Quantum Entanglement

You've gotta be pulling my leg!

Quantum Entanglement

Quantum Gates are no longer a math game.
Physicists can really build them!

March 2019 (v2)
This work is funded in part by EPiQC, an NSF Expedition in Computing, under grant 1730449

What if coin flips were entangled?!?

We could create the following scenario:

ENTANGLEMENT in the QUANTUM world
Qubits become entangled in a special way.
Consider...

There's a 50/50 probability of measuring them in the same state, but never in opposite states:

\[ \frac{1}{\sqrt{2}} |0\rangle + \frac{1}{\sqrt{2}} |1\rangle \]

For this circuit, when one of the entangled qubits is measured, the other is forced to take the same value.

ENTANGLED with MATH
Sometimes TWO things are DEPENDENT
For example:
I have 10 marbles.

I close the boxes & give Box B to a friend
She opens it & finds 4 marbles.

Then, she says... There are 6 marbles in Box A.

How did she know how many were in Box A WITHOUT opening it???
Because...
The number of marbles in each box is DEPENDENT on the number in the other box!

If coin flips are independent.....

One coin:

Two coins:

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