Fall 2019
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QC101μ Introduction to Quantum Computing with IBM Q Experience

Mission 2: Bell state and entanglement

This assessment evaluates the following competencies:

- *QC102 – Understand the superposition and entanglement operations*
- *QC201 – Understand the notions quantum logic gate and perform simple operations on quantum circuits (X, H, CNOT)*
- *QC401 – Program a quantum circuit with IBM Q Experience and simulate it*

In this mission, you have to create a quantum circuit on the IBM Q Experience platform that computes one of the four Bell states, simulate it and analyse the obtained results. You have to present your manipulations to the teacher and explain how you built your quantum circuit. The four Bell states are:

1. $|\Phi^{\pm}\rangle = \frac{1}{\sqrt{2}}\left(|00\rangle \pm |11\rangle\right)$
2. $|\Psi^{\pm}\rangle = \frac{1}{\sqrt{2}}\left(|01\rangle \pm |10\rangle\right)$