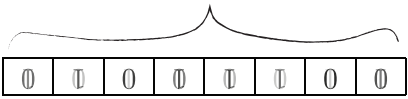
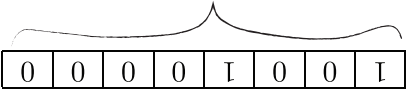


$2^8 = 256$ possible states in superposition, giving 256 pieces of information



8 qubits in superposition:

8 pieces of information

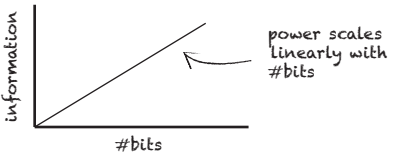


8 classical bits:

Example

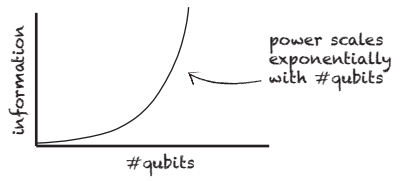
Adding a qubit

Add a classical bit:



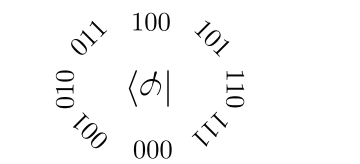
8 → 9 pieces of info

Add a qubit:



256 → 512 pieces of info

With superposition, n qubits can be a combination of all permutations at once



In classical bits can only represent 1 of these permutations at a time

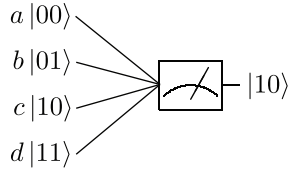
Given n bits, there are 2^n permutations of these bits

000 001 010 011
100 101 110 111

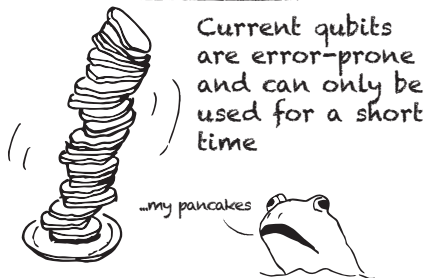
Superposition is Powerful!

Caveats

Superposition allows a qubit to hold multiple values at once



But we can only read out one value, and doing so destroys all the others!



Current qubits are error-prone and can only be used for a short time

Find more Quantum Computing zines here:

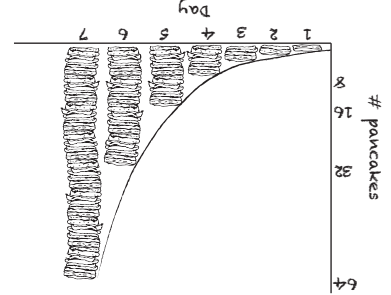
<https://www.epiqc.cs.uchicago.edu/resources/>

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Doubling the amount of pancakes each day is a form of exponential growth

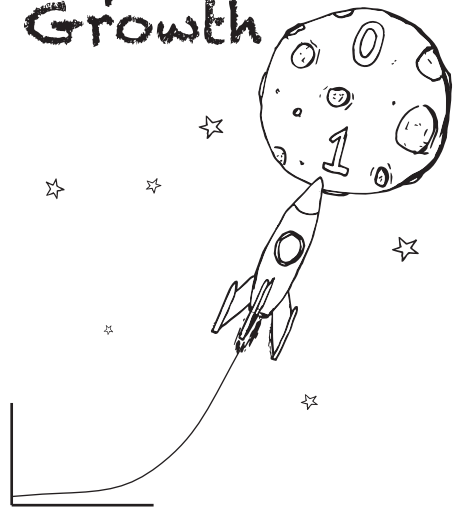


Wow! That's a lot of pancakes!

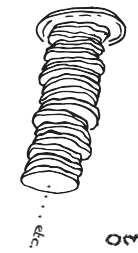
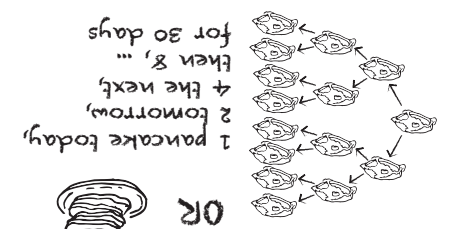
$$1 + 2 + 4 + 8 + \dots + 2^{29} = 2^{30} - 1 = 1,073,741,823 \text{ pancakes}$$

Adding up the pancakes from the second option...
(in order to maximize pancakes)
How do you choose?

Exponential Growth



In Quantum Computing



A million (1,000,000) pancakes right now!

You ask her for pancakes, and she gives you two options:



Imagine this: one day you're walking along, when suddenly you meet a pancake fairy!

Tough Choice!