

TSP Problem Report

Report generated on: 2025-07-24 15:08:13

Graph Details

Number of Nodes: 3

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

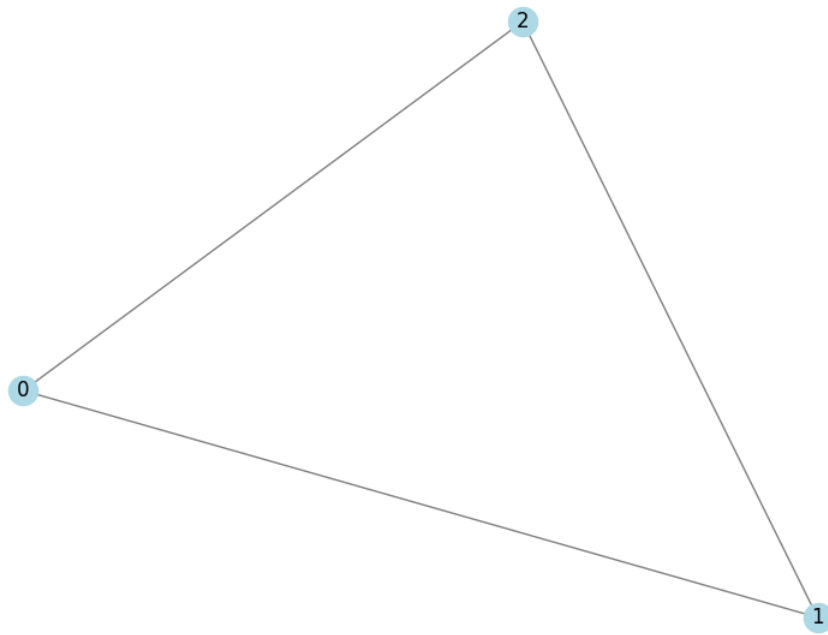


Figure 1: Graph Visualization

0.1 QUBO Matrix Visualization

Converted QUBO matrix visualization:

-90.0	90.0	90.0	90.0	11.0	0.0	90.0	30.0	0.0
0.0	-90.0	90.0	0.0	90.0	11.0	0.0	90.0	30.0
0.0	0.0	-90.0	0.0	0.0	90.0	0.0	0.0	90.0
0.0	11.0	0.0	-90.0	90.0	90.0	90.0	35.0	0.0
0.0	0.0	11.0	0.0	-90.0	90.0	0.0	90.0	35.0
0.0	0.0	0.0	0.0	0.0	-90.0	0.0	0.0	90.0
0.0	30.0	0.0	0.0	35.0	0.0	-90.0	90.0	90.0
0.0	0.0	30.0	0.0	0.0	35.0	0.0	-90.0	90.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-90.0

0.2 Oracle Visualization

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

QAOA Optimization Results

Most Probable Solution for QAOA:

- Variable x_1 is set to false
- Variable x_2 is set to false
- Variable x_3 is set to false
- Variable x_4 is set to true
- Variable x_5 is set to true
- Variable x_6 is set to false
- Variable x_7 is set to false
- Variable x_8 is set to true
- Variable x_9 is set to true

VQE Optimization Results

Most Probable Solution for VQE:

- Variable x_1 is set to false

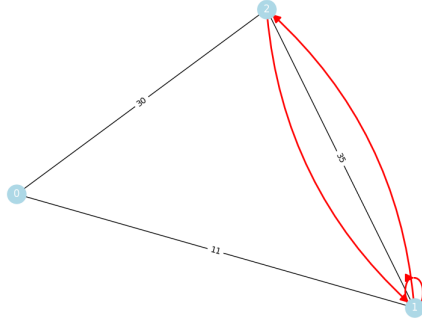


Figure 2: QAOA Result

- Variable x_2 is set to false
- Variable x_3 is set to true
- Variable x_4 is set to true
- Variable x_5 is set to false
- Variable x_6 is set to false
- Variable x_7 is set to false
- Variable x_8 is set to true
- Variable x_9 is set to false

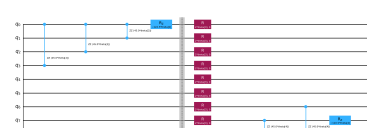
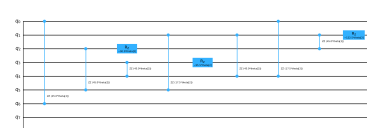
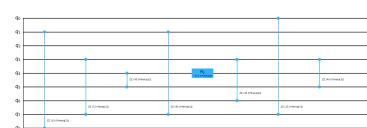
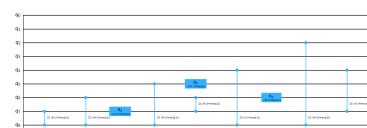
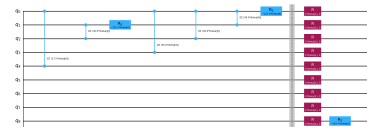
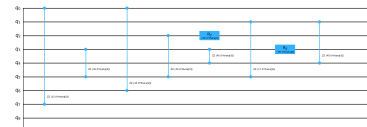
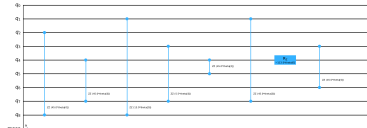
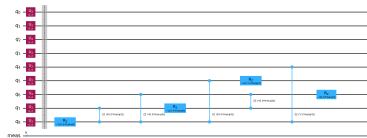
Grover's Algorithm Results

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 of 17.14%, time to execute: 6253.2 seconds and a price of \$288625.0.
- Lowest time: IQM Garnet from Amazon Braket with a calculated error of 100.0%, time to execute: 0.731 seconds and a price of \$87.5.
- Lowest price: Rigetti Ankaa-9Q-3 from Azure Quantum with a calculated error of 96.89%, time to execute: 1.338 seconds and a price of \$1.74.



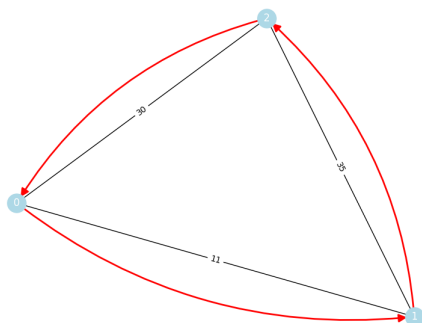


Figure 4: VQE Result

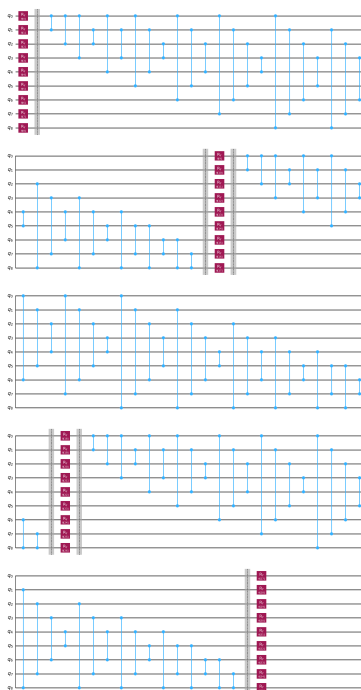


Figure 5: VQE Quantum Circuit

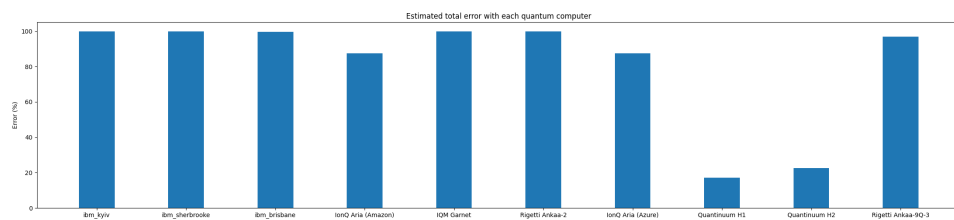


Figure 6: Estimated total error with each quantum computer

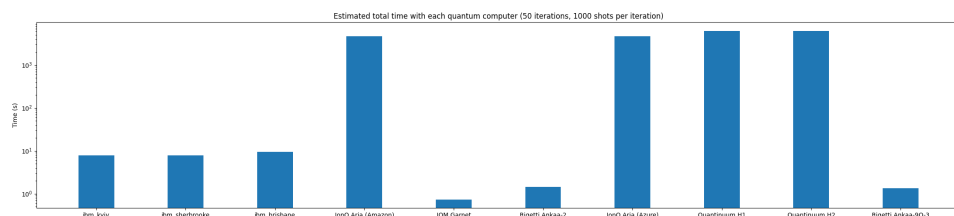


Figure 7: Estimated total time with each quantum computer

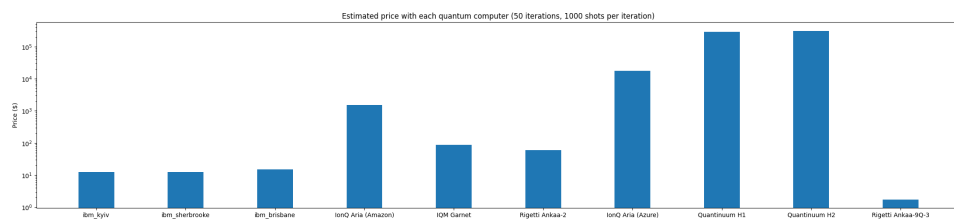


Figure 8: Estimated price with each quantum computer