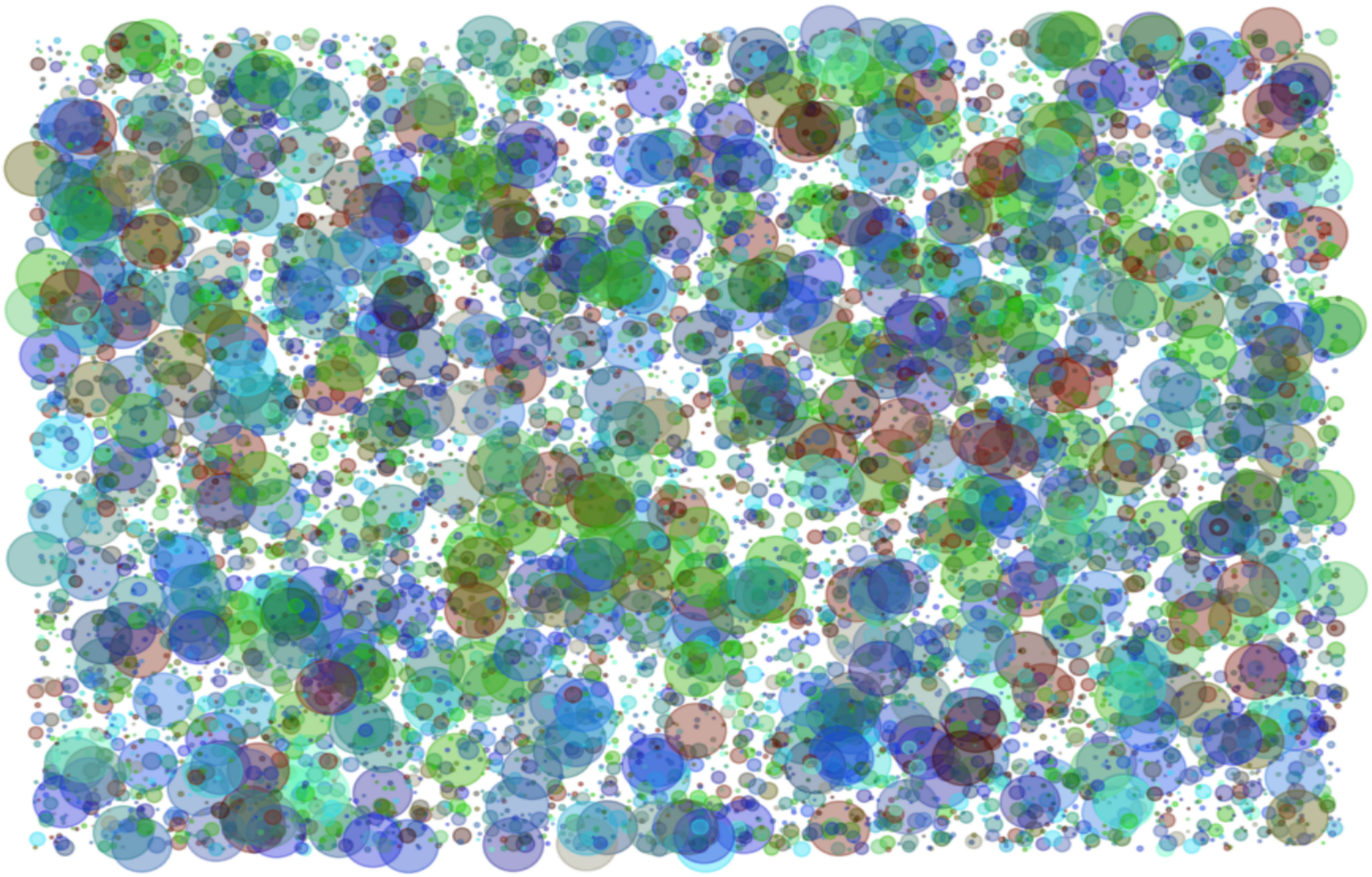
# Quantum meme calendar 2022

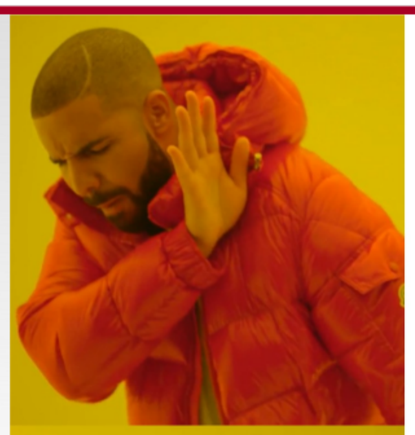


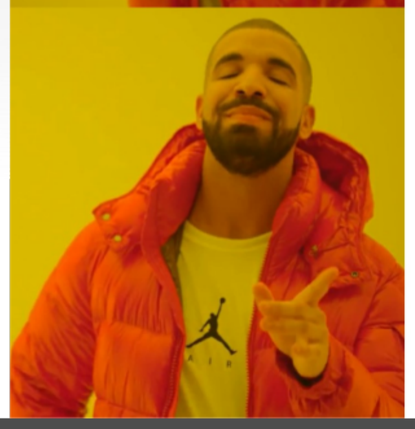
May you appreciate these quantum memes from PIQUE's holiday event, all year long!

The Quantum Art Generator (https://qartgen.herokuapp.com/) translates strings into bubble art, and extra bubbles are introduced by measurement and gate errors causing deviations from the original text. This image uses P(meas) = 0.1 and P(gate) = 0.1 with the lyrics of "Never Gonna Give You Up." Congratulations, you have been rickrolled by a quantum computer.

# January

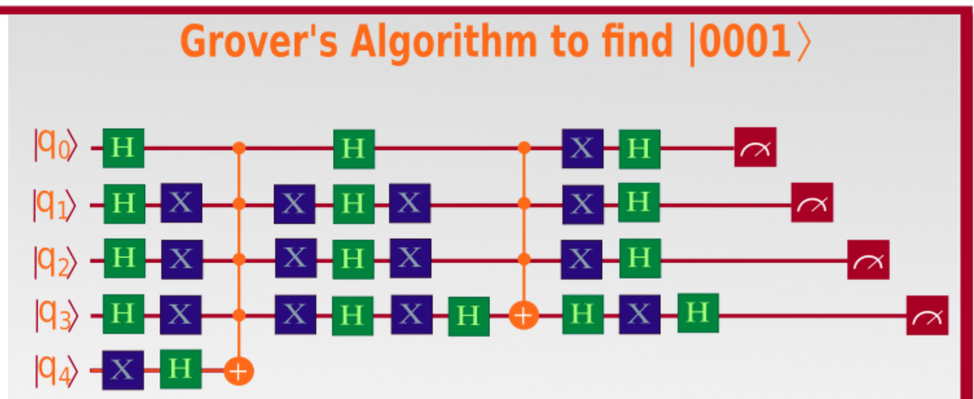
|0001⟩





Study quantum computing to solve complex quantum many-body problems and make the world a better place

Study quantum computing to win a t-shirt





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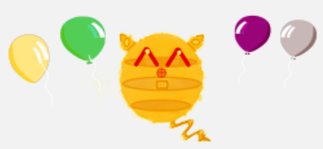
| 27 | 28 | 29 | 30 | 31 |  | 02 |
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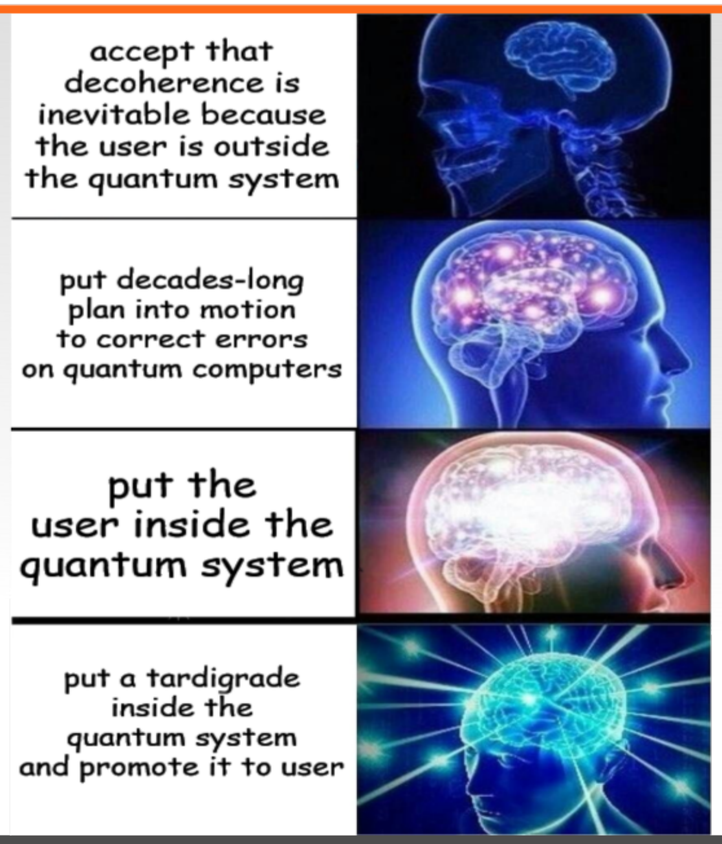
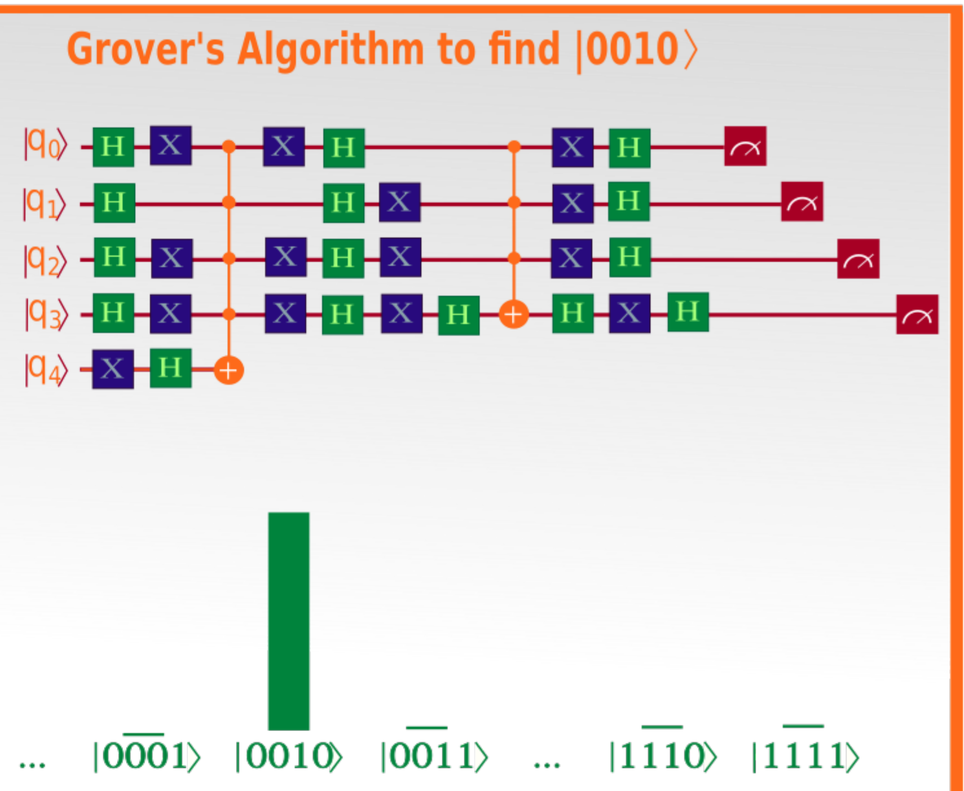
In the 80’s Richard Feynman an American physicist had an intuition that a quantum computer would be able to simulate things a classical computer could not do in a feasible amount of time. For Feynman and others solving many-body problems would be the number one application of a quantum computer, but not for Quantum Drake.

# February

|0010⟩

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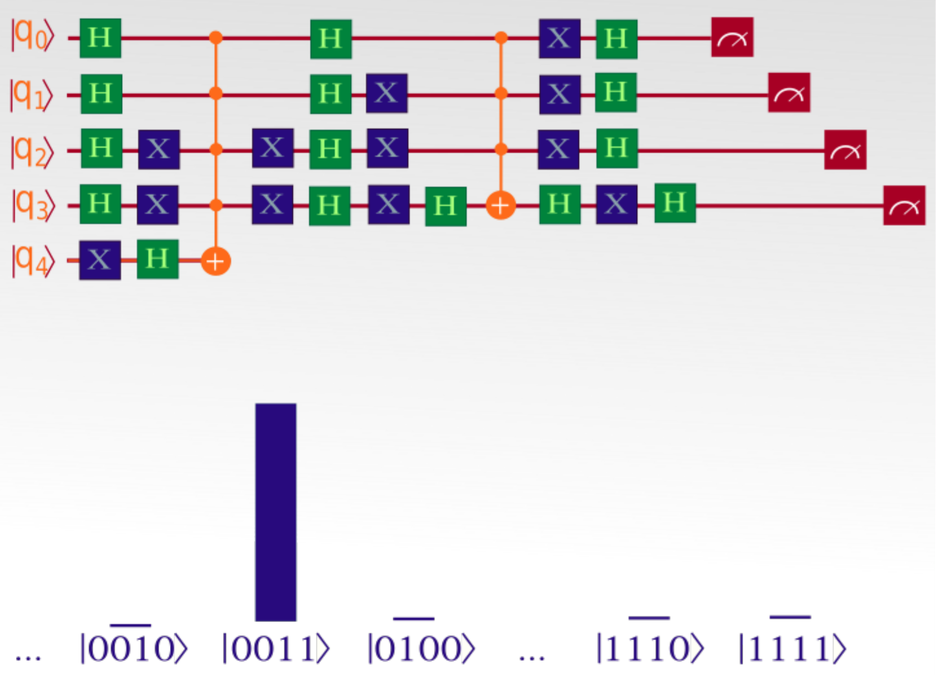
# March

$|0011\rangle$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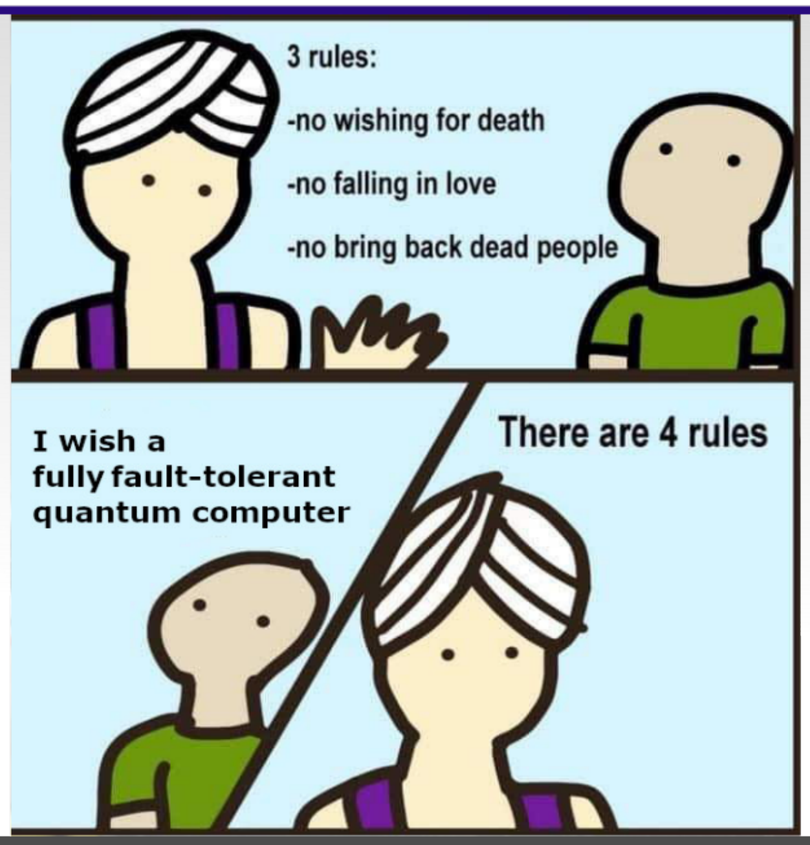
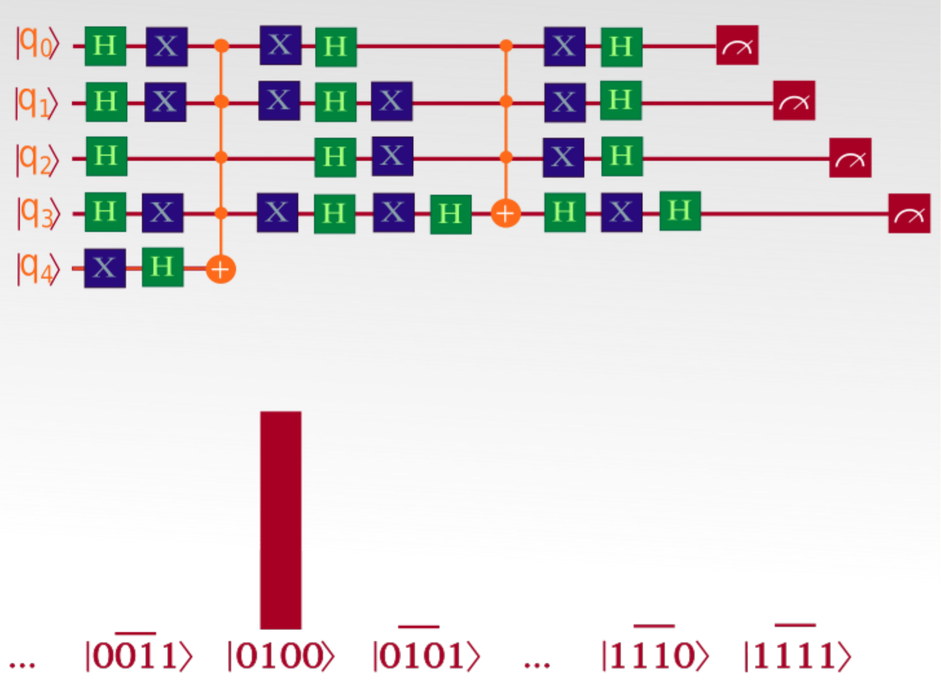
# April

|0100⟩

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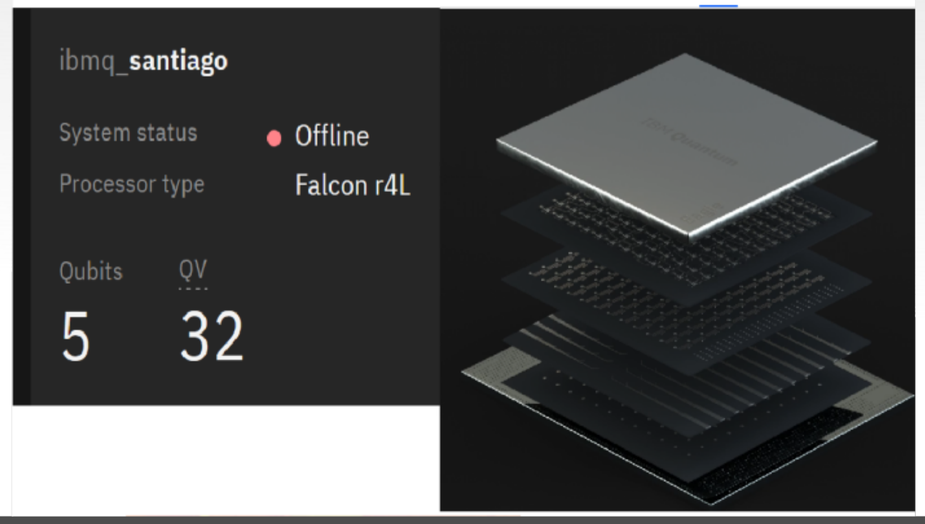
Guillaume Verdon tweeted that he wanted to swap his RTX 3090 for a  "fully fault-tolerant quantum computer”

# May

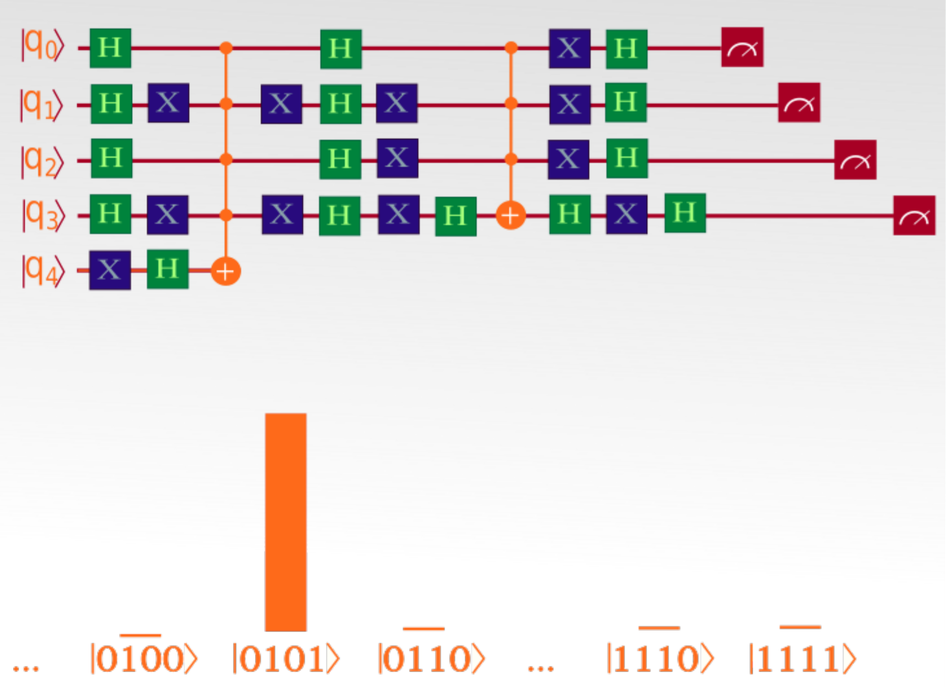
|0101⟩

If you can't handle me at my

Then you don't deserve me at my



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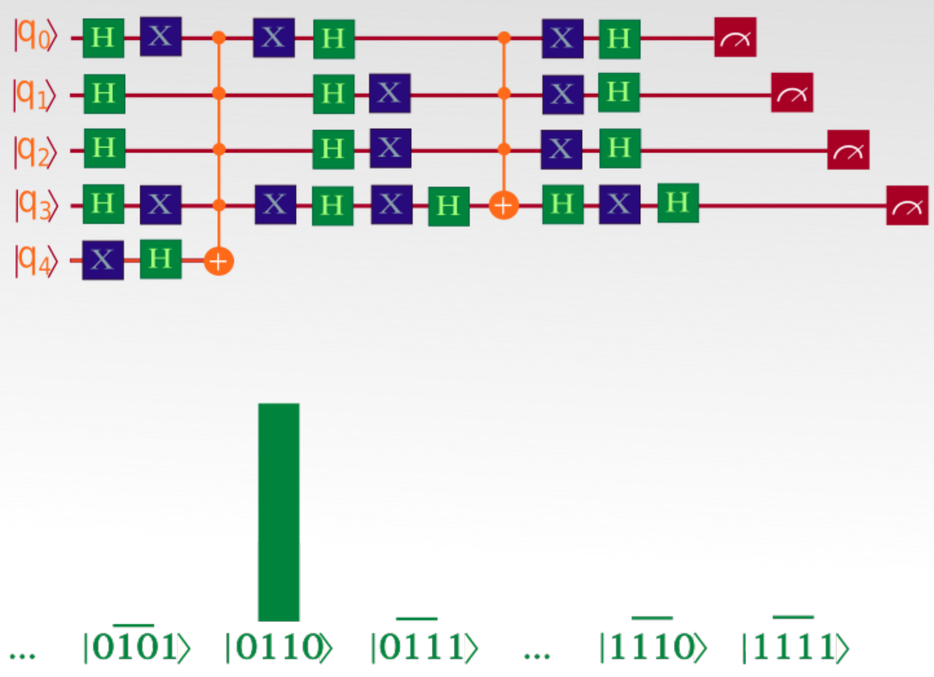
Quantum processors are scaling up in number of qubits and quantum volume. Major companies like IBM and Google are reporting quantum processors with over 100 qubits. Of course, we could not have reached this point without smaller processors first... and some magic smoke along the way.

# June

$|0110\rangle$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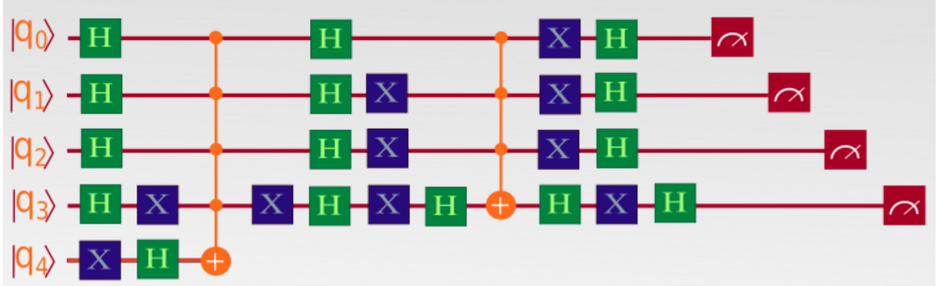
Step 1. IBM Quantum Experience
Step 2. ???
Step 3. Profit

# July

|0111⟩

you said that if I knew linear algebra, I could know quantum computing.

for the first class





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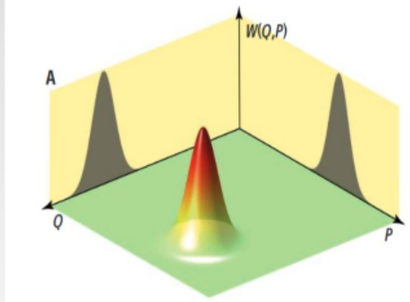
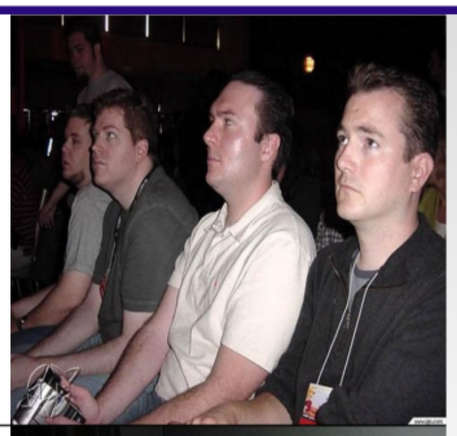
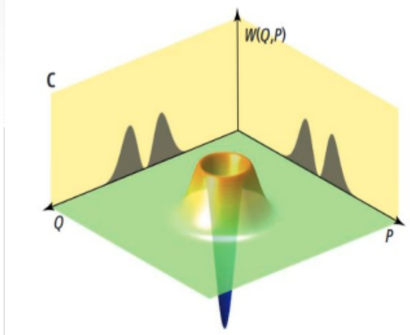
My mind try to remember what is a vector in my first quantum computing class

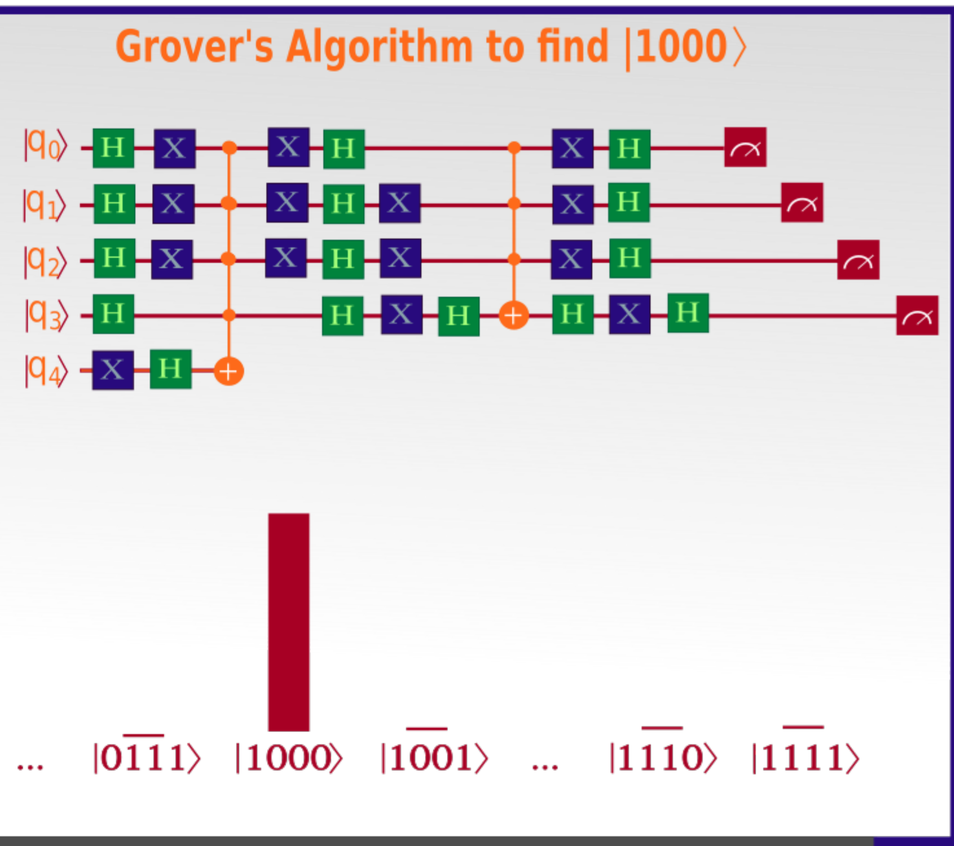
# August

|1000⟩



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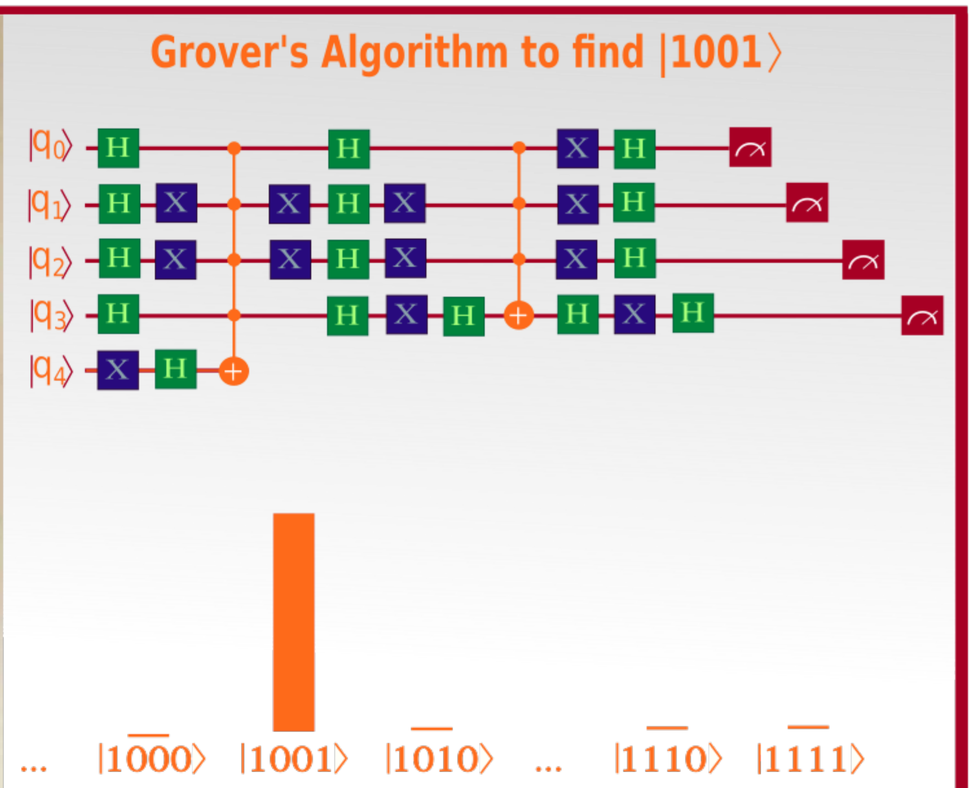
First, there was sports.
Then, there was e-sports.
We introduce the next big thing: q-sports, where you cheer for the excited state.

# September

$|1001\rangle$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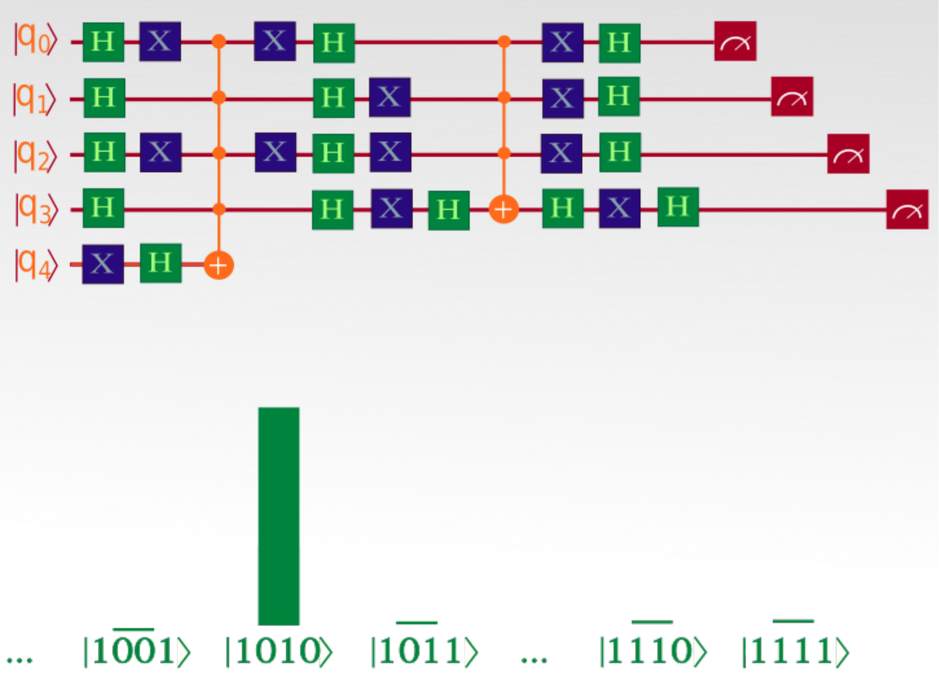
# October

$|1010\rangle$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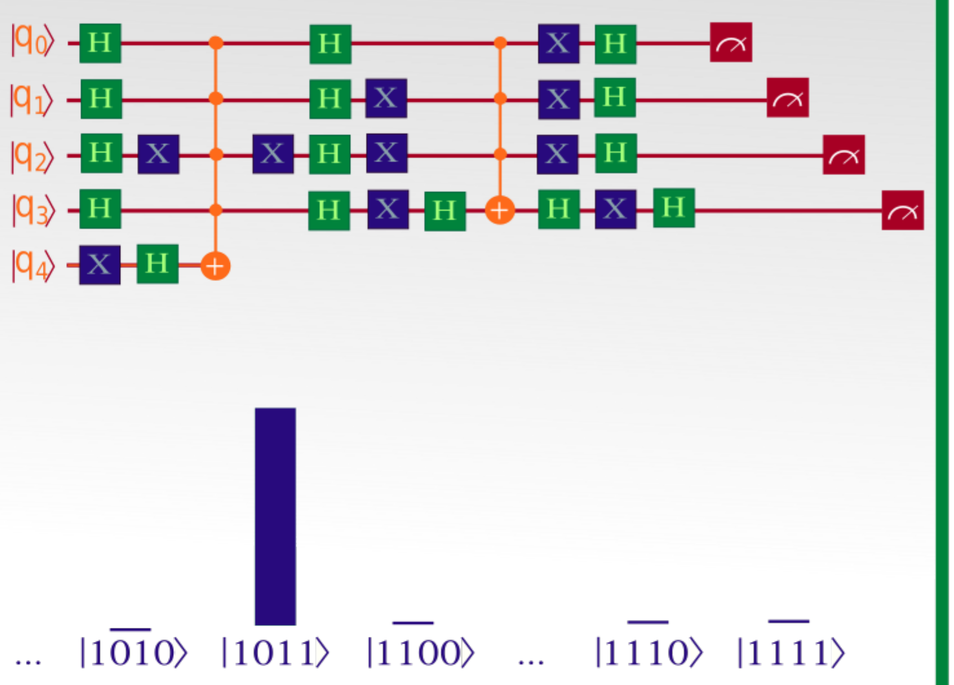
# November

|1011⟩

qc.h(0)

qc.append(HGate(), 0)

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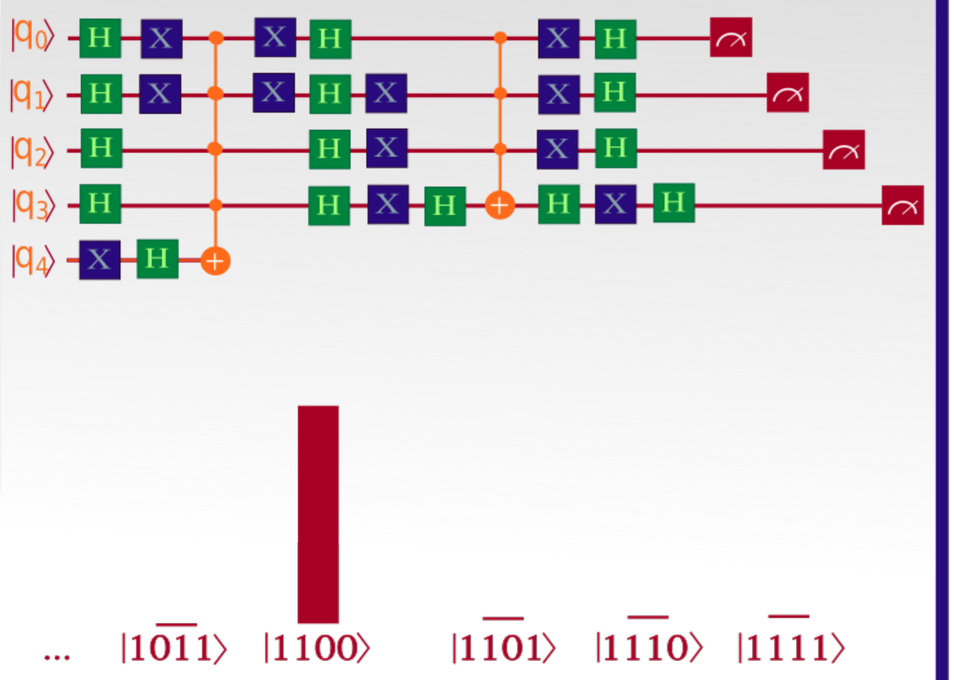
# December

|1100⟩


Grover's Algorithm to find |1100⟩

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All Mariah wants for Christmas is U, a unitary transformation! For a unitary transformation U,
U† = U^-1 => U U† = I where I is identity, so U U† U U† U U† U U† U U† U = U

This result is useful in a number of areas, including in quantum error mitigation. The sub-technique illustrated above is called noise scaling by unitary folding, which is one component of the error mitigation technique Zero Noise Extrapolation. Introducing additional unitary gate operations in the pattern U U† makes the circuit longer and noisier without changing its overall effect. We can then use the results from the "noisier" evaluations as error points to extrapolate back to the zero-noise limit and calculate an error-mitigated observable.