Introduction to Quantum Computing

Lecturer: Xiaodi Wu

Reading Assignment: Course Website; KLM Chap 1 and 2.

Welcome to CMSC/PHYS 457
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&

Happy New Year!

Teaching Team

Instructor

- Instructor: Prof. Xiaodi Wu
- Contact: xwu@cs.umd.edu
- Research: Quantum Information and Computation
- Joint Center for Quantum Information and Computer Science (QuICS)

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TA

- ▶ Haowei Deng, Email: hwdeng@umd.edu

Why Quantum Computing? or Why are you here?

- One sentence about who you are (e.g., name, major, graduate/undergraduate).
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- Please feel free to share your interests or so at piazza.
- Also please finish assignment 0 so that we can understand your need better.

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Tentative topics

- quantum mechanics of qubits; quantum circuits; quantum protocols;

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- ▶ coding experience of quantum clouds – *a more substantial component this year*!
- ▶ selective quantum research frontiers: **formal verification of quantum programs;**.

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▶ **A lot of effort expected!**

CMSC/PHYS 457: Common Questions

There is NO required textbook. We will mainly refer to lecture notes (available online or our own) and the following textbooks.

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Interested in working with QuICS?

▶ Do well! Discuss project topics with QuICS people!

More logistics

Office Hours

- ▶ Wu: around the lecture or by appointment.
- ▶ Deng: Tu 3pm-5pm, Th 2pm-4pm.
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- ▶ **ELMS**: distribute and submit assignments, grades, and solutions.

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Please let us know ASAP if

- ► you cannot submit assignments electronically.
- ► time conflicts of exams.
- ► concerns about the difficulty of the course.
- ► anything that you wanted to discuss ......

You might be interested in knowing

Some ongoing projects inside QuICS: (incomplete list)

- ▶ Circuit Compilation and Optimization.
- ▶ Quantum Programming Languages.
- ▶ Quantum Algorithms for Optimization.
- ▶ Quantum Computing meets Machine Learning.
- ▶ Quantum Hamiltonian Simulation.
- ▶ Quantum Cryptography.
- ▶ .... (check more at our website) ....

Reading Assignments on Linear Algebra

Linear algebra with Dirac notations

- ▶ KLM 2.1-2.6.
- ▶ A cheatsheet on our website.