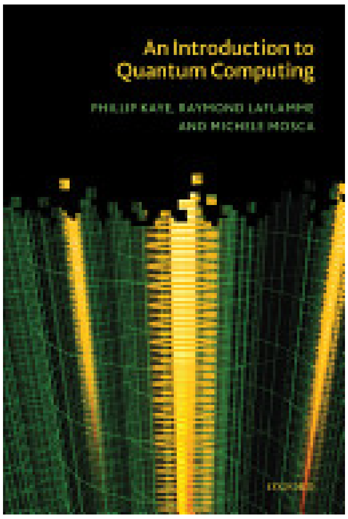

An Introduction to Quantum Computing, Phillip Kaye, Raymond Laflamme, Michele Mosca, Oxford University Press, 2007, 0198570007, 9780198570004, 274 pages. This concise, accessible text provides a thorough introduction to quantum computing - an exciting emergent field at the interface of the computer, engineering, mathematical and physical sciences. Aimed at advanced undergraduate and beginning graduate students in these disciplines, the text is technically detailed and is clearly illustrated throughout with diagrams and exercises. Some prior knowledge of linear algebra is assumed, including vector spaces and inner products. However, prior familiarity with topics such as tensor products and spectral decomposition is not required, as the necessary material is reviewed in the text..

Music and Mathematics From Pythagoras to Fractals, John Fauvel, Raymond Flood, Robin J. Wilson, 2003, Mathematics, 189 pages. From Ancient Greek times, music has been seen as a mathematical art, and the relationship between mathematics and music has fascinated generations. This collection of wide ....

Introduction to Quantum Information Science , Vlatko Vedral, Sep 28, 2006, Computers, 183 pages. In addition to treating quantum communication, entanglement and algorithms, this book also addresses a number of miscellaneous topics, such as Maxwell's demon, Landauer's ....

Quantum Computing A Gentle Introduction, Eleanor Rieffel, Wolfgang Polak, Mar 4, 2011, , 372 pages. A thorough exposition of quantum computing and the underlying concepts of quantum physics, with explanations of the relevant mathematics and numerous examples..

Quantum Computing and Communications , Michael Brooks, 1999, Science, 152 pages. The first handbook to provide a comprehensive inter-disciplinary overview of QCC. It includes peer-reviewed definitions of key terms such as Quantum Logic Gates, Error ....

The Feynman Processor Quantum Entanglement and the Computing Revolution, Gerard J. Milburn, 1998, Computers, 213 pages. Predicts that quantum computation will bypass conventional computers, and explains quantum entanglement, how quantum computers might work, and the possibility of teleportation.

IntroQuantum , Arthur O. Pittenger, 2000, Computers, 138 pages. An excellent introductory reference to quantum computing, this book provides a solid understanding of the basics of the theory and an awareness of the broad potential ....

Quantum computing , Jozef Gruska, 1999, Science, 439 pages. In quantum computing, we witness an exciting and very promising merge of two of the deepest and most successful scientific and technological developments of this century ....

Principles of Quantum Computation and Information, Volume 1 , Giuliano Benenti, Giulio Casati, Giuliano Strini, Jan 1, 2004, Computers, 256 pages. Quantum computation and information is a new, rapidly developing interdisciplinary field. This book provides the reader a useful and not-too-heavy guide. It offers a simple and ....

Introduction to Chemical Engineering Thermodynamics , J.M. Smith, Hendrick Van Ness, Michael M. Abbott, 2005, Science, 817 pages. Introduction to Chemical Engineering Thermodynamics, 7/e, presents comprehensive coverage of the subject of thermodynamics from a chemical engineering viewpoint. The text ....

Quantum Computing for Computer Scientists , Noson S. Yanofsky, Mirco A. Mannucci, Aug 11, 2008, Computers, 384 pages. Finally, a textbook that explains quantum computing using techniques and concepts familiar to computer scientists..

Introduction to Quantum Computation and Information , Hoi-Kwong Lo, Tim Spiller, Sandu Popescu, Jan 1, 1998, Computers, 348 pages. This book aims to provide a pedagogical introduction to the subjects of quantum information and computation. Topics include non-locality of quantum mechanics, quantum ....

Quantum information and computing :[proceedings of the international conference "Quantum Information 2003" held in Tokyo University of Science/Tokyo (Japan) from 1 to 3 november 2003, in Universityt of Waseda/Tokyo...] , Luigi Accardi, Masanori Ohya, 2006, Science, 384 pages. The main purpose of this volume is to emphasize the multidisciplinary aspects of this very active new line of research in which concrete technological and industrial ....

Quantum Computation and Quantum Information Theory Reprint Volume with Introductory Notes for ISI TMR Network School, 12-23 July 1999, Villa Gualino, Torino, Italy, Chiara Macchiavello, G. M. Palma, Anton Zeilinger, 2000, Computers, 517 pages. Quantum information theory has revolutionised our view on the true nature of information and has led to such intriguing topics as teleportation and quantum computation. The ....

Introduction to Quantum Computers , Gennady P. Berman, Jan 1, 1998, Computers, 187 pages. Quantum computing promises to solve problems which are intractable on digital computers. Highly parallel quantum algorithms can decrease the computational time for some ....

The physics of quantum information quantum cryptography, quantum teleportation, quantum computation, Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger, 2000, Science, 314 pages. "This volume covers Quantum Cryptography, Quantum Teleportation and Quantum Computation. The book presents clearly the fundamental concepts, amply illustrated with theoretical ....

This concise, accessible text provides a thorough introduction to quantum computing - an exciting emergent field at the interface of the computer, engineering, mathematical and physical sciences. Aimed at advanced undergraduate and beginning graduate students in these disciplines, the text is technically detailed and is clearly illustrated throughout with diagrams and exercises. Some prior knowledge of linear algebra is assumed, including vector spaces and inner products. However, prior familiarity with topics such as tensor products and spectral decomposition is not required, as the necessary material is reviewed in the text.

Phillip Ronald Kaye was born in Toronto, and raised in Waterloo, Ontario, Canada. In 1995 Phil was accepted to the Faculty of Engineering at the University of Waterloo with an entrance scholarship. He completed his undergraduate degree in Systems Design Engineering in 2000 and was awarded the George Dufault Medal for Excellence in Communication at his convocation. During the Summer months following his undergraduate convocation, Phil worked as an encryption software developer at Research in Motion (R.I.M.), where he continued to work on a part-time basis during his graduate studies. Phil did his Master's degree in the department of Combinatorics and Optimization at Waterloo. His Master's thesis was entitled 'Quantum Networks for Concentrating Entanglement, and a Logical Characterization of the Computational Complexity Class B.P.P.' Phil is currently a Ph.D. student at the School of Computer Science at the University of Waterloo. Raymond Laflamme completed his undergraduate studies in Physics at Universitï¿½ Laval. He then moved to Cambridge, U.K., where he took Part III of the Mathematical Tripos before doing a Ph.D. in the Department of Applied Mathematics and Theoretical Physics (D.A.M.T.P.) under the direction of Professor Stephen Hawking. Following posts at U.B.C., Cambridge and Los Alamos National Laboratory, Raymond moved to the University of Waterloo in 2001 as a Canada Research Chair in Quantum Information. Raymond is a recipient of Ontario's Premier Research Award and a Director of the Quantum Information program of the Canadian Institute for Advanced Research. He was named the Ivey Foundation Fellow of the Canadian Institute for Advanced Research (C.I.A.R.) in September of 2005. Michele Mosca obtained a D.Phil. in quantum computer algorithms in 1999 at the University of Oxford. Since then he has been a faculty member in Mathematics at St. Jerome's University and in the Combinatorics and Optimization department of the Faculty of Mathematics, University of Waterloo, and a member of the Centre for Applied Cryptographic Research. He holds a Premier's Research Excellence Award (2000-2005), is the Canada Research Chair in Quantum Computation (since January 2002), and is a C.I.A.R. scholar (since September 2003). He is a co-founder and the Deputy Director of the Institute for Quantum Computing, and a founding member of the Perimeter Institute for Theoretical Physics.

This book is geared for the reader who has an undergraduate education in a technical field and who has a solid background in linear algebra, including vector spaces and inner products. Prior familiarity with topics such as eigendecomposition and more advanced mathematical topics is not required. The book reviews all of the necessary additional material. There are some places in the book where group theory is referred to, but these sections of the book are self-contained so that the reader can skip them if needed. It is a very accessible introduction to a complex subject that is fairly detailed and complete. Exercises are integrated into the body of the text. Each exercise is designed to illustrate a particular concept, fill in the details of a calculation or proof, or to show how concepts in the book can be generalized or extended. The following is a brief overview of the book:

4. A Quantum Model of Computation - The circuit model of classical computation can be generalized to a model of quantum circuits. In such a model you have logical qubits carried along "wires" and quantum gates that act on the qubits. For convenience, the discussion is limited to unitary quantum gates.

5. Superdense Coding and Quantum Teleportation - Looks at our first protocols for quantum information. Examines two communication protocols that can be implemented using the tools which can be implemented using the tools developed in previous chapters. These protocols are known as superdense coding and quantum teleportation. Both of these are inherently quantum - there are no classical protocols that behave in the same way as these.

6. Introductory Quantum Algorithms - Describes some of the early quantum algorithms that are simple and illustrate the main ingredients behind the more useful and powerful quantum algorithms described in subsequent chapters. Since quantum algorithms share some features with classical probabilistic algorithms, the chapter starts with a comparison of the two algorithmic paradigms.

7. Algorithms with Superpolynomial Speed-Up - Examines one of two main classes of algorithms: quantum algorithms that solve problems with a complexity that is superpolynomially less than the complexity of the best-known classical algorithm for the same problem. That is, the complexity of the best-known classical algorithm cannot be bounded above by any poynomial in the complexity of the quantum algorithm. The chapter starts off by studying the problem of quantum phase estimation, which leads naturally to the Quantum Fourier Transform (QFT).

9. Quantum Computational Complexity Theory and Lower Bounds - Quantum computers seem to be

more powerful than classical computers for certain problems. However, there are limits on the power of quantum computers. Since a classical computer can simulate a quantum one, a quantum computer can only compute the same set of functions that a classical computer can. This chapter examines this and some related issues.

10. Quantum Error Correction - Quantum computers are more susceptible to errors than classical digital computers because quantum mechanical systems are more delicate and more difficult to control. If large-scale quantum computers are to be possible, a theory of quantum error correction is needed. This is the issue discussed in this chapter.

This is definitely a great book on a mysterious topic. Make sure you have the right background: you need to know something about complex (as in "complex plane", not "complicated") linear algebra (phrases like hermitean, orthonormal basis and schmidt decomposition should be a breeze if you really want to understand the raw math), but once you've got that down, this material does not take much more. The book includes a few refreshers on linear algebra just in case. Somewhere halfway through the book the authors basically sum up a list of algorithms which were important at the time of writing, and while most of them still are very useful, you may want to read the latest and greatest on arxiv if you really want to know about the cutting edge material.

1-qubit gates amplitude ancilla apply bit flip black-box Bloch sphere Church-Turing Thesis classical algorithm classical computer CNOT gate codeword computational basis consider control qubit corresponding defined denote density operator described Dirac notation discrete logarithm efficiently eigenstate eigenvalue eigenvalue estimation eigenvectors encoding Equation equivalent error correction error model error operators example Exercise factor fault-tolerant finite function Hadamard gate hidden subgroup Hilbert space illustrated in Figure implement input integer linear lower bound maps Neumann measurement Note order-finding orthogonal output parity phase flip photon polynomial probabilistic Turing machine probability at least quantum algorithm quantum circuit quantum computing quantum mechanics quantum searching qubit query complexity real numbers recovery operation reversible second register Section shown in Figure simulate solution solve string subspace superposition Suppose tensor product Theorem three-bit code three-qubit Toffoli gate transformation uniformly at random unitary operator vector space wires

Book Description: Oxford University Press, 2006. Paperback. Book Condition: New. 234x156 mm. (288) This concise, accessible introduction to quantum computing is aimed at advanced undergraduate and beginning graduate students from a variety of scientific backgrounds. The text is technically detailed and clearly illustrated throughout with diagrams and exercises. (Paperback). Bookseller Inventory # AQ019857049X

Book Description: Oxford University Press. Hardcover. Book Condition: New. Brand New , Dispatched from UK Warehouse If Not Available in the UK Warehouse it will Dispatched from Our UAE (Dubai) Warehouse or Iran Warehouse , without any changes in Shipping Rates. Bookseller Inventory # 9780198570004--89