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Computers History

The Abacus was the first computer to be ever used about 5000 years ago in Asia. It is considered as the first computer. It allowed the users to make computations by using sliding beads on the rack. Early Merchants used abacus to keep trading transactions. After the invention of paper and pencil, Abacus was ignored across the Europe and it took about 12 centuries for next computer device to emerge in the society. (Jones Telecommunication and Multimedia)

In 1642, Blaise Pascal, the son of a French tax collector, invented numerical wheel calculator to help his father with his duties. It was known as Pascaline. It was brass rectangular box which consisted of eight movable dials to add sums up to eight figures. Pascal's idea was great at the time because there was no other way of calculating that easily. Only flop to his idea was it was only limited to addition. In 1694, a German mathematician and philosopher, Gottfried Wilhem von Leibniz, added a function of multiplication to Pascal's design. This design lasted for about 150 years before the invention of mechanical calculators. (Jones Telecommunication and Multimedia)

In 1820, Charles Xavier Thomas de Colmar, a Frenchman, invented a machine that could perform four operations. It was known as Arithometer, (Jones Telecommunication and Multimedia)

Following the Mathematic function, Charles Babbage proposed a machine to perform differential equation which he called a Difference Engine. It was powered by steam and was large as size of locomotive. The machine had the ability to store the calculations and then print them out. After his research on Difference Engine, he started working on the first general purpose computer which was called Analytical Engine. This machine was instrumental to government security and it allowed to create the instruction routines to feed into the computer. Lady Lovelace controlled the Analytical Engine and she was the first female computer programmer. In 1980's, the US defense named a programming language ADA in her honor. Analytical Engine outlined the basic elements of the modern computers.

In 1889, an American inventor, Herman Hollerith, researched to find the fast way to compute US census. He used the idea of Joseph Marie Jacquard which was punch card reader to formulate the US census. In 1896, he brought the punch card to the business world by founding Tabulating Machine Company which is called International Business Machine (IBM). After Herman, many other scientists invented other similar ideas of calculations.

First Generation Computers

For the competition of World War 2, the German Engineer, Kourad Zuse, developed a computer Z3 to design airplanes and missiles. The allied forces developed better computers to check the opponent's strategies. In 1943, the British completed a secret code breaking computer called Colossus to decode German messages. This system failed in the future because it's only purpose was to decode and was not a general computer.

Howard H. Aiken, a Harvard Engineer, developed all the electronic calculator. The purpose was to create ballistic chart for US navy. Its size was half of the football field consisting of 500 miles

of wiring. The Harvard-IBM Automatic Sequenced Controlled calculator, or Mark 1, was electronic computer using electro magnetism to move the materials.

Another computer development was the ENIAC, produced by a partnership between US government and University of Pennsylvania was 1000 times faster than Mark 1. In the mid of 1940's, John Von Neumann, joined the ENIAC producers and designed the Electronic Discrete Variable Automatic Computer in 1945 with a memory to hold both a stored program as well as data. The stored memory allowed the computer to be stopped at any point and then resume, which allowed greater versatility in computer programming. The key element to Neumann architecture was CPU which allowed all computers to function to be coordinated through a single source. The UNIVAC-1 was the first commercial computer to be owned by US Census Bureau and General Electric. The early achievement was predicting the winner of 1952 presidential election.

Second Generation Computers

By 1948, the invention of the transistor greatly changed the computer's development. The transistor replaced the large, cumbersome vacuum tube in televisions, radios and computers. As a result, the size of electronic machinery has been shrinking ever since. The transistor was at work in the computer by 1956. Coupled with early advances in magnetic-core memory, transistors led to second generation computers that were smaller, faster, more reliable and more energy-efficient than their predecessors. The first large-scale machines to take advantage of this transistor technology were early supercomputers, Stretch by IBM and LARC by Sperry-Rand. These computers, both developed for atomic energy laboratories, could handle an enormous amount of data, a capability much in demand by atomic scientists. The machines were costly, however, and tended to be too powerful for the business sector's computing needs, thereby limiting their

attractiveness. Only two LARCs were ever installed: one in the Lawrence Radiation Labs in Livermore, California, for which the computer was named (Livermore Atomic Research Computer) and the other at the U.S. Navy Research and Development Center in Washington, D.C. Second generation computers replaced machine language with assembly language, allowing abbreviated programming codes to replace long, difficult binary codes.

Throughout the early 1960's, there were a number of commercially successful second generation computers used in business, universities, and government from companies such as Burroughs, Control Data, Honeywell, IBM, Sperry-Rand, and others. These second generation computers were also of solid state design, and contained transistors in place of vacuum tubes. They also contained all the components we associate with the modern day computer: printers, tape storage, disk storage, memory, operating systems, and stored programs.

Third Generation Computers

The transistors generated a lot of heat which damaged the computer's sensitive internal parts. The quartz rock eliminated this problem. Jack Kilby, an engineer with Texas Instruments, developed the integrated circuit (IC) in 1958. The IC combined three electronic components onto a small silicon disc, which was made from quartz. Scientists later managed to fit even more components on a single chip, called a semiconductor. As a result, computers became ever smaller as more components were squeezed onto the chip. Another third-generation development included the use of an operating system that allowed machines to run many different programs at once with a central program that monitored and coordinated the computer's memory.

Fourth Generation Computers

After the integrated circuits, the only place to go was down - in size, that is. Large scale integration (LSI) could fit hundreds of components onto one chip. By the 1980's, very large scale integration (VLSI) squeezed hundreds of thousands of components onto a chip. Ultra-large scale integration (ULSI) increased that number into the millions. The ability to fit so much onto an area about half the size of a U.S. dime helped diminish the size and price of computers. It also increased their power, efficiency and reliability. The Intel 4004 chip, developed in 1971, took the integrated circuit one step further by locating all the components of a computer (central processing unit, memory, and input and output controls) on a minuscule chip. Whereas previously the integrated circuit had had to be manufactured to fit a special purpose, now one microprocessor could be manufactured and then programmed to meet any number of demands. Soon everyday household items such as microwave ovens, television sets and automobiles with electronic fuel injection incorporated microprocessors.

Such condensed power allowed everyday people to harness a computer's power. They were no longer developed exclusively for large business or government contracts. By the mid-1970's, computer manufacturers sought to bring computers to general consumers. These minicomputers came complete with user-friendly software packages that offered even non-technical users an array of applications, most popularly word processing and spreadsheet programs. Pioneers in this field were Commodore, Radio Shack and Apple Computers. In the early 1980's, arcade video games such as Pac Man and home video game systems such as the Atari 2600 ignited consumer interest for more sophisticated, programmable home computers.

In 1981, IBM introduced its personal computer (PC) for use in the home, office and schools. The 1980's saw an expansion in computer use in all three arenas as clones of the IBM PC made the personal computer even more affordable. The number of personal computers in use more than

doubled from 2 million in 1981 to 5.5 million in 1982. Ten years later, 65 million PCs were being used. Computers continued their trend toward a smaller size, working their way down from desktop to laptop computers (which could fit inside a briefcase) to palmtop (able to fit inside a breast pocket). In direct competition with IBM's PC was Apple's Macintosh line, introduced in 1984. Notable for its user-friendly design, the Macintosh offered an operating system that allowed users to move screen icons instead of typing instructions. Users controlled the screen cursor using a mouse, a device that mimicked the movement of one's hand on the computer screen.

Fifth Generation Computers

Defining the fifth generation of computers is somewhat difficult because the field is in its infancy. The most famous example of a fifth generation computer is the fictional HAL9000 from Arthur C. Clarke's novel, 2001: A Space Odyssey. HAL performed all of the functions currently envisioned for real-life fifth generation computers. With artificial intelligence, HAL could reason well enough to hold conversations with its human operators, use visual input, and learn from its own experiences. (Unfortunately, HAL was a little too human and had a psychotic breakdown, commandeering a spaceship and killing most humans on board.)

Though the wayward HAL9000 may be far from the reach of real-life computer designers, many of its functions are not. Using recent engineering advances, computers may be able to accept spoken word instructions and imitate human reasoning. The ability to translate a foreign language is also a major goal of fifth generation computers. This feat seemed a simple objective at first, but appeared much more difficult when programmers realized that human understanding relies as much on context and meaning as it does on the simple translation of words.

Many advances in the science of computer design and technology are coming together to enable the creation of fifth-generation computers. Two such engineering advances are parallel processing, which replaces von Neumann's single central processing unit design with a system harnessing the power of many CPUs to work as one. Another advance is superconductor technology, which allows the flow of electricity with little or no resistance, greatly improving the speed of information flow. Computers today have some attributes of fifth generation computers. For example, expert systems assist doctors in making diagnoses by applying the problem-solving steps a doctor might use in assessing a patient's needs. It will take several more years of development before expert systems are in widespread use.

Programming Languages History

In 1945, John Von Neumann developed two concepts of programming languages. The first one was shared program technique. This technique stated that the actual computer should be simple and the complex instructions should control the simple hardware. The second concept was important for the programming languages. It introduced the idea of Coding. The codes included IF, THEN, and FOR.

The language Short Code was the first language for electronic devices. It required the programmer to change its statements into 0's and 1's by hand. It was the first towards complex programming. In 1951, Grace Hopper wrote the first compiler, A-0. It was used to make computer understand the 0's and 1's.

FORTAN was used to handle numbers but it was not good at handling inputs and outputs, which was the most important in business computing. COBOL was developed to erase the defects of

FORTAN. Its only data types were numbers and strings of text. COBOL is written in form of essays. It used to have like or five sections.

In 1958, John McCarthy of MIT created the LISt Processing (or LISP) language. It was designed for Artificial Intelligence (AI) research. Because it was designed for a specialized field, the original release of LISP had a unique syntax: essentially none. Programmers wrote code in parse trees, which are usually a compiler-generated intermediary between higher syntax (such as in C or Java) and lower-level code. Another obvious difference between this language (in original form) and other languages is that the basic and only type of data is the list; in the mid-1960's, LISP acquired other data types. A LISP list is denoted by a sequence of items enclosed by parentheses. LISP programs themselves are written as a set of lists, so that LISP has the unique ability to modify itself, and hence grow on its own. The LISP syntax was known as "Cambridge Polish," as it was very different from standard Boolean logic (Wexelblat, 177):

LISP remains in use today because its highly specialized and abstract nature.

One of the important programming language was ALGOL, created by a committee in 1958. This language is the root of many important languages such as C, C++, and Java. It was the first language with a formal grammar. The next version of ALGOL was complex and difficult to use. This led to the development of smaller language called PASCAL. PASCAL was a good teaching tool. It combined the features of other programming languages.

C language was developed by Dennis Ritchie in New Jersey. It is one of the currently used language. It is quite similar to PASCAL. All of the PASCAL features are included in it with faster and better performance. C was created for Unix System so it is used in operating systems such as Mac, Windows, and Linux.

Later in 70's, Bjarne Stroustroup used Object Oriented Programming to create a new language called C++. It was designed to organize the raw power of C using OOP. C++ in modern days is used in games. For the TV interaction, the new programming language was developed called JAVA.

After the invention of JAVA, Visual Basic was developed by Thomas Kurtz using the idea of basic languages.

The programming languages and modern computers have put some much into the society that without that the tools would not have been easier to use.

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