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Nota di contenuto	Quantum Computing and Communications An Engineering Approach; Contents; Preface; How to use this book; Acknowledgments; List of Figures; Acronyms; Part I Introduction to Quantum Computing; 1 Motivations; 1.1 Life Cycle of a Well-known Invention; 1.2 What about Computers and Computing?; 1.3 Let us Play Marbles; 2 Quantum Computing Basics; 2.1 Mystery of Probabilistic Gate; 2.2 The Postulates of Quantum Mechanics; 2.3 Qbits and Qregisters; 2.4 Elementary Quantum Gates; 2.5 General Description of the Interferometer; 2.6 Entanglement; 2.6.1 A surprising quantum state - entanglement 2.6.2 The CNOT gate as classical copy machine and quantum entangler2.6.3 Bell states; 2.6.4 Entanglement with the environment - decoherence; 2.6.5 The EPR paradox and the Bell inequality; 2.7 No Cloning Theorem; 2.8 How to Prepare an Arbitrary Superposition; 2.9 Further Reading; 3 Measurements; 3.1 General Measurements; 3.2 Projective Measurements; 3.2.1 Measurement operators and the 3(rd)

Postulate in the case of projective measurement; 3.2.2 Measurement using the computational basis states; 3.2.3 Observable and projective measurement; 3.2.4 Repeated projective measurement
3.2.5 CHSH inequality with entangled particles
3.3 Positive Operator Valued Measurement; 3.3.1 Measurement operators and the 3(rd) Postulate in the case of POVM; 3.3.2 How to apply POVM operators; 3.4 Relations among the Measurement Types; 3.5 Quantum Computing-based Solution of the Game with Marbles; 3.6 Further Reading; Part II
Quantum Algorithms; 4 Two Simple Quantum Algorithms; 4.1 Superdense Coding; 4.2 Quantum Teleportation; 4.3 Further Reading; 5
Quantum Parallelism; 5.1 Introduction; 5.2 Deutsch-Jozsa Algorithm; 5.3 Simon Algorithm; 5.4 Further Reading
6 Quantum Fourier Transform and its Applications
6.1 Quantum Fourier Transform; 6.2 Quantum Phase Estimation; 6.2.1 Idealistic phase estimation; 6.2.2 Phase estimation in practical cases; 6.2.3 Quantitative analysis of the phase estimator; 6.2.4 Estimating quantum uncertainty; 6.3 Order Finding and Factoring - Shor Algorithm; 6.3.1 Connection between factoring and order finding; 6.3.2 Quantum-based order finding; 6.3.3 Error analysis and a numerical example; 6.4 QFT as generalized Hadamard transform; 6.5 Generalizations of order finding; 6.5.1 Period finding
6.5.2 Two-dimensional period finding and discrete logarithm
6.6 Further Reading; Part III Quantum-assisted Solutions of Infocom Problems; 7 Searching in an Unsorted Database; 7.1 The Basic Grover Algorithm; 7.1.1 Initialization - quantum parallelism; 7.1.2 First stage of G - the Oracle; 7.1.3 Second stage of G - inversion about the average; 7.1.4 Required number of iterations; 7.1.5 Error analysis; 7.2 Quantum Counting; 7.2.1 Quantum counting based on phase estimation; 7.2.2 Error analysis; 7.2.3 Replacing quantum counting with indirect estimation on M; 7.3 Quantum Existence Testing
7.3.1 Error analysis

Sommario/riassunto

Quantum computers will revolutionize the way telecommunications networks function. Quantum computing holds the promise of solving problems that would be intractable with conventional computers by implementing principles from quantum physics in the development of computer hardware, software and communications equipment. Quantum-assisted computing will be the first step towards full quantum systems, and will cause immense disruption of our traditional networks. The world's biggest manufacturers are investing large amounts of resources to develop crucial quantum-assisted circuits and d
