Ada Lovelace

Born in London, England, on December 10th, 1815 as the sole legitimate child of the renowned English Romantic poet Lord Byron, Ada Byron seemed destined to follow in the footsteps of her father into poetry and the arts. Indeed, she might have done so, had it not been for the influence of her mother, who separated from Lord Byron five weeks after Ada’s birth. The poet Byron, well known for his romantic affairs and general debauchery, was deemed a poor role model for Ada by Lady Byron, and Ada never saw her father again. From then on, Ada’s upbringing involved a strict regimen of math, science, and music. Her mother, known as the “Princess of Parallelograms”, had always been fond of math, and so she raised Ada as a scientist and a mathematician. In fear of Ada inheriting her father’s erratic behaviors and dark moods, Lady Byron discouraged literary study. Ada soon grew an interest in math and science, and began to excel in them. She would make model boats and even design plans for a steam-powered airplane. As her knowledge and intelligence skyrocketed past the elementary school level, Lady Byron hired a number of private tutors for her. At the time, education beyond that level was not typically available for girls of the upper class, and especially not in the field of mathematics. Many of her tutors either were prominent mathematicians, or went on to become prominent in the years following her tutoring, some examples being William Frend of Cambridge, Augustus DeMorgan of the University College London, and Mary Somerville, distinguished science researcher of the 1800s.

At the age of seventeen, in the summer of 1833, Ada Lovelace met mathematician Charles Babbage at a party (hosted by Mary Somerville), who had invented a device that he called the “Difference Engine”. This was an automatic mechanical calculator that could solve polynomial equations automatically. He had built a small model of the Difference Engine, while acquiring a government grant to make a full scale version. However, the technology required to produce a full size version did not exist, and thus he had failed at making the machine while losing the government funding. The difference machine wasn’t the only machine Charles Babbage had made, however. He also created something called an “analytical engine”, which was a more general purpose machine. This machine would perform any kind of mathematical calculation, as long as the relevant instructions were “programmed” into it. He based it off of an automatic loom invented by Joseph-Marie Jacquard that wove cloth based on instructions fed in through punch cards. Babbage had the idea of using punch cards for his machine, as well, but after the failure of the Difference Engine, nobody wanted to invest in this larger, even more complex idea. Ada was amazed by this idea, and interested in its development. The Analytical Engine is now known as the ancestor of and predecessor to modern computers.

Ada did not get involved with Babbage’s work just yet, however. First, she married the Baron King, William King, in 1835. When he became the first Earl of Lovelace later on, in 1838, she became the Countess of Lovelace along with her title of Baroness King. Ada and William King had three children: Byron, Anne Isabella, and Ralph Gordon. Ada’s mother, the Lady Byron, assigned William Benjamin Carpenter as the tutor of Ada’s kids, displaying her control over Ada’s life. Baron King was supportive of his wife’s intellectual and academic pursuits, and encouraged her friendship with Charles Babbage.

Babbage continued his work on calculating machines throughout the decade, and in the late 1830s, went on an international tour to raise funding for his machines. In 1842, Luigi Federico Menabrea, an Italian military engineer and mathematician, wrote an article about the inner workings of the Analytical Engine in French. Babbage asked Lovelace to translate the paper into English and add her own notes and annotations. Her notes ended up being three times longer than Menabrea’s original paper, including details about the “very difficult and abstract questions connected with the subject”. However, because she was a woman that was part of the aristocracy, it was improper for her to sign her name on the document, and thus she signed with the initials A.A.L. For years, nobody knew who A.A.L. was, and only thirty years later did her identity become known. In the paper, Lovelace speculated on the uses of the Analytical Machine and its future derivatives, remarking that it might eventually be used for such purposes as composing music, producing graphics, and serious scientific work. The ubiquity of computers today is a testimony to her clairvoyance.

The paper offered further insight that is still applicable today. She warned against treating computers like humans, stating that the machines “must be programmed to think and cannot do so for themselves.” This is still a common statement made by Computer Scientists and professors in introductory courses, as a computer can do nothing without it receiving the instructions to do so. Following from this observation, Ada included a set of clear instructions for calculating Bernoulli numbers on the Analytical Machines in her paper, effectively creating the world’s first computer program. To this day, she is known as the first computer programmer.

In her later years, Ada fell into sickness and debt. She became addicted to gambling, specifically horse racing, as she believed that she had created an infallible mathematical system for betting. However, she was incorrect, and as she fell further into debt she ended up having to resort to pawning off the family jewels. At the age of 36, Ada King, Countess of Lovelace died from uterine cancer on November 27th 1852. Though she lived a short life, Ada Lovelace contributed much to the field of Computer Science, and preceded most work into computing by over a century. What we think of as a brand new field was worked on by Ada back in the 19th century. As a tribute to her legacy, the US Department of Defense named a new programming language after her in 1979 – Ada.

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