The Turing Guide

Alan Turing is regarded as one of the greatest scientists of the 20th century. But who was Turing, and what did he achieve during his tragically short life of 41 years? Best known as the genius who broke Germany's most secret codes during the war of 1939-45, Turing was also the father of the modern computer. Today, all who 'click-to-open' are familiar with the impact of Turing's ideas. Here, B. Jack Copeland provides an account of Turing's life and work, exploring the key elements of his life-story in tandem with his leading ideas and contributions. The book highlights Turing's contributions to computing and to computer science, including Artificial Intelligence and Artificial Life, and the emphasis throughout is on the relevance of his work to modern developments. The story of his contributions to codebreaking during the Second World War is set in the context of his thinking about machines, as is the account of his work in the foundations of mathematics.

Containing never-before-published material, this fascinating account sheds new light on one of the greatest figures of the twentieth century.

An accessible and rigorous textbook for introducing undergraduates to computer science theory What Can Be Computed? is a uniquely accessible yet rigorous introduction to the most profound ideas at the heart of computer science. Crafted specifically for undergraduates who are studying the subject for the first time, and requiring minimal prerequisites, the book focuses on the essential fundamentals of computer science theory and features a practical approach that uses real computer programs (Python and Java) and encourages active experimentation. It is also ideal for self-study and reference. The book covers the standard topics in the theory of computation, including Turing machines and finite automata, universal computation, nondeterminism, Turing and Karp reductions, undecidability, time-complexity classes such as P and NP, and NP-completeness, including the Cook-Levin Theorem. But the book also provides a broader view of computer science and its historical development, with discussions of Turing's original 1936 computing machines, the connections between undecidability and Gödel's incompleteness theorem, and Karp's famous set of twenty-one NP-complete problems. Throughout, the book recasts traditional computer science concepts by considering how computer programs are used to solve real problems. Standard theorems are stated and proven with full mathematical rigor, but motivation and understanding are enhanced by considering concrete implementations. The book's examples and other content allow readers to view demonstrations of—and to experiment with—a wide selection of the topics it covers. The result is an ideal text for an introduction to the theory of computation. An accessible and rigorous introduction to the essential fundamentals of computer science theory, written specifically for undergraduates taking introduction to the theory of computation Features a practical, interactive approach using real computer programs (Python in the text, with forthcoming Java alternatives online) to enhance motivation and understanding Gives equal emphasis to computability and complexity Includes special topics that demonstrate the profound nature of key ideas in the theory of computation Lecture slides and Python programs are available at whatcanbecomputed.com

This book explores how digital culture is transforming museums in the 21st century. Offering a corpus of new evidence for readers to explore, the authors trace the digital evolution of the museum and that of their audiences, now fully immersed in digital life, from the Internet to home and work. In a world where life in code and digits has redefined human information behavior and dominates daily activity and communication, ubiquitous use of digital tools and technology is radically changing the social contexts and purposes of museum exhibitions and collections, the work of museum professionals and the expectations of visitors, real and virtual. Moving beyond their walls, with local and global communities, museums are evolving into highly dynamic, socially aware and relevant institutions as their connections to the global digital ecosystem are strengthened. As they adopt a visitor-centered model and design visitor experiences, their priorities shift to engage audiences, convey digital collections, and tell stories through exhibitions. This is all part of crafting a dynamic and innovative museum identity of the future, made whole by seamless integration with digital culture, digital thinking, aesthetics, seeing and hearing, where visitors are welcomed participants. The international and interdisciplinary chapter contributors include digital artists, academics, and museum professionals. In themed parts the chapters present varied evidence-based research and case studies on museum theory, philosophy, collections, exhibitions, libraries, digital art and digital future, to bring new insights and perspectives, designed to inspire readers. Enjoy the journey!

The Annotated Turing

Interviews with Twenty Eminent Cognitive Scientists

Algorithmics

The Turing Test

The Blackwell Guide to the Philosophy of Computing and Information

Philosophical and Methodological Issues in the Quest for the Thinking Computer

The Imitation Game

Provides an expansion of Turing's original paper, a brief look at his life, and information on the Turing machine and computability topics.

This textbook presents both a conceptual framework and detailed implementation guidelines for computer science (CS) teaching. Updated with the latest teaching approaches and trends, and expanded with new learning activities, the content of this new edition is clearly written and structured to be applicable to all levels of CS education and for any teaching organization. Features: provides 110 detailed learning activities; reviews curriculum and cross-curriculum topics in CS; explores the benefits of CS education research; describes strategies for cultivating problem-solving skills, for assessing learning processes, and for dealing with pupils ' misunderstandings; proposes active-learning-based classroom teaching methods, including lab-based teaching; discusses various types of questions that a CS instructor or trainer can use for a range of teaching situations; investigates thoroughly issues of lesson planning and course design; examines the first field teaching experiences gained by CS teachers.

Provides a study of the fundamental theoretical ideas of computing and examining how to design accurate and efficient algorithms.

Contrary to what many believe, Alan Turing is not the father of the all-purpose computer. Engineers were, independently of Turing, already building such machines during World War II. Turing's influence was felt more in programming after his death than in computer building during his lifetime. The first person to receive a Turing award was a programmer, not a computer builder. Logicians and programmers recast Turing's notions of machine and universality. Gradually, these recast notions helped programmers to see the bigger picture of what they were accomplishing. Later, problems unsolvable with a computer influenced experienced programmers, including Edsger W. Dijkstra. Dijkstra's pioneering work shows that both unsolvability and aesthetics have practical relevance in software engineering. But to what extent did Dijkstra and others depend on Turing's accomplishments? This book presents a revealing synthesis for the modern software engineer and, by doing so, deromanticizes Turing's role in the history of computing.

Turing Computability

Alan M. Turing

New Perspectives and Research

The Road from Leibniz to Turing

Alan Turing: Life and Legacy of a Great Thinker

Philosophical Explorations of the Legacy of Alan Turing

Guide to Teaching Computer Science

A new computationalist view of the mind that takes into account real-world issues of embodiment, interaction, physical implementation, and semantics.

Alan Turing, pioneer of computing and WWII codebreaker, is one of the most important and influential thinkers of the twentieth century. In this volume for the first time his key writings are made available to a broad, non-specialist readership. They make fascinating reading both in their own right and for their historic significance: contemporary computational theory, cognitive science, artificial intelligence, and artificial life all spring from this ground-breaking work, which is also rich in philosophical and logical insight. An introduction by leading Turing expert Jack Copeland provides the background and guides the reader through the selection. About Alan Turing Alan Turing FRS OBE, (1912-1954) studied mathematics at King's College, Cambridge. He was elected a Fellow of King's in March 1935, at the age of only 22. In the same year he invented the abstract computing machines - now known simply as Turing machines - on which all subsequent stored-program digital computers are modelled. During 1936-1938 Turing continued his studies, now at Princeton University. He completed a PhD in mathematical logic, analysing the notion of 'intuition' in mathematics and introducing the idea of oracular computation, now fundamental in mathematical recursion theory. An 'oracle' is an abstract device able to solve mathematical problems too difficult for the universal Turing machine. In the summer of 1938 Turing returned to his Fellowship at King's. When WWII started in 1939 he joined the wartime headquarters of the Government Code and Cypher School (GC&CS) at Bletchley Park, Buckinghamshire. Building on earlier work by Polish cryptanalysts, Turing contributed crucially to the design of electro-mechanical machines ('bombes') used to decipher Enigma, the code by means of which the German armed forces sought to protect their radio communications. Turing's work on the version of Enigma used by the German navy was vital to the battle for supremacy in the North Atlantic. He also contributed to the attack on the cyphers known as 'Fish'. Based on binary teleprinter code, Fish was used during the latter part of the war in preference to morse-based Enigma for the encryption of high-level signals, for example messages from Hitler and other members of the German High Command. It is estimated that the work of GC&CS shortened the war in Europe by at least two years. Turing received the Order of the British Empire for the part he played. In 1945, the war over, Turing was recruited to the National Physical Laboratory (NPL) in London, his brief to design and develop an electronic computer - a concrete form of the universal Turing machine. Turing's report setting out his design for the Automatic Computing Engine (ACE) was the first relatively complete specification of an electronic stored-program general-purpose digital computer. Delays beyond Turing's control resulted in NPL's losing the race to build the world's first working electronic stored-program digital computer - an honour that went to the Royal Society Computing Machine Laboratory at Manchester University, in June 1948. Discouraged by the delays at NPL, Turing took up the Deputy Directorship of the Royal Society Computing Machine Laboratory in that year. Turing was a founding father of modern cognitive science and a leading early exponent of the hypothesis that the human brain is in large part a digital computing machine, theorising that the cortex at birth is an 'unorganised machine' which through 'training' becomes organised 'into a universal machine or something like it'. He also pioneered Artificial Intelligence. Turing spent the rest of his short career at Manchester University, being appointed to a specially created Readership in the Theory of Computing in May 1953. He was elected a Fellow of the Royal Society of London in March 1951 (a high honour).

The collected works of Turing, including a substantial amount of unpublished material, will comprise four volumes: Mechanical Intelligence, Pure Mathematics, Morphogenesis and Mathematical Logic. Alan Mathison Turing (1912-1954) was a brilliant man who made major contributions in several areas of science. Today his name is mentioned frequently in philosophical discussions about the nature of Artificial Intelligence. Actually, he was a pioneer researcher in computer architecture and software engineering; his work in pure mathematics and mathematical logic extended considerably further and his last work, on morphogenesis in plants, is also acknowledged as being of the greatest originality and of permanent importance. He was one of the leading figures in Twentieth-century science, a fact which would have been known to the general public sooner but for the British Official Secrets Act, which prevented discussion of his wartime work. What is maybe surprising about these papers is that although they were written decades ago, they address major issues which concern researchers today.

Turing's famous 1936 paper introduced a formal definition of a computing machine, a Turing machine. This model led to both the development of actual computers and to computability theory, the study of what machines can and cannot compute. This book presents classical computability theory from Turing and Post to current results and methods, and their use in studying the information content of algebraic structures, models, and their relation to Peano arithmetic. The author presents the subject as an art to be practiced, and an art in the aesthetic sense of inherent beauty which all mathematicians recognize in their subject. Part I gives a thorough development of the foundations of computability, from the definition of Turing machines up to finite injury priority arguments. Key topics include relative computability, and computably enumerable sets, those which can be effectively listed but not necessarily effectively decided, such as the theorems of Peano arithmetic. Part II includes the study of computably open and closed sets of reals and basis and nonbasis theorems for effectively closed sets. Part III covers minimal Turing degrees. Part IV is an introduction to games and their use in proving theorems. Finally, Part V offers a short history of computability theory. The author has honed the content over decades according to feedback from students, lecturers, and researchers around the world. Most chapters include exercises, and the material is carefully structured according to importance and difficulty. The book is suitable for advanced undergraduate and graduate students in computer science and mathematics and researchers engaged with computability and mathematical logic.

Europa Turing

a better approacg to computer programming

Concise Guide to Computation Theory

Parsing the Turing Test

Mechanical Intelligence

The Princeton Thesis

The Essential Turing

Artificial Intelligence is no longer the stuff of science fiction. Half a century of research has resulted in machines capable of beating the best human chess players, and humanoid robots which are able to walk and interact with us. But how similar is this 'intelligence' to our own? Can machines really think? Is the mind just a complicated computer program? Addressing major issues in the design of intelligent machines, such as consciousness and environment, and covering everything from the influential groundwork of Alan Turing to the cutting-edge robots of today, Introducing Artificial Intelligence is a uniquely accessible illustrated introduction to this fascinating area of science.

An introduction to the principles and design of molecular computers.

An exhaustive work that represents a landmark exploration of both the philosophical and methodological issues surrounding the search for true artificial intelligence. Distinguished psychologists, computer scientists, philosophers, and programmers from around the world debate weighty issues such as whether a self-conscious computer would create an internet 'world mind'. This hugely important volume explores nothing less than the future of the human race itself.

A concise but informative overview of AI ethics and policy. Artificial intelligence, or AI for short, has generated a staggering amount of hype in the past several years. Is it the game-changer it's been cracked up to be? If so, how is it changing the game? How is it likely to affect us as customers, tenants, aspiring home-owners, students, educators, patients, clients, prison inmates, members of ethnic and sexual minorities, voters in liberal democracies? This book offers a concise overview of moral, political, legal and economic implications of AI. It covers the basics of AI's latest permutation, machine learning, and considers issues including transparency, bias, liability, privacy, and regulation.

Turing 100

The Dawn of Software Engineering

Museums and Digital Culture

Photography from the Turin Shroud to the Turing Machine

Guide Automovile D´Europe

Pioneer of the Information Age

Verbal Behavior as the Hallmark of Intelligence

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 – the logicians. The story begins with Leibniz in the 17th century and then focuses on Boole, Frege, Cantor, Hilbert, and Gödel, before turning to Turing. Turing ' s analysis of algorithmic processes led to a single, all-purpose machine that could be programmed to carry out such processes—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.

Alan Turing has long proved a subject of fascination, but following the centenary of his birth in 2012, the code-breaker, computer pioneer, mathematician (and much more) has become even more celebrated with much media coverage, and several meetings, conferences and books raising public awareness of Turing's life and work. This volume will bring together contributions from some of the leading experts on Alan Turing to create a comprehensive guide to Turing that will serve as a useful resource for researchers in the area as well as the increasingly interested general reader. The book will cover aspects of Turing's life and the wide range of his intellectual activities, including mathematics, code-breaking, computer science, logic, artificial intelligence and mathematical biology, as well as his subsequent influence.

This is the first book-length presentation and defense of a new theory of human and machine cognition, according to which human persons are superminds. Superminds are capable of processing information not only at and below the level of Turing machines (standard computers), but above that level (the "Turing Limit"), as information processing devices that have not yet been (and perhaps can never be) built, but have been mathematically specified; these devices are known as super-Turing machines or hypercomputers. Superminds, as explained herein, also have properties no machine, whether above or below the Turing Limit, can have. The present book is the third and pivotal volume in Bringsjord's supermind quartet; the first two books were What Robots Can and Can't Be (Kluwer) and AI and Literary Creativity (Lawrence Erlbaum). The final chapter of this book offers eight prescriptions for the concrete practice of AI and cognitive science in light of the fact that we are superminds.

A NEW YORK TIMES BESTSELLER The official book behind the Academy Award-winning film The Imitation Game, starring Benedict Cumberbatch and Keira Knightley It is only a slight exaggeration to say that the British mathematician Alan Turing (1912-1954) saved the Allies from the Nazis, invented the computer and artificial intelligence, and anticipated gay liberation by decades--all before his suicide at age forty-one. This New York Times–bestselling biography of the founder of computer science, with a new preface by the author that addresses Turing's royal pardon in 2013, is the definitive account of an extraordinary mind and life. Capturing both the inner and outer drama of Turing ' s life, Andrew Hodges tells how Turing ' s revolutionary idea of 1936--the concept of a universal machine--laid the foundation for the modern computer and how Turing brought the idea to practical realization in 1945 with his electronic design. The book also tells how this work was directly related to Turing ' s leading role in breaking the German Enigma ciphers during World War II, a scientific triumph that was critical to Allied victory in the Atlantic. At the same time, this is the tragic account of a man who, despite his wartime service, was eventually arrested, stripped of his security clearance, and forced to undergo a humiliating treatment program--all for trying to live honestly in a society that defined homosexuality as a crime. The inspiration for a major motion picture starring Benedict Cumberbatch and Keira Knightley, Alan Turing: The Enigma is a gripping story of mathematics, computers, cryptography, and homosexual persecution.

The Oxford Handbook of Philosophy of Cognitive Science

An Activity-Based Approach

Turing

A Guided Tour Through Alan Turing's Historic Paper on Computability and the Turing Machine

Centenary Edition

Molecular Computing

Speaking Minds

Can machines really think? Is the mind just a complicated computer program? This book focuses on the major issues behind one of the hardest scientific problems ever undertaken, from Alan Turing's influential groundwork to cutting-edge robotics and the new AI.

Historical and contemporary papers on the philosophical issues raised by the Turing Test as a criterion for intelligence. The Turing Test is part of the vocabulary of popular culture—it has appeared in works ranging from the Broadway play "Breaking the Code" to the comic strip "Robotman." The writings collected by Stuart Shieber for this book examine the profound philosophical issues surrounding the Turing Test as a criterion for intelligence. Alan Turing's idea, originally expressed in a 1950 paper titled "Computing Machinery and Intelligence" and published in the journal Mind, proposed an "indistinguishability test" that con Descartes's dictum that it is the ability to speak that distinguishes human from beast, Turing proposed to test whether machine and person were indistinguishable in regard to verbal ability. He was not, as is often assumed, answering the question "Can machines think?" but proposing a more concrete way to ask it. Turing's proposed thought experiment encapsulates the issues that the writings in The Turing Test define and discuss. The first section of the book contains writings by philosophical precursors, including Descartes, who first proposed the idea of indistinguishability tests. The second section contains all of Turing's v Mind paper but also less familiar ephemeral material. The final section opens with responses to Turing's paper published in Mind soon after it first appeared. The bulk of this section, however, consists of papers from a broad spectrum of scholars in the field that directly address the issue of the Turing Test as a test for intelligence. Contributors John R. Searle, Ned Block, Daniel C. Dennett, and Noam Chomsky (in a previously unpublished paper). Each chapter is introduced by background material that can also be read as a self-contained essay on the Turing Test

This volume offers an overview of the philosophy of cognitive science that balances breadth and depth, with chapters covering every aspect of the psychology and cognitive anthropology.

A facsimile edition of Alan Turing's influential Princeton thesis Between inventing the concept of a universal computer in 1936 and breaking the German Enigma code during World War II, Alan Turing (1912–1954), the British founder of computer science and artificial intelligence, came to Princeton University to study mathematical logic. Some of the greatest logicians in the world—including Alonzo Church, Kurt Gödel, John von Neumann, and Stephen Kleene—were at Princeton in the 1930s, and they were working on ideas that would lay the groundwork for what would become known as computer science. This book presen fascinating and influential 1938 Princeton PhD thesis, one of the key documents in the history of mathematics and computer science. The book also features essays by Andrew Appel and Solomon Feferman that explain the still-unfolding significance of the ideas Turing developed at Princeton. A work of philosophy as well as mathematics, Turing's thesis envisions a practical goal—a logical system to formalize mathematical proofs so they can be checked mechanically. If every step of a theorem could be verified mechanically, the burden on intuition would be limited to the axioms. Turing's point, as Appel writes, is that "matha in mechanizable formal logic." Turing's vision of "constructive systems of logic for practical use" has become reality: in the twenty-first century, automated "formal methods" are now routine. Presented here in its original form, this fascinating thesis is one of the key documents in the history of mathematics and computer science.

Superminds

A Citizen's Guide to Artificial Intelligence

The Book That Inspired the Film The Imitation Game - Updated Edition

Alan Turing Decoded

Theory and Applications

Introducing Artificial Intelligence

The Spirit of Computing

Few developments in the intellectual life of the past quarter-century have provoked more controversy than the attempt to engineer human-like intelligence by artificial means. Born of computer science, this effort has sparked a continuing debate among the psychologists, neuroscientists, philosophers,and linguists who have pioneered--and criticized--artificial intelligence. Are there general principles, as some computer scientists had originally hoped, that would fully describe the activity of both animal and machine minds, just as aerodynamics accounts for the flight of birds and airplanes? In the twenty substantial interviews published here, leading researchers address this and other vexing questions in the field of cognitive science. The interviewees include Patricia Smith Churchland (Take It Apart and See How It Runs), Paul M. Churchland (Neural Networks and Commonsense), Aaron V. Cicourel (Cognition and Cultural Belief), Daniel C. Dennett (In Defense of AI), Hubert L. Dreyfus (Cognitivism Abandoned), Jerry A. Fodor (The Folly of Simulation), John Haugeland (Farewell to GOFAI?), George Lakoff (Embodied Minds and Meanings), James L. McClelland (Toward a Pragmatic Connectionism), Allen Newell (The Serial Imperative), Stephen E. Palmer (Gestalt Psychology Redux), Hilary Putnam (Against the New Associationism), David E. Rumelhart (From Searching to Seeing), John R. Searle (Ontology Is the Question), Terrence J. Sejnowski (The Hardware Really Matters), Herbert A. Simon (Technology Is Not the Problem), Joseph Weizenbaum (The Myth of the Last Metaphor), Robert Wilensky (Why Play the Philosophy Game?), Terry A.Winograd (Computers and Social Values), and Lotfi A. Zadeh (The Albatross of Classical Logic). Speaking Minds can complement more traditional textbooks but can also stand alone as an introduction to the field. Originally published in 1995. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

How did computers take over the world? In late 1945, a small group of brilliant engineers and mathematicians gathered at the newly created Institute for Advanced Study in Princeton, New Jersey. Their ostensible goal was to build a computer which would be instrumental in the US government's race to create a hydrogen bomb. The mathematicians themselves, however, saw their project as the realization of Alan Turing's theoretical 'universal machine.' In Turing's Cathedral, George Dyson vividly re-creates the intense experimentation, incredible mathematical insight and pure creative genius that led to the dawn of the digital universe, uncovering a wealth of new material to bring a human story of extraordinary men and women and their ideas to life. From the lowliest iPhone app to Google's sprawling metazoan codes, we now live in a world of self-replicating numbers and self-reproducing machines whose origins go back to a 5-kilobyte matrix that still holds clues as to what may lie ahead.

Award winning authors Jim Ottaviani and Leland Purvis present a historically accurate graphic novel biography of English mathematician and scientist Alan Turing in The Imitation Game. English mathematician and scientist Alan Turing (1912-1954) is credited with many of the foundational principles of contemporary computer science. The Imitation Game presents a historically accurate graphic novel biography of Turing's life, including his groundbreaking work on the fundamentals of cryptography and artificial intelligence. His code breaking efforts led to the cracking of the German Enigma during World War II, work that saved countless lives and accelerated the Allied defeat of the Nazis. While Turing's achievements remain relevant decades after his death, the story of his life in post-war Europe continues to fascinate audiences today. Award-winning duo Jim Ottaviani (the #1 New York Times bestselling author of Feynman and Primates) and artist Leland Purvis (an Eisner and Ignatz Award nominee and occasional reviewer for the Comics Journal) present a factually detailed account of Turing's life and groundbreaking research--as an unconventional genius who was arrested, tried, convicted, and punished for his openly gay lifestyle, and whose innovative work still fuels the computing and communication systems that define our modern world. Computer science buffs, comics fans, and history aficionados will be captivated by this riveting and tragic story of one of the 20th century's most unsung heroes.

The mathematical genius Alan Turing, now well known for his crucial wartime role in breaking the ENIGMA code, was the first to conceive of the fundamental principle of the modern computer-the idea of controlling a computing machine's operations by means of a program of coded instructions, stored in the machine's 'memory'. In 1945 Turing drew up his revolutionary design for an electronic computing machine-his Automatic Computing Engine ('ACE'). A pilot model of the ACE ran its first program in 1950 and the production version, the 'DEUCE', went on to become a cornerstone of the fledgling British computer industry. The first 'personal' computer was based on Turing's ACE. Alan Turing's Automatic Computing Engine describes Turing's struggle to build the modern computer. The first detailed history of Turing's contributions to computer science, this text is essential reading for anyone interested in the history of the computer and the history of mathematics. It contains first hand accounts by Turing and by the pioneers of computing who worked with him. As well as relating the story of the invention of the computer, the book clearly describes the hardware and software of the ACE-including the very first computer programs. The book is intended to be accessible to everyone with an interest in computing, and contains numerous diagrams and illustrations as well as original photographs. The book contains chapters describing Turing's path-breaking research in the fields of Artificial Intelligence (AI) and Artificial Life (A-Life). The book has an extensive system of hyperlinks to The Turing Archive for the History of Computing, an on-line library of digital facsimiles of typewritten documents by Turing and the other scientists who pioneered the electronic computer.

New Directions

The Universal Computer

What Can Be Computed?

Computationalism

The Struggle to Build the ACE, the World's Fastest Computer

Speak

Human-Like Machine Intelligence

Chapters "Turing and Free Will: A New Take on an Old Debate" and "Turing and the History of Computer Music" are available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

This textbook presents a thorough foundation to the theory of computation. Combining intuitive descriptions and illustrations with rigorous arguments and detailed proofs for key topics, the logically structured discussion guides the reader through the core concepts of automata and languages, computability, and complexity of computation. Topics and features: presents a detailed introduction to the theory of computation, complete with concise explanations of the mathematical prerequisites; provides end-of-chapter problems with solutions, in addition to chapter-opening summaries and numerous examples and definitions throughout the text; draws upon the author's extensive teaching experience and broad research interests; discusses finite automata, context-free languages, and pushdown automata; examines the concept, universality and limitations of the Turing machine; investigates computational complexity based on Turing machines and Boolean circuits, as well as the notion of NP-completeness.

This Guide provides an ambitious state-of-the-art survey of the fundamental themes, problems, arguments and theories constituting the philosophy of computing. A complete guide to the philosophy of computing and information. Comprises 26 newly-written chapters by leading international experts. Provides a complete, critical introduction to the field. Each chapter combines careful scholarship with an engaging writing style. Includes an exhaustive glossary of technical terms. Ideal as a course text, but also of interest to researchers and general readers.

Alan Turing's fundamental contributions to computing led to the development of modern computing technology, and his work continues to inspire researchers in computing science and beyond. This book is the definitive collection of commemorative essays, and the distinguished contributors have expertise in such diverse fields as artificial intelligence, natural computing, mathematics, physics, cryptology, cognitive studies, philosophy and anthropology. The volume spans the entire rich spectrum of Turing's life, research work and legacy. New light is shed on the future of computing science by visionary Ray Kurzweil. Notable contributions come from the philosopher Daniel Dennett, the Turing biographer Andrew Hodges, and the distinguished logician Martin Davis, who provides a first critical essay on an emerging and controversial field termed hypercomputation. A special feature of the book is the play by Valeria Patera which tackles the scandal surrounding the last apple, and presents as an enigma the life, death and destiny of the man who did so much to decipher the Enigma code during the Second World War. Other chapters are modern reappraisals of Turing's work on computability, and deal with the major philosophical questions raised by the Turing Test, while the book also contains essays addressing his less well-known ideas on Fibonacci phyllotaxis and connectionism.

Alan Turing's Systems of Logic

A Graphic Guide

Alan Turing: The Enigma

Alan Turing's Electronic Brain

The Origins of the Digital Universe

Alan Turing: His Work and Impact

Turing's Cathedral

This book introduces two conceptual models of photography: the Turin Shroud and the universal Turing machine. The Turin Shroud inspires a discussion on photography's frequently acclaimed 'ontological privilege', which has conditioned an understanding of photography as a sui generis breed of images wherein pictorial representation is coextensive with human vision. This is then contrasted with a discussion of the universal Turing machine, which integrates photography into a framework of media philosophy and algorithmic art. Here, photography becomes more than just the present-day sum of its depiction traditions, devices and dissemination networks. Rather, it is archetypical of multiple systems of abstraction and classification, and various other symbolic processes of transformation.

She cannot run. She cannot walk. She cannot even blink. As her batteries run down for the final time, all she can do is speak. Will you listen? From a pilgrim girl's diary, to a traumatised child talking to a software program; from Alan Turing's conviction in the 1950s, to a genius imprisoned in 2040 for creating illegally lifelike dolls: all these lives have shaped and changed a single artificial intelligence - MARY3. In Speak she tells you their story, and her own. It is the last story she will ever tell, spoken both in celebration and in warning. When machines learn to speak, who decides what it means to be human? 'TRANSFIXING' New York Times 'BRILLIANT' Huffington Post 'INCREDIBLE' Buzzfeed 'HYPNOTIC' Guardian 'A MASTERPIECE' NPR

Discrete Structure, Logic, and Computability introduces the beginning computer science student to some of the fundamental ideas and techniques used by computer scientists today, focusing on discrete structures, logic, and computability. The emphasis is on the computational aspects, so that the reader can see how the concepts are actually used. Because of logic's fundamental importance to computer science, the topic is examined extensively in three phases that cover informal logic, the technique of inductive proof; and formal logic and its applications to computer science.

In this 2013 winner of the prestigious R.R. Hawkins Award from the Association of American Publishers, as well as the 2013 PROSE Awards for Mathematics and Best in Physical Sciences & Mathematics, also from the AAP, readers will find many of the most significant contributions from the four-volume set of the Collected Works of A. M. Turing. These contributions, together with commentaries from current experts in a wide spectrum of fields and backgrounds, provide insight on the significance and contemporary impact of Alan Turing's work. Offering a more modern perspective than anything currently available, Alan Turing: His Work and Impact gives wide coverage of the many ways in which Turing's scientific endeavors have impacted current research and understanding of the world. His pivotal writings on subjects including computing, artificial intelligence, cryptography, morphogenesis, and more display continued relevance and insight into today's scientific and technological landscape. This collection provides a great service to researchers, but is also an approachable entry point for readers with limited training in the science, but an urge to learn more about the details of Turing's work. 2013 winner of the prestigious R.R. Hawkins Award from the Association of American Publishers, as well as the 2013 PROSE Awards for Mathematics and Best in Physical Sciences & Mathematics, also from the AAP Named a 2013 Notable Computer Book in Computing Milieux by Computing Reviews Affordable, key collection of the most significant papers by A.M. Turing Commentary explaining the significance of each seminal paper by preeminent leaders in the field Additional resources available online

The Rough Guide to Turkey

From Turing to Dijkstra

Discrete Structures, Logic, and Computability

People Harness Hypercomputation, and More

A Practical Guide to the Theory of Computation

Turing

The Turing Guide

This book, authored by an array of internationally recognised researchers, is of direct relevance to all those involved in Academia and Industry wanting to obtain insights into the topics at the forefront of the revolution in Artificial Intelligence and Cognitive Science.