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Late First Generation: 1953-1959(Lisp)

Lisp was first developed in 1958 by a man named, “John McCarthy”, who was an artificial intelligence (AI) inventor and is also known as the “Father of Artificial Intelligence”. John McCarthy first became interested in artificial intelligence in September 1948 where he attended the Hixon Symposium on Cerebral Mechanisms in behavior. Many leading researchers in the cognitive science field attended this symposium. After McCarthy listened to discussions that compared the computer to the human brain, McCarthy’s interests in computer science began shifting to artificial intelligence.

As previously stated, John McCarthy was known as the, “Father of Artificial Intelligence”, and it was for a good reason. McCarthy had so much passion for the topic of AI that he would go as far as making a revolutionary language that is still in use today, attend and make a huge impact on the very first AI meeting, and his never-ending passion to always keep inventing new possibilities.

McCarthy wanted to develop machines that could think and act like people. Even though other leading researchers were working in artificial intelligence as well, McCarthy’s work was still the most notable work in this field. McCarthy’s work was able to distinguish itself from other researchers’ work through its emphasis on mathematical logic as a means of reasoning and knowledge for an intelligent machine. Eventually, this emphasis on mathematical logic would develop into the computer language named Lisp. Lisp programs would be the first programs to challenge the capacity of computers and machines around this time period. In comparison to FORTRAN, Lisp required much more memory and power in order to run the program quickly. This was due to Lisp’s dynamic style and garbage collection which required large amounts of memory in order to run smoothly.

During the 1956 Dartmouth Conference, which was the first official artificial intelligence conference, McCarthy talked about finding and coding new ways for a machine to have the same thought process as a human. He believed that no matter what kind of human-related topic there was in society, then there was always a way to code the ability to reason and use intelligence just as any other ordinary human could all in to a machine. This sparked the development of the software language known as, “Lisp” later in the year of 1958.

In 1960, McCarthy published the design on Lisp in a paper in the Communications of the ACM magazine. Steve Russel, a computer scientist, read McCarthy’s paper and first implemented Lisp on an IBM 704 computer. To both McCarthy and Russel’s surprise, Lisp could be implemented into the machine code. This resulted in a Lisp interpreter that ran Lisp programs and lisp expressions.

The term Lisp is derived from the words “List Processor”. It is named this way because the Lisp source code is made up of lists. AI is simply defined as the idea of a computer simulating or acting exactly like a human. He was known as the “father of artificial intelligence.” He believed that AI would be a unique big trend in society sooner or later thus, his creation of the Lisp programming language in 1958. Lisp was designed to be the standard AI programming language which is still in use today. It was used in many technologies deemed to be classified as AI, which are technologies such as but not limited to non-player characters (NPC’s) for video games, voice recognition with the ability to reply back just as a human would in our world (Apple’s Siri technology), and robots. The first appearance of artificial intelligence in games occurred in 1966 when McCarthy hosted four computer chess matches over telegraph against rivals in the Soviet Union. McCarthy saw the usage of Lisp for games as a waste and as a distraction for programmers. As a result of this, he would later on dismiss the potential of personal computers and regard them as toys. This would eventually lead to the creation of Lisp Machines rather than exploring the potential of personal computers.

Lisp machines (LispMs) were developed for the Lisp programming language because of its tendency to overtake the resources of the machines it was being programmed from. Prior to the development of Lisp Machines, standard computers were being used to run Lisp programs. While standard computers were fast enough to handle FORTRAN, they were not suited to run Lisp programs at all. It was nearly impossible for a Lisp program to run smoothly on a standard computer back in the 1960s. In contrast to the timesharing computers around this time where multiple users would use one computer at once, Lisp Machines were designed for only one user at any given time. At first, many people saw this as wasteful since only one person could use the computer at once. However, people would adapt to this and it is evident even in today’s society. This would be the way that people would use computers for the next few decades, and it is still being used today.

Since Lisp was a language designed for AI programming, it was used for building the logical systems of robots which required not only a software system built-in to the robot itself, but the hardware for the logic to communicate with. In other words, without Lisp, artificial intelligence would not be able to exist. Only the outside of a robot and its components would exist without ever giving it human-like processing. Lisp Machines had its operating system and applications written in Lisp. These machines were also developed because other machines at this time were not powerful enough for artificial intelligence as it was simply too complex.

With the development of more powerful Lisp machines, it eventually led to the creation of workstations with megapixel screens, networking, larger memory. Multiple processes, mouse, and graphical user interface. These workstations contain characteristics that many modern computers still use to this date. In a way, Lisp machines made this possible by setting a new standard of workstations when it was first developed. After the creation of Lisp Machines, machines and computers developed in the future would feature many similar attributes of Lisp Machines. Future computers would simply improve upon the attributes of Lisp Machines. Commercially, Lisp machines were being developed for interactive programming environments. These systems would be used by major technology companies such as Texas Instruments, Symbolics, Xerox, and Lisp Machines Inc. These companies would later build their own machines based on Lisp as well with Symbolics being one of the largest producers of Lisp Machines.

Lisp has had a profound impact on today’s technology. Many of the computers and machines used today are very similar to the Lisp Machines used in the 1960s. Today’s machines and computers still contain networking, megapixel screens, mice, and large amounts of memory. The only thing that has changed is that Lisp is no longer the dominant programming language in computers today.

In the 1980s, the popularity of Lisp machines fell when engineering workstations were developed which could run Lisp implementations. With the fall of Lisp Machines, more emphasis was placed in applications rather than artificial intelligence and C/C++ and Java began to see more use. Even though Lisp was not as popular, it remains a fact that Lisp was superior to Java and C/C++ in the field of list-based rule engines. Despite this, Lisp was still seeing decreased usage in today’s society. However, Lisp is important in today’s society as many other languages greatly benefitted from the widespread usage of Lisp in the 1960s. Programming languages today are able to run smoothly on personal computers that contain many characteristics of Lisp Machines from the past. Without Lisp’s need of more powerful and faster computers, the technology we see in today’s society may have been slower or less powerful. If programmers in the 1960s decided to continue using FORTRAN, there would have been no need for engineers to produce a more powerful machine as standard computers could have run FORTRAN with no difficulties.

With the development of Lisp in 1958 by John McCarthy, today’s society has seen many benefits from its development. When Lisp was first implemented by Steve Russel in 1960 on an IBM 704 computer, it quickly became clear that standard computers were limited in memory and capacity when Lisp was used. Over time, the popularity of Lisp grew and more complex machines would be developed as a result of this. These machines (Lisp Machines), would be the basis for computers and machines that would be built in the future.

Lisp Machines changed the way people would work with computers. In contrast to time-sharing machines, Lisp Machines only allowed one user at a time, which is still a common practice even today. These characteristics would eventually lead to the development of personal computers. However, due to McCarthy’s neglect for personal computers, Lisp was still used on Lisp machines rather than exploring the potential for personal computers. Ironically, McCarthy’s neglect for PCs would also be the downfall of Lisp. With the introduction of personal computers, programmers became more concerned with application programming which resulted in higher usage of Java and C/C++. These new programming languages would be implemented on machines that were reminiscent of 1960s Lisp Machines. In other words, even though Lisp is not as widely used in today’s society, it still has had a profound effect on society through its wide usage in 1960. Lisp fueled the demand for more powerful computers and some technology such as artificial intelligence still uses Lisp even today. Without Lisp, today’s society may be much different with less powerful computers and less of an understanding in artificial intelligence.

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