Qiskit Textbook Reading Sessions もくもく会

11 Bi-Weekly Sessions

1.5 Hour Reading and Coding, 30 Minutes Discussion

Textbook Link: https://community.qiskit.org/textbook/

Completely Remote (Live via IndiQ YouTube)

More Info on Qiskit Slack (#textbook-reading-group)

Timetable (Indian Standard Time/+05:30 GMT)
Saturday - 11 AM IST
Sunday - 8 PM IST

Session 0 (TBD over the week before S1)

Chapter 0. Prerequisites

- Python and Jupyter Notebooks
- Qiskit
- Linear Algebra

Session 1

Chapter 1. Quantum States and Qubits

- Introduction
- The Atoms of Computation
- The Unique Properties of Qubits
- Writing Down Qubit States

Session 2

- Pauli Matrices and the Bloch Sphere
- States for Many Qubits

Chapter 2. Single Qubits and Multi-Qubits gates

- Introduction
- Quantum Gates

Session 3

- Fun with Matrices
- The Standard Gate Set
- Proving Universality
- Basic Circuit Identities

Problems

- Set 1: Classical Logic Gates with Quantum Circuits
- Set 2: Basis Synthesis of Single-Qubit Gates
- Building the Best AND Gate

Session 4

Chapter 3. Quantum Algorithms

- Quantum Teleportation
- Deutsch-Josza Algorithm

Session 5

- Bernstein-Vazirani Algorithm
- Simon's Algorithm

Session 6

- Quantum Fourier Transform
- Quantum Phase Estimation

Session 7

- Grover's Algorithm

Chapter 4. Quantum Algorithms for Applications

- Simulating Molecules using VQE

Session 8

- Solving combinatorial optimization problems using QAOA
- Solving Satisfiability Problems using Grover's Algorithm

Session 9

Chapter 5. Investigating Quantum Hardware Using Qiskit

- Calibrating Qubits with OpenPulse
- Introduction to Quantum Error Correction using Repetition Codes

Session 10

- Measurement Error Mitigation
- Randomized Benchmarking

Session 11

- Measuring Quantum Volume

Chapter 6. Implementations of Recent Quantum Algorithms

- Variational Quantum Linear Solver