

To children growing up in the 1960s, computers were exotic, otherworldly machines that guided rockets into space. They cost millions of dollars, took up entire rooms, and were operated by punch card-wielding astrophysicists. The possibility that kids could own a computer in their very own home seemed as distant as the moon itself. But what is a computer, exactly? Does it need to be electronic? Does it need to be capable of performing advanced calculations? Does it need a screen, or even a keyboard?

"If you have ever counted on your fingers YOU could be called a DIGITAL COMPUTER," the instruction manual for E.S.R. Inc.'s Digi-Comp I computer began. "The word *digit* means finger (or toe) and a computer is someone or something that does number work." At first glance, Digi-Comp was

a far cry from the IBM 7090 mainframe computers that guided the Mercury and Gemini manned spaceflights. The IBM needed its own air-conditioned room; Digi-Comp could easily fit on a coffee table. Rather than using fifty thousand germanium alloy-junction transistors, Digi-Comp relied on three plastic flip-flopers as memory devices that could accept an input, remember it, and then output it on command. Instead of costing \$2.9 million, Digi-Comp cost \$4.99.

And yet, as the instructions proudly stated, Digi-Comp was still a computer. "[Digi-Comp] is a mechanical equivalent of an electronic, digital computer. With DIGI-COMP I you can PLAY GAMES, SOLVE RIDDLES, and DO ARITHMETIC in the same way as you would on a large digital computer." Measuring about a foot long and four

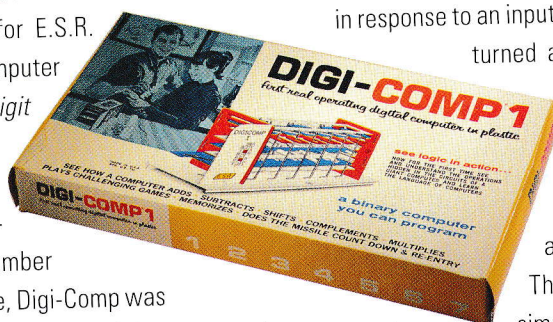
inches high, it performed surprisingly sophisticated math despite its all-plastic construction. The packaging came with coding sheets and a manual explaining Digi-Comp's binary language, which could be programmed using "logic rods" positioned over the mechanical flip-flopers. Digi-Comp's flip-flopers were binary, able to be set in one of two positions. Because it contained three flip-flopers, Digi-Comp was technically a three-bit computer.

Users could program Digi-Comp by repositioning the logic rods along the flip-flopers using thin vertical wires. With cylindrical pegs, a user could control whether the logic rods moved in response to an input or were blocked. She then

turned a separate control, called the "clock," which cycled the program in the same way your laptop's processor does—just at a tiny fraction of the speed.

The manual included many simple games and tasks Digi-

Comp could perform. One program simulated a rocket launch from Cape Canaveral with a countdown timer and a preflight check of oxygen systems, ship controls, and radio systems. Another program simulated an elevator with a memory function allowing Digi-Comp to "remember" on which floor the elevator was presently sitting. One challenge tasked users with helping a bank manager recall the binary password to the vault, while another helped astronauts re-enter Earth's atmosphere by correctly sequencing reentry procedures. Digi-Comp could even play a version of Nim, the ancient mathematical strategy game in which players take turns removing objects from three rows, with the loser taking the final object. Nim had been a favorite



game for computer scientists to simulate on massive mainframes, but now kids could play it on their own personal computer at home.

Similar toys had long existed for other areas of technological advance. Erector Sets and Lionel trains introduced children to construction and the intricacies of railroads. Chemistry sets offered kids the chance to experiment as society was learning about "better living through chemistry," as the famous DuPont slogan went. Future physicists like Richard Feynman learned the properties of waves with crystal radio sets. But the beauty of Digi-Comp lay not just in the machine's simplicity, but in the great respect the makers had for young minds. Programming Digi-Comp required understanding binary, and children were challenged with learning this unintuitive language of ones and zeroes along with Boolean logic notations consisting of "true" and "false" statements. Digi-Comp's goal was not to idly amuse kids, but to engage them, to teach them, and to mold them into the scientific minds that would be necessary to change the world. "Everything you learn on Digi-Comp can be used on large electronic digital computers," the manual promised. Digi-Comp's simple binary language is the basis for how all computers then and now operate.

Digi-Comp also represented a great gender equalizer. Toys at the time, especially those

geared toward math and the sciences, were highly gendered. Erector Sets and chemistry kits almost always featured young boys on the cover, while most toys marketed toward girls were dolls. One of the few intricate toys for girls was the Easy-Bake Oven—a first of many reminders of a woman's expected place in American society. Yet Digi-Comp's packaging featured a young boy and a young girl, both taking part in programming the machine.

In many ways, this reflected the reality of computing, for women were integral to the programming of computers from the very beginning. Admiral Grace Hopper headed many of the United States' computing initiatives and created COBOL, the programming language that became the engine of most business computing. In government and business, while men usually dominated the arenas of hardware design, women often did the painstaking work of designing, running, and debugging the programs that computers ran. Those who have seen the movie *Hidden Figures* will recognize the ways both men and women contributed to the computing revolution that transformed American society.

The Digi-Comp I was not able to send a man to the moon, but it did have the power, through play, to help children—boys and girls—master the new digital world with the flip of a few plastic switches.

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