

HOMEWORK 16

Question 1

How would you write the statevector of the following state:

$$|b\rangle = 0.4 \cdot |00\rangle + 0.65 \cdot |01\rangle + 0.21 \cdot |10\rangle + 0.61 \cdot |11\rangle$$

Please write it in the form "state_b = [a,b,c,d]" where a,b,c,d are numbers between 0 and 1.

(Hint: refer to Activity 1a of the notebook)

Question 2

How would you write the statevector of the following state:

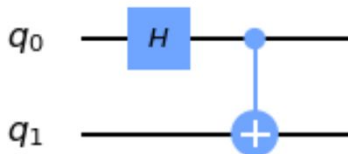
$$|b\rangle = 0.924 \cdot |00\rangle + 0.383 \cdot |11\rangle$$

Please write it in the form "b = [w,x,y,z]" where w,x,y,z are numbers between 0 and 1.

(Hint: refer to Activity 1b of the notebook)

Question 3:

What is the following circuit representing?

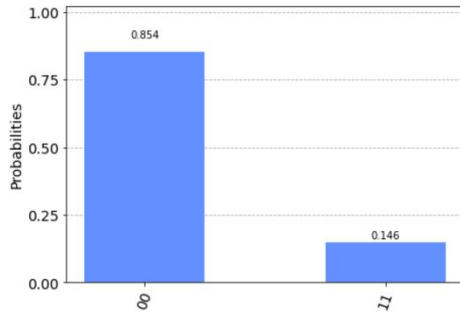


(Hint: refer to Activity 2a of the notebook)

- a) A 2 qubit circuit with an Hadamard gate on the first qubit, and a CNOT gate with the q0 qubit as the target and the q1 as the control.
- b) Two qubits placed in a superposition
- c) A qubit encoding known as the “Rick Purnell Maneuver”
- d) A Single qubit circuit with a bit flip and then a Hadamard gate applied.

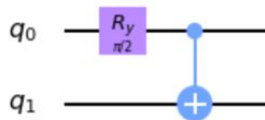
Question 4:

What circuit could create the following probability histogram?



(Hint: refer to Activity 2c and 2d of the notebook)

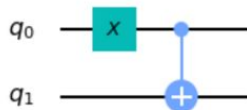
a)



b)



c)

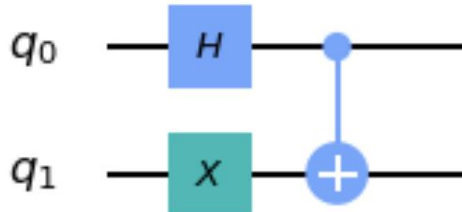


d)



Question 5

What Bell state does the following circuit create?

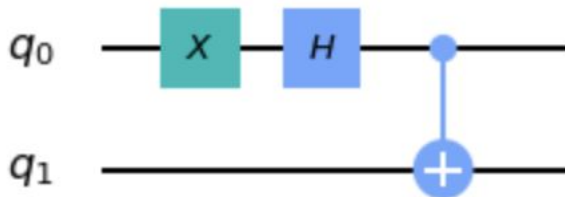


(Hint: refer to Activity 3 of the notebook)

- a) Φ^+
- b) Φ^-
- c) Ψ^+
- d) Ψ^-

Question 6 (this does not directly correspond to 5a on the notebook)

What Bell state does the following circuit create?



(Hint: refer to Activity 3 of the notebook)

- a) Ψ^+
- b) Φ^+
- c) Ψ^-
- d) Φ^-