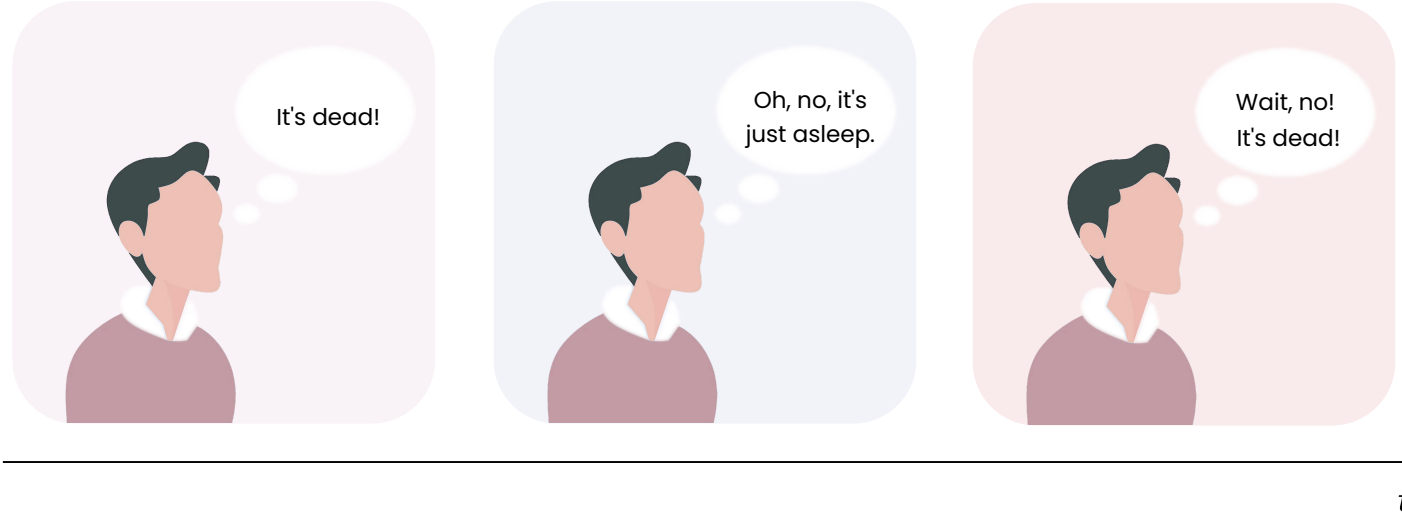
The man sees a cat that is standing still on a shelf. Nothing but some light movements of the cat's fur is noticed by the man, who cannot decide whether the cat is dead (and the perceived movement is due to an air current) or if it is sleeping.

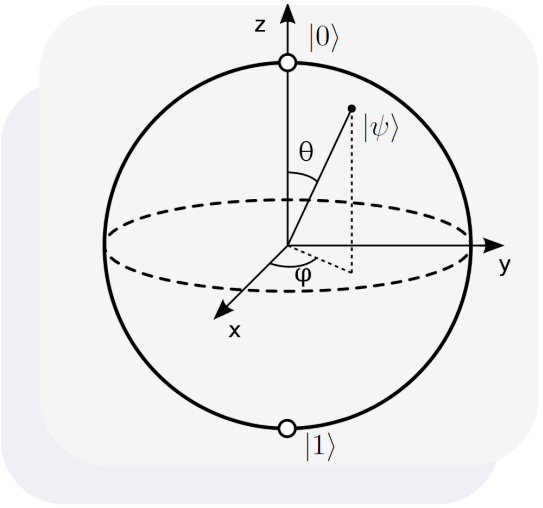
Right now he is experiencing a **superposition** of conscious states, because the perceptual stimuli that he receives are not strong enough to make him clearly feel that the cat is sleeping, neither that the cat is dead.

Over time, his consciousness oscillates between the two superposition states (at least, until he does not receive a stronger stimulus that makes him certain about one of the two situations)



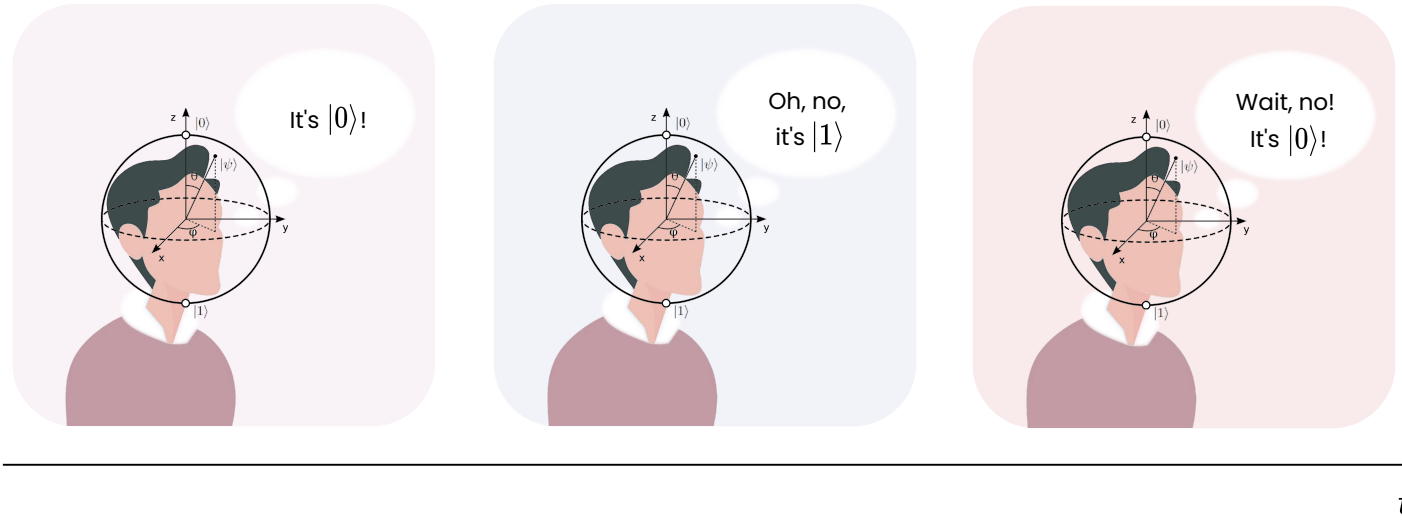
Quantum-like (QL) perception models in cognitive sciences reproduce this behavior by exploiting quantum systems properties. Considering the most simple quantum system, the qubit, QL models can mimic behaviors like the one we just saw.

A **qubit** is a two-state quantum-mechanical system (e.g., the spin of the electron in which the two states can be taken as spin up and spin down).



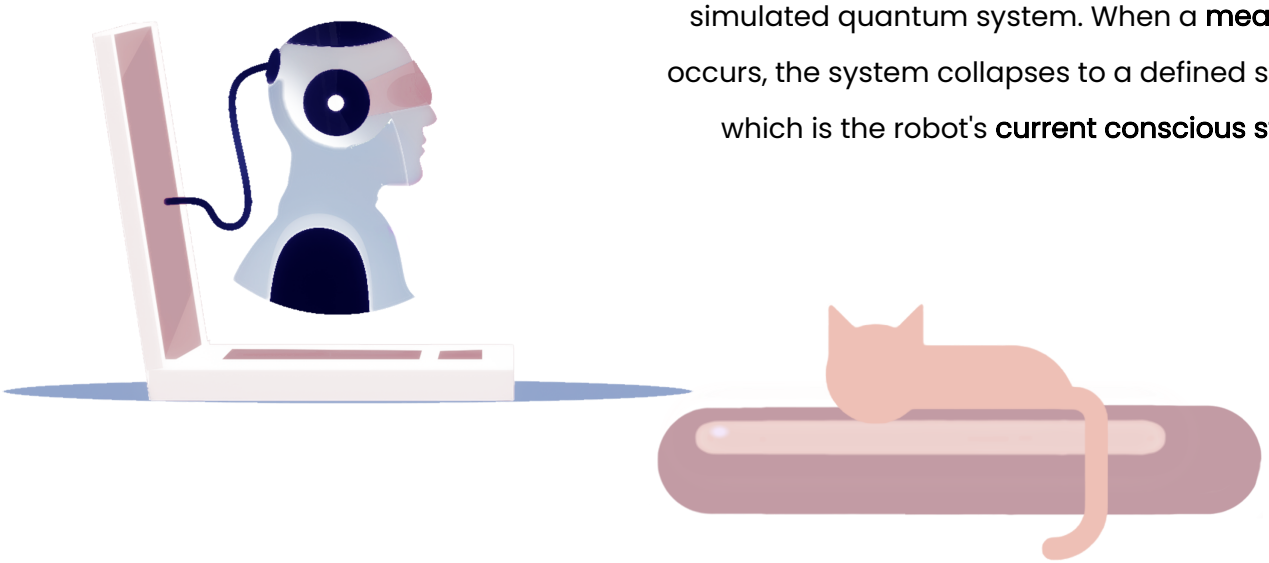
In quantum computing, a qubit is the basic unit of quantum information —the quantum version of the classical binary bit. Whether in a classical system a bit has to be in one state or the other (namely, 0 or 1), a qubit can be in a **coherent superposition of both states** simultaneously.

Measuring the qubit' state causes its **collapse** on one of the two states, i.e., the qubit' state pass from a superposition of states to being a single, defined state. A measurement **stops the evolution** of the system over time and forces its state into one of the two basis states (the ones in superposition). When the system is not observed anymore, it **resumes** its evolution over time.



Through the superposition, "*the two alternatives exist at the **perceptual-cognitive level**. Then, they pass at the **decisional and conscientious level** towards a selection of the two subsisting alternatives. An alternative logical structure is delineated, a structure of the simultaneous YES and NO*" (Elio Conte) where the cat is dead and yet sleeps simultaneously.

What we do with robots is to reproduce this behavior through simulated quantum systems:



Based on the perceptual stimuli received, the robot represents its knowledge by means of a simulated quantum system. When a **measure** occurs, the system collapses to a defined state, which is the robot's **current conscious state.**

After collecting data for a certain time period ΔT, a measurement occurs: