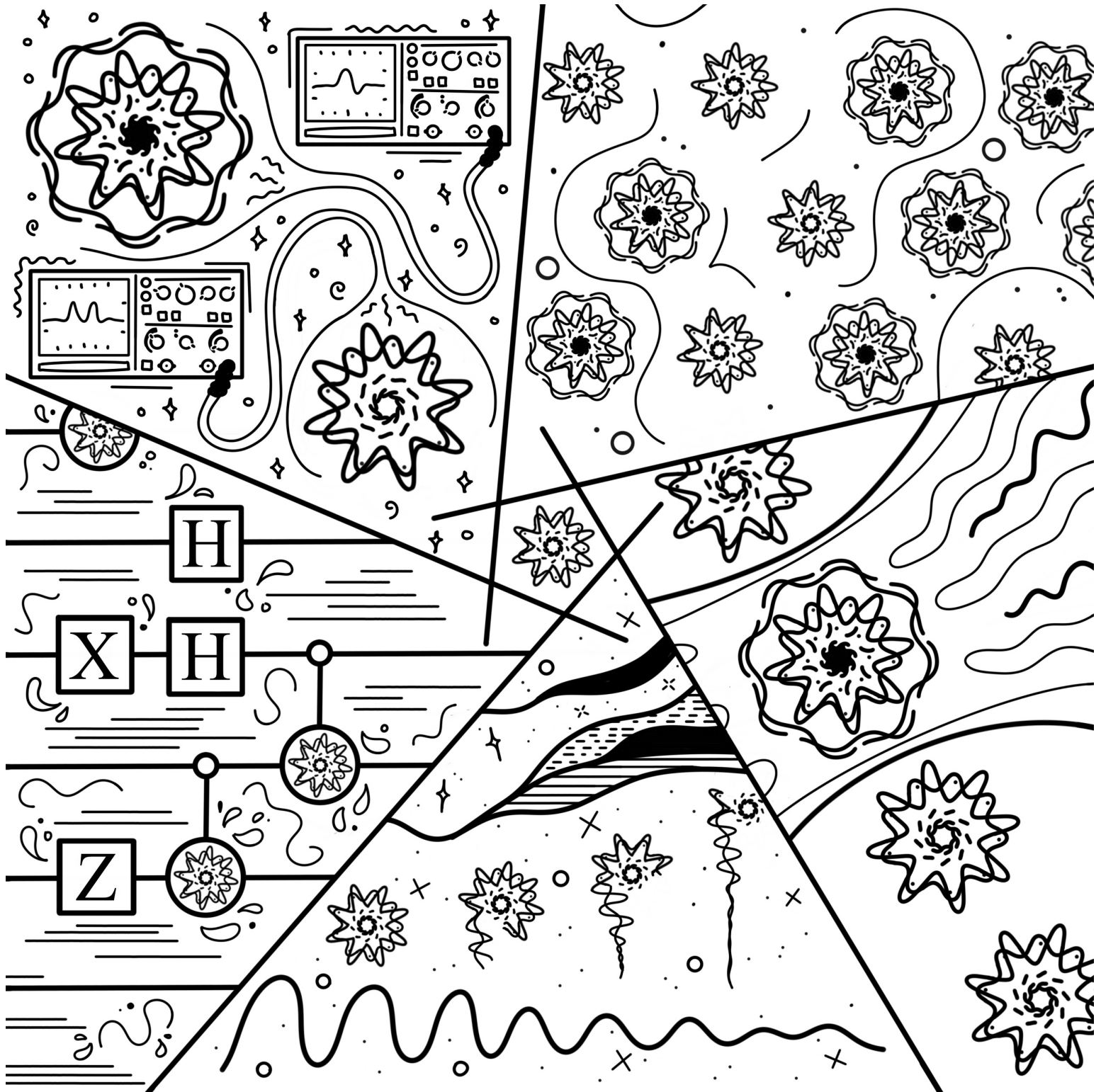




DiVincenzo Criteria



What do scientists need to make a quantum computer? In 1996, theoretical physicist David DiVincenzo came up with five important rules, known as the DiVincenzo criteria, needed for qubits to form a functional quantum computer:

1. Lots of **qubits** that work well together: Qubits are the smallest units of information used in quantum computers. A useful quantum computer needs a large number of qubits that can handle calculations without losing their special quantum properties.
2. Ability to set up the qubits in certain states: Before they can be used in calculations, qubits need to be prepared in the right set of conditions, or starting state.
3. Long **coherence** times: Once qubits are set up, they have to stay in the same state until the quantum computer applies changes to the qubits according to a set of rules. This is called "coherence". If qubits lose coherence too quickly, the calculations won't work.
4. Universal set of **quantum gates**: The quantum computer needs to be able to change the state of the qubits according to a set of rules in order to perform calculations.
5. Ability to measure each qubit: After the quantum computer finishes a set of calculations, each qubit needs to be measured so that we can understand the results