Edition 13

Computer Science

June 2024

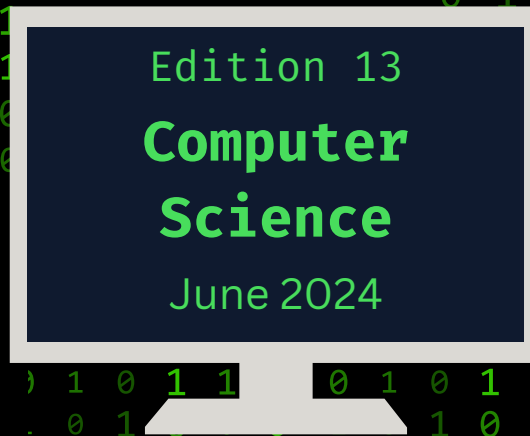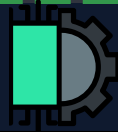> "THE MOST DANGEROUS PHRASE IN THE LANGUAGE IS, 'WE'VE ALWAYS DONE IT THIS WAY.'"
> - Grace Hopper

Generative AI | By: Bailey WR.

AI has been all the rage in the past few years. Some people seem optimistic about the groundbreaking technology and some seem to be more on the suspicious side, but do you really know what generative AI is? AI stands for Artificial Intelligence, which you may have already known. MIT explains that previous AI seemed to focus on machines making conclusions about preexisting data, but generative AI takes a different path. "Generative AI can be thought of as a machine-learning model that is trained to create new data, rather than making a prediction about a specific dataset (Zewe, 2023)." ChatGPT is a prime example of generative AI that has the ability to communicate through text. "Generative AI, also referred to as GenAI, allows users to input a variety of prompts to generate new content, such as text, images, videos, sounds, code, 3D designs, and other media (Coursera, 2024)." Artificial Intelligence is now being used to summarize pieces of texts and can also be used to create subtitles (Coursera, 2024). It can even help write articles for you if it's given a topic. This article was not written by AI, but with these new technologies it would be quite easy to! How would you use generative AI?

Read on!

SCIENTIST SPOTLIGHT

By: Jan P.

Kathleen Booth

Born in 1922 (Kathleen Booth, n.d.), Kathleen Booth has left an immense impact on computer science. Not only did she write the first Assembly language—a low-level programming language that abstracts away machine code to be more readable to humans ("Assembly language," 2024)—but she also "got her hands dirty with the hardware, having built a large portion of the computers which she programmed" (Cassel, 2022). The first computer Booth and a colleague built was the Automatic Relay Calculator, or ARC for short. They then built a faster computer, known as the Simple Electronic Computer (SEC), which was later replaced by the All Purpose Electronic X-ray Computer (APE(X)C) (Campbell-Kelly, 2022).

Booth published major papers, such as "Synchronous v. asynchronous operation" (Videla, 2018). In 1953, she and her husband "published a book called Automatic Digital Calculators, where not only they explain the design of a computer, but also they present techniques about how to program them [...] Machine Learning and Artificial Intelligence, in this last section they explain how to produce a conditioned reflex in a digital calculator" (Videla, 2018). Through books and papers such as these, Booth's research helped pave the way for modern large language models such as OpenAI's ChatGPT or Google's Gemini.

Other influential papers that Booth wrote include "Automatic Digital Calculators," "Variations in Tension of An Unwinding Thread," "Statistical Parsing by Computer," "An Experiment In mechanical Translation," "Machine Aided Translation With A Post-editor," "Using Neural Nets To Identify Marine Mammals," and more (O'Connor and Robertson, 2023).

Even later in her life, Booth "continued to follow developments in computing and [...] approaching her 99th birthday, used an iPad to record her memories" (O'Connor and Robertson, 2023).

In conclusion, Kathleen Booth's research, papers, and books massively contributed to the advancement of computer technology, including the advancement of large language models, such as Google's Gemini and OpenAI's ChatGPT. With her colleagues, Kathleen Booth also built and programmed 3 of the earliest computers and wrote the first assembly language, allowing the computers to be programmed without needing to write machine code directly.

Computer Science Experiments

By: Hitej R.

Easy

Caeser Cipher

You can make your own cipher by assigning one letter to another letter in the alphabet. By using a number as what is called the "key," you can shift each letter however many times the key tells you to! Try encoding your own secret message and leaving it around the house with the key, for someone to find and decode! For an additional twist, try using a different key for each letter. By shifting each part of your code a different amount, it makes it a little more difficult to decode!

CLICK HERE FOR AN EXAMPLE!

Medium

Code A Maze Game

You can make your own maze game on a platform called Scratch! Scratch has easy-to-use blocks that you can arrange to tell your character or "sprite" to do different things. You can design your own levels, characters, and even add custom sound effects! To add some complexity, you can even add a computer opponent you have to avoid while running through the maze! Scratch gives you a great deal of customization power, and even a library with hundreds of characters and settings to choose from!

CLICK HERE FOR AN EXAMPLE!

Hard

Code A Calculator

You can make a simple calculator in Python that has a user input two values. You can then ask what they would like to do with these values, and use the built-in operators in Python to evaluate these problems. The challenge here is involved with accounting for all of the edge cases that might produce errors, such as dividing by 0! This project will be good practice with using user inputs, variable management, and conditional logic!
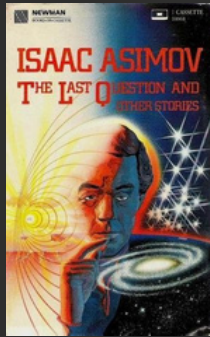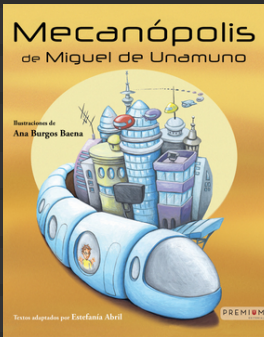
CLICK HERE FOR AN EXAMPLE!

World Computer Science News

By: Hitej R.

MIT researchers have created a robotic hand with a human-like touch using a gel-based sensor.

AI has already begun to attempt deceiving humans in some tests.

Researchers at the University of Michigan say that one of the best methods of managing cell phone usage is by making them slightly more laggy.

SCIENCE FICTION...NOT FICTION ANYMORE!

By: Elle W.

When you think of science fiction, most likely aliens, outer space, and futuristic inventions come to mind. But have you ever thought about how, what used to be the future, is now the present? Computers used to be science fiction - and are now reality. Here are a few incredibly interesting short stories that refer to modern day computers.

"The IWM 1000" by Alicia Yánez Cossío (1975)

The IWM 1000 is a small box with all the answers to all the questions. People at first find it incredible, and wish to increase their knowledge. But as they get used to the IWM 1000, people stop learning. The box is always there, always with the answers, so why bother learning anything else in your own brain? No one could read or write anymore, and all learning institutions were converted to other uses. In the end, people begin to realize how meaningless that life is, and learn to read. They get hold of the few books they can, and change themselves. At last, they join wild peoples who have never gone on the 'tech trajectory' - and find meaning. Love, friends, hate, joy... life.

"Mechanopolis" by Miguel de Unamuno (1913)

The protagonist is lost and dying in a desert. He at last comes across a deserted train, and out of curiosity, climbs aboard. It takes him to a perfectly sterile city - Mechanopolis. There are no people, no birds, no trees, and no life. He begins to go mad, until finally he boards the train again and it takes him back. There, he comes across some of the last remaining humans. They cry together, hug, and pray. "And ever since then I have developed a true hatred of what we choose to call 'progress', and even of culture itself, and I look everywhere for someone who is like me, a man like me, who laughs and cries just like I laugh and cry, and where there are no machines..."

"The Last Question" by Isaac Asimov (1956)

A computer called Multivac has all the answers, for all questions. Except one: "how can the net amount of entropy of the universe be massively decreased?" and that was The Last Question. People repeatedly ask it this question, but it always answers, "INSUFFICIENT DATA FOR MEANINGFUL ANSWER." At last, after a long time, a descendant of Multivac (called "AC") comes with an answer: "Let there be light!" and there is light.

Code Girls: The Untold Story of the American Women Code Breakers of World War II

by Liza Mundy

BOOK REVIEW | BY: SOFIA J.

"Code Girls" is a captivating narrative that sheds light on the often overlooked contributions of women during such an important period in history. The book provides in-depth explanations of the coding systems used during the war and the innovative methods these women used to crack them. Furthermore, the author does a great job revealing these women's stories, all of whom played pivotal roles in World War II code-breaking efforts. Mundy also explores the sexism and gender disparities occurring in the field of intelligence during that time, highlighting the pure passion and determination of these women who fought these barriers and narrow gender stereotypes to achieve greatness. Not only does this book celebrate their resilience and perseverance, but also challenges historical accounts that lessen their impact on the victory. Overall, "Code Girls" is a must-read for anyone interested in the combination of women's history, female empowerment, and coding.

Book
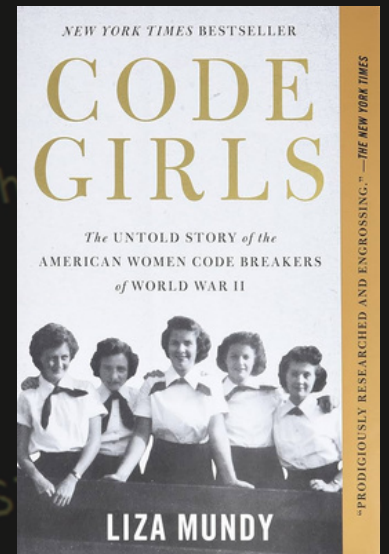
Review Rating: 4/5

Fantastic Facts!

By: Elle W.

The first computer weighed more than 27 tons. That's a lot!

The first known computer programmer was a woman, Ada Lovelace.

People blink less when they use computers.

Meet the Team

Ace M. 🌷⚛️ Elle W. 🌷 Maya F. ⚛️

Bailey WR. ⚛️ Hitej R. 🌷 Sofia J. ⚛️

Diana S. ⚛️ Jan P. 🌷 Stephanie A. ⚛️

Durga I. 🌷 Jasmine P. ⚛️ Vasilisa B. ⚛️

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Thank you to everyone who contributed to these editions over the course of this school year. We could not have done this without you! And to all seniors, best wishes in all of your future endeavors! Have a great summer, everyone!