

Quantum Hardware

CS 198-120 HW6

November 7, 2022

Exercise 1

What are the five DiVincenzo's criteria for quantum computation? What are the two additional criteria for quantum communication?

Exercise 2

Briefly explain the importance of each criteria. In particular, talk about what would happen if we fail to fulfill each criteria.

Exercise 3

Explain why "particle in a box", despite having good energy spacing, is not a valid candidate as a qubit.

Exercise 4

Choose one potential quantum hardware system, and explain how the system can fulfill all five criteria. The system can be anything that we have mentioned in class, or something you have read about in media.

Exercise 5

Which is your favorite qubit implementation? List out 3 advantage of this implementation, and 2 potential challenges. One your own, find research that has been done to address these two challenges.