Advanced Operations

homework

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True/False

This state evolution table represents an inverted CNOT gate.

State Evolution:

$$|\text{target}\rangle \otimes |\text{control}\rangle \mapsto |\text{target}\rangle \otimes |\text{control}\rangle$$

$$|\phi_{in}\rangle \otimes |\psi_{in}\rangle \mapsto |\phi_{out}\rangle \otimes |\psi_{out}\rangle$$

$$|0\rangle \otimes |0\rangle = |00\rangle \mapsto |0\rangle \otimes |0\rangle = |00\rangle$$
$$|0\rangle \otimes |1\rangle = |01\rangle \mapsto |1\rangle \otimes |1\rangle = |11\rangle$$
$$|1\rangle \otimes |0\rangle = |10\rangle \mapsto |1\rangle \otimes |0\rangle = |10\rangle$$
$$|1\rangle \otimes |1\rangle = |11\rangle \mapsto |0\rangle \otimes |1\rangle = |01\rangle$$

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True/False:

Two-qubit gates can be placed on quantum circuits in any order. FALSE

No matter how you place a gate on a multi-qubit quantum circuit, you will get the same result. FALSE

Any quantum gate can be made into the target part of a larger controlled gate. TRUE

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Circuit Transformation HOMEWORK

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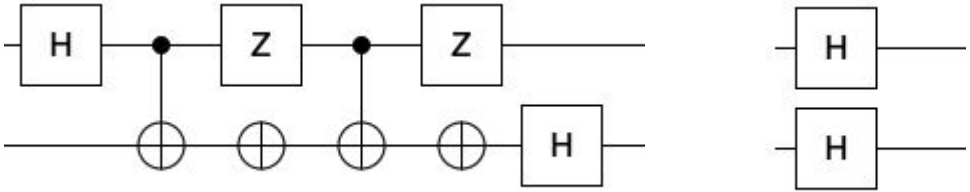
(True / False) These circuits are equivalent.



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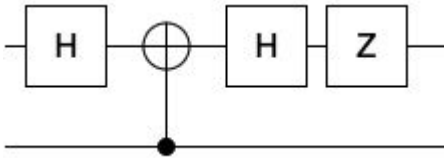
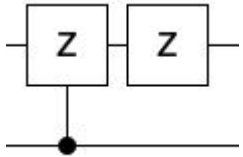
Which circuit is not equivalent to the rest?

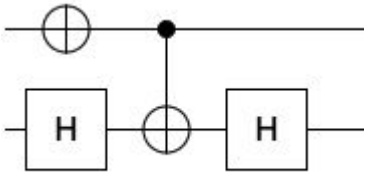
a.



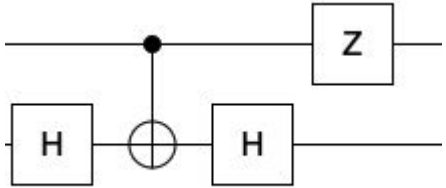
c.



b.



d.



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