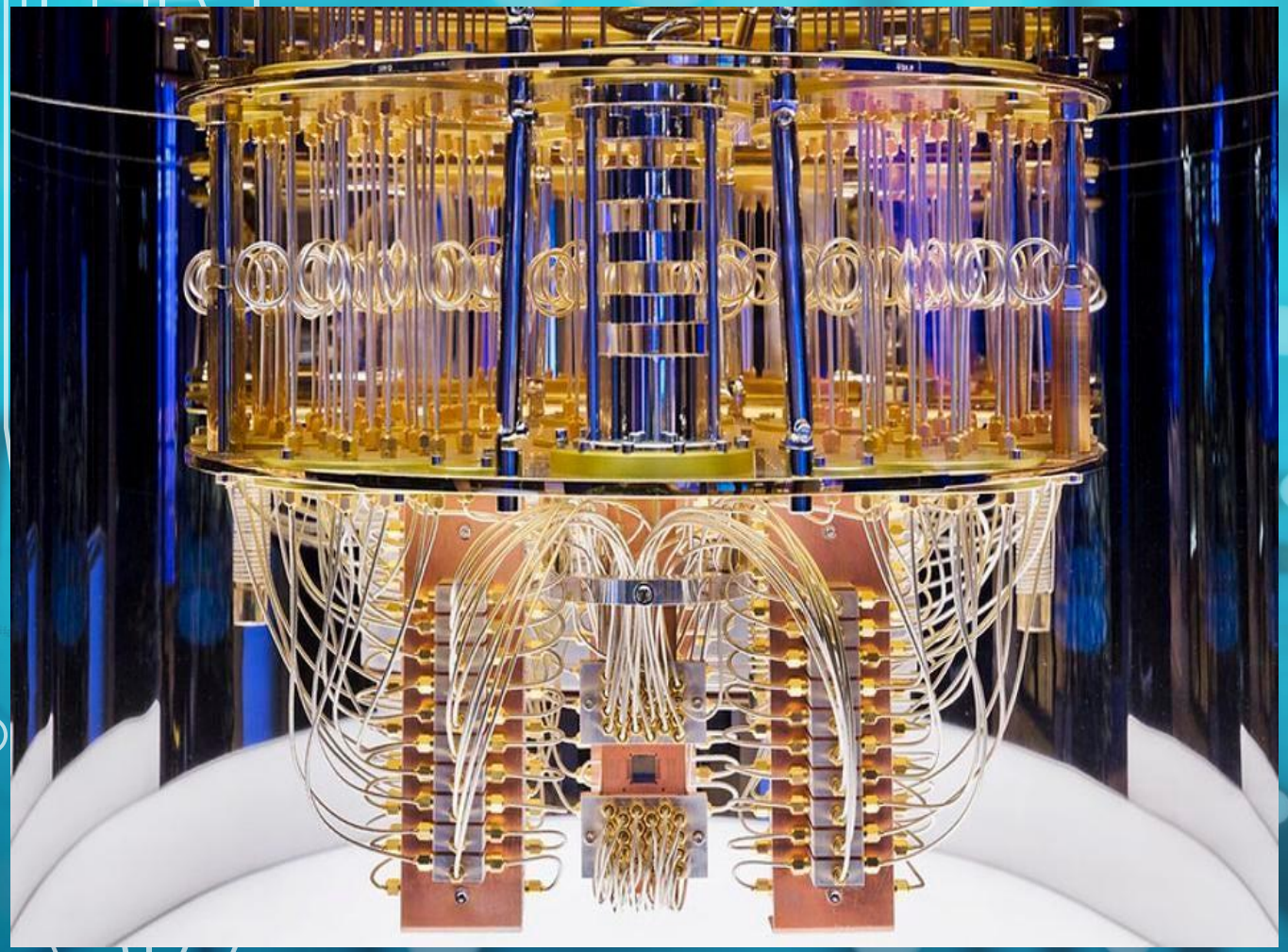
QUANTUM COMPUTER

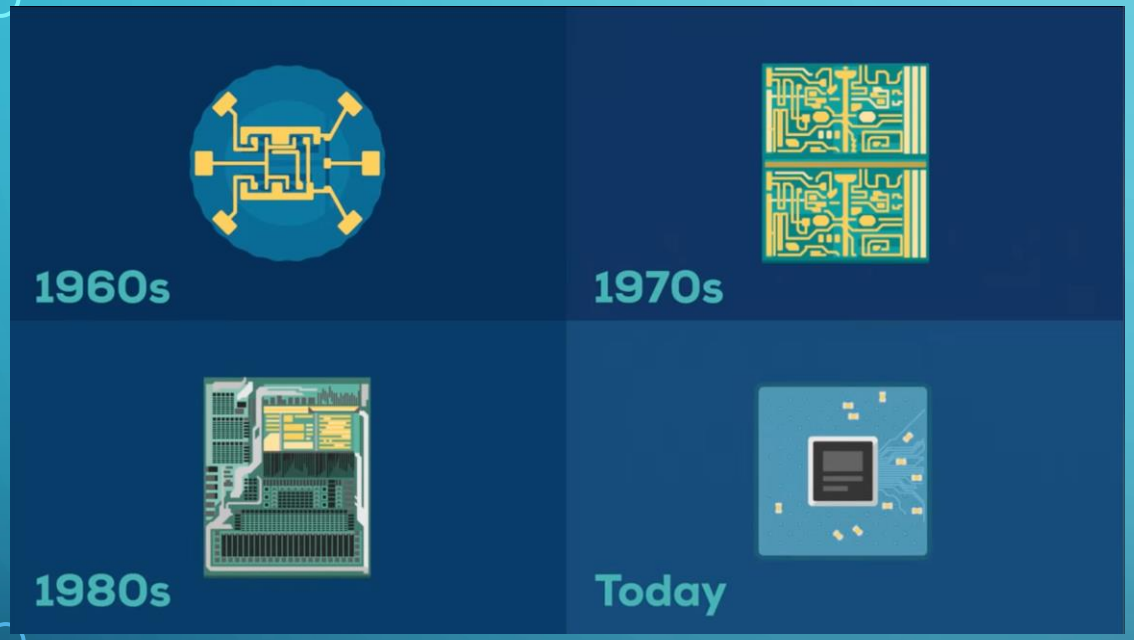
NGUYEN VANTAI

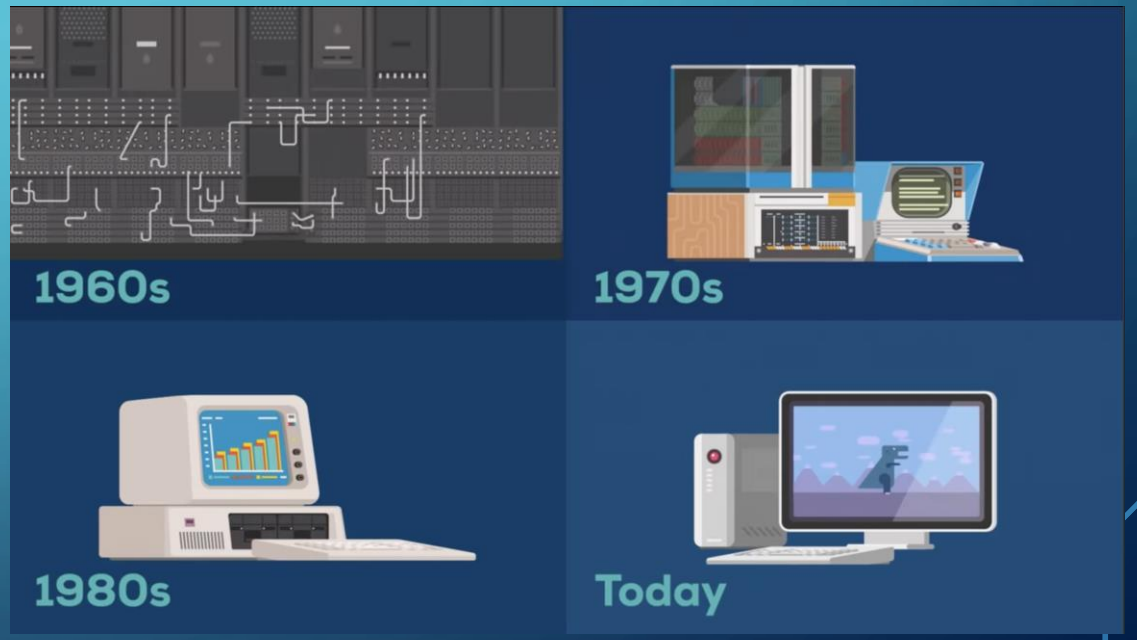


QUANTUM COMPUTER

- What's quantum computing ? and why do we need them ?
- How does it work ?
  - Qubit
  - Superposition
  - Entanglement
  - Quantum circuits
  - Example a maze
- Limits and benefits of quantum computer .

COMPUTER TECHNOLOGY TODAY





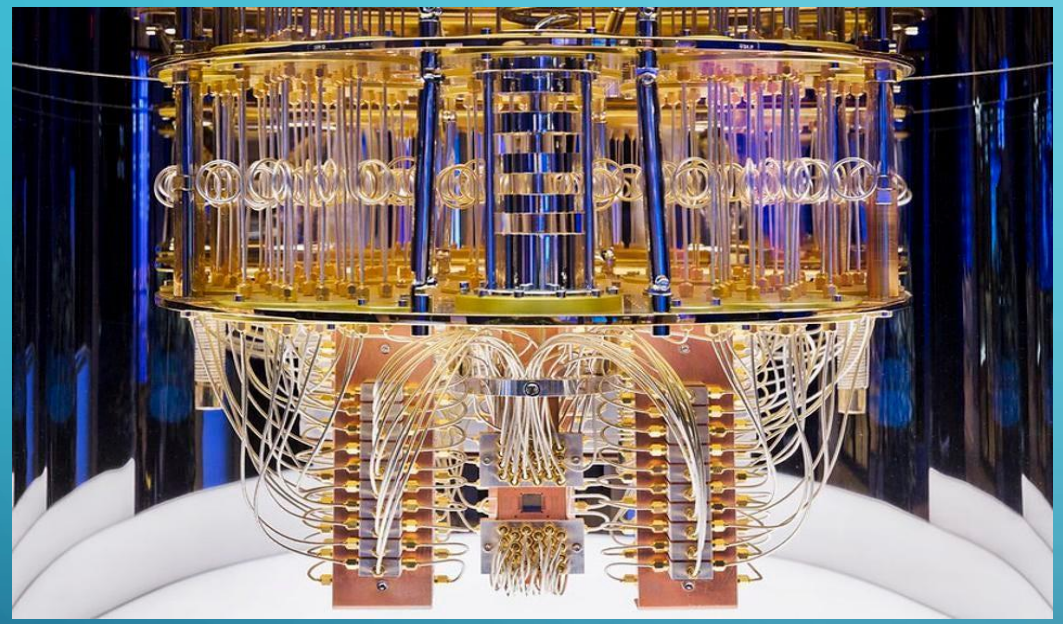
COMPUTER TECHNOLOGY TODAY

7-nanometer process technology

What are the limits of human technology ?

WHAT'S QUANTUM COMPUTING ?

WHAT'S QUANTUM COMPUTING ?



Quantum Computer

Technology based on the principles of quantum theory.

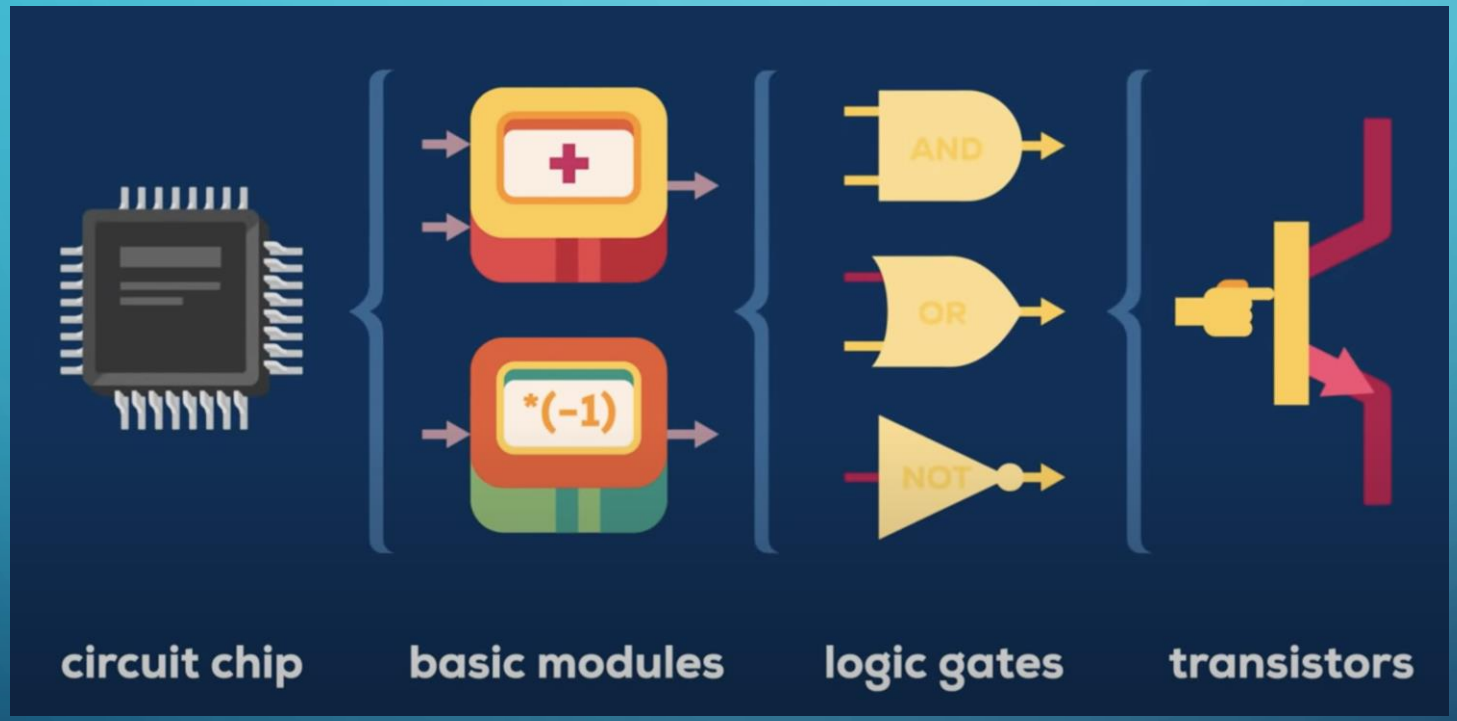
Supercomputer

A computer with thousands of classical CPU and GPU cores.

HOW DOES IT WORK ?

HOW DOES IT WORK ?

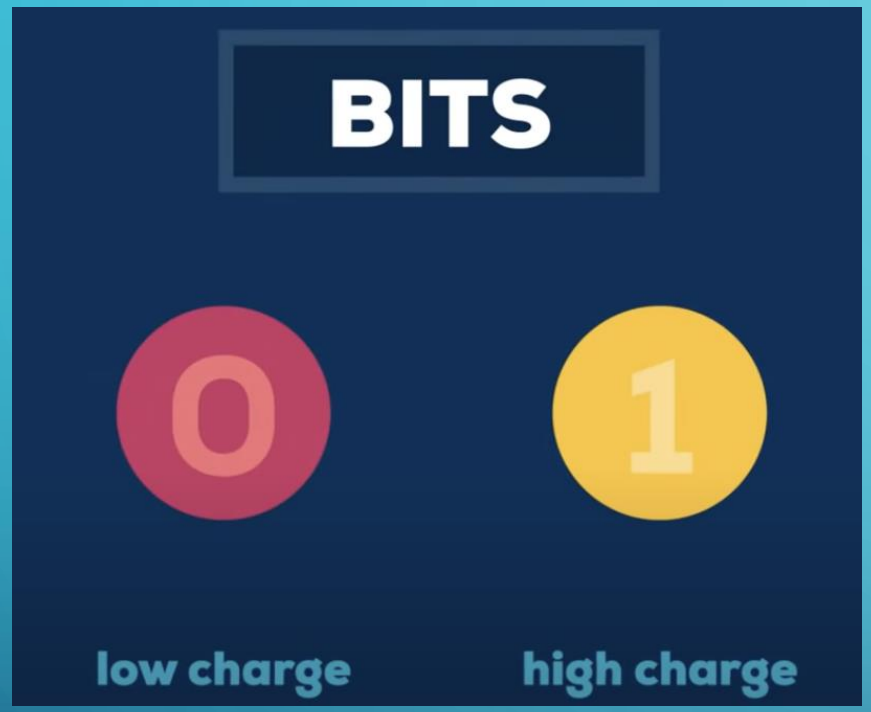
A classical computer



Components of computer :

- Main memory
- Arithmetic unit
- Control unit

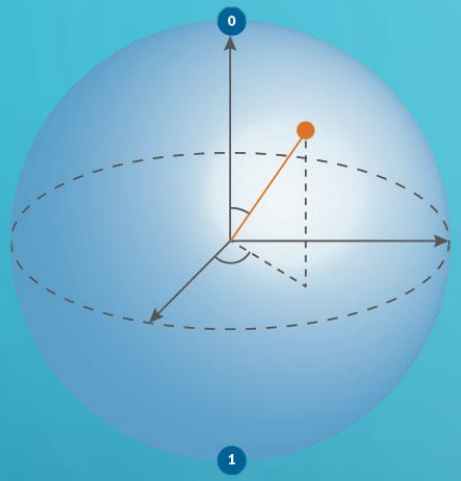
BITS AND QUBITS



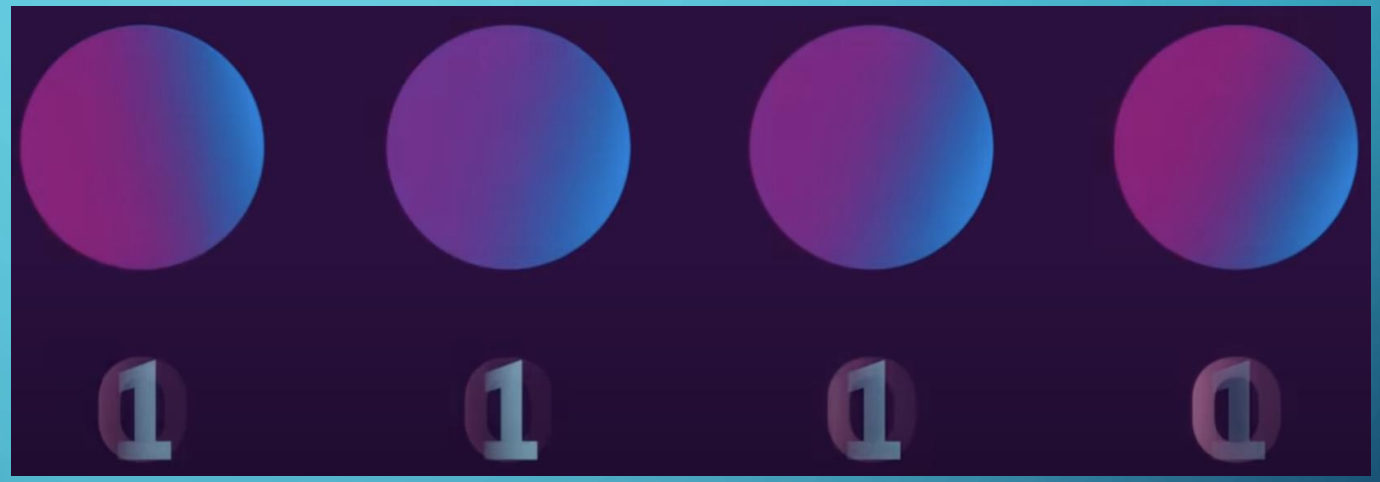
For classical bits can be in one of two to the power of four different configurations at a time, that's 16 possible combinations, out of which you can use just one.

For qubits in superposition, however can be in all of those 16 combinations at once.

SUPERPOSITION

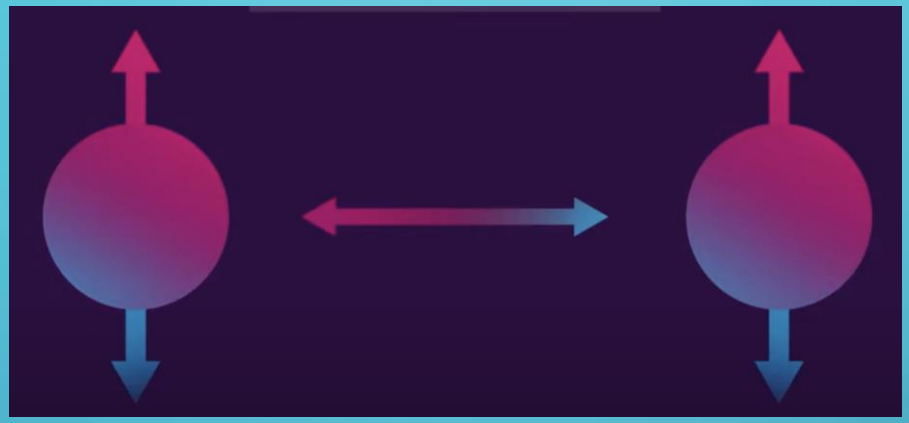


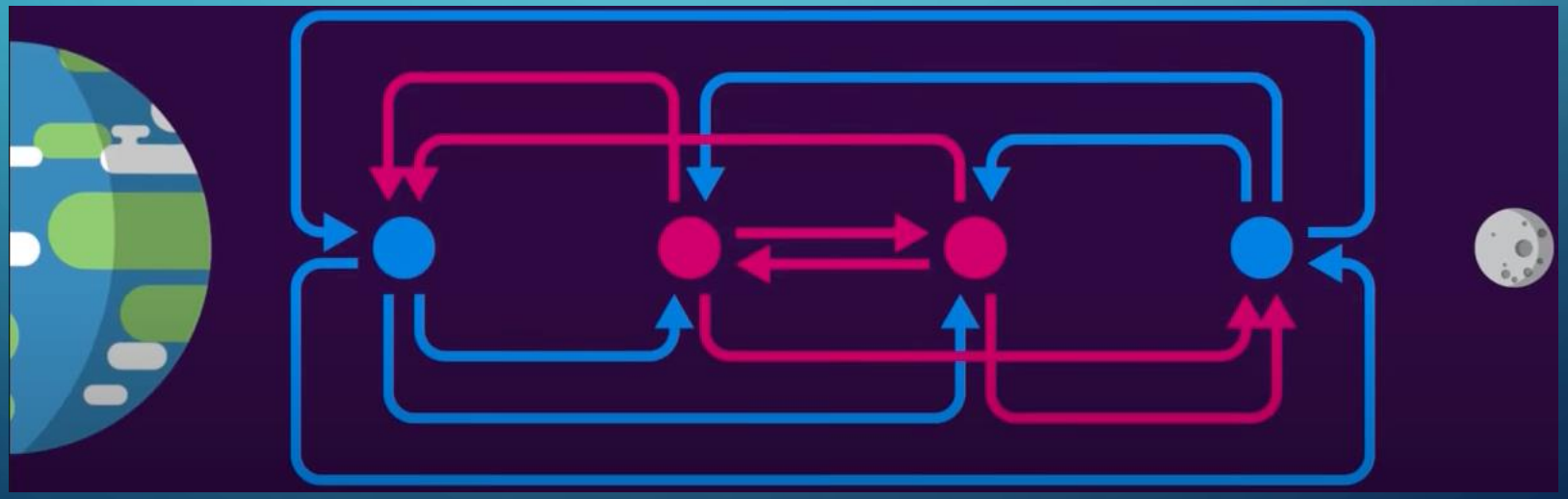
A qubit



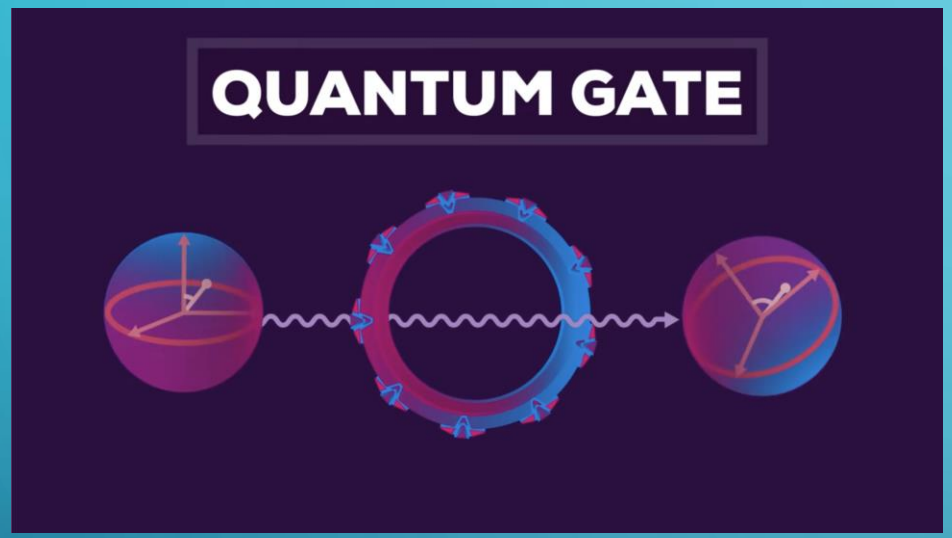
A computer consisting of n qubits can exists in a superposition of 2^n states: from 000…0 to 111..1

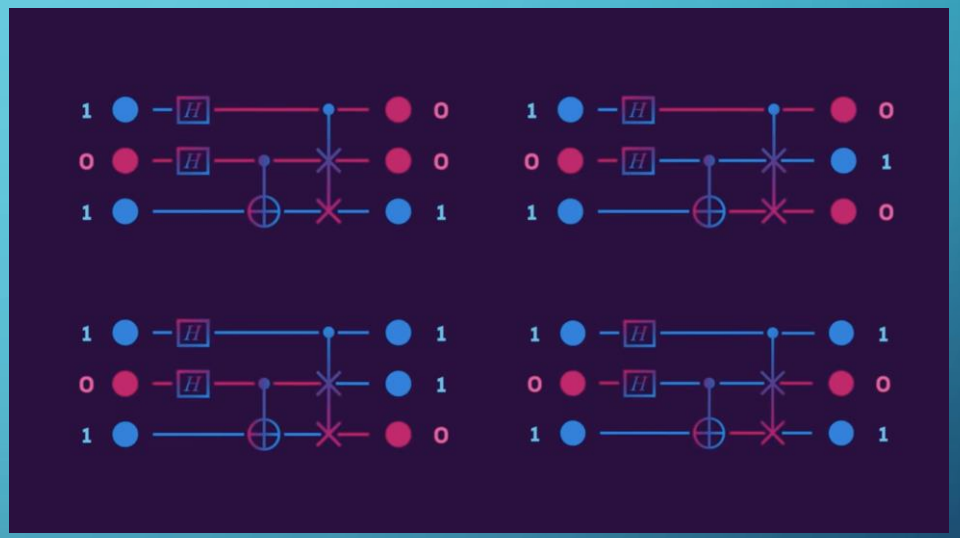
ENTANGLEMENT



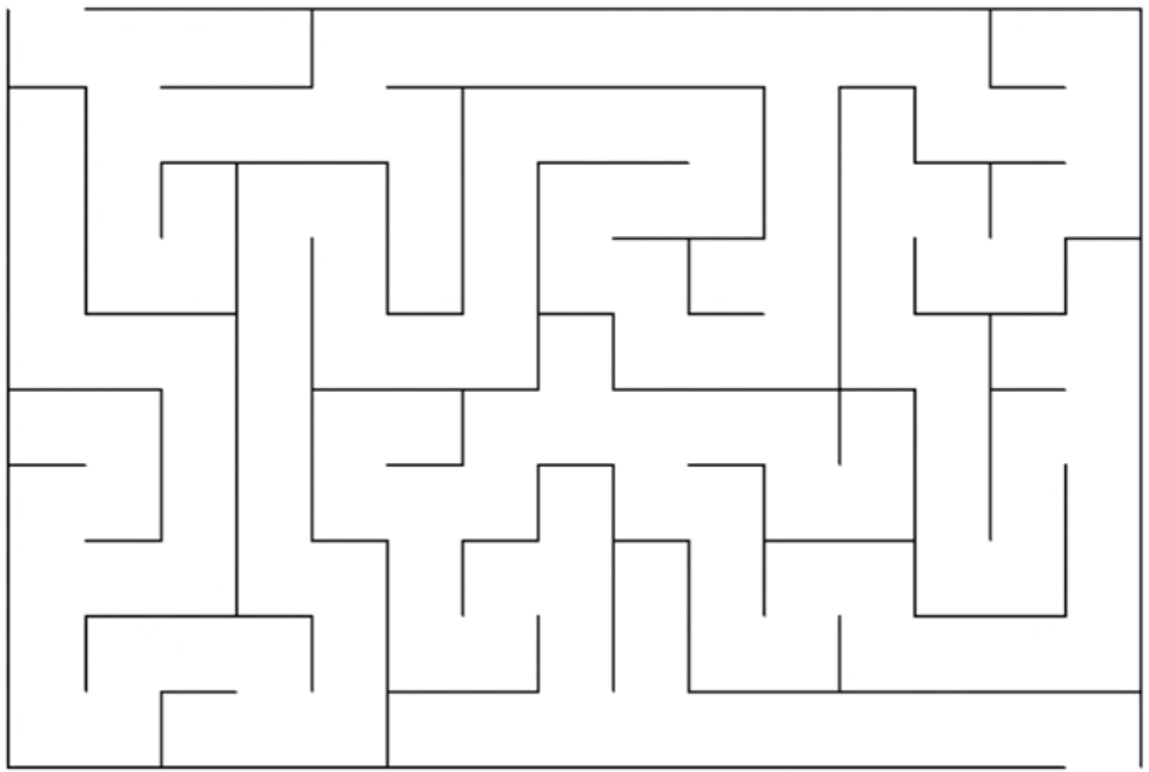


QUANTUM CIRCUIT

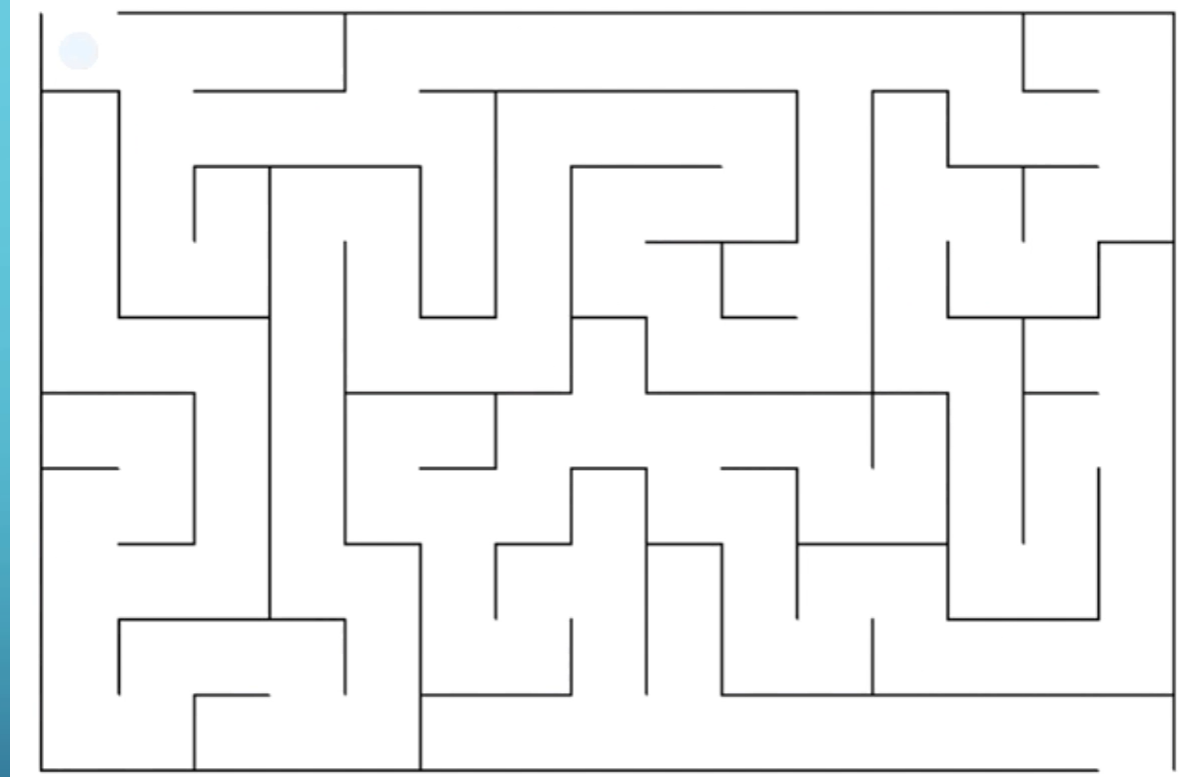




EXAMPLE A MAZE

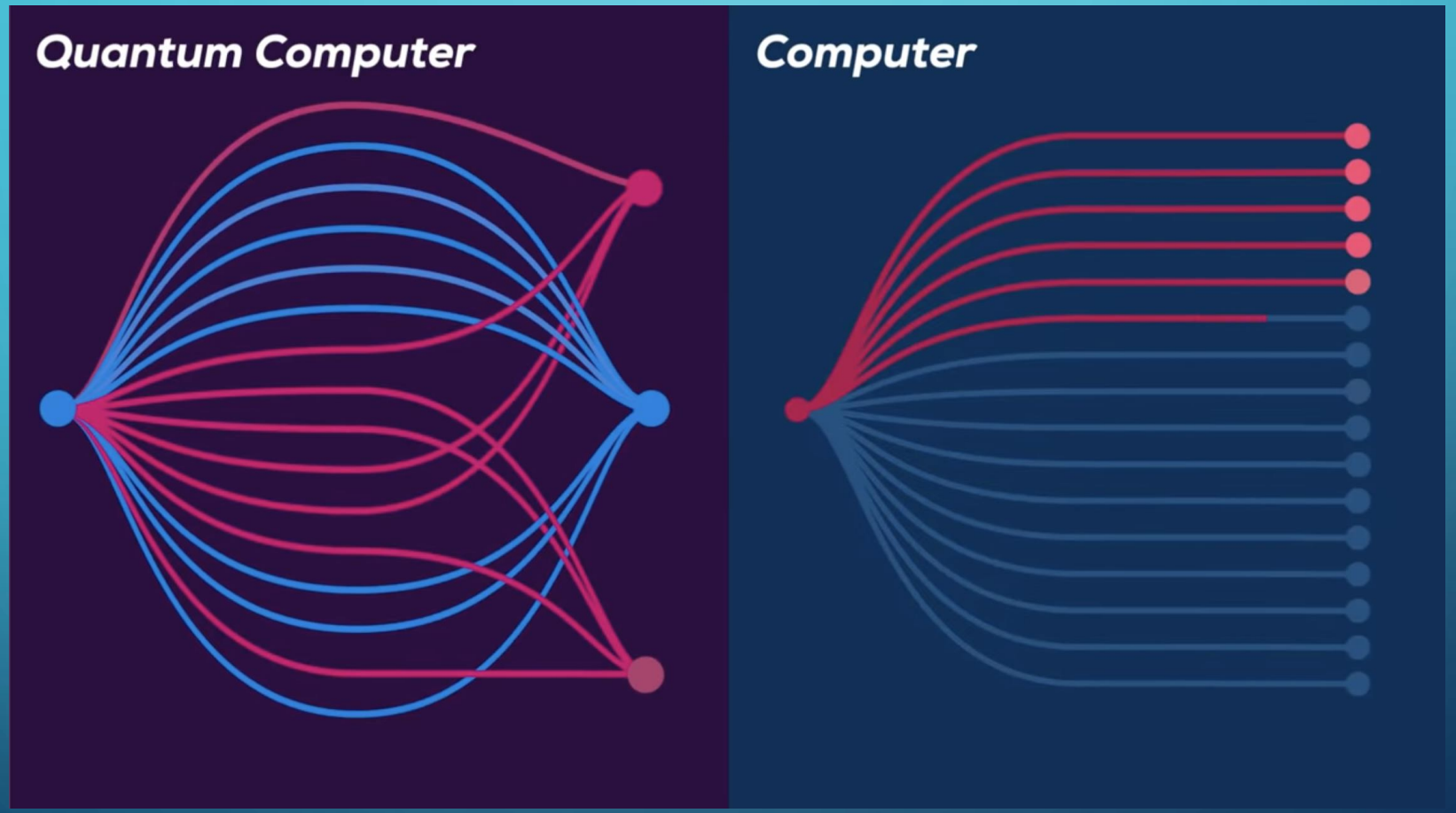


How quantum computer would solve a maze



How classical computer solves a maze

EXAMPLE A MAZE



LIMITS AND BENEFITS

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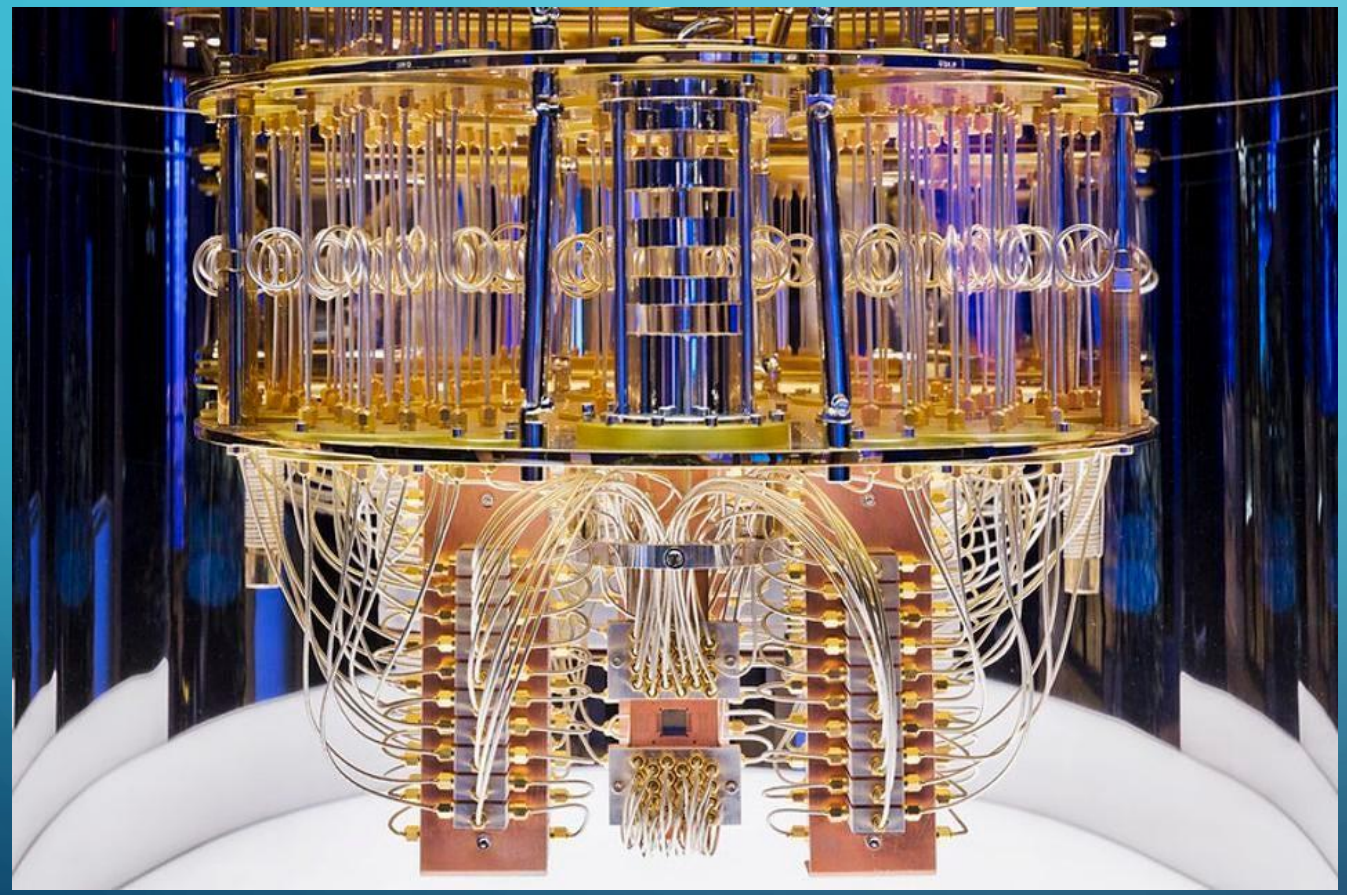

- Difficult to engineer, build and program
- Faults and loss of quantum coherence
- Will not probably not replace our home computer
- Should know so much law of mathematic, physical to build

LIMITS AND BENEFITS

THANKS FOR LISTENING !

Read more :

- https://www.ibm.com/quantum-computing/what-is-quantum-computing/
- https://www.newscientist.com/question/what-is-a-quantum-computer/
- https://www.youtube.com/watch?v=JhHMJCUmq28
- https://en.wikipedia.org/wiki/Quantum_computing
- https://www.scientificamerican.com/video/how-does-a-quantum-computer-work/