Assignment 1

Generations of Computers

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CSC 101 Intro to Computer Science

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5/15/22

Computers have existed far longer than most people realize. Now, it is true that the modern computer that we know today has only been in existence since the 1990’s, however, computing power was around long before then. There have been five generations of computers at this point dating back to the 1940’s. What most people are familiar with today is the fourth generation, the generation that introduced microprocessors. The first generation of computers began in the 1940’s with vacuum tubes. The second generation in the mid 1950’s with transistors. The third generation in the mid 1960’s with integrated circuits. Then the fifth generation, for the modern era, which is still being developed, and questioned, Artificial intelligence.

As one might imagine, computers have not always been what we know them as today. The first generation of computers was the main form of a computer from 1940 until 1956. The main electronic component was known as vacuum tubes. Vacuum tubes were not just used in computers, they were part of radios, televisions, and many other technologies of the time (Basic Knowledge). There were three main kinds of computers that used vacuum tubes. The first was known as ENIAC, or Electronic Numerical Integrator and Computer. This was a general-purpose computer built by J. Presper Eckert and John V. Mauchly. This computer contained about eighteen thousand vacuum tubes and took up an entire room (Jaiswal). The second and third types of computers were known as the EDVAC and UNIVAC, or Electronic Discrete Variable Automatic Computer and Universal Automatic Computer respectively. The EDVAC was designed by Von Neumann and could store data as an instruction which increased the speed of the computer (Jaiswal). The UNIVAC was developed by J. Presper Eckert and John Mauchly. IBM also built computers in this time called the IBM 650 and IBM 701 (Jaiswal).

With the first generation of computers mostly being very large and not very reliable, the second generation looked to change that. The second generation of computers introduced transistors. The transistor was invented by John Bardeen, William B. Shockley, and Walter H. Brattain at Bell Telephone Laboratories in the mid 1940’s and was mainly used in computers starting in 1956 (Jaiswal). Notable computers from this generation are known as Transac S-2000 and IBM 7090 (Jaiswal). Around this time is also when the Central processing Unit, better known as a CPU, was introduced. The ability to store information was also improved by using magnetic disks and tape. With the transistors, magnetic disks, and the CPU; computers were able to process things faster than before using newer easier to use programming languages such as COBOL, FORTRAN, ALGOL, and COBOL (Jaiswal).

In the race of rapidly improving technologies, it was only a matter of time before those better technologies pushed computers even further. Integrated circuits kicked off the third generation of computers. Invented by Jack Kilby and Robert Noyce, the integrated circuit took multiple transistors onto a single device to work more efficiently. With the integrated circuit IBM was able to create their IBM System/360 Model 50. This computer is considered to be the most important machine built during the third generation (McCarthy) as it is said to have single handedly created the third generation. This computer was able to complete five hundred thousand additions per second which was the fastest of its time (McCarthy). The main issue here though was, in today’s dollars, cost over four million dollars. Meaning it was still far off being widely acceptable.

In 1971, intel was able to build off of the sucsess of integrated circuits and create the Microprocessor. A microprocessor consisted of all of the circuits required to perform tasks on a computer in a single chip (Jaiswal). With the use of, what is known as, Large and Very Large Scale Integratoin (LSI and VLSI respectively) Intel developed the Intel 4004 chip. This chip was the first of many microprocessors built on a single silicon chip (McCarthy). This chip was used in the IBM-PC and was able to execute two hundred and fourty thousand additions per second. While this was not as quick as prior generations, it only cost, in today’s dollars, $4,000 (McCarthy). The trade off for speed and cost seemed very worth it, especially since the technology was brand new and could only improve from there. It was in 1996 that Intel improved on their original design and introduced the Pentium Pro PC. This computer was able to execute four hundred million addiotns per second and only cost $4,400 in todays dollars which exploded the market for personal computers (McCarthy).

Now that computers are more widley acceptable amonst the public and do not cost a fortune to obtain, where do we go next? The answer is Artificial Inteligence (AI). This is the computer for the modern era, the idea being to allow computers to behave like humans. This era of computing is still in its infancy with developments happening every day. It has started to make its way into more and more US households in the form of personal smart assistants. These devices are able to take the human voice as input and give the output as a human sounding voice. The technology to do this consists of Ultra Large Scale Integration, or ULSI, and the use of Parallel Processing, or using two or more microproceessors simultaneously (Wang). The fifth generation of computers are able to process information faster, more accurately, and reliably in comparisoin to the fourth generation of computers, which was already very quick. There is still much to be discovered and developed in this stage of computing with lots of possibilities to come. There is also a lot of fear behind this generation in the sense that it could replace humanity. How far as a species should we take it?

Computers as a whole have come a long way in such a short amount of time. The rate we have improved the technology in less then one hudred years is remarkeable and is still improving each day. To date there are five generations of computers, each generation building off of the successes and failures of their predesessors. It is only a matter of time before we find another way to improve what we already have. What could the next invention be that launches us into the sixth generation? Does it already exist?

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