

Homework Quiz - Week 18 Results for Murshed SK

❗ Correct answers are hidden.

Score for this attempt: 10 out of 10

Submitted Mar 4 at 9:49pm

This attempt took 1 minute.



Question 1

1 / 1 pts

What is the name of the set of 5 criteria that describe the ideal Quantum Computer?

- ☒ Di Vincenzo's Criteria
- ☐ Feynman's Criteria
- ☐ Quantum Criteria
- ☐ Quantum Advantage
- ☐ Fault Tolerance



Question 2

1 / 1 pts

Why is error correction necessary?

- ☐ Quantum measurement is random, so it needs to be corrected
- ☐ Errors lead to too much noise
- ☒ Enough errors can destroy any use of quantum computing
- ☐ Error correction is not necessary
- ☐ None of the above



Question 3

1 / 1 pts

Which of the following best describes the relationship between logical qubits and physical qubits?

- ☐ Physical qubits are always exact copies of logical qubits
- ☐ There are always more logical qubits than physical qubits
- ☐ Physical qubits are exclusively in hardware and logical qubits are exclusively in software

- ☐ Logical qubits encode a physical qubit's state
- ☒ Physical qubits encode a logical qubit's state



Question 4

1 / 1 pts

Complete the following sentence: "A syndrome measurement is one that _____."

- ☐ makes qubits sick
- ☒ detects errors
- ☐ causes errors
- ☐ corrects errors
- ☐ synchronizes qubits



Question 5

1 / 1 pts

Given a bit flip repetition code that uses 100 qubits, what is the maximum number of bit flips that can occur before the error fails? (NOTE: If you would like a challenge, determine the probability of this maximum number occurring assuming there's a 50% chance of each bit flip occurring).

- ☐ 1
- ☐ 2
- ☐ 49
- ☒ 50
- ☐ 100



The following questions are based on the Problems in this week's homework notebook.



Question 6

1 / 1 pts

Which of the following changes would not make the phase-flip code into a 5 physical qubit code?

- ☐ In Step #1: `qubits = cirq.NamedQubit.range(5)`
- ☐ In Step #1: `encode_circuit.append(cirq.CNOT(qubits[0], qubits[4]))`
- ☐ In Step #3: `detection_circuit.append(cirq.H.on_each(qubits[0], qubits[1], qubits[2], qubits[3], qubits[4]))`

☒ In Step #4: `correction_circuit.append(cirq.CCNOT(qubits[4], qubits[1], qubits[0]))`

☐ In Step #5: `decode_circuit.append(cirq.measure(qubits))`



Question 7

1 / 1 pts

How many Hadamard gates are in the general circuit (not counting any particular preparation circuit)?

☐ 0

☐ 1

☐ 3

☒ 6

☐ 9



Question 8

1 / 1 pts

What percentage of the measurement results in Problem #1.1 were $|1\rangle$?

☒ 0

☐ 25

☐ 50

☐ 100



Question 9

1 / 1 pts

If a phase-flip error is the same as an unintended Z gate, which of the following states is not affected by phase-flip errors?

☒ $|0\rangle$

☐ $|1\rangle$

☐ $|+\rangle$

☐ $|-\rangle$

☐ None of the above



Question 10

1 / 1 pts

If we wanted to run Grover's algorithm for items represented by 90,000 logical qubits error corrected with the code you have implemented in the notebook, how many physical qubits would you need?

- ☐ 300
- ☐ 900
- ☐ 30,000
- ☐ 90,000
- ☒ 270,000

Quiz Score: 10 out of 10