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Background... Layout Theme... Transition...

Quantum Finance:
Using Quantum Methods to Speed-up Monte Carlo Simulations

Zach Bottemeleser
Dillon Dunteman

2 Background
Why did we choose this project?

3 Finance Introduction
What is a European call option?
IBM stock has been trading at ~$140 on the NYSE

4 Finance Introduction
Analytical Pricing: The Black Scholes Model
By taking the limit of a binomial tree, underlying assets are modeled by a stochastic process known as Brownian Motion

5 Improving this Pricing Method
Can a quantum algorithm be utilized in order to improve efficiency of Monte Carlo methods and decrease estimation error?

6 Quantum Monte Carlo Methods
Loading Uncertainty Models
Given:
We know:

7 Quantum Monte Carlo Methods
Qubits only hold discrete distributions

8 Quantum Monte Carlo Methods
Create the G gate

9 Quantum Monte Carlo Methods
Create the Chi State

10 Quantum Circuit Overview

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