Exercise: Understanding Qubit States

Objective: Learn to represent and visualize basic qubit states on the Bloch sphere.

Tasks:

- **Initialize a Qubit in the |0⟩ State:**
  - Create a simple quantum circuit with one qubit in the *|0⟩* state.
  - Visualize this state on the Bloch sphere.
- **Change to |1⟩ State:**
  - Apply the X gate (also known as a NOT gate) to change the qubit to the *|1⟩* state.
  - Visualize the *|1⟩* state on the Bloch sphere.
- **Create a Superposition:**
  - Apply the Hadamard gate to create a superposition state.
  - Visualize how the state changes on the Bloch sphere.