IBM |
| Title | Ph.D. (1890, Columbia University) |
| Awards | [Elliott Cresson Medal](http://en.wikipedia.org/wiki/Elliott_Cresson_Medal) (1890), [World's Columbian Exposition](http://en.wikipedia.org/wiki/World%27s_Columbian_Exposition), Bronze Medal (1892), [National Inventors Hall of Fame](http://en.wikipedia.org/wiki/National_Inventors_Hall_of_Fame)(1990), Medaille d'Or, Exposition Universelle de 1889 |

**Mark-1 Computer:**

The Manchester Mark-1 was one of the earliest [stored-program computers](http://en.wikipedia.org/wiki/Stored-program_computer), developed at the Victoria University of Manchester from the [Small-Scale Experimental Machine](http://en.wikipedia.org/wiki/Manchester_Small-Scale_Experimental_Machine) (SSEM) or "Baby" (operational in June 1948). It was also called the Manchester Automatic Digital Machine, or MADM. Work began in August 1948, and the first version was operational by April 1949; a program written to search for Mersenne primes ran error-free for nine hours on the night of 16/17 June 1949.

Howard Hathaway Aiken (March 8, 1900 – March 14, 1973) was a pioneer in [computing](http://en.wikipedia.org/wiki/Computing), being the original conceptual designer behind [IBM](http://en.wikipedia.org/wiki/IBM)'s [Harvard Mark-I](http://en.wikipedia.org/wiki/Harvard_Mark_I) computer. He envisioned an electro-mechanical computing device that could do much of the tedious work for him. This computer was originally called the ASCC (Automatic Sequence Controlled Calculator) and later renamed Harvard Mark-I. In 1947, Aiken completed his work on the Harvard Mark-II computer. He continued his work on the Mark-III and the Harvard Mark-IV. The Mark-III used some electronic components and the Mark-IV was all-electronic. The Mark-III and Mark-IV used magnetic drum memory and the Mark-IV also had magnetic core memory.

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| --- | --- |
| Howard Hathaway Aiken’s Mark-1, Mark-2, Mark-3 and Mark-4 | |
| Born | March 8, 1900 [Hoboken, New Jersey](http://en.wikipedia.org/wiki/Hoboken,_New_Jersey) |
| Died | March 14, 1973 (aged 73) [St. Louis, Missouri](http://en.wikipedia.org/wiki/St._Louis,_Missouri) |
| Nationality | [American](http://en.wikipedia.org/wiki/United_States) |
| Fields | [Applied mathematics](http://en.wikipedia.org/wiki/Applied_mathematics), [computer science](http://en.wikipedia.org/wiki/Computer_science) |
| Institutions | [Harvard University](http://en.wikipedia.org/wiki/Harvard_University) |
| [Alma mater](http://en.wikipedia.org/wiki/Alma_mater) | [University of Wisconsin-Madison](http://en.wikipedia.org/wiki/University_of_Wisconsin-Madison) [Harvard University](http://en.wikipedia.org/wiki/Harvard_University) (doctorate) |
| Known for | Automatic Sequence Controlled Calculators Harvard Mark I – IV |
| Notable awards | [Harry H. Goode Memorial Award](http://en.wikipedia.org/wiki/Harry_H._Goode_Memorial_Award)(1964) [Edison Medal](http://en.wikipedia.org/wiki/Edison_Medal) (1970) |

**First Generation Computers (1949-55)**

**ENIAC:**

ENIAC (Electronic Numerical Integrator And Calculator) was the first electronic general-purpose [computer](http://en.wikipedia.org/wiki/Computer). It was [Turing-complete](http://en.wikipedia.org/wiki/Turing_complete), digital, and capable of being reprogrammed to solve "a large class of numerical problems". Though ENIAC was designed and primarily used to calculate artillery [firing tables](http://en.wikipedia.org/wiki/External_ballistics) for the [United States Army](http://en.wikipedia.org/wiki/United_States_Army)'s Ballistic Research Laboratory, its first programs included a study of the feasibility of the [hydrogen bomb](http://en.wikipedia.org/wiki/Hydrogen_bomb). When ENIAC was announced in 1946, it was heralded in the press as a "Giant Brain". It had a speed of one thousand times that of electro-mechanical machines. This computational power, coupled with general-purpose programmability, excited scientists and industrialists.

ENIAC's design and construction was financed by the United States Army, Ordnance Corps, Research and Development Command which was led by Major General Gladeon Marcus Barnes.

ENIAC contained 17,468 [vacuum tubes](http://en.wikipedia.org/wiki/Vacuum_tube), 7,200 crystal [diodes](http://en.wikipedia.org/wiki/Diode), 1,500 [relays](http://en.wikipedia.org/wiki/Relay), 70,000 [resistors](http://en.wikipedia.org/wiki/Resistor), 10,000 [capacitors](http://en.wikipedia.org/wiki/Capacitor) and around 5 million hand-[soldered](http://en.wikipedia.org/wiki/Solder) joints. It weighed more than 30 [short tons](http://en.wikipedia.org/wiki/Short_ton) (27 t), was roughly 8 by 3 by 100 feet (2.4 m × 0.9 m × 30 m), took up 1800 square feet (167 m2), and consumed 150 [kW](http://en.wikipedia.org/wiki/Kilowatt) of power. This led to the rumor that whenever the computer was switched on, lights in Philadelphia dimmed. Input was possible from an IBM [card reader](http://en.wikipedia.org/wiki/Card_reader_(punched_card)), and an IBM [card punch](http://en.wikipedia.org/wiki/Card_punch) was used for output.

The basic machine cycle was 200 [microseconds](http://en.wikipedia.org/wiki/Microseconds) (20 cycles of the 100 kHz clock in the cycling unit), or 5,000 cycles per second for operations on the 10-digit numbers. In one of these cycles, ENIAC could write a number to a register, read a number from a register, or add/subtract two numbers. A multiplication of a 10-digit number by a d-digit number (for d up to 10) took d+4 cycles, so a 10 by 10 digit multiplication took 14 cycles, or 2800 microseconds. Division and square roots took 13(d+1) cycles, where d is the number of digits in the result (quotient or square root). So a division or square root took up to 143 cycles, or 28,600 microseconds.

ENIAC's six primary programmers, [Kay McNulty](http://en.wikipedia.org/wiki/Kathleen_Antonelli), [Betty Jennings](http://en.wikipedia.org/wiki/Jean_Bartik), [Betty Snyder](http://en.wikipedia.org/wiki/Betty_Holberton), Marlyn Wescoff, [Fran Bilas](http://en.wikipedia.org/wiki/Frances_Spence) and [Ruth Lichterman](http://en.wikipedia.org/wiki/Ruth_Teitelbaum), not only determined how to input ENIAC programs, but also developed a deep understanding of ENIAC's inner workings.

**Second Generation Computer (1956-65)**

**IBM 1400 Series:**

The IBM 1400 series were second generation (**Transistor**) mid-range business [decimal computers](http://en.wikipedia.org/wiki/Decimal_computer) that IBM marketed in the early 1960s. 1400-series machines stored information in [magnetic cores](http://en.wikipedia.org/wiki/Core_memory) as variable length character strings separated at the left and right by a special flag, called word mark. Arithmetic was performed digit-by-digit. Input and output support included punched card, magnetic tape and high speed line printers. Disk storage was also available.

The IBM-1401 was a variable word length decimal computer that was announced by [IBM](http://en.wikipedia.org/wiki/International_Business_Machines) on October 5, 1959. The first member of the highly successful IBM-1400 series, it was aimed at replacing electromechanical unit record equipment for processing data stored on punched cards. Each alphanumeric character in the 1401 was encoded by six [bits](http://en.wikipedia.org/wiki/Bit), called B, A, 8, 4, 2, 1. The B, A bits were called zone bits and the 8,4,2,1 bits were called numeric bits, terms taken from the [IBM-80 column punched card](http://en.wikipedia.org/wiki/Punched_card#IBM_80_column_punched_card_format).

Programming languages for the 1400 series included Symbolic Programming System (SPS, an assembly language), Autocoder (assembly language), COBOL, FORTRAN, Report Program Generator (RPG) and FARGO Fourteen-o-one [[IBM 1401](http://en.wikipedia.org/wiki/IBM_1401)] Automatic Report Generation Operation.

**Third Generation Computer (1966-75)**

**IBM System-360, PDP-11**

The **IBM System-360** was a **Mainframe Computer** system family announced by **IBM** on April 7, 1964, and delivered between 1965 and 1978. It was the first family of computers designed to cover the complete range of applications, from small to large, both commercial and scientific.

The slowest System/360 model announced in 1964, the Model 30, could perform up to 34,500 instructions per second, with memory from 8 to 64 [KB](http://en.wikipedia.org/wiki/Kibibyte). The larger 360 models could have up to 8 [MB](http://en.wikipedia.org/wiki/Mebibyte) of internal main memory, though main memory that big was unusual—a more typical large installation might have as little as 256 KB of main storage, but 512 KB, 768 KB or 1024 KB was more common. Up to 8 megabytes of slower (8 microsecond) [Large Capacity Storage (LCS)](http://en.wikipedia.org/wiki/IBM_2361_Large_Capacity_Storage) was also available.

The **PDP-11** is a series of [16-bit](http://en.wikipedia.org/wiki/16-bit) [minicomputers](http://en.wikipedia.org/wiki/Minicomputer) sold by **Digital Equipment Corporation** (DEC) from 1970 into the 1990s, one of a succession of products in the [PDP](http://en.wikipedia.org/wiki/Programmed_Data_Processor) series. The PDP-11 is considered by some experts to be the most popular **Minicomputer** ever. Design features of the PDP-11 influenced the design of most late-1970s computer systems including the Intel x86 and the [Motorola 68000](http://en.wikipedia.org/wiki/Motorola_68000).

Design features of PDP-11 operating systems, as well as other operating systems from Digital Equipment, influenced the design of other operating systems such as CP/M and hence also [MS-DOS](http://en.wikipedia.org/wiki/MS-DOS).  For a decade PDP-11 was the smallest system that could run [Unix](http://en.wikipedia.org/wiki/Unix); the first officially named version ran on the PDP-11/20 in 1970. It is commonly stated that the [C programming language](http://en.wikipedia.org/wiki/C_(programming_language)) took advantage of several low-level programming features, although not originally by design.

**Fourth Generation Computers (1976 – Present)**

A microcomputer is a small, relatively inexpensive [computer](http://en.wikipedia.org/wiki/Computer) with a [microprocessor](http://en.wikipedia.org/wiki/Microprocessor) as its [central processing unit](http://en.wikipedia.org/wiki/Central_processing_unit)(CPU).  It includes a Microprocessor, Memory, and Input/Output (I/O) facilities. Microcomputers became popular in the 1970s and 80s with the advent of increasingly powerful microprocessors. The [MITS](http://en.wikipedia.org/wiki/Micro_Instrumentation_and_Telemetry_Systems) **Altair 8800** is a [microcomputer](http://en.wikipedia.org/wiki/Microcomputer) designed in 1974 based on the [**Intel 8080**](http://en.wikipedia.org/wiki/Intel_8080)[**CPU**](http://en.wikipedia.org/wiki/Central_processing_unit). The Altair is widely recognized as the spark that ignited the [microcomputer revolution](http://en.wikipedia.org/wiki/Microcomputer_revolution). The [computer bus](http://en.wikipedia.org/wiki/Computer_bus) designed for the Altair was to become a [de facto standard](http://en.wikipedia.org/wiki/De_facto_standard) in the form of the [S-100 bus](http://en.wikipedia.org/wiki/S-100_bus), and the first programming language for the machine was [Microsoft](http://en.wikipedia.org/wiki/Microsoft)'s founding product, **Altair BASIC**.

**IBM ThinkCentre M93z All-in-OneFeatures**

The M93z's 58.42cm (23) full HD LED display with in-plane switching (IPS) offers a wide viewing angle nearly 180 degrees so multiple users can read the screen’s contents from different positions around the PC. High performance anti-glare glass with touchscreen facility, enhances collaboration, as does the sensitive, 10-point multitouch technology that powers the touch experience. Engage in crystal-clear teleconferences with Microsoft Lync™-qualified, Skype-ready, VoIP-optimized software and hardware, including a 2MP HD webcam, stereo speakers with Dolby® Advanced Audio™, and a digital array microphone. The M93z offers some of the best security tools available in the industry, including USB ports disablement to help prevent data theft and network security risks against unauthorized use of storage devices.

**Apple’s iMac with Retina 5K display**

The all-new Retina 5K display has 14.7 million pixels four times as many as the standard 27-inch iMac. iMac with Retina 5K display is still just 5mm thin at its edge.

Tech Specifications: Processor 4.0GHz quad-core Intel Core i7 processor (Turbo Boost up to 4.4GHz), Memory 8GB (two 4GB) 1600MHz DDR3 memory (four SO-DIMM slots, user accessible) Configurable to 16GB or 32GB.

Display: 27-inch Retina 5K display with IPS technology; 5120-by-2880 resolution with support for millions of colors. Storage 1TB Fusion Drive Configurable to 3TB Fusion Drive, 1TB of flash storage (SSD). AMD Radeon R9 M295X with 4GB of GDDR5 memory. Video Support and Camera FaceTime HD camera supports full native resolution on the built-in display and up to 3840 by 2160 pixels. SDXC card slots, Four USB 3 ports, Two Thunderbolt 2 ports, Mini Display Port output with support for DVI, VGA, and dual-link DVI, 10/100/1000BASE-T Gigabit Ethernet, Kensington lock slot. Input **Apple Wireless Keyboard, Magic Mouse, Magic Trackpad** Glass Multi-Touch trackpad for precise cursor control; Wireless **Wi-Fi** 802.11ac Wi-Fi Wireless networking; IEEE 802.11a/b/g/n compatible **Bluetooth** Bluetooth 4.0 wireless technology**. OS X Yosemite** is intuitive and easy to use with Operating altitude of 10,000 feet.