

CPSC 4110/5110: Quantum Computation — Project

The project is a team effort. Random teams (of 3) are on Moodle for 4110. If you are in 5110 then you have to do this project independently.

The project has three components of independent learning, application of ideas, and communication of results.

Cook's Theorem tells us that every problem in NP is polynomially reducible to Satisfiability. Thus, if we know how to solve Satisfiability, we can solve a host of other problems. In this project, you will solve Satisfiability using Grover's Quantum search.

To learn about Grover's search and its application to Satisfiability, read,

- Chapter 13 in the textbook.
- The post on 'amplification' available at <https://www.cs.uleth.ca/~gaur/post/grovers-amplification/>
- The application of Grover's search to solving Satisfiability is described in the Qiskit textbook <https://qiskit.org/textbook/ch-applications/satisfiability-grover.html>

You can use the section (above link) in the Qiskit textbook as the template for your project. Follow the steps listed in the textbook to implement the project. Test your program on the problem listed at the end of the section (Problems).

Write a 5-10 page report and submit it as a PDF on Moodle. The deadline is the last day of the classes. You can add text to the IBM QX notebook and structure the report after the Qiskit textbook section or the amplification post. We will meet for a demo and to discuss your report.