Electrodynamics
Notes

1   Recap/Intro

2   Today's stuff

Grover's Algorithm.

1. Make a uniform superposition of all states. Do a Hadamard Transform on all input states.

2. Feed into the oracle, which picks an answer. The oracle identifies the right state with a phase.

3. Amplify the amplitude so that the right answer is pushed to have higher probability.

For example, in a 2 qubit example, we'd start with (after the Hadamard transform):

$$\frac{1}{2}\left[|00\rangle + |01\rangle + |10\rangle + |11\rangle\right]$$

After applying the phase oracle, we see that it's changed the state to:

$$\frac{1}{2}\left[|00\rangle + |01\rangle + |10\rangle - |11\rangle\right]$$

Now, we just apply the amplification, which flips the state about the average so much so that the final output state is the only one that you have any realistic probability of getting.

3   What's next