







Modeling Superposition with Cards

A quantum computer is a type of computer that stores and processes information as quantum bits (qubits). A qubit can exist as a **superposition** of 0 and 1 - at the same time. We will create a simplified model for the superposition state of a qubit using cards.

Card Values

Red Cards (0)	Black Cards (1)
 	 

Example

Superposition State		
50% : 0 50% : 1		
We choose 1 RED card & 1 BLACK card to represent equal probabilities of 0 and 1.		

Modeling Superposition States with Cards

Use cards to represent these superposition states.

	Superposition State	Card Combination	# RED Cards	# BLACK Cards
1.	66% : 0 33% : 1	RRB	2	1
2.	33% : 0 66% : 1			
3.	25% : 0 75% : 1			
4.	80% : 0 20% : 1			
5.	10% : 0 90% : 1			

Measurements of the Superposition State of a Qubit

1. Use cards to model a qubit with the superposition state: (75% : 0 & 25% : 1).
2. With the cards face down, shuffle the card stack and place it on the table.
3. Flip over the top card to “measure” the qubit. Record the outcome in the table below.
4. Repeat steps 1-3, until you have measured the qubit 12 times.

MEASUREMENT #	OUTCOME (Circle 0 or 1)	
1	0	1
2	0	1
3	0	1
4	0	1
5	0	1
6	0	1
7	0	1
8	0	1
9	0	1
10	0	1
11	0	1
12	0	1

How many times did you measure 0?	
How many times did you measure 1?	