Intro to Quantum Computing

MnP

Week #4 Project

Deadline: 7 July, 11:59 PM

1. **Grover's Algorithm**
   Start with an equal superposition state of 4 qubits. Make a Grover's circuit to amplify the $|1111\rangle$ state. Figure out the optimal number of times to apply the algorithm, and measure the state in the end.

2. **Shor's Algorithm**
   Read up on Shor's Algorithm from *Nielsen and Chuang*, and create a circuit to factorize the number 15.

3. **Bonus**
   Try to combine the two algorithms above. Can you think of a way to do it?