GenAI-QAI Development Accelerator Kit - Proposal Document

# 1. Introduction

This proposal demonstrates a mock end-to-end lifecycle of the GenAI-QAI Development Accelerator Kit, built to map real-world optimization problems into QAI (Quantum-AI) solutions using simulated QUBO and QAOA workflows.

# 2. Client Input

Example: Logistics domain – optimize delivery routing across 50 cities.

Constraints: time windows, fuel cost.

Goal: minimize total cost.

# 3. Problem Classification

Classified as:

- Problem Type: QUBO

- Quantum Model: QAOA

- Hybrid Needed: True

# 4. Generated QUBO Matrix

[1, -1, 5, 2, 0]

[-1, 4, -1, -1, 2]

[5, -1, -1, -1, -1]

[2, -1, -1, -1, -3]

[0, 2, -1, -3, -5]

# 5. Generated Pseudocode

# Hybrid Optimization Pipeline (Pseudo)  
1. Parse input data and map constraints  
2. Build QUBO cost matrix  
3. Initialize parameters  
4. Run QAOA loop:  
 - Apply rotation layers  
 - Measure qubit states  
 - Evaluate cost function  
5. Return best bitstring solution

# 6. Simulated QAOA Circuit Instructions

H(q0) -> RX(θ0\_0) -> RZ(γ0\_0)

H(q1) -> RX(θ0\_1) -> RZ(γ0\_1)

H(q2) -> RX(θ0\_2) -> RZ(γ0\_2)

H(q3) -> RX(θ0\_3) -> RZ(γ0\_3)

H(q4) -> RX(θ0\_4) -> RZ(γ0\_4)

# 7. Evaluation Score

Simulated Cost Function Score: 0.0

# 8. Asset Packaging

All generated assets were bundled into `QAI\_Solution\_Export.zip`, including:

- QUBO matrix (TXT)

- Pseudocode (TXT)

- Circuit (TXT)

- README (MD)