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KEY=THE - CAMILA SCHMIDT

The Turing Guide

Oxford University Press *This carefully edited resource brings together contributions from some of the world's leading experts on Alan Turing to create a comprehensive guide that will serve as a useful resource for researchers in the area as well as the increasingly interested general reader.*

The Turing Guide

Oxford University Press *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.*

The Essential Turing

Clarendon Press *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).

Alan Turing: Life and Legacy of a Great Thinker

Springer Science & Business Media *Written by a distinguished cast of contributors, Alan Turing: Life and Legacy of a Great Thinker is the definitive collection of essays in commemoration of the 90th birthday of Alan Turing. This fascinating text covers the rich facets of his life, thoughts, and legacy, but also sheds some light on the future of computing science with a chapter contributed by visionary Ray Kurzweil, winner of the 1999 National Medal of Technology. Further, important contributions come from the philosopher Daniel Dennett, the Turing biographer Andrew Hodges, and from the distinguished logician Martin Davis, who provides a first critical essay on an emerging and controversial field termed "hypercomputation".*

The Turing Test

Verbal Behavior as the Hallmark of Intelligence

MIT Press *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 compared artifact and person. Following 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 indistinguishablity tests. The second section contains all of Turing's writings on the Turing Test, including not only the 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*

Alan Turing's Systems of Logic

The Princeton Thesis

<u>Princeton University Press</u> *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 presents a facsimile of the original typescript of Turing's 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 "mathematical reasoning can be done, and should be done, 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.*

The Universal Computer

The Road from Leibniz to Turing

<u>CRC Press</u> *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.

Turing's Cathedral

The Origins of the Digital Universe

<u>Vintage</u> *Presents the history of the invention of computers, describing the collaboration of John von Neumann and his colleagues as they worked together to create the first computer, an event which led to the hydrogen bomb and the birth of the digital age.*

Turing

Pioneer of the Information Age

<u>Oxford University Press</u> *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.*

Concise Guide to Computation Theory

<u>Springer Science & Business Media</u> *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.

The Turing Option

Tor Books *Turing Option is written by Harry Harrison who is also the author of Deathworld, Make Room! Make Room! (filmed as Soylent Green), the popular Stainless Steel Rat books, and many other famous works of SF. At the Publisher's request, this title is being sold without Digital Rights Management Software (DRM) applied.*

Alan Turing's Manchester

The History Press *Alan Turing is a patron saint of Manchester, remembered as the Mancunian who won the war, invented the computer, and was all but put to death for being gay. Each myth is related to a historical story. This is not a book about the first of those stories, of Turing at Bletchley Park. But it is about the second two, which each unfolded here in Manchester, of Turing's involvement in the world's first computer and of his refusal to be cowed about his sexuality. Manchester can be proud of Turing, but can we be proud of the city he encountered?*

Alan Turing: Life and Legacy of a Great Thinker

Springer Science & Business Media *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.*

Turing Tutorial Guide

Artificial Intelligence

A Guide for Thinking Humans

<u>Farrar, Straus and Giroux</u> *Melanie Mitchell separates science fact from science fiction in this sweeping examination of the current state of AI and how it is remaking our world No recent scientific enterprise has proved as alluring, terrifying, and filled with extravagant promise and frustrating setbacks as artificial intelligence. The award-winning author Melanie Mitchell, a leading computer scientist, now reveals AI's turbulent history and the recent spate of apparent successes, grand hopes, and emerging fears surrounding it. In Artificial Intelligence, Mitchell turns to the most urgent questions concerning AI today: How intelligent—really—are the best AI programs? How do they work? What can they actually do, and when do they fail? How humanlike do we expect them to become, and how soon do we need to worry about them surpassing us? Along the way, she introduces the dominant models of modern AI and machine learning, describing cutting-edge AI programs, their human inventors, and the historical lines of thought underpinning recent achievements. She meets with fellow experts such as Douglas Hofstadter, the cognitive scientist and Pulitzer Prize–winning author of the modern classic Gödel, Escher, Bach, who explains why he is "terrified" about the future of AI. She explores the profound disconnect between the hype and the actual achievements in AI, providing a clear sense of what the field has accomplished and how much further it has to go. Interweaving stories about the science of AI and the people behind it, Artificial Intelligence brims with clear-sighted, captivating, and accessible accounts of the most interesting and provocative modern work in the field, flavored with Mitchell's humor and personal observations. This frank, lively book is an indispensable guide to understanding today's AI, its quest for "human-level" intelligence, and its impact on the future for us all.*

Alan Turing: The Enigma

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

<u>Princeton University Press</u> *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.

A Citizen's Guide to Artificial Intelligence

MIT Press *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.*

Alan M. Turing

Centenary Edition

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

Turing Computability

Theory and Applications

Springer *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.*

The Routledge Handbook of the Computational Mind

Routledge *Computational approaches dominate contemporary cognitive science, promising a unified, scientific explanation of how the mind works. However, computational approaches raise major philosophical and scientific questions. In what sense is the mind computational? How do computational approaches explain perception, learning, and decision making? What kinds of challenges should computational approaches overcome to advance our understanding of mind, brain, and behaviour? The Routledge Handbook of the Computational Mind is an outstanding overview and exploration of these issues and the first philosophical collection of its kind. Comprising thirty-five chapters by an international team of contributors from different disciplines, the Handbook is organised into four parts: History and future prospects of computational approaches Types of computational approach Foundations and challenges of computational approaches Applications to specific parts of psychology. Essential reading for students and researchers in philosophy of mind, philosophy of psychology, and philosophy of science, The Routledge Handbook of the Computational Mind will also be of interest to those studying computational models in related subjects such as psychology, neuroscience, and computer science.*

Philosophical Explorations of the Legacy of Alan Turing

Turing 100

Tuning

a better approacg to computer programming

Alan Turing and the Power of Curiosity

Sourcebooks, Inc. *Meet Alan Turing. Famous mathematician, cryptographer, and...superhero! This next book in the My Super Science Heroes series shares the amazing story of Alan Turing and how he used his astonishing superpower of curiosity to overcome obstacles and solve problems. This series is scientifically vetted and promoted by the Marie Curie Alumni Association, which promotes the worldwide advancement of knowledge. One sunny day in June 1912, a new super science hero was born. He hadn't figured out he was a super science hero; though everyone else around him was pretty sure about this early on. His name was Alan Turing. Super Evil Nemesis decides to call on his minion Ms. Deception to confound and confuse Alan—but because Alan likes working on puzzles, he's not easy to defeat... The minion in this book will speak in code (which will read like nonsense). As the story progresses, Alan will crack the code on Ms. D's enigma machine and be able to decipher her speech, which is how he befriends her. At the end of the book, we will provide a decryption key that allows the children to decipher what the minion is saying in earlier pages. This is the AMAZING (mostly) true story of how Alan Turing had a superpower that helped him become a successful scientist. But, of course, the super power is really something we all have inside of us.*

What Can Be Computed?

A Practical Guide to the Theory of Computation

<u>Princeton University Press</u> *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*

Alan Turing: His Work and Impact

<u>Elsevier</u> *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 Annotated Turing

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

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

The Imitation Game

Alan Turing Decoded

Abrams ComicArts *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.

Human-Like Machine Intelligence

<u>Oxford University Press</u> *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.*

Black Hole Survival Guide

<u>Anchor</u> *From the acclaimed author of Black Hole Blues and Other Songs from Outer Space—an authoritative and accessible guide to the most alluring and challenging phenomena of contemporary science. "[Levin will] take you on a safe black hole trip, an exciting travel story enjoyed from your chair's event horizon." —Boston Globe Through her writing, astrophysicist Janna Levin has focused on making the science she studies not just comprehensible but also, and perhaps more important, intriguing to the nonscientist. In this book, she helps us to understand and find delight in the black hole—perhaps the most opaque theoretical construct ever imagined by physicists—illustrated with original artwork by American painter and photographer Lia Halloran. Levin takes us on an evocative exploration of black holes, provoking us to imagine the visceral experience of a black hole encounter. She reveals the influence of black holes as they populate the universe, sculpt galaxies, and even infuse the whole expanse of reality that we inhabit. Lively, engaging, and utterly unique, Black Hole Survival Guide is not just informative—it is, as well, a wonderful read from first to last.*

The Road to Reality

A Complete Guide to the Laws of the Universe

<u>Vintage</u> ***WINNER OF THE 2020 NOBEL PRIZE IN PHYSICS** The Road to Reality is the most important and ambitious work of science for a generation. It provides nothing less than a comprehensive account of the physical universe and the essentials of its underlying mathematical theory. It assumes no particular specialist knowledge on the part of the reader, so that, for example, the early chapters give us*

the vital mathematical background to the physical theories explored later in the book. Roger Penrose's purpose is to describe as clearly as possible our present understanding of the universe and to convey a feeling for its deep beauty and philosophical implications, as well as its intricate logical interconnections. The Road to Reality is rarely less than challenging, but the book is leavened by vivid descriptive passages, as well as hundreds of hand-drawn diagrams. In a single work of colossal scope one of the world's greatest scientists has given us a complete and unrivalled guide to the glories of the universe that we all inhabit. 'Roger Penrose is the most important physicist to work in relativity theory except for Einstein. He is one of the very few people I've met in my life who, without reservation, I call a genius' Lee Smolin

Parsing the Turing Test

Philosophical and Methodological Issues in the Quest for the Thinking Computer

Springer Science & Business Media *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.*

The Blackwell Guide to the Philosophy of Computing and Information

John Wiley & Sons *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.*

Code-Breaker and Mathematician Alan Turing

STEM Trailblazer Bios "*A straightforward biography of famous British mathematician and computer scientist Alan Turing.*"--

A Science of Operations

Machines, Logic and the Invention of Programming

Springer Science & Business Media *Today, computers fulfil a dazzling array of roles, a flexibility resulting from the great range of programs that can be run on them. A Science of Operations examines the history of what we now call programming, defined not simply as computer programming, but more broadly as the definition of the steps involved in computations and other information-processing activities. This unique perspective highlights how the history of programming is distinct from the history of the computer, despite the close relationship between the two in the 20th century. The book also discusses how the development of programming languages is related to disparate fields which attempted to give a mechanical account of language on the one hand, and a linguistic account of machines on the other. Topics and features: Covers the early development of automatic computing, including Babbage's "mechanical calculating engines" and the applications of punched-card technology, examines the theoretical work of mathematical logicians such as Kleene, Church, Post and Turing, and the machines built by Zuse and Aiken in the 1930s and 1940s, discusses the role that logic played in the development of the stored program computer, describes the "standard model" of machine-code programming popularised by Maurice Wilkes, presents the complete table for the universal Turing machine in the Appendices, investigates the rise of the initiatives aimed at developing higher-level programming nota tions, and how these came to be thought of as 'languages' that could be studied independently of a machine, examines the importance of the Algol 60 language, and the framework it provided for studying the design of programming languages and the process of software development and explores the early development of object-oriented languages, with a focus on the Smalltalk project. This fascinating text offers a new viewpoint for historians of science and technology, as well as for the general reader. The historical narrative builds the story in a clear and logical fashion, roughly following chronological order.*

Discrete Structures, Logic, and Computability

Jones & Bartlett Learning *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.*

Introducing Artificial Intelligence

Totem Books *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.*

The Programmer's Guide To Theory: Great Ideas Explained

Computer science, specifically the theory of computation, deserves to be better known even among non-computer scientists. The reason is simply that it is full of profound thoughts and ideas. It contains some paradoxes that reveal the limits of human knowledge. It provides ways to reason about information and randomness that are understandable without the need to resort to abstract math. This is not an academic textbook but could be the precursor to reading an academic textbook. In Programmer's Guide to Theory, you will find the fundamental ideas of computer science explained in an informal and yet informative way. The first chapter sets the scene by outlining the challenges of understanding computational theory. After this the content is divided into three parts. The first explores the question "What is Computable?" introducing the Turing Machine, the Halting Problem and Finite State Machines before going on to consider the different types of computing model that are available and the languages they produce. This part also covers the different types of numbers and of infinities which paves the way for considering the topics of Kolmogorov Complexity and randomness, the Axiom of Choice, Godel's Incompleteness and the Lambda Calculus. Part II switches to lower-level concerns - from bits to Boolean logic covering information theory and error correction along the way. Part III dives deeper into computational complexity, considers polynomial-time versus exponential-time problems and then explores the benefits of recursion. It concludes with a discussion of NP (non-deterministic polynomial) versus P (polynomial) algorithms. Don't be put off by this list of unfamiliar concepts. This book

sets out to lead you from one topic to the next so that the ideas are unfolded gradually. It does cover all the ideas that are fundamental to computer science, plus some that are not normally included but make things easier to understand, but does so in a very approachable, and even entertaining way. Mike James is editor of I-Programmer.info, an online magazine written by programmers for programmers. He has a BSc in Physics, an MSc in Mathematics and a PhD in Computer Science. His programming career spans several generations of computer technology but he keeps his skills completely up to date. As an author he has published dozens of books and hundreds of print articles, a tradition he now continues online.

Math Geek

From Klein Bottles to Chaos Theory, a Guide to the Nerdiest Math Facts, Theorems, and Equations

<u>Simon and Schuster</u> *The new "sine" of mathematical geekdom! Do you dream about long division in your sleep? Does the thought of solving abstruse equations bring a smile to your face? Do you love celebrating pi every March? Then, Math Geek was made for you! With this guide, you'll learn even more about the power of numbers as you explore their brilliant nature in ways you've never imagined. From manhole covers to bubbles to subway maps, each page gives you a glimpse of the world through renowned mathematicians' eyes and reveals how their theorems and equations can be applied to nearly everything you encounter. Covering dozens of your favorite math topics, you'll find fascinating answers to questions like: How are the waiting times for buses determined? Why is Romanesco Broccoli so mesmerizing? How do you divide a cake evenly? Should you run or walk to avoid rain showers? Filled with compelling mathematical explanations, Math Geek sheds light on the incredible world of numbers hidden deep within your day-to-day life.*

Museums and Digital Culture

New Perspectives and Research

<u>Springer</u> *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!

How Long or How Wide?

A Measuring Guide

Lerner Digital ™ Audisee® eBooks with Audio combine professional narration and text highlighting for an engaging read aloud experience! Brian Cleary and Brian Gable bring their trademark sense of humor to the subject of measuring length. A rhyming text filled with funny examples explains how to use and compare metric and U.S. customary units of length. Readers are also introduced to the tools they need to measure length—rulers, metersticks, and more.