MaxCut Problem Report

Report generated on: 2025-08-14 10:33:56

Graph Details

Number of Nodes: 4
Edges of Nodes: [(0,1), (1,2), (2,3)]

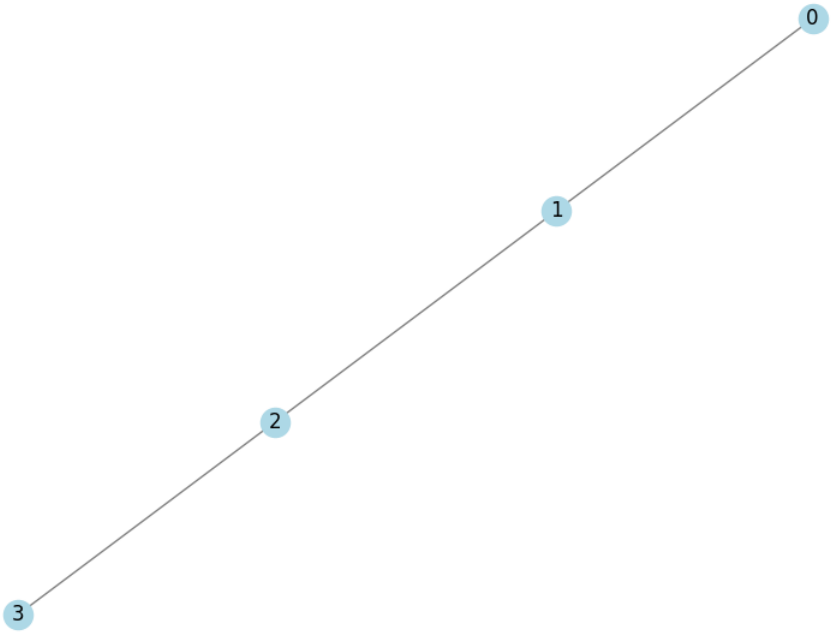

Figure 1: Graph Visualization

0.1 QUBO Matrix Visualization

Converted QUBO matrix visualization:

$$\begin{array}{cccc} -1.0 & 2.0 & 0.0 & 0.0 \\ 0.0 & -2.0 & 2.0 & 0.0 \\ 0.0 & 0.0 & -2.0 & 2.0 \\ 0.0 & 0.0 & 0.0 & -1.0 \end{array}$$

0.2 Oracle Visualization

The corresponding oracle for the MaxCut is shown below:
not implemented yet

QAOA Optimization Results

Most Probable Solution for QAOA:

- Variable x_1 is set to true
- Variable x_2 is set to false
- Variable x_3 is set to true
- Variable x_4 is set to false

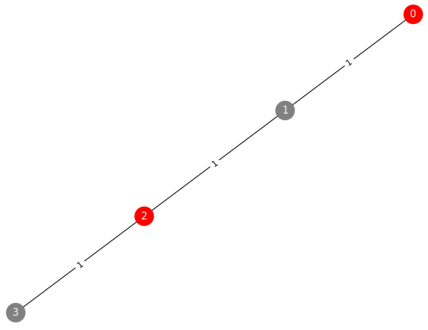

Figure 2: QAOA Result

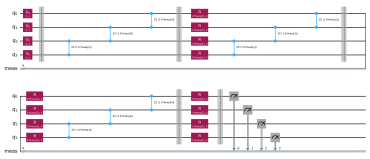

Figure 3: QAOA Quantum Circuit

VQE Optimization Results

Most Probable Solution for VQE:

- Variable x_1 is set to true
- Variable x_2 is set to false
- Variable x_3 is set to true
- Variable x_4 is set to false

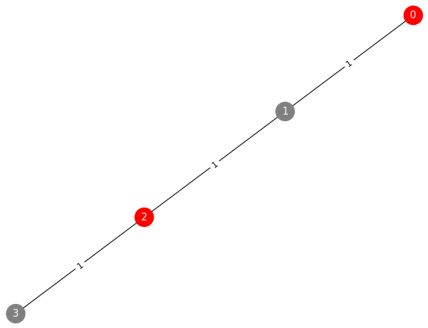

Figure 4: VQE Result

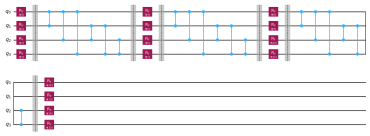

Figure 5: VQE Quantum Circuit

Grover's Algorithm Results

not implemented yet

Device Recommendation Summary

\textbf{Here is the device recommendation summary based on error, time, and price:}\
- Lowest error: Quantinuum H1 from Azure Quantum with a calculated error

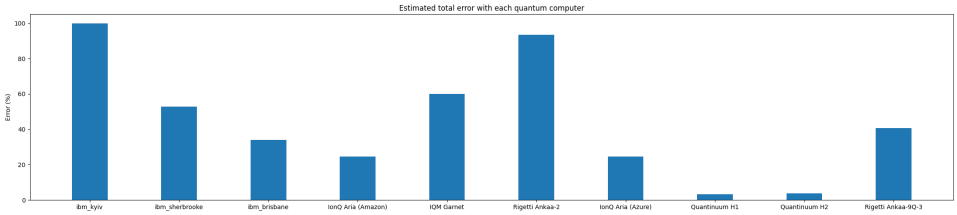

Figure 6: Estimated total error with each quantum computer

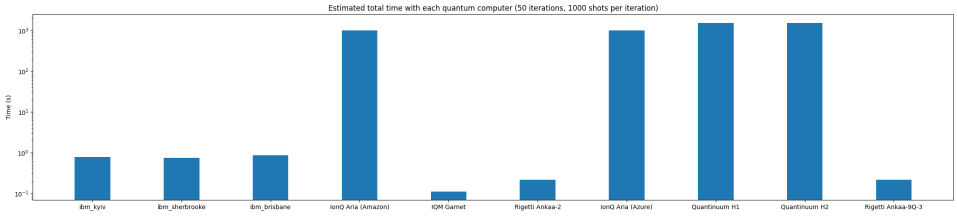

Figure 7: Estimated total time with each quantum computer

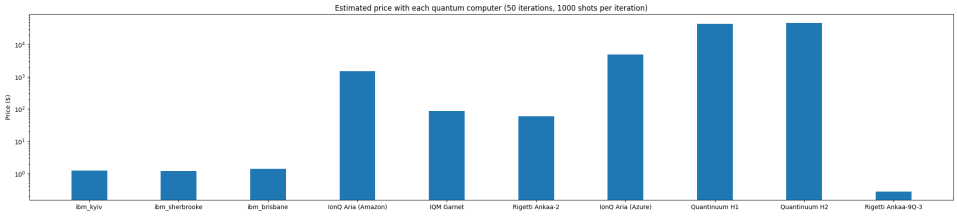

Figure 8: Estimated price with each quantum computer

of 3.24%, time to execute: 1530.0 seconds and a price of $43625.0.
- Lowest time: IQM Garnet from Amazon Braket with a calculated error of 59.87%, time to execute: 0.11 seconds and a price of $87.5.
- Lowest price: Rigetti Ankaa-9Q-3 from Azure Quantum with a calculated error of 40.62%, time to execute: 0.213 seconds and a price of $0.28.