Ada Lovelace and women in computer science

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Not everyone knows that British mathematician Ada Lovelace was among the pioneers of computer science. Today, however, the percentage of women who study or work in this area is still very low

"To obtain a mechanism capable of combining general symbols in sequences that are unlimited by variety and extension means to have found a link between the operations of matter and the more abstract mental processes of mathematics". This was not uttered by Alan Turing, Bill Gates or Steve Jobs, but was written in 1843 by a British mathematician who was considered by many as the first programmer in history: **Ada Lovelace**.

The scientific history of Lovelace is closely linked to that of **Charles Babbage**, another pioneer of computer science who in the mid-1930s designed the "Analytical Engine", a prototype of a real mechanical computer powered by a steam machine. The idea, extremely innovative at the time, was never developed, but in 1842 Italian engineer **Luigi Menabrea**, after listening to a lecture given by Babbage on the operation principles of the machine, published a report in French. And this is where Ada Lovelace, who had been collaborating with Babbage for about ten years after studying mathematics on her own comes into play: Babbage asked her to translate the document by Menabrea into English but invited her to add original content and comments in the form of notes in the appendix.

Ada Lovelace

Lovelace did not have to be asked twice, and it was especially "note G" (the last of the series) to make history, with the description of an algorithm for the calculation of the so-called "Bernoulli numbers" (a recursive succession of rational numbers which has numerous applications in modern mathematics) which in some respects can be considered as the first computer program in history.

In fact, the real original contribution of Ada Lovelace to these notes has long been a topic of discussion among scholars in the field, but recent research based on the original manuscripts kept in the Bodleian Library of Oxford (as described in the book "Ada Lovelace: the making of a computer scientist") do justice to the talent and originality of the British mathematician. Who, in her notes, even made considerations on what we now call "artificial intelligence", i.e. on the ability of the Analytical Engine to produce original ideas. Lovelace did not consider it possible, thus starting an ideal debate with Alan Turing (the father of modern computer science), who in his famous 1950 work "Computing Machinery and Intelligence" – in which he explicitly referred to "the objection of lady Lovelace" – affirming his conviction that it was possible to program a machine so as to obtain unpredictable answers.

The story of Ada Lovelace and her contribution to the development of modern computing leads us to a reflection on the present. Today, the percentages of women who choose to study and work in the IT industry is very low all around the world. It seems one of the many examples of open challenges on the topic of gender equality, but the case of information technology has always been a particular field of study, because it raises a crucial question: is it a problem – as in many other cases – of lack of equal opportunities or is it a matter of natural inclination towards the subject? In other words: are there so few women in IT because they do not have the same career opportunities in this field if compared to men, or are they on average less interested in this discipline?

A statistic provided by the "Girls Who Code" movement, an American project that aims to facilitate girls' access to IT jobs, would seem to back the first hypothesis: in the United States, in 1984, 37% of computer science graduates were women, while today the share has fallen to 18%. Similar percentages are observed with regard to employees in the IT industry. "It is no coincidence that, in the eighties, the computers on the market were mainly designed for male customers, which radically changed the public image of the computer",

Reshma Sajuani, founder of "Girls Who Code" recently pointed out in a paper in *Scientific American*. "What started out as a working environment with a significant presence of women turned into one in which programmers were boys bent over computers, locked up in a basement. As a result, girls ended up pulling back en masse". So, according to Sajuani, the problem of equal opportunities in accessing the world of computer science starts much earlier than at the time of enrollment in college or a job interview, already in middle school, almost inevitably favoured by the social context.

Today, perhaps, things are beginning to slowly change, and there are those who support the thesis that, even in the presence of equal opportunities, fewer women would still follow the path of information technology compared to men. However, in order to find out with certainty, it is necessary that equal opportunities really exist, and there is still much work to do. If there were a new potential Ada Lovelace, out there, it would be too bad to let her go away.