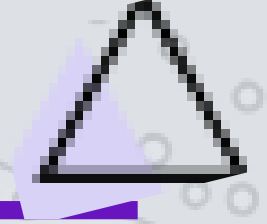
ESCUELA EN ESPAÑOL

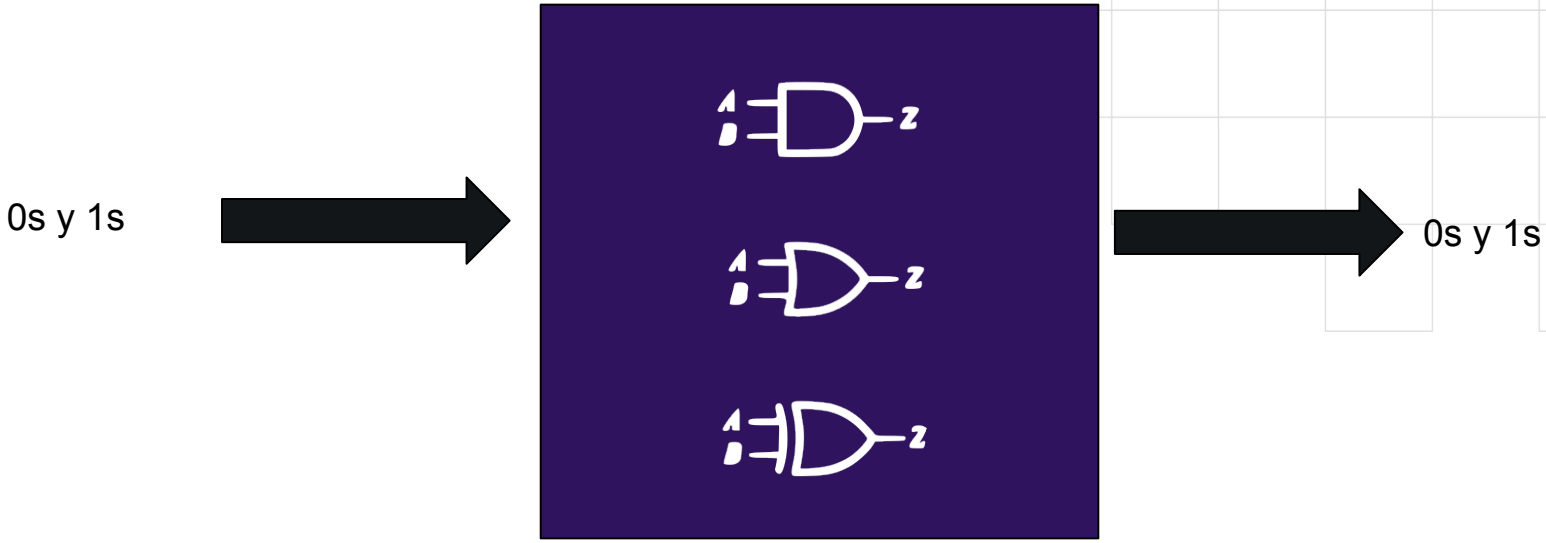
QISKIT FALL FEST



Analogía

Computación

Computación

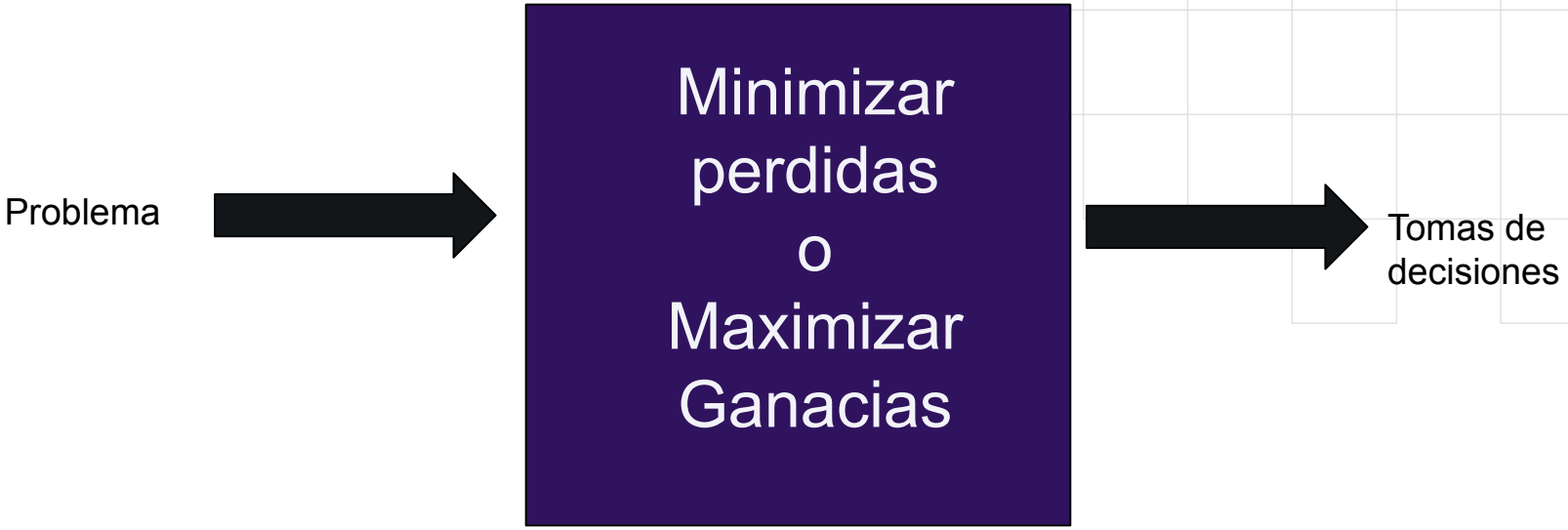


Computación

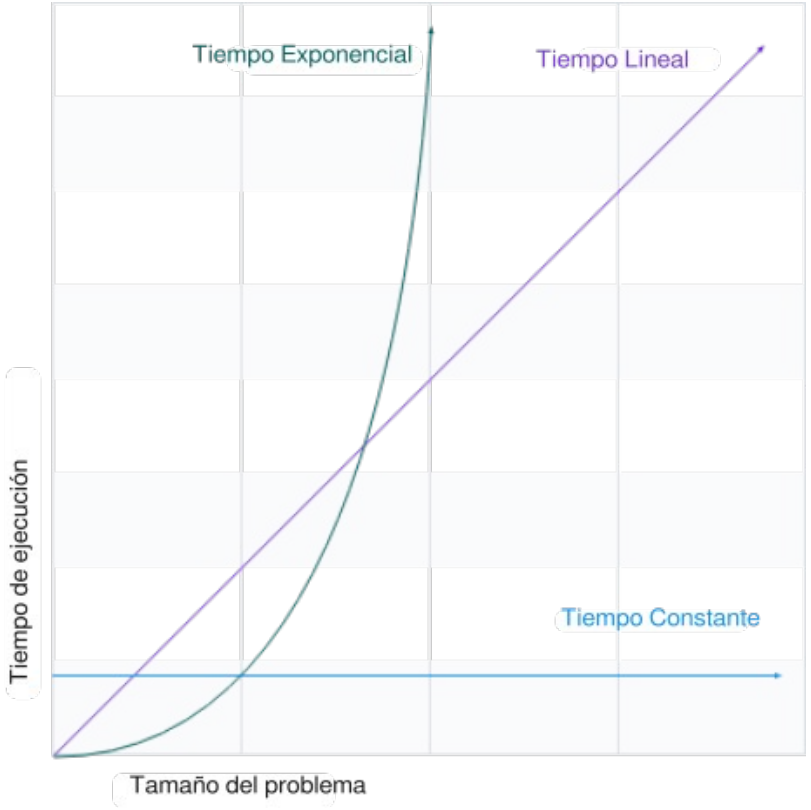
Computación

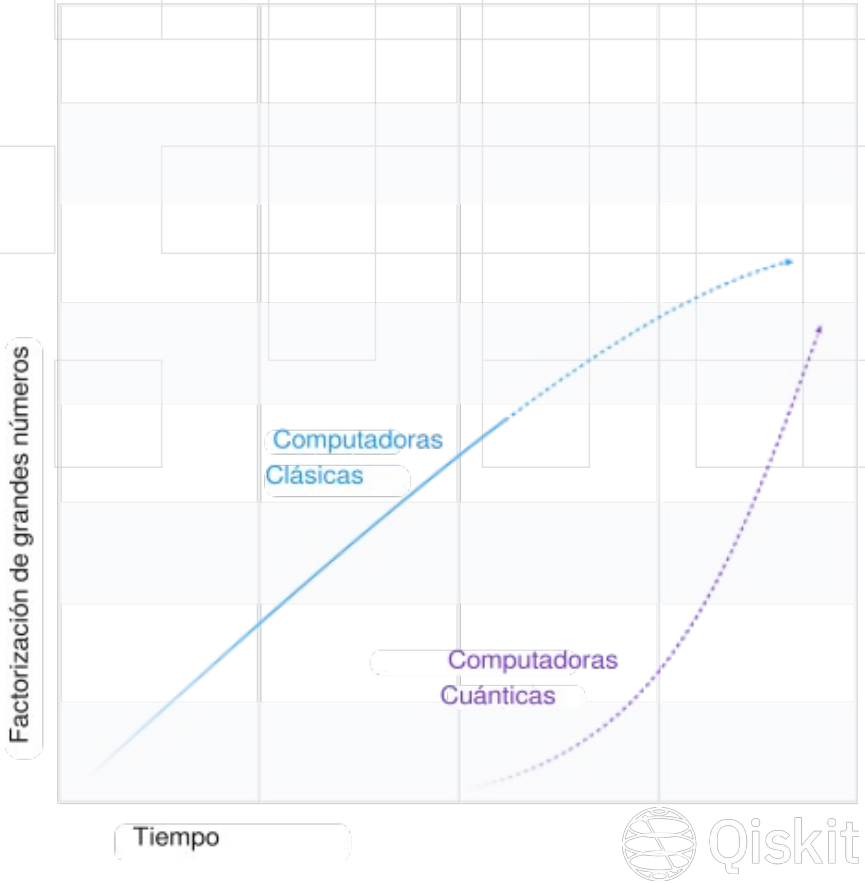
Computación

Computación



Complejidad Computacional





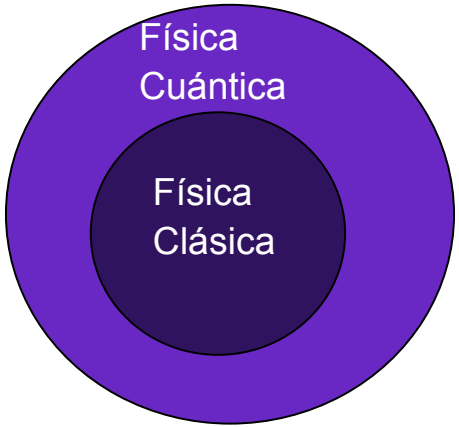
Analogía

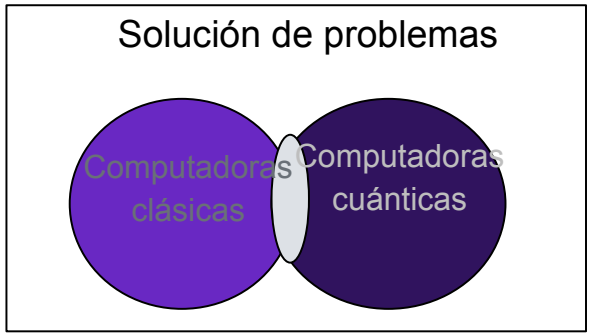
Cuántica

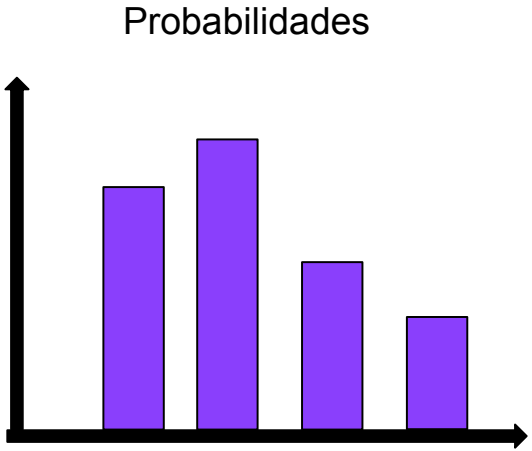
Código: AX-213-AW

¿Qué es una computadora cuántica?

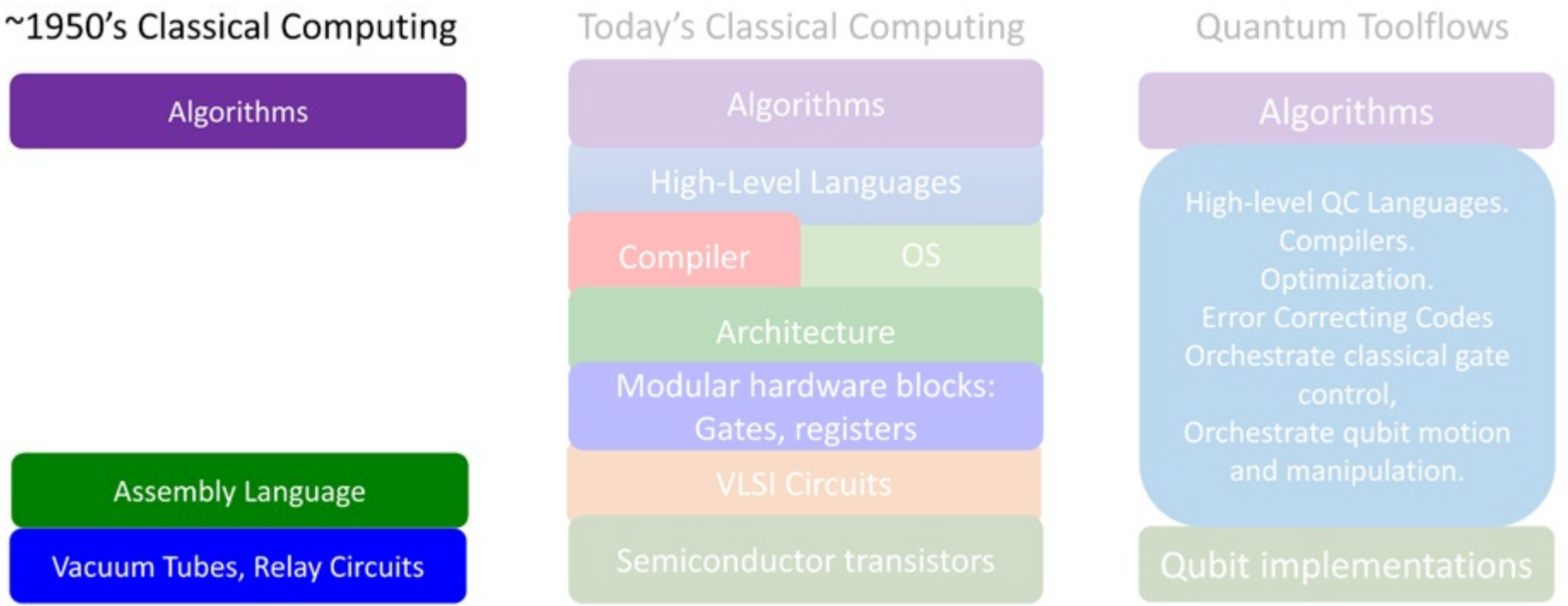
Los actuales sistemas de procesamiento de información están basados en la física clásica.





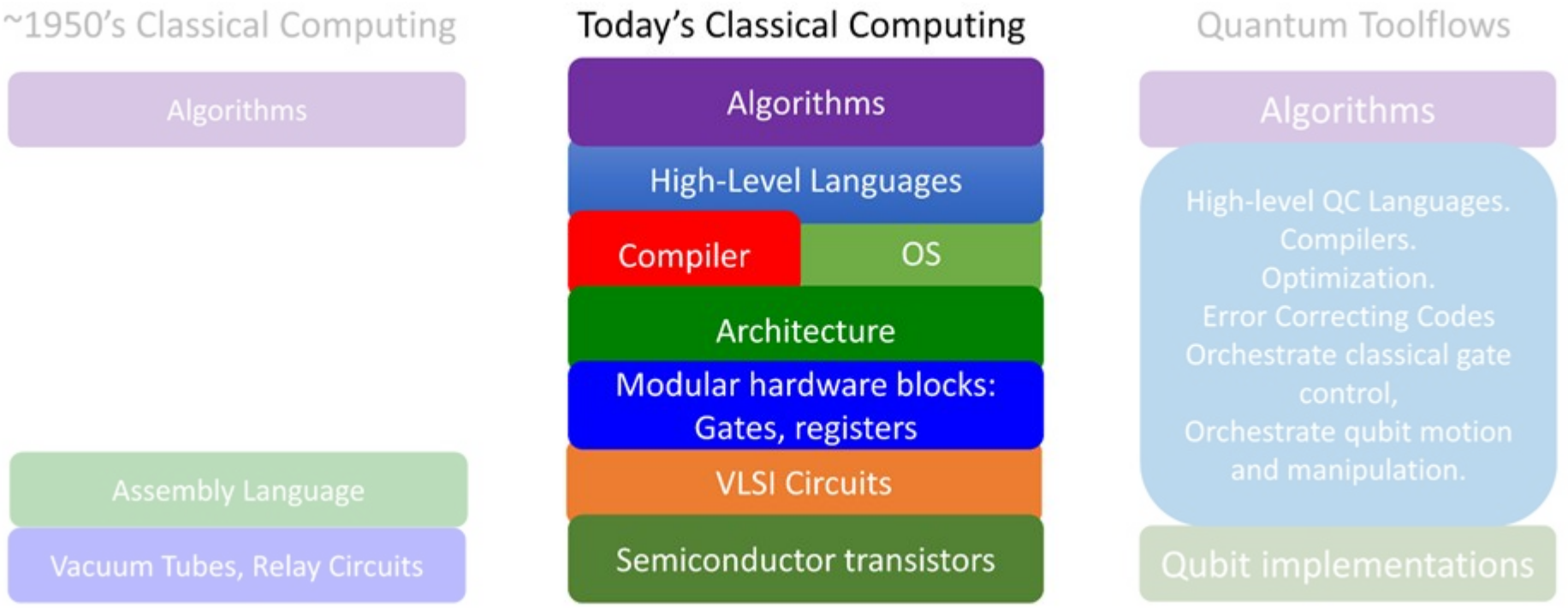


Código: AX-213-AW



Código: AX-213-AW

si and M. Roetteler, "Next steps in quantum computing: Computer science's role," Computing Research Association CCC Catalyst, Nov 2018.



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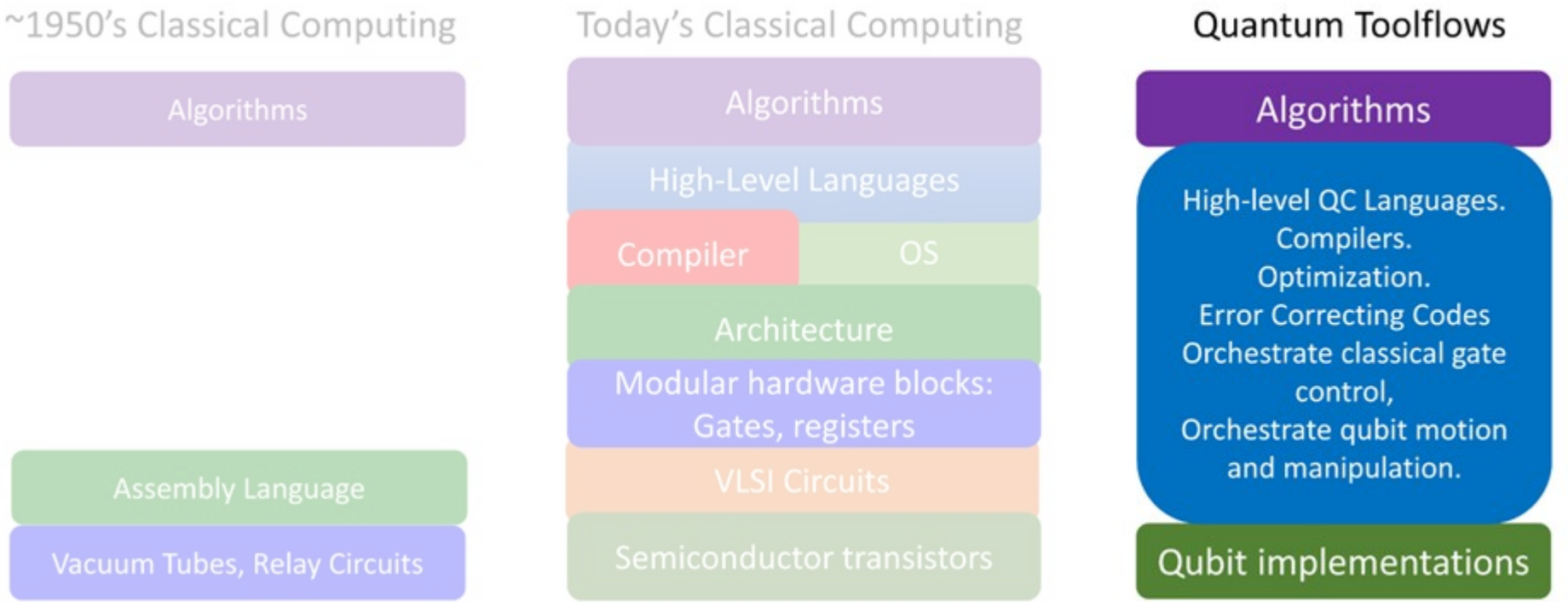


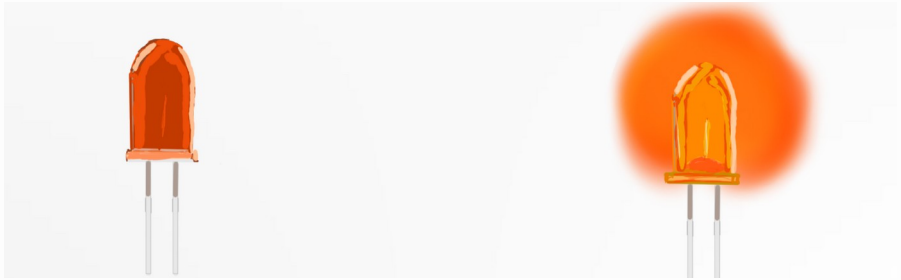
Código: AX-213-AW

si and M. Roetteler, "Next steps in quantum computing: Computer science's role," Computing Research Association CCC Catalyst, Nov 2018.

bit clásico

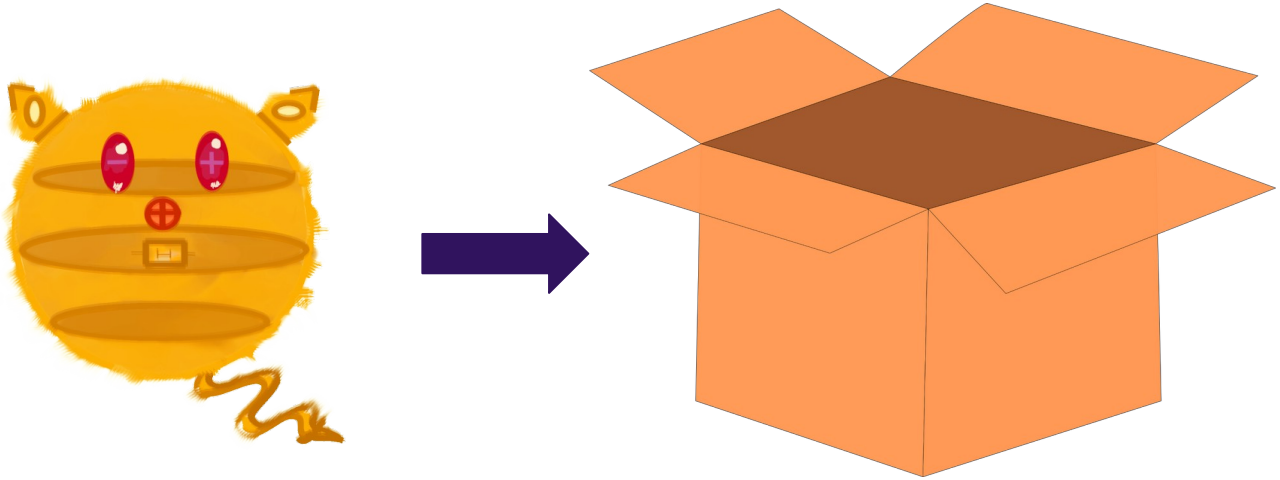
0

1



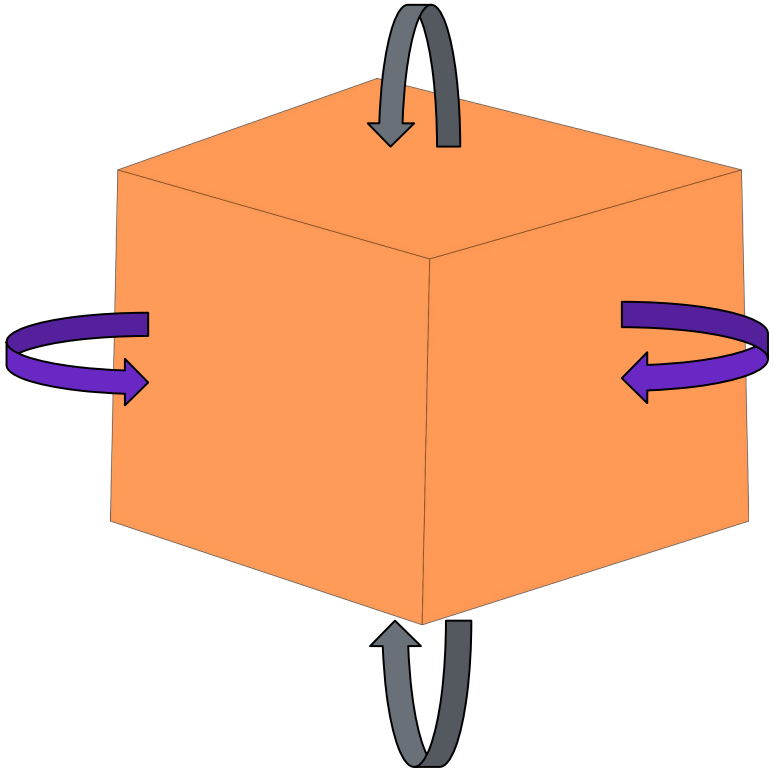
bit cuántico

Bit cuántico



Qiskit

Bit cuántico



Qiskit

Bit cuántico

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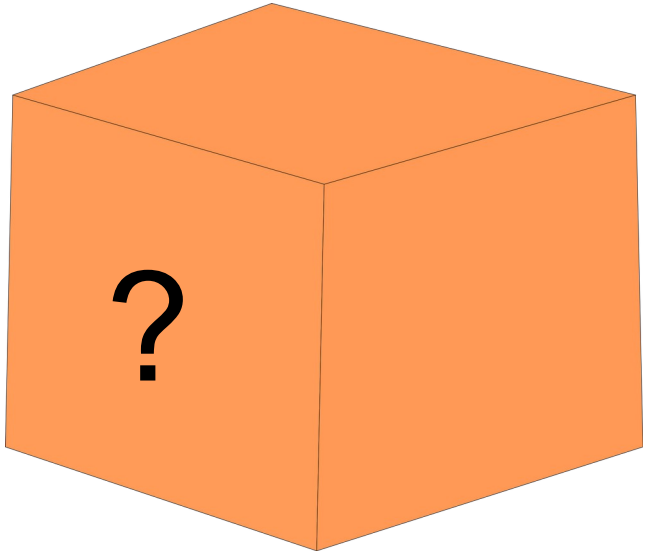
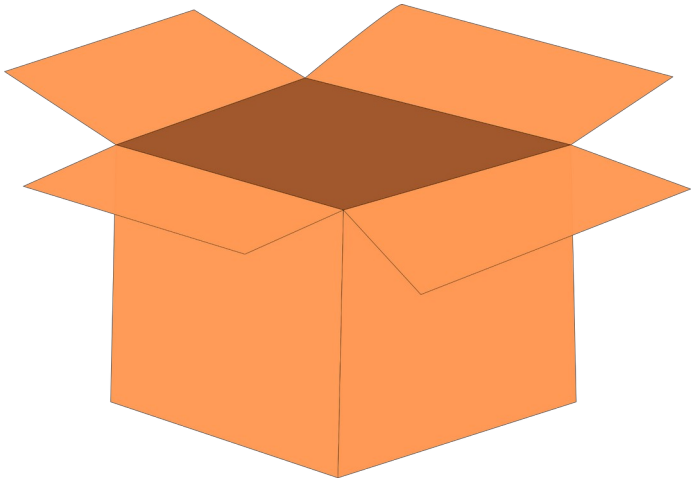


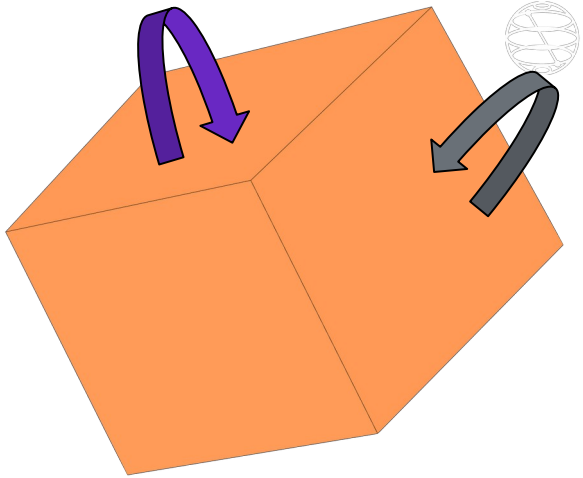
Qiskit

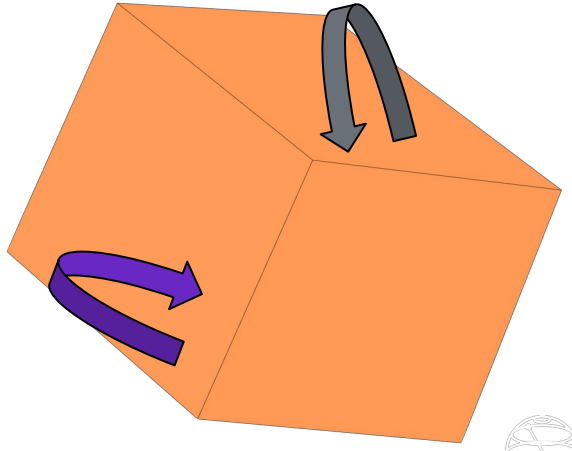
Bit cuántico



Qiskit

Bit cuántico





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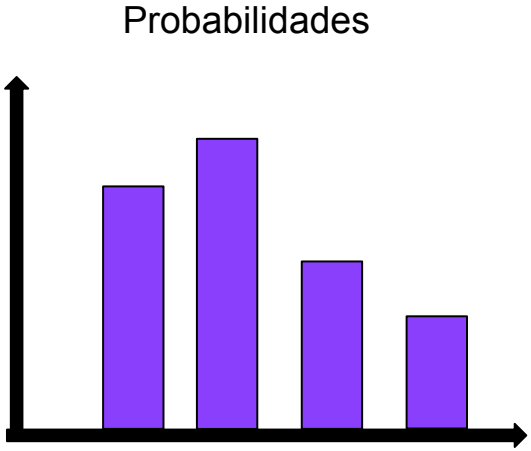
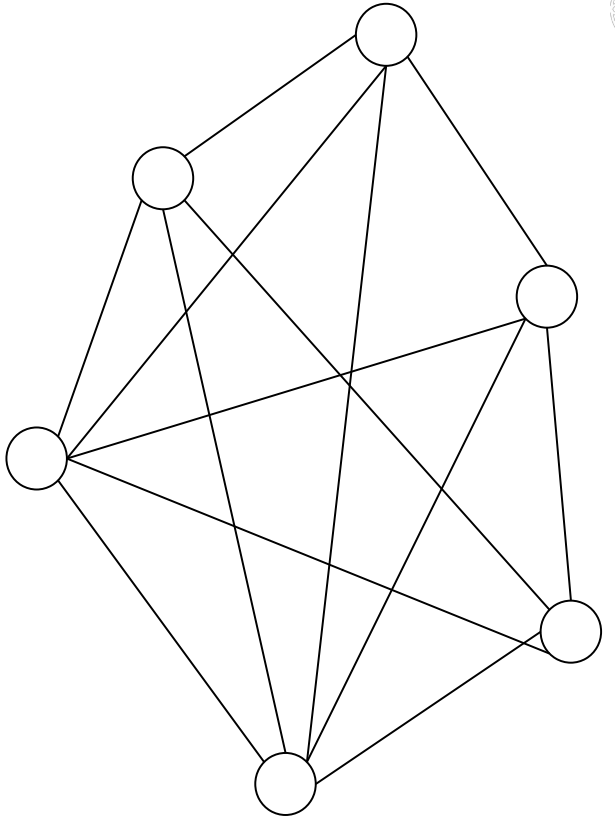




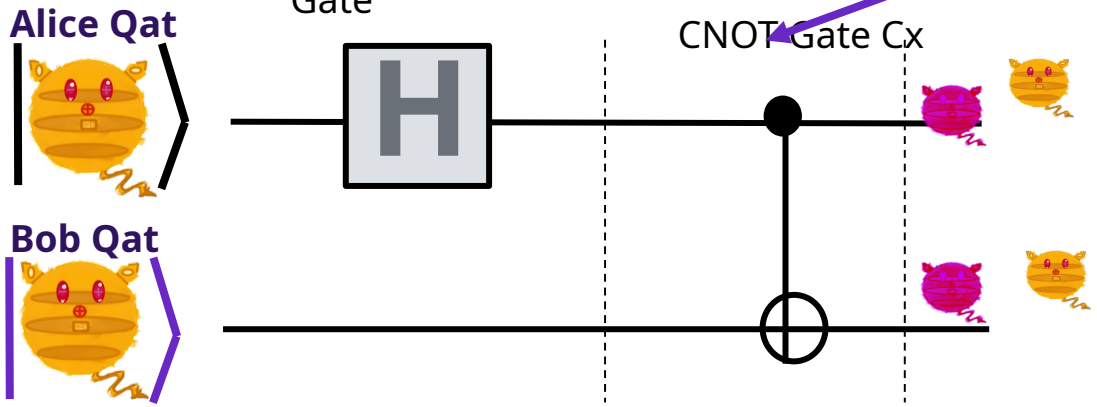
Qiskit

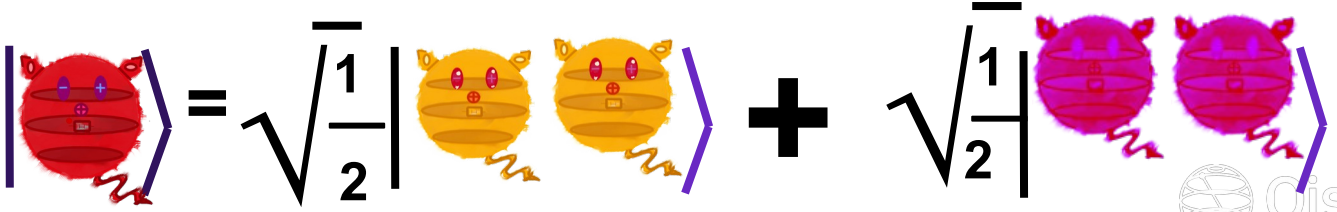
Bit cuántico

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & \frac{-1}{\sqrt{2}} \end{bmatrix}$$

Hadamard Gate

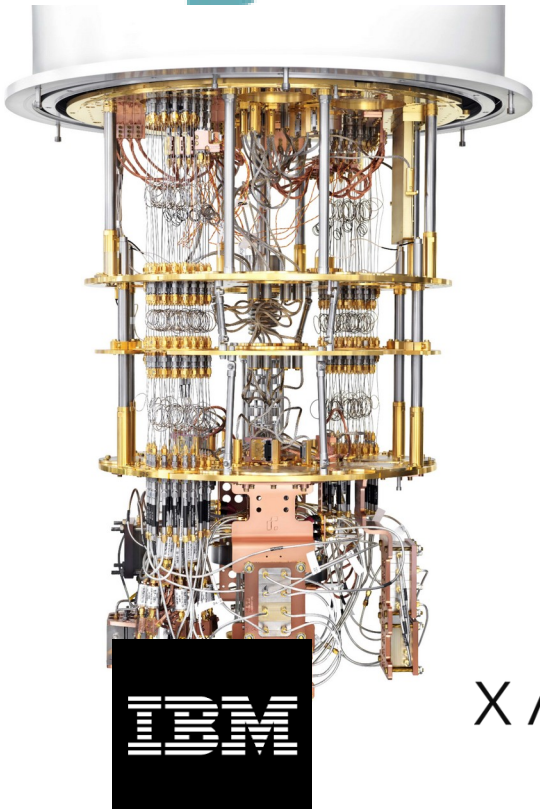
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$





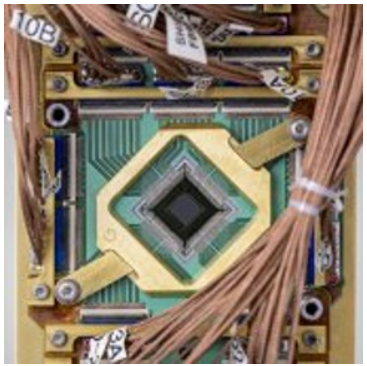
Computadoras reales

rigetti

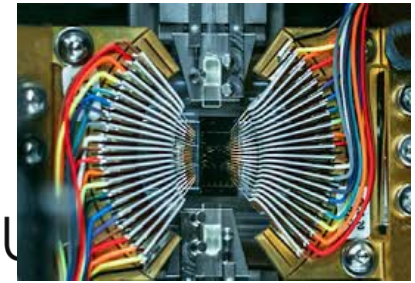


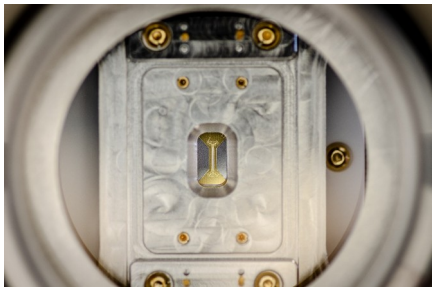
IBM

D-Wave
The Quantum Computing Company™



XANADU





Google

aws
Amazon Braket

Qiskit

IONQ

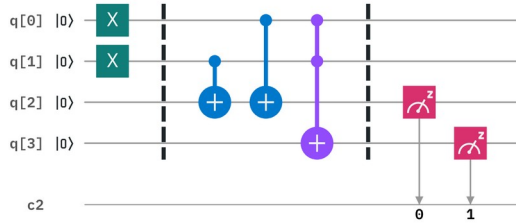
Entornos de Programación

Qiskit

Cirq

STRAWBERRY FIELDS

Q#



Machine learning interfaces

NumPy TensorFlow PyTorch

PENNYLANE

Qiskit Cirq rigetti

Microsoft STRAWBERRY FIELDS

Quantum hardware and simulators

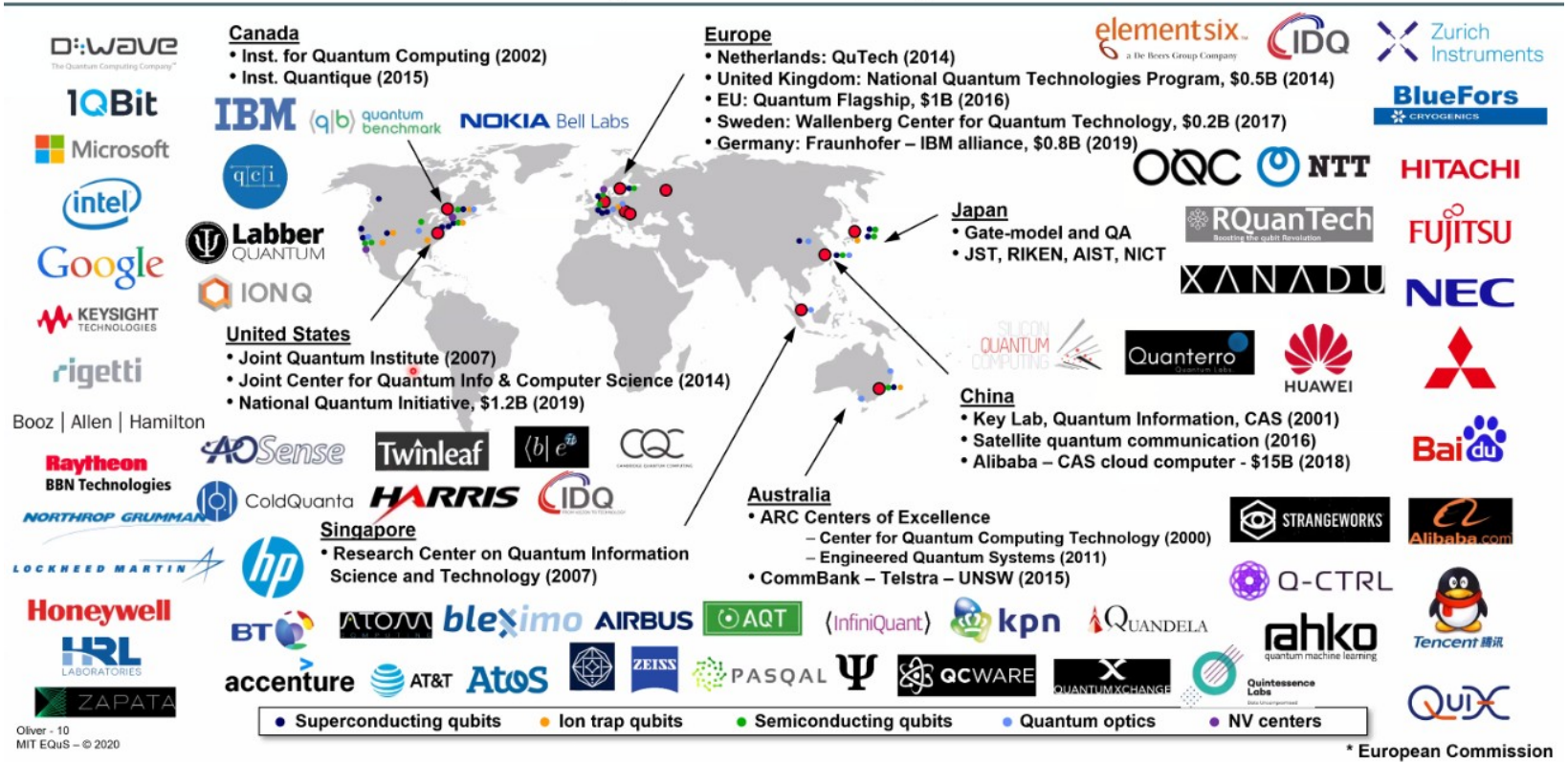
SILQ

```
def plusStateInvalid():ℝ{
  x := false;
  x := H(x);
  return x;
} // error: redefinition of "x"
```

Quantum Worldwide

(not an exhaustive list)

CQE



From: https://www.youtube.com/watch?v=S_F8ouc5gWc

Development Roadmap

Executed by IBM
On target

IBM **Quantum**

	2019	2020	2021	2022	2023	2024	2025	Beyond 2026
Model Developers					Prototype quantum software applications →		Quantum software applications	
							Machine Learning | Optimization | Natural Science | Finance	
Algorithm Developers		Quantum algorithm and application modules			Quantum Serverless			
		Machine Learning | Natural science | Optimization | Finance				Intelligent orchestration	Circuit Knitting Toolbox	Circuit Libraries
Kernel Developers	Circuits			Qiskit Runtime				
					Dynamic Circuits	Threaded Primitives	Error suppression and mitigation	Error correction
System Modularity	Falcon 27 qubits	Hummingbird 65 qubits	Eagle 127 qubits	Osprey 433 qubits	Condor 1,121 qubits	Flamingo 1,386+ qubits	Kookaburra 4,158+ qubits	
					Heron 133 qubits x p	Crossbill 408 qubits		

Gracias por su atención