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More On Grover S Algorithm Arxiv

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Quantum Walks and Search Algorithms
Quantum Information in Gravitational Fields
Dancing with Qubits
Artificial Neural Nets and Genetic Algorithms
21st International Conference, Krakow, Poland, June 16–18, 2021, Proceedings, Part VI
An Introduction to Quantum Computing
Quantum Computing 218 Success Secrets - 218 Most Asked Questions on Quantum Computing - What You Need to Know
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Post-Quantum Cryptography
An Introduction to Quantum Computing Algorithms
Quantum Computer - Unabridged Guide
How quantum computing works and how it can change the world
Generalization of Quantum Search Algorithm
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Quantum Computation and Quantum Information

More On Grover S Algorithm Arxiv ***OMB No. 8351481674325 edited by***

HOLT CANTU

Quantum Walks and Search Algorithms

Springer
One of the major scientific thrusts in recent years has been to try to harness quantum phenomena to increase dramatically the performance of a wide variety of classical information processing devices. In particular, it is generally accepted that quantum co

Quantum Information in Gravitational Fields

Springer
Quantum computing is on the horizon and you can get started today! This practical, clear-spoken guide shows you don't need a physics degree to write your first quantum software. In Quantum Computing in Action you will learn: An introduction to the core concepts of quantum computing Qubits and quantum gates Superposition, entanglement, and hybrid computing Quantum algorithms including Shor's, Deutsch-jozsa, and Grover's search Quantum Computing in Action shows you how to leverage your existing Java skills into writing your first quantum software, so you're ready for the quantum revolution. This book is focused on practical implementations of quantum computing algorithms—there's no deep math or confusing theory. Using Strange, a Java-based quantum computer simulator, you'll go hands-on with quantum computing's core components including qubits and quantum gates. About the technology Quantum computing promises unimaginably fast performance for tasks like encryption, scientific modeling, manufacturing logistics, financial modeling, and AI. Developers can explore quantum computing now using free simulators, and increasingly powerful true quantum systems are gradually becoming available for production use. This book gives you a head start on quantum computing by introducing core concepts, key algorithms, and the most beneficial use cases. About the book Quantum Computing in Action is a gentle introduction to the ideas and applications of quantum computing. After briefly reviewing the science that makes quantum tick, it guides you through practical implementations of quantum computing algorithms. You'll write your first quantum code and explore qubits and quantum gates with the Java-based Strange quantum simulator. You'll enjoy the interesting examples and insightful explanations as you create quantum algorithms using standard Java and your favorite IDE and build tools. What's inside An introduction to the core concepts of

quantum computing Qubits and quantum gates Superposition, entanglement, and hybrid computing Quantum algorithms including Shor’s, Deutsch-jozsa, and Grover’s search About the reader For Java developers. No advanced math knowledge required. About the author Johan Vos is a cofounder of Gluon, a Java technology company. He is a Java Champion and holds an MSc in Mining Engineering and a PhD in Applied Physics. Table of Contents PART 1 QUANTUM COMPUTING INTRODUCTION 1 Evolution, revolution, or hype? 2 “Hello World,” quantum computing style 3 Qubits and quantum gates: The basic units in quantum computing PART 2 FUNDAMENTAL CONCEPTS AND HOW THEY RELATE TO CODE 4 Superposition 5 Entanglement 6 Quantum networking: The basics PART 3 QUANTUM ALGORITHMS AND CODE 7 Our HelloWorld, explained 8 Secure communication using quantum computing 9 Deutsch-Jozsa algorithm 10 Grover’s search algorithm 11 Shor’s algorithm

Dancing with Qubits

Springer

A breath of fresh Quantum Computer air. A Quantum Computer (also recognized like a quantum supercomputer) is a calculation implement that produces straight employ of quantum-mechanical occurrences, such like superposition and entwinement, to accomplish transactions on information. Quantum Computers are dissimilar as of digital computers founded on transistors. Whereas digital computers need information to be encrypted in to binary numerals (bits), Quantum Computation utilizes quantum assets to constitute information and accomplish transactions on those information. A hypothetical model is the quantum Turing engine, as well recognized like the general Quantum Computer. Quantum Computers share hypothetical resemblances with non-deterministic and likelihood computers. One illustration is the capacity to be in further compared to one state concurrently. The area of Quantum Computing was foremost instituted by Yuri Manin in 1980 and Richard Feynman in 1982. A Quantum Computer with spins as quantum bits was as well devised for employ like a quantum space-time in 1969. There has never been a Quantum Computer Guide like this. It contains 230 answers, much more than you can imagine; comprehensive answers and extensive details and references, with insights that have never before been offered in print. Get the information you need--fast! This all-embracing guide offers a thorough view of key knowledge and detailed insight. This Guide introduces what you want to know about Quantum Computer. A quick look inside of some of the subjects covered: Loss-DiVincenzo quantum computer, Cryptography - Computer era, List of fictional computers - Comics/Graphic Novels, Cryptanalysis - Quantum computing applications for cryptanalysis, Knot theory - History, Commodore 64 - Networking software, One-way quantum computer - Implementations, Grover's algorithm - Applications, Hidden subgroup problem - Motivation, Quantum technology, and much more...

Artificial Neural Nets and Genetic Algorithms

Springer Nature

The revised edition of this book offers an extended overview of quantum walks and explains their role in building quantum algorithms, in particular search algorithms. Updated throughout, the book focuses on core topics including Grover's algorithm and the most important quantum walk models, such as the coined, continuous-time, and Szedgedy's quantum walk models. There is a new chapter describing the staggered quantum walk model. The chapter on spatial search algorithms has been rewritten to offer a more comprehensive approach and a new chapter describing the element distinctness algorithm has been added. There is a new appendix on graph theory highlighting the importance of graph theory to quantum walks. As before, the reader will benefit from the pedagogical elements of the book, which include exercises and references to deepen the reader's understanding, and guidelines for the use of computer programs to simulate the evolution of quantum walks. Review of the first edition: “The book is nicely written, the concepts are introduced naturally, and many meaningful connections between them are highlighted. The author proposes a series of exercises that help the reader get some working experience with the presented concepts, facilitating a better understanding. Each chapter ends with a discussion of further references, pointing the reader to major results on the topics presented in the respective chapter.” - Florin Manea, zbMATH.

21st International Conference, Krakow, Poland, June 16–18, 2021, Proceedings, Part VI
American Mathematical Soc.
This book is a timely report of the state-of-the-art analytical techniques in the domain of quantum algorithms related to Boolean functions. It bridges the gap between recent developments in the area and the hands-on analysis of the spectral properties of Boolean functions from a cryptologic viewpoint. Topics covered in the book include Qubit, Deutsch–Jozsa and Walsh spectrum, Grover’s algorithm, Simon’s algorithm and autocorrelation spectrum. The book aims at encouraging readers to design and implement practical algorithms related to Boolean functions. Apart from combinatorial techniques, this book considers implementing related programs in a quantum computer. Researchers, practitioners and educators will find this book valuable.

An Introduction to Quantum Computing
Springer Science & Business Media
Learn Quantum Computing with Python and Q# introduces quantum computing from a practical perspective. Summary Learn Quantum Computing with Python and Q# demystifies quantum computing. Using Python and the new quantum programming language Q#, you’ll build your own quantum simulator and apply quantum programming techniques to real-world examples including cryptography and chemical analysis. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Quantum computers present a radical leap in speed and computing power. Improved scientific simulations and new frontiers in cryptography that are impossible with classical computing may

soon be in reach. Microsoft’s Quantum Development Kit and the Q# language give you the tools to experiment with quantum computing without knowing advanced math or theoretical physics. About the book Learn Quantum Computing with Python and Q# introduces quantum computing from a practical perspective. Use Python to build your own quantum simulator and take advantage of Microsoft’s open source tools to fine-tune quantum algorithms. The authors explain complex math and theory through stories, visuals, and games. You’ll learn to apply quantum to real-world applications, such as sending secret messages and solving chemistry problems. What's inside The underlying mechanics of quantum computers Simulating qubits in Python Exploring quantum algorithms with Q# Applying quantum computing to chemistry, arithmetic, and data About the reader For software developers. No prior experience with quantum computing required. About the author Dr. Sarah Kaiser works at the Unitary Fund, a non-profit organization supporting the quantum open-source ecosystem, and is an expert in building quantum tech in the lab. Dr. Christopher Granade works in the Quantum Systems group at Microsoft, and is an expert in characterizing quantum devices. Table of Contents PART 1 GETTING STARTED WITH QUANTUM 1 Introducing quantum computing 2 Qubits: The building blocks 3 Sharing secrets with quantum key distribution 4 Nonlocal games: Working with multiple qubits 5 Nonlocal games: Implementing a multi-qubit simulator 6 Teleportation and entanglement: Moving quantum data around PART 2 PROGRAMMING QUANTUM ALGORITHMS IN Q# 7 Changing the odds: An introduction to Q# 8 What is a quantum algorithm? 9 Quantum sensing: It’s not just a phase PART 3 APPLIED QUANTUM COMPUTING 10 Solving chemistry problems with quantum computers 11 Searching with quantum computers 12 Arithmetic with quantum computers

Quantum Computing 218 Success Secrets - 218 Most Asked Questions on Quantum Computing - What You Need to Know

MIT Press

Understand the nuances of programming traditional quantum computers and solve the challenges of the future while building and executing quantum programs on IBM Quantum hardware and simulators Key Features Work your way up from writing a simple quantum program to programming complex quantum algorithms Explore the probabilistic nature of qubits by performing quantum coin tosses and using random number generators Delve into quantum algorithms and their practical applications in various domains Long Description IBM Quantum Experience(R) is a leading platform for programming quantum computers and implementing quantum solutions directly on the cloud. This book will help you get up to speed with programming quantum computers and provide solutions to the most common problems and challenges. You'll start with a high-level overview of IBM Quantum Experience(R) and Qiskit(R), where you will perform the installation while writing some basic quantum programs. This introduction puts less emphasis on the theoretical framework and more emphasis on recent developments such as Shor's algorithm and Grover's algorithm. Next, you'll delve into Qiskit(R), a quantum information science toolkit, and its constituent packages such as Terra, Aer, Ignis, and Aqua. You'll cover these packages in detail, exploring their benefits and use cases. Later, you'll discover various quantum gates that Qiskit(R) offers and even deconstruct a quantum program with their help, before going on to compare Noisy Intermediate-Scale Quantum (NISQ) and Universal Fault-Tolerant quantum computing using simulators and actual hardware. Finally, you'll explore quantum algorithms and understand how they differ from classical algorithms, along with learning how to use pre-packaged algorithms in Qiskit(R) Aqua. By the end of this quantum computing book, you'll be able to build and execute your own quantum programs using IBM Quantum Experience(R) and Qiskit(R) with Python. What You Will Learn Visualize a qubit in Python and understand the concept of superposition Install a local Qiskit(R) simulator and connect to actual quantum hardware Compose quantum programs at the level of circuits using Qiskit(R) Terra Compare and contrast Noisy Intermediate-Scale Quantum computing (NISQ) and Universal Fault-Tolerant quantum computing using simulators and IBM Quantum(R) hardware Mitigate noise in quantum circuits and systems using Qiskit(R) Ignis Understand the difference between classical and quantum algorithms by implementing Grover's algorithm in Qiskit(R) Who this book is for This book is for developers, data scientists, machine learning researchers, or quantum computing enthusiasts who want to understand how to use IBM Quantum Experience(R) and Qiskit(R) to implement quantum solutions and gain practical quantum computing experience. Python programming experience is a must to grasp the concepts covered in the book more effectively. Basic knowledge of quantum computing will also be beneficial.

Classical and Quantum Computation

Springer

This book is about quantum computing and quantum algorithms. The book starts with a chapter introducing the basic rules of quantum mechanics and how they can be used to build quantum circuits and perform computations. Further, Grover's algorithm is presented for unstructured search discussing its consequences and applications. Next, important techniques are discussed such as Quantum Fourier Transform and quantum phase estimation. Finally, Shor's algorithm for integer factorization is explained. At last, quantum walks are explained in detail covering both the discrete and continuous time models,and applications of this techniques are described for the design and analyses of quantum algorithms.

Quantum Detection and Estimation Theory

Tebbo

Write algorithms and program in the new field of quantum computing. This book covers major topics such as the physical components of a quantum computer: qubits, entanglement, logic gates, circuits, and how they differ from a traditional computer. Also, Practical Quantum Computing for Developers discusses quantum computing in the cloud using IBM Q Experience including: the composer, quantum scores, experiments, circuits, simulators, real quantum devices, and more. You'll be able to run experiments in the cloud on a real quantum device. Furthermore, this book shows you how to do quantum programming using the QISKit (Quantum Information Software Kit), Python SDK, and other APIs such as QASM (Quantum Assembly). You'll learn to write code using these languages and execute it against simulators (local or remote) or a real quantum computer provided by IBM's Q Experience. Finally, you'll learn the current quantum algorithms for entanglement, random number generation, linear search, integer factorization, and others. You'll peak inside the inner workings of the Bell states for entanglement, Grover's algorithm for linear search, Shor's algorithm for integer factorization, and other algorithms in the fields of optimization, and more. Along the way you'll also cover game theory with the Magic Square, an example of quantum pseudo-telepathy where parties sharing entangled states can be observed to have some kind of communication between them. In this game Alice and Bob play against a referee. Quantum mechanics allows Alice and Bob to always win! By the end of this book, you will understand how this emerging technology provides massive parallelism and significant computational speedups over classical computers, and will be prepared to program quantum computers which are expected to replace traditional computers in the data center. What You Will Learn Use the Q Experience Composer, the first-of-its-kind web console to create visual programs/experiments and submit them to a quantum simulator or real device on the cloud Run programs remotely using the Q Experience REST API Write algorithms that provide superior performance over their classical counterparts Build a Node.js REST client for authenticating, listing remote devices, querying information about quantum processors, and listing or running experiments remotely in the cloud Create a quantum number generator: The quintessential coin flip with a quantum twist Discover quantum teleportation: This algorithm demonstrates how the exact state of a qubit (quantum information) can be transmitted from one location to another, with the help of classical communication and quantum entanglement between the sender and receiver Peek into single qubit operations with the classic game of Battleships with a quantum twist Handle the counterfeit coin problem: a classic puzzle that consists of finding a counterfeit coin in a beam balance among eight coins in only two turns Who This Book Is For Developers and programmers interested in this new field of computing.

A Gentle Introduction

Universal-Publishers

The six-volume set LNCS 12742, 12743, 12744, 12745, 12746, and 12747 constitutes the proceedings of the 21st International Conference on Computational Science, ICCS 2021, held in Krakow, Poland, in June 2021.* The total of 260 full papers and 57 short papers presented in this book set were carefully reviewed and selected from 635 submissions. 48 full and 14 short papers were accepted to the main track from 156 submissions; 212 full and 43 short papers were accepted to the workshops/ thematic tracks from 479 submissions. The papers were organized in topical sections named: Part I: ICCS Main Track Part II: Advances in High-Performance Computational Earth Sciences: Applications and Frameworks; Applications of Computational Methods in Artificial Intelligence and Machine Learning; Artificial Intelligence and High-Performance Computing for Advanced Simulations; Biomedical and Bioinformatics Challenges for Computer Science Part III: Classifier Learning from Difficult Data; Computational Analysis of Complex Social Systems; Computational Collective Intelligence; Computational Health Part IV: Computational Methods for Emerging Problems in (dis-)Information Analysis; Computational Methods in Smart Agriculture; Computational Optimization, Modelling and Simulation; Computational Science in IoT and Smart Systems Part V: Computer Graphics, Image Processing and Artificial Intelligence; Data-Driven Computational Sciences; Machine Learning and Data Assimilation for Dynamical Systems; MeshFree Methods and Radial Basis Functions in Computational Sciences; Multiscale Modelling and Simulation Part VI: Quantum Computing Workshop; Simulations of Flow and Transport: Modeling, Algorithms and Computation; Smart Systems: Bringing Together Computer Vision, Sensor Networks and Machine Learning; Software Engineering for Computational Science; Solving Problems with Uncertainty; Teaching Computational Science; Uncertainty Quantification for Computational Models *The conference was held virtually.

An Introduction to Quantum, DNA and Membrane Computing

Springer Science & Business Media
This book presents the basics of quantum information, e.g., foundation of quantum theory, quantum algorithms, quantum entanglement, quantum entropies, quantum coding, quantum error correction and quantum cryptography. The required knowledge is only elementary calculus and linear algebra. This way the book can be understood by undergraduate students. In order to study quantum information, one usually has to study the foundation of quantum theory. This book describes it from more an operational viewpoint which is suitable for quantum information while traditional textbooks of quantum theory lack this viewpoint. The current book bases on Shor's algorithm, Grover's algorithm, Deutsch-Jozsa's algorithm as basic algorithms. To treat several topics in quantum information, this book covers several kinds of information quantities in

quantum systems including von Neumann entropy. The limits of several kinds of quantum information processing are given. As important quantum protocols, this book contains quantum teleportation, quantum dense coding, quantum data compression. In particular conversion theory of entanglement via local operation and classical communication are treated too. This theory provides the quantification of entanglement, which coincides with von Neumann entropy. The next part treats the quantum hypothesis testing. The decision problem of two candidates of the unknown state are given. The asymptotic performance of this problem is characterized by information quantities. Using this result, the optimal performance of classical information transmission via noisy quantum channel is derived. Quantum information transmission via noisy quantum channel by quantum error correction are discussed too. Based on this topic, the secure quantum communication is explained. In particular, the quantification of quantum security which has not been treated in existing book is explained. This book treats quantum cryptography from a more practical viewpoint.

Post-Quantum Cryptography John Wiley & Sons

A self-contained treatment of the fundamentals of quantum computing This clear, practical book takes quantum computing out of the realm of theoretical physics and teaches the fundamentals of the field to students and professionals who have not had training in quantum computing or quantum information theory, including computer scientists, programmers, electrical engineers, mathematicians, physics students, and chemists. The author cuts through the conventions of typical jargon-laden physics books and instead presents the material through his unique "how-to" approach and friendly, conversational style. Readers will learn how to carry out calculations with explicit details and will gain a fundamental grasp of: * Quantum mechanics * Quantum computation * Teleportation * Quantum cryptography * Entanglement * Quantum algorithms * Error correction A number of worked examples are included so readers can see how quantum computing is done with their own eyes, while answers to similar end-of-chapter problems are provided for readers to check their own work as they learn to master the information. Ideal for professionals and graduate-level students alike, Quantum Computing Explained delivers the fundamentals of quantum computing readers need to be able to understand current research papers and go on to study more advanced quantum texts.

Computational Science – ICCS 2021

Cambridge University Press

This book presents a concise introduction to an emerging and increasingly important topic, the theory of quantum computing. The development of quantum computing exploded in 1994 with the discovery of its use in factoring large numbers--an extremely difficult and time-consuming problem when using a conventional computer. In less than 300 pages, the authors set forth a solid foundation to the theory, including results that have not appeared elsewhere and improvements on existing works. The book starts with the basics of classical theory of computation, including NP-complete problems and the idea of complexity of an algorithm. Then the authors introduce general principles of quantum computing and pass to the study of main quantum computation algorithms: Grover's algorithm, Shor's factoring algorithm, and the Abelian hidden subgroup problem. In concluding sections, several related topics are discussed (parallel quantum computation, a quantum analog of NP-completeness, and quantum error-correcting codes). This is a suitable textbook for a graduate course in quantum computing. Prerequisites are very modest and include linear algebra, elements of group theory and probability, and the notion of an algorithm (on a formal or an intuitive level). The book is complete with problems, solutions, and an appendix summarizing the necessary results from number theory.

Hands-On Quantum Machine Learning With Python Independently Published

This book addresses an interesting area of quantum computation called quantum walks, which play an important role in building quantum algorithms, in particular search algorithms. Quantum walks are the quantum analogue of classical random walks. It is known that quantum computers have great power for searching unsorted databases. This power extends to many kinds of searches, particularly to the problem of finding a specific location in a spatial layout, which can be modeled by a graph. The goal is to find a specific node knowing that the particle uses the edges to jump from one node to the next. This book is self-contained with main topics that include: Grover's algorithm, describing its geometrical interpretation and evolution by means of the spectral decomposition of the evolution operator Analytical solutions of quantum walks on important graphs like line, cycles, two-dimensional lattices, and hypercubes using Fourier transforms Quantum walks on generic graphs, describing methods to calculate the limiting distribution and mixing time Spatial search algorithms, with emphasis on the abstract search algorithm (the two-dimensional lattice is used as an example) Szedgedy's quantum-walk model and a natural definition of quantum hitting time (the complete graph is used as an example) The reader will benefit from the pedagogical aspects of the book, learning faster and with more ease than would be possible from the primary research literature. Exercises and references further deepen the reader's understanding, and guidelines for the use of computer programs to simulate the evolution of quantum walks are also provided.

Volume 1: Get Started MIT Press

Complete, Unabridged Guide to Quantum computer. Get the information you need--fast! This comprehensive guide offers a thorough view of key knowledge and detailed insight. It's all you need. Here's part of the content - you would like to know it all? Delve into this book today!..... : Large-scale quantum computers could be able to solve certain problems much faster than any classical computer by using the best currently known algorithms, like integer factorization using Shor's algorithm or the simulation of quantum many-body systems. ...It has been proven that applying Grover's algorithm to break a symmetric (secret key) algorithm by brute force requires roughly 2n/2 invocations of the underlying cryptographic algorithm, compared with roughly 2n in the classical case, meaning that symmetric key lengths are effectively halved: AES-256 would have the same security against an attack using Grover's algorithm that AES-128 has against classical brute-force search (see Key size). ... Besides factorization and discrete logarithms, quantum algorithms offering a more than polynomial speedup over the best known classical algorithm have been found for several problems, including the simulation of quantum physical processes from chemistry and solid state physics, the approximation of Jones polynomials, and solving Pell's equation. ... In April 2012 a multinational team of researchers from the University of Southern California, Delft University of Technology, the Iowa State University of Science and Technology, and the University of California, Santa Barbara, constructed a two-qubit quantum computer on a crystal of diamond doped with some manner of impurity, that can easily be scaled up in size and functionality at room temperature. There is absolutely nothing that isn't thoroughly covered in the book. It is straightforward, and does an excellent job of explaining all about Quantum computer in key topics and material. There is no reason to invest in any other materials to learn about Quantum computer. You'll understand it all. Inside the Guide: Quantum computer, University of California, Santa Barbara, Universal quantum simulator, Trapped ion quantum computer, Topological quantum computer, Timeline of quantum computing, Technological singularity, Superconducting quantum computing, Stabilizer code, Shor's algorithm, Scott Aaronson, SQUID, Richard Feynman, Raymond Laflamme, RSA (algorithm), Qubit, Quantum threshold theorem, Quantum teleportation, Quantum technology, Quantum mechanics, Quantum information science, Quantum information, Quantum gate, Quantum error correction, Quantum entanglement, Quantum dot, Quantum decoherence, Quantum cryptography, Quantum complexity theory, Quantum circuit, Quantum bus, Quantum annealing, Quantum algorithm, Quantum Turing machine, Quantum Fourier transform, QMA, PostBQP, Post-quantum cryptography, Pell's equation, One-way quantum computer, Nuclear magnetic resonance quantum computer, Nuclear magnetic resonance, Non-deterministic Turing machine, Nitrogen-vacancy center, Natural computing, Moore's law, Michael Freedman, Key size, Kane quantum computer, Ion trap, Integer factorization, Hidden subgroup problem, Grover's algorithm, Graphene, Fictional technology, Electron paramagnetic resonance, Discrete logarithm, David Deutsch, Daniel Lidar, D-Wave Systems, Cryptography, Cryptanalysis, Computer, Computation, Cluster

state, Cavity quantum electrodynamics, Bounded-error probabilistic polynomial, BQP, Atomtronics, Anyon, Amplitude amplification, Alexei Kitaev, Alexander R. Hamilton, Adiabatic quantum computation
Post-Quantum Cryptography Debasis Sadhukhan
An accessible introduction to an exciting new area in computation, explaining such topics as qubits, entanglement, and quantum teleportation for the general reader. Quantum computing is a beautiful fusion of quantum physics and computer science, incorporating some of the most stunning ideas from twentieth-century physics into an entirely new way of thinking about computation. In this book, Chris Bernhardt offers an introduction to quantum computing that is accessible to anyone who is comfortable with high school mathematics. He explains qubits, entanglement, quantum teleportation, quantum algorithms, and other quantum-related topics as clearly as possible for the general reader. Bernhardt, a mathematician himself, simplifies the mathematics as much as he can and provides elementary examples that illustrate both how the math works and what it means. Bernhardt introduces the basic unit of quantum computing, the qubit, and explains how the qubit can be measured; discusses entanglement—which, he says, is easier to describe mathematically than verbally—and what it means when two qubits are entangled (citing Einstein's characterization of what happens when the measurement of one entangled qubit affects the second as “spooky action at a distance”); and introduces quantum cryptography. He recaps standard topics in classical computing—bits, gates, and logic—and describes Edward Fredkin's ingenious billiard ball computer. He defines quantum gates, considers the speed of quantum algorithms, and describes the building of quantum computers. By the end of the book, readers understand that quantum computing and classical computing are not two distinct disciplines, and that quantum computing is the fundamental form of computing. The basic unit of computation is the qubit, not the bit.

An Introduction to Quantum Computing Algorithms

Simon and Schuster
A thorough exposition of quantum computing and the underlying concepts of quantum physics, with explanations of the relevant mathematics and numerous examples. The combination of two of the twentieth century's most influential and revolutionary scientific theories, information theory and quantum mechanics, gave rise to a radically new view of computing and information. Quantum information processing explores the implications of using quantum mechanics instead of classical mechanics to model information and its processing. Quantum computing is not about changing the physical substrate on which computation is done from classical to quantum but about changing the notion of computation itself, at the most basic level. The fundamental unit of computation is no longer the bit but the quantum bit or qubit. This comprehensive introduction to the field offers a thorough exposition of quantum computing and the

underlying concepts of quantum physics, explaining all the relevant mathematics and offering numerous examples. With its careful development of concepts and thorough explanations, the book makes quantum computing accessible to students and professionals in mathematics, computer science, and engineering. A reader with no prior knowledge of quantum physics (but with sufficient knowledge of linear algebra) will be able to gain a fluent understanding by working through the book.

Quantum Computer - Unabridged Guide

Forschungszentrum Jülich
A quantum computer is a computer based on a computational model which uses quantum mechanics, which is a subfield of physics to study phenomena at the micro level. There has been a growing interest on quantum computing in the 1990's and some quantum computers at the experimental level were recently implemented. Quantum computers enable super-speed computation and can solve some important problems whose solutions were regarded impossible or intractable with traditional computers. This book provides a quick introduction to quantum computing for readers who have no backgrounds of both theory of computation and quantum mechanics. “Elements of Quantum Computing” presents the history, theories and engineering applications of quantum computing. The book is suitable to computer scientists, physicists and software engineers.
How quantum computing works and how it can change the world
Quantum Computation and Quantum Information First-ever comprehensive introduction to the major new subject of quantum computing and quantum information.
Generalization of Quantum Search Algorithm CRC Press
The authors provide an introduction to quantum computing. Aimed at advanced undergraduate and beginning graduate students in these disciplines, this text is illustrated with diagrams and exercises.