

Thesis Topic Registration Form

Student's Data:

Student's Name: Farizi Muhammad Al
Student's Neptun code: OCSWOM

Educational Information:

Training programme: Computer Science BSc

I have an internal supervisor

Internal Supervisor's Name: *Morse Gregory Reynolds*
Supervisor's Home Institution: *Department of Programming Languages and Compilers*
Address of Supervisor's Home Institution: *1117, Budapest, Pázmány Péter sétány 1/C.*
Supervisor's Position and Degree: *Lecturer and MSc in Computer Science*

Thesis Title: Visual Quantum Circuit Partitioner

Topic of the Thesis:

(Upon consulting with your supervisor, give a 150-300-word-long synopsis of your planned thesis.)

This thesis addresses a key challenge in quantum computing: executing complex algorithms on today's limited-qubit hardware. The project develops an interactive visualization system that decomposes quantum circuits into smaller components that can be processed more efficiently.

The system implements multiple partitioning techniques and renders these partitioned circuits through an intuitive interface highlighting critical metrics for evaluation. A comparative analysis framework evaluates different partitioning methods across diverse circuit samples, helping researchers determine which approach works best for specific applications.

The implementation combines visualization technologies with scientific computing libraries to create an accessible tool for understanding circuit transformations. Educational aspects of the system allow users to gain insights into quantum circuit structure and execution requirements. Additionally, the project explores optimization opportunities within partitioning strategies while maintaining algorithmic correctness. This project demonstrates advanced algorithms, data structures, and object-oriented programming languages while contributing to the quantum computing ecosystem through a framework for circuit analysis that adapts to evolving hardware constraints.

Budapest, 2025. 04. 17.