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Quantum Computer Programming

Qiskit Section

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Questions Lectures 1

- What is the difference between a bit and a qubit?
    - Classical **Bit** → System that has classical states 0 or 1.
    - **Quantum States** → Unit (column) vectors in a Hilbert space.
    - **Qubit** (Quantum bit) → Quantum state in a two-dimensional Hilbert space.
- What is a superposition of states?
    - **Superposition** of states = Linear combination of the basis states.

Questions Lectures 1

- How do we obtain information about a qubit?

$$|\psi\rangle \xrightarrow{measure} \begin{cases} 0, \text{with probability } p_0 = |\langle\psi|0\rangle|^2 = |\alpha|^2, \\ 1, \text{with probability } p_1 = |\langle\psi|1\rangle|^2 = |\beta|^2. \end{cases}$$

- What is a global phase?

Global Phase

$$|\psi\rangle = e^{i\theta} |\phi\rangle$$

Questions Lectures 1

- What are some components of a quantum circuit?