# Quantum Computing Tutorial

## Quantum Circuits

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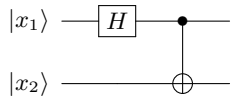
**Bell State - Simple**

1. Implement the following circuit

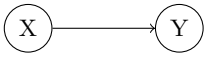



2. Run the circuit for 10,000 shots with the Aer simulator

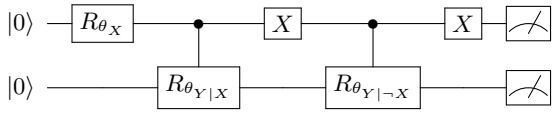
3. Collect the results and plot them in a histogram

**Quantum Bayesian Network - Simple**

1. Given is the following Bayesian network:




The quantum circuit for the network is represented by:




(1)

Use the following rotational angles and simulate the circuit with Aer simulator for 10,000 shots:

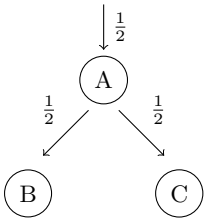
$\theta_X = 2 * arcsin\sqrt{0.2}$

$\theta_{Y|X} = 2 * arcsin\sqrt{0.9}$

$\theta_{Y|\neg X} = 2 * arcsin\sqrt{0.3}$

**Quantum Pachinko - Medium**

1. Implement a quantum circuit for the following Pachinko game




2. Simulate the circuit with 10,000 shots and Aer simulator

3. Repeat steps 1 and 2 for a Pachinko game with a depth of 4