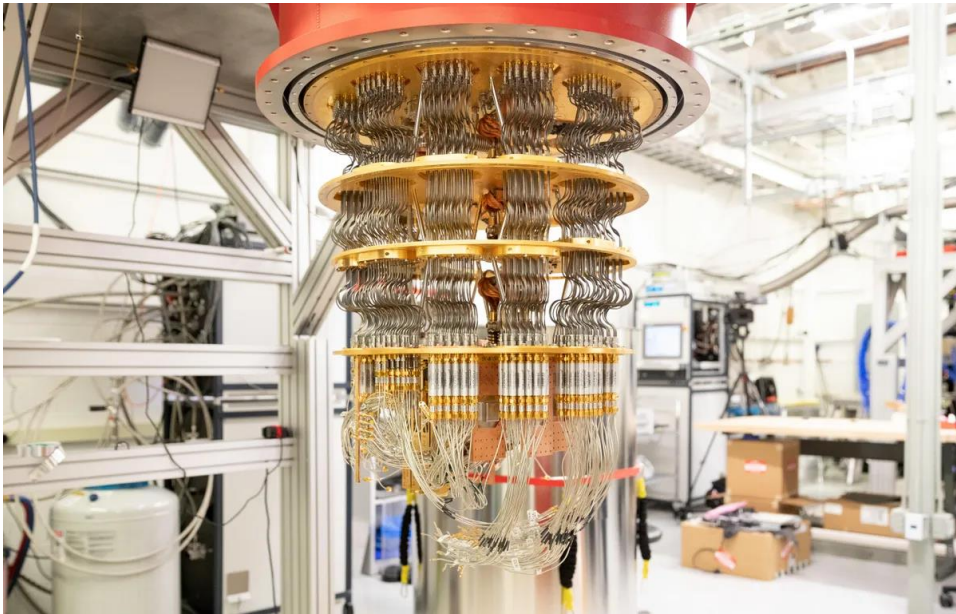# A Simple Introduction to Quantum Computers
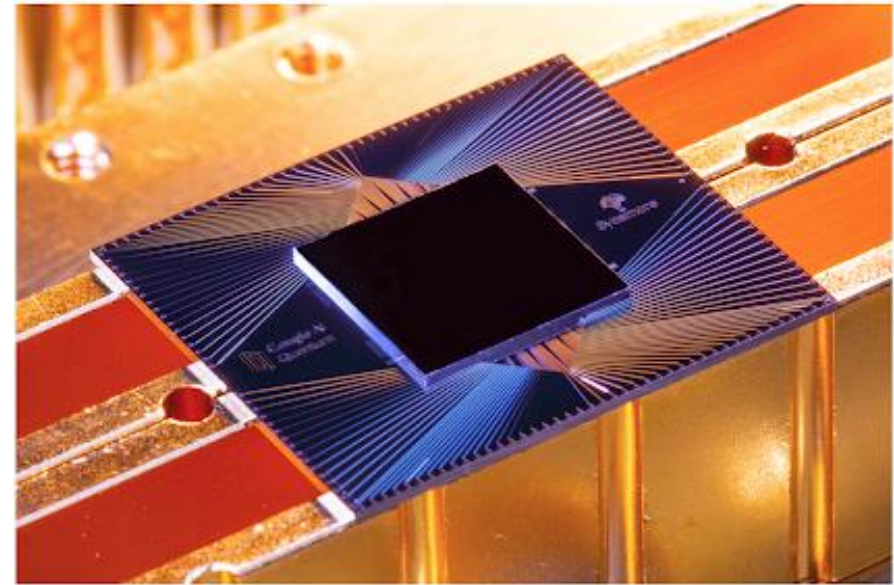
For SIT111

Overview of Topics

- What are quantum computers?

- Qubits and their representation

- Quantum Logic Gates

- Quantum Logic Circuits

- Applications of Quantum Computers

What are Quantum Computers?

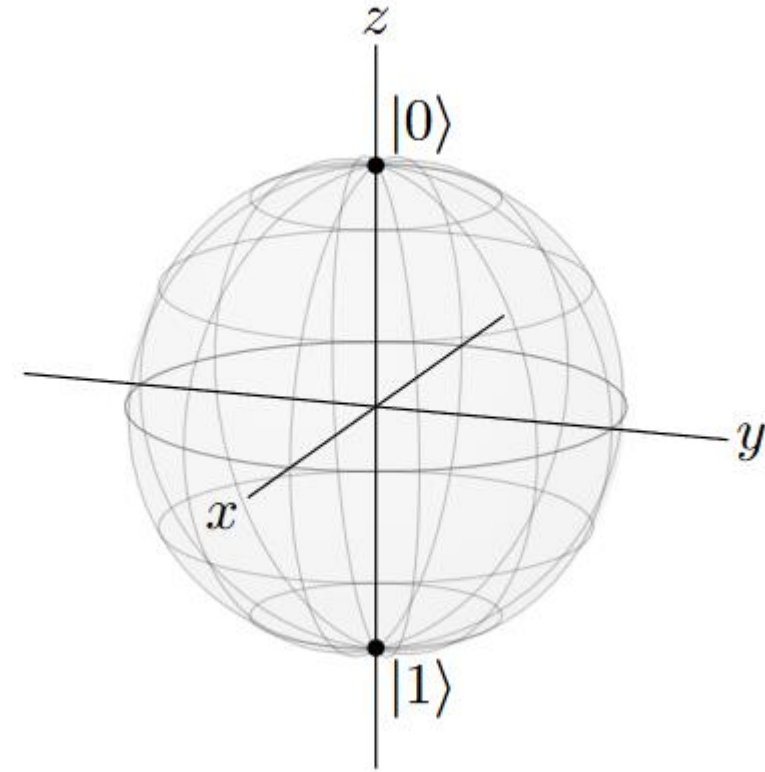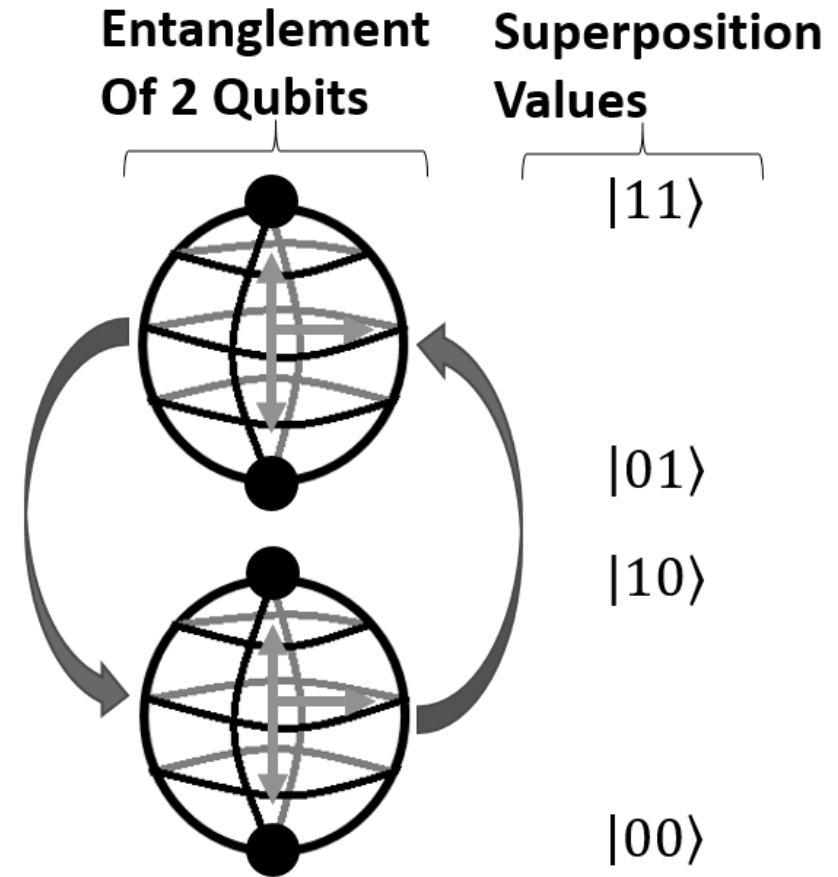Source: https://www.cnet.com/pictures/take-a-look-at-googles-quantum-computing-technology/

Source: https://ai.googleblog.com/2019/10/quantum-supremacy-using-programmable.html

SIT111 Task 1.6HD Rishant Sharma 222458666

How do they differ from classical computers?

Source: https://computer.howstuffworks.com/bytes.htm

Source: Wong, T.G. (2022) 'One Quantum Bit', in *Introduction to classical and quantum computing*. Omaha: Rooted Groove, p. 76.

Entanglement Of 2 Qubits Superposition Values

$|11\rangle$

$|01\rangle$

$|10\rangle$

$|00\rangle$

ALU output

decode

instruction

inM

reset

D

D

A

A

Mux

A

M

Mux

A/M

ALU

outM

writeM

addressM

A

PC

pc
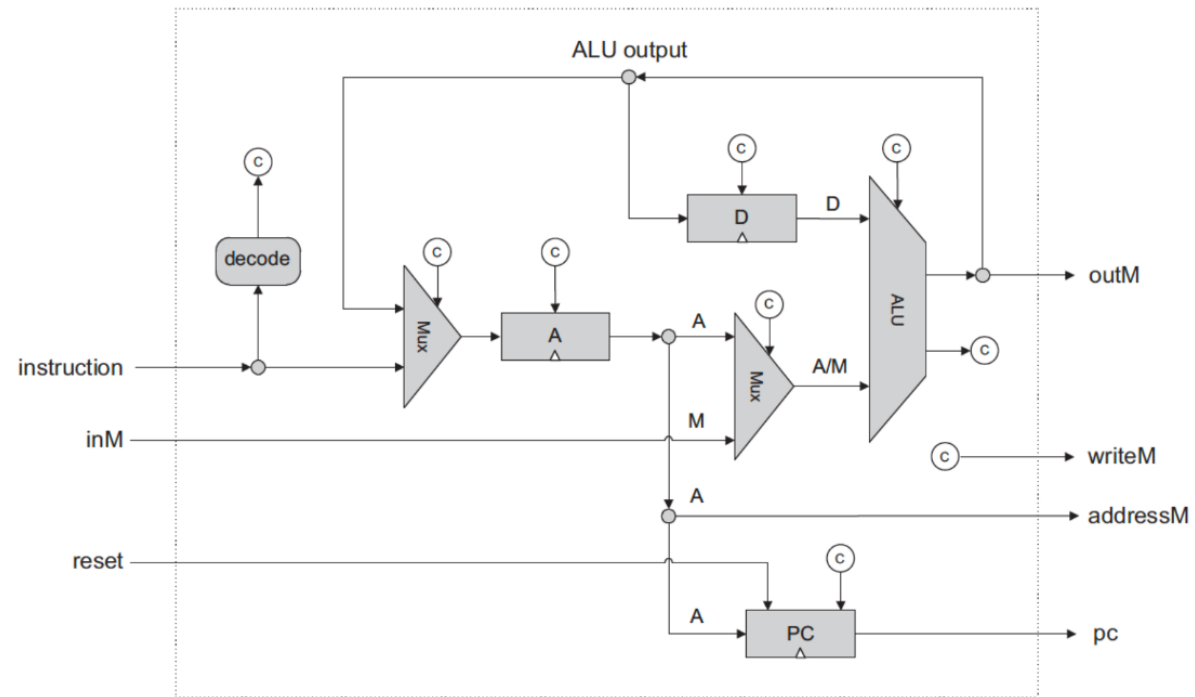
Source: Havenstein, Christopher & Thomas, Damarcus & Chandrasekaran, Swami. (2018). SMU Data Science Review Compar
 of Performance between Quantum and Classical Machine Learning Comparisons of Performance between Quantum
 and Classical Machine Learning. 10.13140/RG.2.2.20353.40801.

Prerequisites

- Knowledge of Trigonometry and Linear Algebra
  - https://www.khanacademy.org/math/trigonometry
  - https://www.khanacademy.org/math/linear-algebra
- IBM Quantum Account
  - Set up using Deakin email
  - https://quantum-computing.ibm.com/