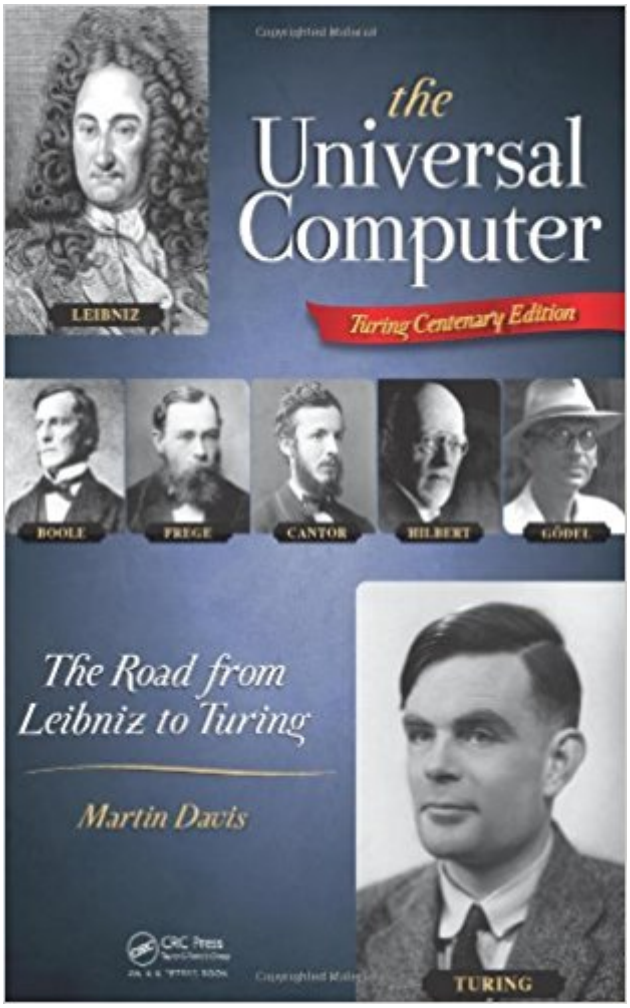
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The Universal Computer: The Road From Leibniz To Turing



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Synopsis

The breathtakingly rapid pace of change in computing makes it easy to overlook the pioneers who began it all. Written by Martin Davis, respected logician and researcher in the theory of computation, The Universal Computer: The Road from Leibniz to Turing explores the fascinating lives, ideas, and discoveries of seven remarkable mathematicians. It tells the stories of the unsung heroes of the computer age Ã¢â ¬â œ the logicians. The story begins with Leibniz in the 17th century and then focuses on Boole, Frege, Cantor, Hilbert, and GÃƒÂ¶del, before turning to Turing. TuringÃ¢â ¬â„¢s analysis of algorithmic processes led to a single, all-purpose machine that could be programmed to carry out such processesÃ¢â ¬â ¢the computer. Davis describes how this incredible group, with lives as extraordinary as their accomplishments, grappled with logical reasoning and its mechanization. By investigating their achievements and failures, he shows how these pioneers paved the way for modern computing. Bringing the material up to date, in this revised edition Davis discusses the success of the IBM Watson on Jeopardy, reorganizes the information on incompleteness, and adds information on Konrad Zuse. A distinguished prize-winning logician, Martin Davis has had a career of more than six decades devoted to the important interface between logic and computer science. His expertise, combined with his genuine love of the subject and excellent storytelling, make him the perfect person to tell this story.

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Customer Reviews

Computers rely on such things as semiconductors, memory chips, and electricity. But they also rely

on a hard-won body of scientific knowledge that has enabled the now-ubiquitous devices to perform complex calculations, multitask, and even play a game of solitaire. Martin Davis, a fluent interpreter of mathematics and philosophy, locates the source of this knowledge in the work of the remarkable German thinker G. W. Leibniz, who, among other accomplishments, was a distinguished jurist, mining engineer, and diplomat but found time to invent a contraption called the "Leibniz wheel," a sort of calculator that could carry out the four basic operations of arithmetic. Leibniz subsequently developed a method of calculation called the calculus raciocinator, an innovation his successor George Boole extended by, in Davis's words, "turning logic into algebra." (Boole emerges as a deeply sympathetic character in Davis's pages, rather than as the dry-as-dust figure of other histories. He explained, Davis reports, that he had turned to mathematics because he had so little money as a student to buy books, and mathematics books provided more value for the money because they took so long to work through.) Davis traces the development of this logic, essential to the advent of "thinking machines," through the workshops and studies of such thinkers as Georg Cantor, Kurt GÃƒÂ¶del, and Alan Turing, each of whom puzzled out just a little bit more of the workings of the world--and who, in the bargain, made the present possible. --Gregory McNamee
--This text refers to the Hardcover edition.

This thoroughly enjoyable mix of biographical portraits and theoretical mathematics reveals how a sequence of logicians posed the conceptual questions and contributed the crucial insights resulting in the development of computers long before the technology was available to build even the simplest machines. An intriguing portrait of the great 17th-century mathematician G.W. Leibniz, a pivotal figure in the history of the search for human knowledge, launches this account by New York University professor emeritus Davis (Computability and Unsolvability). Steeped in Aristotelian ideas of perfection but trained in modern engineering, Leibniz conceived the idea of a universal system for determining truth. His contributions to this system are as diverse as the ingenious Leibniz Wheel (an early calculating machine) and the notation used today for calculus. His ideasDin particular, his recognition of the deep connection between systems of notation and actual physical devices for performing computationDinspired mathematicians and logicians, including George Boole, Gottlob Frege, Georg Cantor, David Hilbert and Kurt G del, until Alan Turing used them to develop the powerful mathematical tools that underlie modern computers as well as some of the earliest computer prototypes. After Leibniz, people thought about the problem of building computational systems; after Turing, people got busy building the machines. Davis has told the fascinating story in between. Full of well-honed anecdotes and telling detail, the book reads like a masterful lecture.

Presenting key mathematical ideas in moderate depth, it also offers a solid introduction to the field of computer science that will captivate motivated readers. Agent, Alex Hoyt. Copyright 2000 Reed Business Information, Inc. --This text refers to the Hardcover edition.

Dr. Martin Davis' book is excellent! It starts out to be biographies of seven great mathematicians/logicians, but is so much more. You get inside the heads of these great men, but you also learn about their lives, the world in which they lived, world history, and the mathematics that they developed. Dr. Davis has a way of presenting the math in a style that practically anyone can understand with a little effort. Also, Dr. Davis adds anecdotes about some of the men in his book because he knew them or heard them speak. Also, Dr. Davis is a math/logic professor with many years of experience. The book presents the material so the reader feels like he's reading an exciting story. The book is exciting and energetic. For anyone with an interest in science or math, computers, technology, this is a worthwhile read. Students entering college would especially benefit from the book as it might give their course of study some new meaning and provide additional motivation to learn and achieve.

Very good book. Explains in simple and clear words the most complex ideas that lead to the invention of the modern computer. An informative book that should be on the reading list of everybody interested in the development of artificial intelligence and the basics of computer science. Complicated ideas such as Cantor's multiple infinities and GÃƒÂ¶del's Incompleteness theorem are explained to the interested layman without the use of convoluted mathematical formulas. Martin Davis enables the reader to understand how it was possible to create machines that could simulate human intelligence and how men like Alan Turing lay the foundations for the world we live in today.

I read this for a 300 level computer science class and was surprised and how enjoyable it was. It has some heavy math/logic in some places but overall not outside the realm of understanding of a college student. Even if the logic parts are too deep, you can still enjoy it for it's historical accounts of how people react to new paradigms of understanding and philosophy.

Worth the read if you enjoy computational history. Well written and not too challenging given the mathematical references.Davis was there at the beginning and knows his computer history.

Great, thanks!

Awesome review of logic, semantics, and semiotics.

Great timeless work focusing on historical development of logic theory.

A history of one of the most important recent devices made by humans. And the author was there for the 20th century bits! He manages to make math that boggles the mind into something that still boggles the mind, but at least leaves you feeling "oh, well, I could probably understand that with a bit of study". And the history.... richly compelling, interesting, and approachable. The author brings the people involved over the centuries to life as real people who contributed their bit to this amazing thing that affects our modern world so completely. Thoroughly enjoyable!

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