

Jean Bartik



Introduction

Jean Bartik (Betty Jean Jennings Bartik), was one of 6 women responsible for programming the ENIAC, the first programmable, electronic, general-purpose digital computer. This machine was in charge of calculating ballistics trajectories during the Second World War, and later thanks to the help of Bartik, it became the first stored-program computer - the predecessor to our modern computer. Bartik then went on to develop the first commercially sold computer, - the UNIVAC.

While programming the ENIAC, Bartik and her colleagues developed many fundamental programming techniques that are still used today.

Bartik has described her plethora of work as “the greatest adventure of my life”. I believe that this adventure has unequivocally impacted the software engineering discipline as we know it today.

Early life and education

Jean Bartik (born Betty Jean Jennings), was born in Gentry County, Missouri, in 1924. She grew up on her family's farm and was educated in a one-room schoolhouse before attaining her formal high school education in a neighbouring town. In 1941, the year Pearl Harbor was bombed, Bartik was a freshman at Northwest Missouri Teachers College, majoring in mathematics. The school emptied suddenly, as the majority of men were enlisted in the war, and Bartik graduated with the only mathematics degree in her class, in 1945.

Career

Bartik's calculus teacher undoubtedly saw a lot of potential in Bartik, as he encouraged her to apply to the University of Pennsylvania, who was seeking female math majors to work for the Army Ordnance at Aberdeen Proving Ground. Despite a lot of pressure to follow in her family's footsteps, and stay at home to become a teacher (like her father, grandmother and sisters), Bartik applied and got hired as a human calculator to calculate ballistics trajectories for the Army.

At the same time, the ENIAC computer was being developed and after a few months of Bartik working on trajectories, an announcement was made asking if any of the girls would like to apply to be an operator of the ENIAC. Bartik, along with 5 other women were selected to be the main programmers. They faced many difficulties however as initially they were not permitted to see the hardware of the device as it was classified and security clearance was required. The 6 women taught themselves the skills needed by reviewing circuit diagrams of the device and interviewing the engineers who built it. A space to work together was also not provided to the group, so they found themselves working wherever they could, in abandoned classrooms and fraternity houses.

The group developed subroutines, nesting, and other fundamental programming techniques while working on the device.

Once the 6 women had worked out all the math on paper, they were finally allowed to interact with and program the machine. This meant physically rerouting cables and changing thousands of switches. For these reasons, Bartik has described the device as "a son of a bitch to program".

In 1946, the ENIAC was demonstrated to the press, displaying that the device worked to the specification. This turned out to be a huge success as it proved to operate 1,000 times faster than any machine that existed prior to the time, including the Mark 1, a well-known electromechanical machine at Harvard. On top of this, work that would have taken 40 hours to complete by hand, could now be executed in 20 seconds.

Despite the significant work Bartik and her fellow programmers accomplished, none of the women were introduced at the demonstration and they were not invited to the celebratory dinner held afterwards. Bartik and the 5 other women received little recognition as most of the congratulations were given to its engineers, John Mauchly and J. Presper Eckert.

Due to the end of World War II, the firing tables computed by the ENIAC were now redundant and Jean was hired to lead a group at the University of Pennsylvania to figure out how to convert the ENIAC into a stored program machine. Bartik and the group achieved this by March 1948, which ultimately led to the ENIAC operating more quickly, efficiently and accurately. Bartik is now credited for the majority of this work as documents later discovered by a team of authors show the majority of the 60-order Code (the logical coding system applied to the ENIAC) was in Bartik's handwriting.

Eckert and Mauchly left the University of Pennsylvania in 1946 and started up the Eckert-Mauchly Computer Corporation. Bartik worked with them to build the Binary Automatic Computer (BINAC) here. This was a significant accomplishment as it was the first computer to use magnetic tape to store data, instead of punch cards. Not only this, but it was the first computer to demonstrate the twin unit concept.

Another great success story of Bartik's, was her participation in developing the first commercially available computer - the UNIVAC. Bartik was challenged with designing its logic circuits as well as other programming tasks. She worked alongside her friend, Betty Holberton, and the pair co-programmed the first generative programming system, (SORT/MERGE) for a computer.

In the early 1950s, Remington Rand bought the Eckert-Mauchly Corporation and Bartik continued her work on the UNIVAC, training how to program and use the UNIVAC. However once her husband took a job with Remington Rand, Jean was asked to resign from the company. This was due to a company policy that at the time refused to allow husbands and wives to work together. Bartik carried out free-lance programming jobs for John Mauchly before she retired from her career in computing to concentrate on raising a family.

Later life and legacy

During the time when Bartik had left her computing career in order to raise her children, she pursued her longstanding interest in writing and completed a master's degree in English at the University of Pennsylvania. In 1967, she returned to the workforce, finding a job at Auerbach Corporation as a writer and editor of technical reports on computers,

combining her two great academic interests. She became product manager and editor in numerous other jobs and spent the last years of her working life as a real estate agent.

Jean Bartik died at the age of 86 in 2011 from congestive heart failure. Prior to her death, Bartik wrote her autobiography "Pioneer Programmer: Jean Jennings Bartik and the Computer that Changed the World".

Until articles published by columnist Tom Petzinger in the Wall Street Journal, documenting Bartik's integral part in developing ENIAC, Bartik's pioneering work was unknown to the world. It was not until then that she began to receive rightful recognition. Bartik was inducted into the 'Women in Technology International Hall of Fame' in 1998; she was a recipient of a 'Museum Fellows Award' from the 'Computing History Museum' at Mountain View, California, in 2008; she was awarded the 'Computer Pioneer Award' in 2008 from the 'Institute of Electrical and Electronics Engineers Computer Society' Board Of Governors.

In 2010, "Top Secret Rosies: The Female "Computers" of WWII", a documentary surrounding 3 of the 6 women from the ENIAC team was released. A 2013 award-winning documentary entitled "The Computers", also documents the women's patriotic contributions.

Why I chose Jean Bartik

I chose Jean Bartik as my key software engineer primarily due to a quote I stumbled upon while researching software engineers. Bartik stated, "If my life has proved anything, it is that women (and girls) should never be afraid to take risks and try new things". She was an advocate for women in computer science, particularly since she released her autobiography which documents the instances she felt that she and her female colleagues were left behind in history.

I also admire her unequivocal ambition for pursuing what she loved, "I do believe that you should enjoy what you do." Despite the backlash she received from her family, she entered an almost completely male-dominated industry where her future was unknown and it led her to achieving the plenitude of pieces of work mentioned above. Pieces of work that have undoubtedly shaped the face of computer science and software engineering as we know it today.

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