

MVC Problem Report

Report generated on: 2025-07-24 15:08:39

Graph Details

Number of Nodes: 5

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

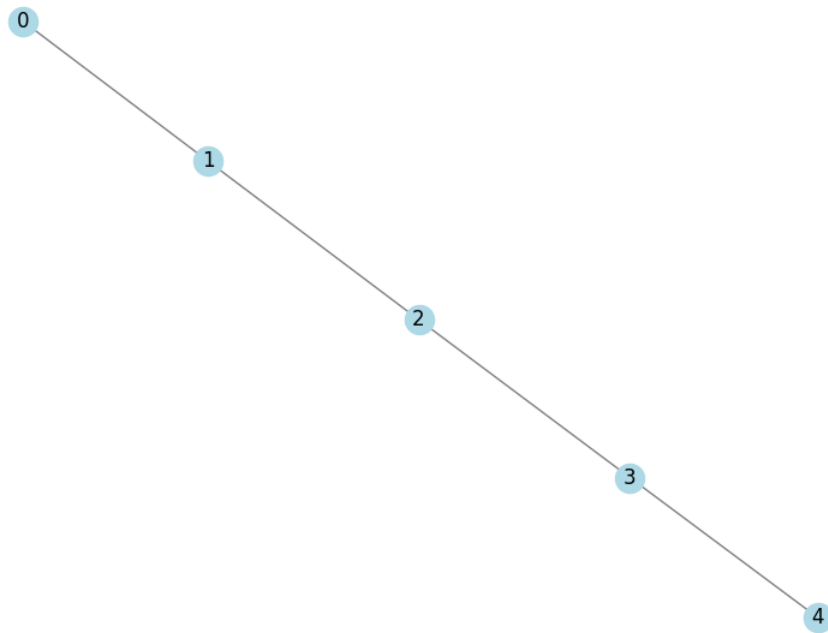


Figure 1: Graph Visualization

0.1 QUBO Matrix Visualization

Converted QUBO matrix visualization:

| | | | | |
|------|------|------|------|------|
| -1.0 | 2.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | -3.0 | 2.0 | 0.0 | 0.0 |
| 0.0 | 0.0 | -3.0 | 2.0 | 0.0 |
| 0.0 | 0.0 | 0.0 | -3.0 | 2.0 |
| 0.0 | 0.0 | 0.0 | 0.0 | -1.0 |

0.2 Oracle Visualization

The corresponding oracle for the MVC 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 true
- Variable x_3 is set to false
- Variable x_4 is set to true
- Variable x_5 is set to false

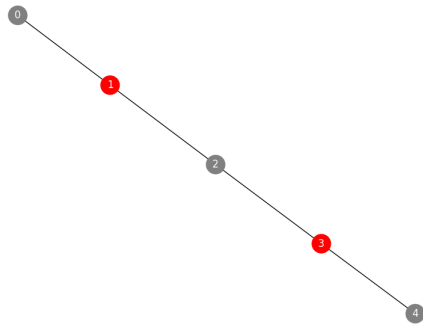


Figure 2: QAOA Result

VQE Optimization Results

Most Probable Solution for VQE:

- Variable x_1 is set to false
- Variable x_2 is set to true
- Variable x_3 is set to false
- Variable x_4 is set to true
- Variable x_5 is set to false

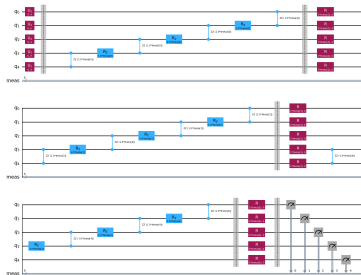


Figure 3: QAOA Quantum Circuit

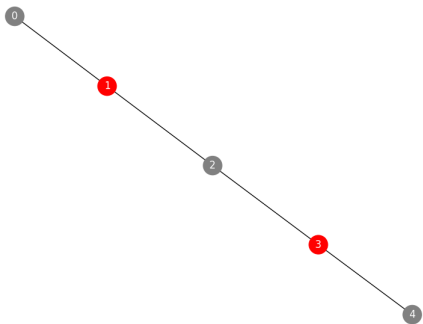


Figure 4: VQE Result

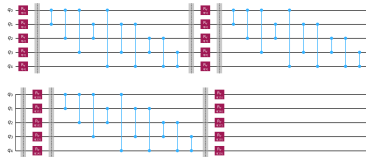


Figure 5: VQE Quantum Circuit

Grover’s Algorithm Results
 not implemented yet

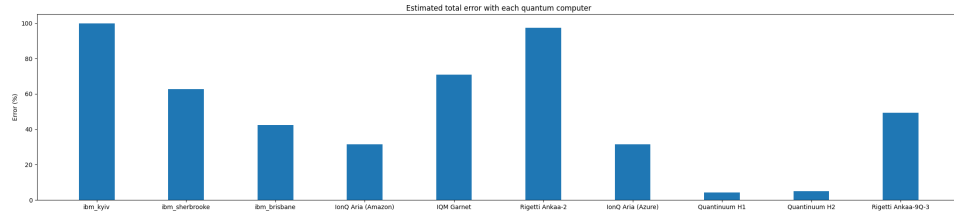


Figure 6: Estimated total error with each quantum computer

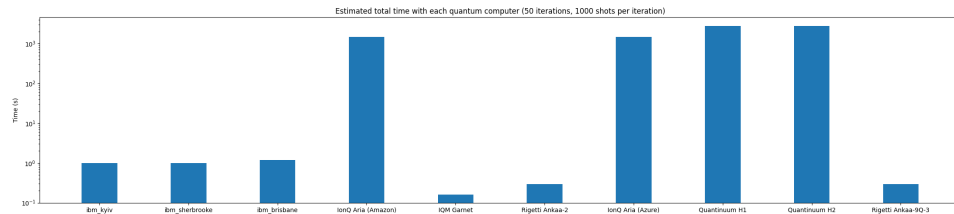


Figure 7: Estimated total time with each quantum computer

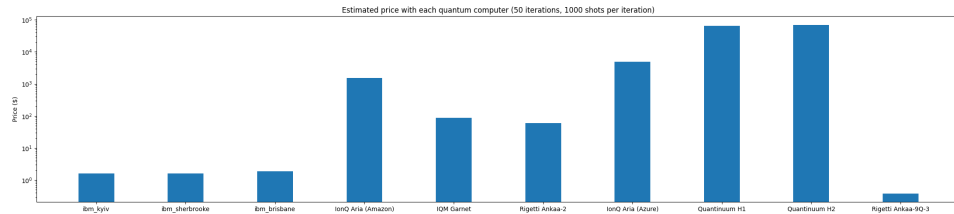


Figure 8: Estimated price with each quantum computer

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 4.31%, time to execute: 2803.2 seconds and a price of \$64375.0.
- Lowest time: IQM Garnet from Amazon Braket with a calculated error of 70.98%, time to execute: 0.161 seconds and a price of \$87.5.
- Lowest price: Rigetti Ankaa-9Q-3 from Azure Quantum with a calculated error of 49.31%, time to execute: 0.294 seconds and a price of \$0.38.