This little thing called qubit

qubit (or qubit) stands for “quantum bit”. In classical computation one uses **bits** for computation whereas **qubits** are used in quantum computation.

What is a bit ?

A bit is used in classical computation to carry information. It is an electrical state with two levels, for instance 1 Volt and 4 Volts. At each state is associated a numeric value: 0 or 1. This is the basic of binary numeric system.

In computers, classical microprocessors are running billions of operations using bits every second. Therefore your computer encode all values into a series of bits. For instance the value 7 is encoded as follow in a byte (a byte is a set of 8 bits):

0 0 0 0 0 1 1 1

I won't explain how to encode and decode values from mathematical value to binary value, someone else already did that right:

https://ccm.net/contents/57-binary-encoding

You'll need to be ease with this to understand what follows.

What is a qubit ?

Classic bits are based on voltage associated to binary level 0 or 1, while qubits are based on quantum states.
A qubit is a particle and has 2 base states noted |0> and |1> (called Dirac notation, we'll see that in details later). As a quantum particle, it is in superposed state before being read. Like the cat that is both dead and alive while you open the box.