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November 29, 2018

CS2050

Alan Turing

Alan Turing is known as the man that helped shape computers as we know them today. Turing did not live an easy life, he was a victim of homophobia and spent a lot of his attention solely on math and science. His achievements not only helped the allies during World War II but has also aided in the development of modern computers.



Alan Turing went to school at the University of Cambridge to study mathematics. He graduated at the top of his class and was invited to the Kings College to further study probability theory. The “Kings College” is where all the top students go in order to continue research on their career field. Turing began his research about finding an effective way to solve fundamental math problems. He was trying to solve the Entscheidungs problem which was an “effective method for solving the fundamental mathematical problem of determining exactly which mathematical statements are provable within a given formal mathematical system and which are not” (Copeland). In 1936 Turing published a paper regarding his research. The quest led to there being no exact answer to the problem. In his research Turing proved that there was no effective and consistent system to create a decision method. The point of Turing’s analysis was to generate a formal system that would reduce the amount of work a role-computer (human) would have to do. While Turing was doing research for the formal mathematical system, he also was creating ideas to develop the Turing machine.

The Turing machine was developed in 1936 and was originally called the a-machine. With this machine Alan Turing set out to answer one question: “Does a machine exist that has no fundamental limitations of mechanical computation.” It is with this machine that Turing actually got his final answer on the Entscheidungs problem. He discovered that while formal mathematical systems can express arbitrary computations, their design makes them unsuitable for computation in practice. The Turing machine is a good example of a CPU that controls the data manipulated by a computer. The machine has tape of infinite length which allows read and write operations to be performed. What really makes the Truing machine special is that it is capable of processing unrestricted grammar. Processing unrestricted grammar means that the machine can evaluate first order logic in an infinite number of ways. The only other algorithm that has the potential of doing this is Lambda calculus. Lambda calculus is a formal system in mathematical logic for expressing computation and is the universal model for all simulated Turing machines. Alan Turing did more than just develop the Turing machine, he was also called upon when the world needed him most during World War II.

During World War II it was imperative for the allies to break German Enigma codes, so they could be ready for any attack that they had planned. According to the Imperial War Museum, “The Enigma was a type of enciphering machine used by German armed forces to send messages securely” (Imperial). Though most mathematicians knew how to read the Enigma messages, the Germans increased its security by changing its cipher system daily. Though we knew how to read the code, this made deciphering it much more difficult. This is where Alan Turing stepped in and played a key role by creating the Bombe. The Bombe is a device that helped reduce the work of the code breakers. Turing worked at Bletchley air force base and helped decipher messages coming from the Germans. He also worked to decrypt German naval communications which were imperative to defeat the German U-boats. This meant that because the U.S allies knew the Germans plans, they were able to stay away from packs of German U-boats. In July of 1942 Turing also helped to develop another code breaking technique called “Turingery” which helped decrypt German strategic messages of great importance. Alan Turing was a hero during the World War II era but he never received the recognition he deserved.

Alan Turing was a victim of homophobia and some people say he committed suicide because of it. “Five years after the war he was convicted of gross indecency under laws which banned homosexuality and was sentenced to chemical castration involving a series of injections of female hormones” (Sharma). The conviction meant that Turing would lose his job with the secret service as well as be unable to continue on all of his work. The homosexuality rules of the 1900’s ruined the life of one of the most important computer scientists of all time. Due to the terrible laws at the time, Turing didn’t get the royal treatment as he should have. He was a hero of World War II and without him the war would have gone on for 2-4 more years.

Alan Turing was the biggest influence of computer science in the 20th century. From his writings on probability theory, he was able to build a mathematical system that can tell a user whether a machine is talking to it, or a human. He helped develop the Bombe machine that saved many lives during World War II and should receive more credit for shortening the war. Due to Turing being homosexual he was relieved of his duties with the secret service and sentenced to chemical castration, which eventually led him to his death. Turing will be remembered as a hero and without him, computers may not be as advanced as they are today.

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