Superposers

Superposers is an action and puzzle game that helps users become familiar with quantum circuit logic. As users traverse a level of obstacles and buttons, they act as qubits passing through gates, and the objective is to pass through the correct gates to form a quantum circuit, such as the Bell State circuit or the GHZ State circuit. Users choose which platforms to jump to, or which gates to go through, and attempt to create a circuit that best matches the desired final behavior. There are buttons along the way that the character can jump on in order to alternate between controlling q0 and q1. This way, users can have fun while learning how quantum circuits are composed and what kind of calculations they can generate.

In building our proof of concept for Superposers, we aimed to create a tool that would harness the power of video games in order to help people easily gain familiarity with quantum computing topics. Although there are many learning resources available for people to learn about quantum computing, many of them are intimidating, assume prior knowledge, or are textbook-based. We wanted to gamify the quantum circuit construction process in order to truly engage people from all levels, ages, and interests in discovering the power of quantum computing.

Our Github repo presents our proof of concept for Superposers, including the platformer JavaScript game with 5 levels and our Qiskit JavaScript back-end, both on a web browser powered by HTML. As players run through the platformer game, our infrastructure records the gates they go through for each qubit, and at the end sends that information to our Qiskit logic, which calculates the result of the circuit created.

In future iterations, we would have a user interface graphically showing the final circuit made and what final state and probability distribution it produces, comparing that to the desired behavior with the objective circuit. We would also allow a two player mode where each user is a qubit, in order to better simulate the process of constructing a two-qubit circuit. Finally, we would improve upon our game design in order to provide hints for the correct platforms to jump to and clearly indicate which platform represents which gate. With these additions, Superposers would revolutionize the way people from all walks of life can begin to learn quantum computing, making quantum computing more inclusive and accessible for all. We are changing the world one superposition at a time, we are the Superposers.