3-SAT Solution Report for Problem Reduced from Original Format

Report generated on: 2024-11-15 14:02:27

3-SAT Formula:

[[-1, -2], [-1, -3], [-2, -3], [-2, -4], [2, 3, 1], [-5, 1, 3], [5, -1], [5, -3], [5, 4, 2], [1, 2, 3], [2, 4]]

Exact Solutions:

[-1, 2, -3, -4, -5]

[-1, -2, 3, 4, 5]

[1, -2, -3, 4, 5]

Converted QUBO Matrix Visualization

It is a 15 × 15 upper matrix with 10 ansilla variables.

[

[-4.0 3.0 4.0 0.0 -1.0 0.0 0.0 0.0 0.0 1.0 1.0 0.0 0.0 0.0 1.0]

[0.0 -7.0 3.0 4.0 1.0 0.0 0.0 0.0 0.0 1.0 0.0 0.0 0.0 1.0 1.0]

[0.0 0.0 -4.0 0.0 -1.0 0.0 0.0 0.0 0.0 1.0 1.0 0.0 0.0 0.0 1.0]

[0.0 0.0 0.0 -3.0 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.0 0.0]

[0.0 0.0 0.0 0.0 -2.0 0.0 0.0 0.0 0.0 0.0 1.0 0.0 0.0 1.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 0.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -1.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]

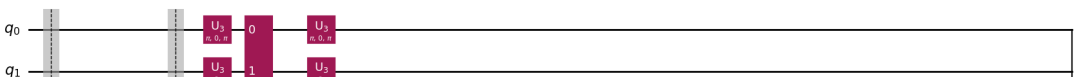
[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0 0.0]

[0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -2.0]

]

Corresponding Oracle Visualization



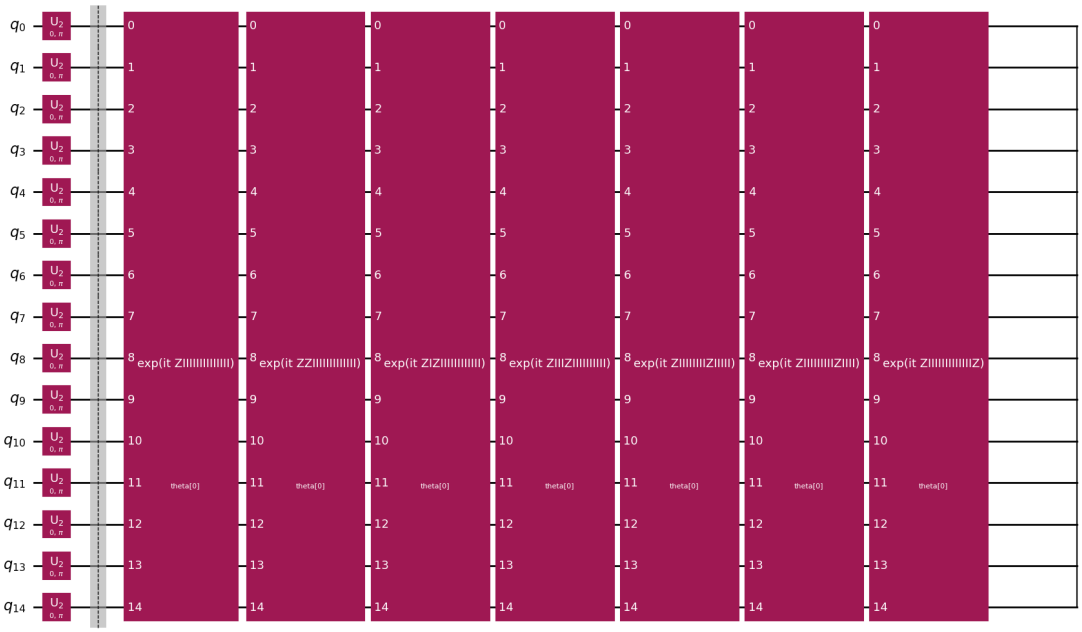
QAOA Solution:

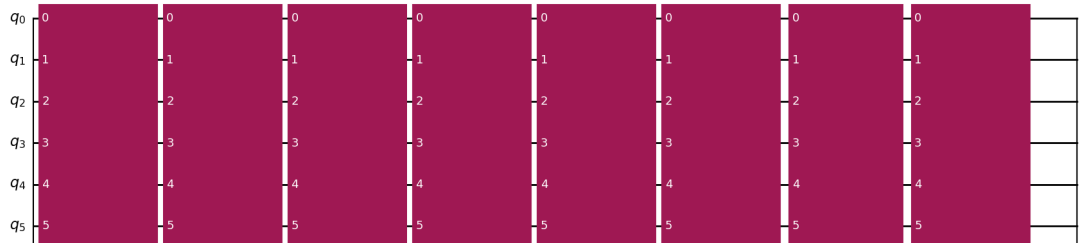
QAOA Highest Probable Solution: [1 0 0 1 0 0 1 0 0 1 1 1 1 1 1]

QAOA Configurations:

- Layers: 3
- Maximizer Hamiltonian: Standard Mixing Hamiltonian
- Classical Optimizer: Powell's Method
- Maximum Iterations: 500
- Initialization:
  - Gamma: 2pi
  - Beta: pi

QAOA Optimization, generated quantum circuit





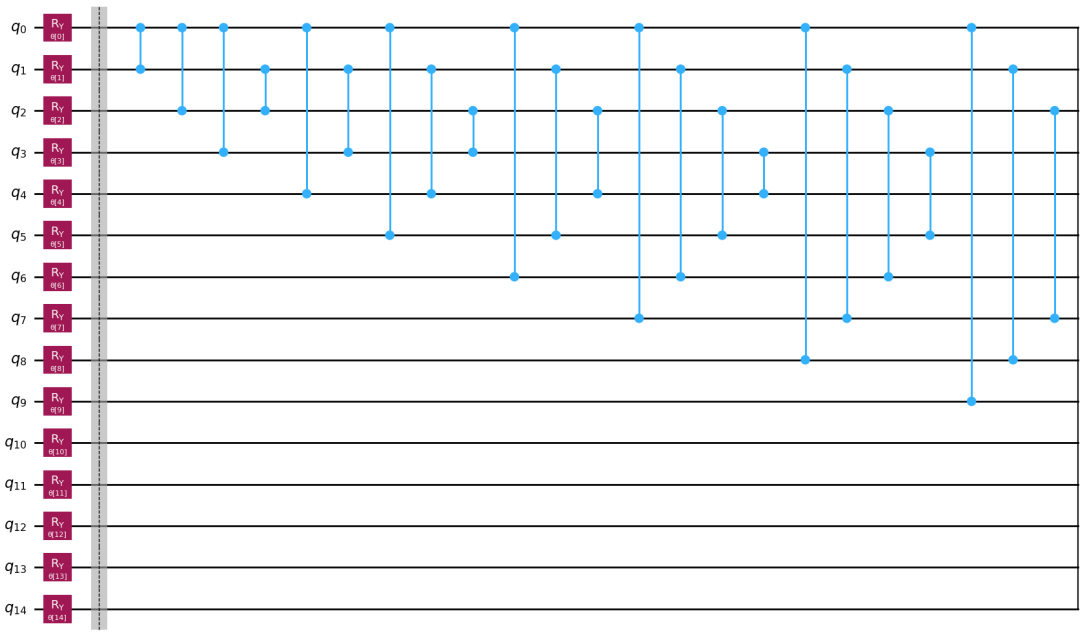
VQE Solution:

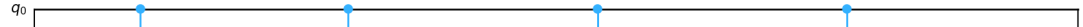
VQE Highest Probable Solution: [0 0 1 1 1 0 0 1 0 1 0 0 1 1 1]

VQE Configurations:

- Layers: 3
- Ansatz: Two Local
- Classical Optimizer: Powell's Method
- Maximum Iterations: 500
- Initialization:
  - Theta: pi

VQE Optimization, generated quantum circuit





Grover's Algorithm Solution:

Grover's Most Probable Solution: [1 1 1 1 1]

Grover Search, generated quantum circuit