

(True / False) The CZ gate is a single qubit gate that toggles the phase if and only if the the input is $|1\rangle$.

(True / False) The control of a C-NOT never changes phase.

The Z gate is the _____ gate.

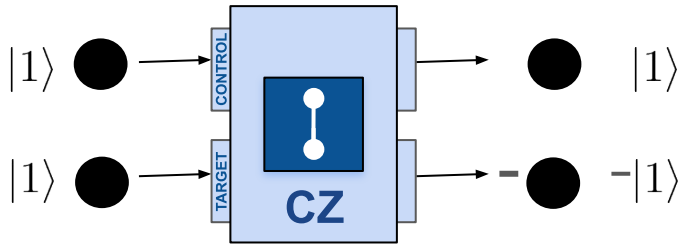
a. bit flip
b. phase flip
c. superposition
d. imaginary

If the state cannot be split into individual qubits, then:

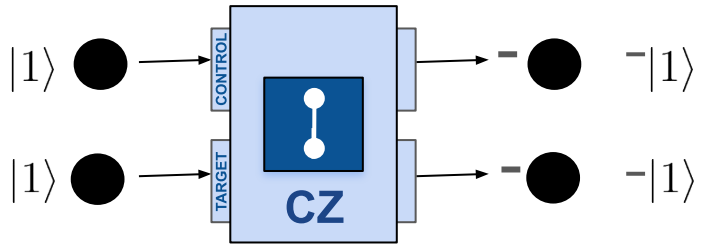
a. The quantum state is invalid / impossible
b. The qubits are entangled
c. The mathematics was performed incorrectly
d. None of the above

For this C-Z (Controlled-Z) gate, which of the following are possible correct start and end states? (choose all that apply)

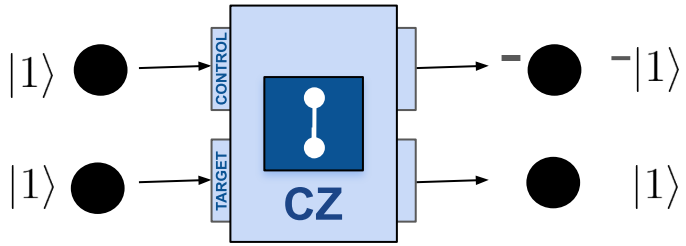
A.



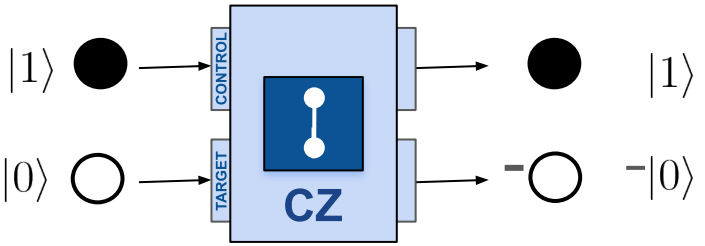
C.



B.

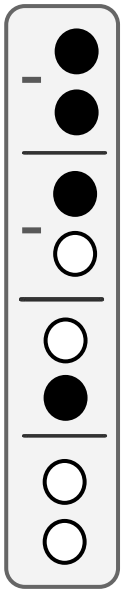


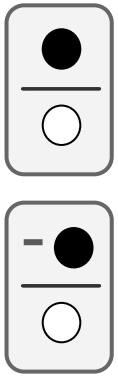
D.

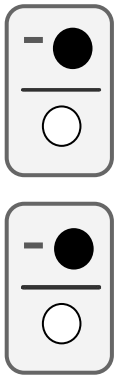


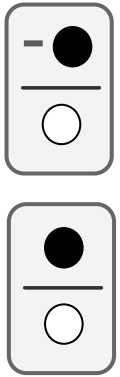
This two-qubit state is the same as which two individual qubits?

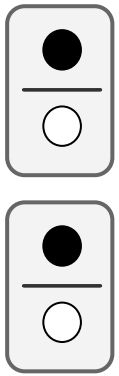
Two-qubit state



$a.$ 

$b.$ 

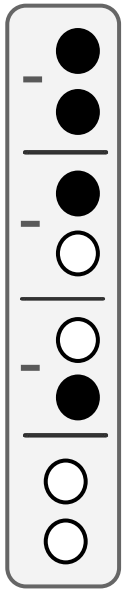
$c.$ 

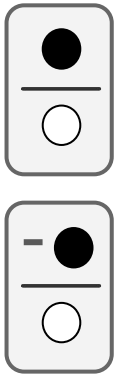
$d.$ 

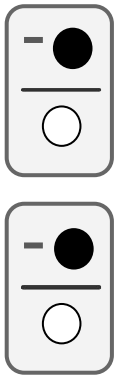
$e.$ cannot be split

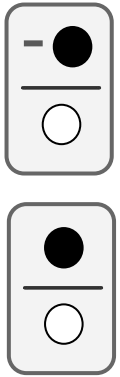
This two-qubit state is the same as which two individual qubits?

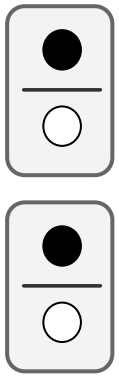
Two-qubit state



$a.$ 

$b.$ 

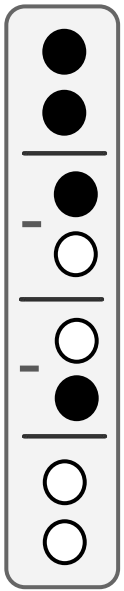
$c.$ 

$d.$ 

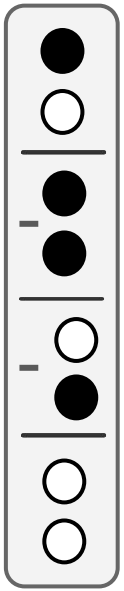
$e.$ cannot be split

Which of the following state(s) is the same as this one?

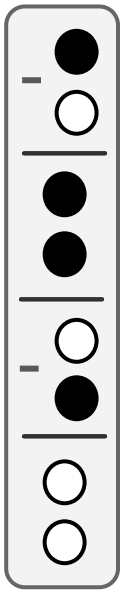
Two-qubit state



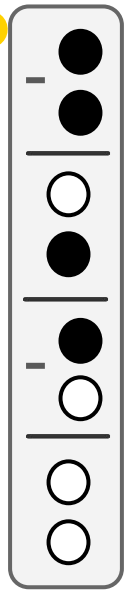
$a.$



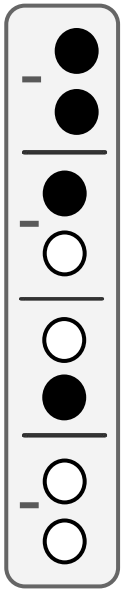
$b.$



$c.$

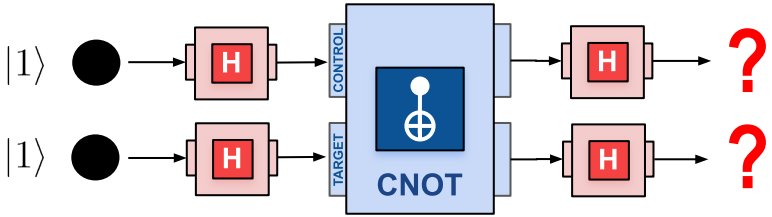


$d.$

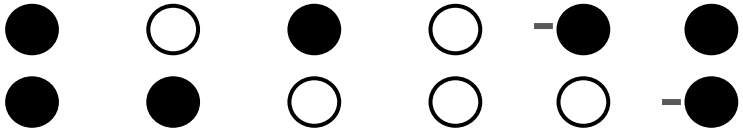


$e.$ None of these represent the same state

What is the output of the following circuit?



A. B. C. D. E. F.



Is the following game an oracle game?

NO

Bop it:
There is an electronic device with a button to press, handle to twist, and handle to pull. The device says either “Press it”, “Twist it”, or “Pull it.” After each command, the player has a certain amount of time to perform the action. If they perform the wrong action or do not do any action in the allotted time, they lose. As the game progresses, it goes faster, allowing less and less time for the action. The goal is to play for as long as possible.

Is the following game an oracle game?

YES, QUALIFY AS AN ORACLE

Think of a Number...:
One person (the thinker) thinks of a number between 0 and 100. The guesser attempts to guess the number. Each time they guess, the thinker answers either, “Higher”, “Lower”, or “You got it!” based on whether the answer they are thinking of is higher, lower, or equal to the guessed number. This continues until the guesser guesses the correct number. The goal is to guess the number in the fewest tries.

What is the computational complexity of the sequential, classical Bernstein Vazirani oracle algorithm for a secret code with n bits?

a) O(1)
b) O(n)
c) O(n^2)
d) O(2^n)

What is the computational complexity of the simultaneous, quantum Bernstein Vazirani oracle algorithm for a secret code with n bits?

a) O(1)
b) O(n)
c) O(n^2)
d) O(2^n)

What is the computational complexity of the sequential, classical Archimedes oracle algorithm for a secret code with n bits?

a) O(1)
b) O(n)
c) O(n^2)
d) O(2^n)

What is the computational complexity of the simultaneous, quantum Archimedes oracle algorithm for a secret code with n bits?

a) O(1)
b) O(n)
c) O(n^2)
d) O(2^n)

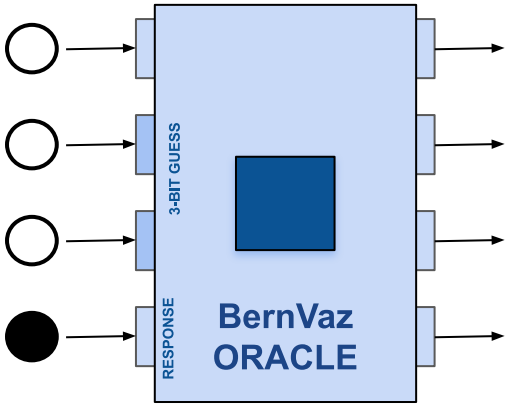
The keys to performance for Bernstein-Vazirani were:

a) Placing values in superposition so all guesses were tested simultaneously
b) Placing values in superposition so the CNOT received inputs in superposition
c) Phase Kick-Back
d) Interference

The keys to performance for Archimedes were:

a) Placing values in superposition so all guesses were tested simultaneously
b) Placing values in superposition so the CNOT received inputs in superposition
c) Phase Kick-Back
d) Interference

The secret code is 101. What is the output of this query?



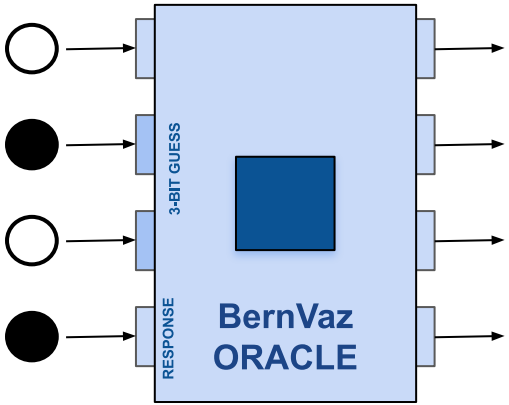
a. 

b. 

c. 

d. 

The secret code is 101. What is the output of this query?



a. 

b. 

c. 

d.