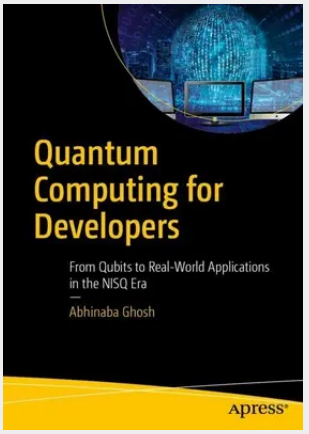
Ghosh

Quantum Computing for Developers

From Qubits to Real-World Applications in the NISQ Era



64,19 €
64,19 € (zzgl. MwSt.)

vorbestellbar, Erscheinungstermin ca. Mai 2027

Artikelnummer: 9798868834035
Medium: Buch
ISBN: 979-8-8688-3403-5
Verlag: APRESS L.P.
Erscheinungstermin: 23.05.2027
Sprache(n): Englisch
Auflage: 1. Auflage 2027
Produktform: Kartoniert
Format (B x H): 178 x 254 mm

This book is a practical, developer-focused guide designed to take you from foundations to hands-on quantum programming. As the world approaches the era of quantum advantage, this book gives engineers, programmers, and data professionals the knowledge and tools to build real quantum applications using Python and Qiskit.The book starts with the foundational concepts like qubits, superposition, and entanglement. You will set up your environment, create an IBM Quantum account, and run your first quantum circuits on simulators and real quantum hardware. It then dives deeper into essential quantum building blocks-gates, circuits, and measurement-before guiding you through core quantum algorithms such as Deutsch-Jozsa, Grover's search, and the Quantum Fourier Transform. With insightful explanations and step-by-step coding examples, you'll see how quantum mechanics powers computational breakthroughs in search, optimization, and simulation. Moving from theory to application, you'll explore quantum machine learning and optimization, learning how to build hybrid quantum-classical models, encode data, use variational algorithms, and solve real-world business problems with QAOA and quantum annealing. Practical chapters walk you through submitting jobs to IBM Quantum, understanding noise, applying error-mitigation techniques, and benchmarking today's NISQ-era devices.By the end, you'll have the skills to write quantum programs, experiment on cloud-based quantum systems, and understand the path toward fault-tolerant machines. Whether you're an engineer preparing for the quantum future or a developer eager to build meaningful quantum applications today, this book equips you to enter one of the most transformative fields in computing.What you will learn:- Build, simulate, and visualize complex quantum circuits to implement a variety of quantum algorithms- How to implement a functional, end-to-end hybrid quantum-classical machine learning model for a classification task- Decoding, Portfolio Optimization, and writing the code to solve it using the Quantum Approximate Optimization Algorithm (QAOA)- Execute code on real, cloud-based IBM quantum hardware, retrieve the results, and compare the noisy output to an ideal simulationWho this book is for:This book is aimed at data scientists, ML engineers, and software developers seeking to become quantum-aware professionals. It also appeals to ambitious university students, including students and PhD candidates in computer science, engineering, and physics.

This book is a practical, developer-focused guide designed to take you from foundations to hands-on quantum programming. As the world approaches the era of quantum advantage, this book gives engineers, programmers, and data professionals the knowledge and tools to build real quantum applications using Python and Qiskit.The book starts with the foundational concepts like qubits, superposition, and entanglement. You will set up your environment, create an IBM Quantum account, and run your first quantum circuits on simulators and real quantum hardware. It then dives deeper into essential quantum building blocks-gates, circuits, and measurement-before guiding you through core quantum algorithms such as Deutsch-Jozsa, Grover's search, and the Quantum Fourier Transform. With insightful explanations and step-by-step coding examples, you'll see how quantum mechanics powers computational breakthroughs in search, optimization, and simulation. Moving from theory to application, you'll explore quantum machine learning and optimization, learning how to build hybrid quantum-classical models, encode data, use variational algorithms, and solve real-world business problems with QAOA and quantum annealing. Practical chapters walk you through submitting jobs to IBM Quantum, understanding noise, applying error-mitigation techniques, and benchmarking today's NISQ-era devices.By the end, you'll have the skills to write quantum programs, experiment on cloud-based quantum systems, and understand the path toward fault-tolerant machines. Whether you're an engineer preparing for the quantum future or a developer eager to build meaningful quantum applications today, this book equips you to enter one of the most transformative fields in computing.What

Kundenservice Verlag Dr. Otto Schmidt KG
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)