Graduation Project Proposal

Julia-QAL: Implementing QAL in Julia

QAL (Quantum Algorithms Lab) is an innovative visual interactive app that is currently under development for researching and teaching quantum algorithms and related mathematical fields. For more info on QAL, check https://q-info.github.io/QAL-Lite.

Project Description: QAL is currently implemented as a web app. Even though the web offers a great platform for publicizing scientific apps, native web apps (that are built directly using JavaScript and HTML) may not provide the best performance or graphics capabilities for visual interactive scientific apps. In this graduation project the students will consider using other platforms to implement QAL—platforms such as Julia, R, SciPy, Matlab, or C/C++. The students will thus be responsible of putting their software development skills towards significantly improving the performance and graphics capabilities of QAL, making use of the QAL infrastructure for mathematics and interactive visualizations.

Team Size: 2-3 members.

Main Technologies: One of Julia (preferably), R, SciPy, Matlab, or C/C++.

Prerequisites: Excellent software development skills. Knowledge of JavaScript, HTML, and general web app development is a must. General knowledge of Julia and some its libraries (particularly Makie, WGLMakie, Vega, and the Algebra of Graphics) is a *strong* plus. General mathematical knowledge, particularly of linear algebra, is a plus, but not absolutely necessary.

Frameworks: QAL is currently implemented as a client-side web app that uses few simple libraries and frameworks (e.g., well-known JavaScript libraries such as jQuery, jQueryUI, … etc.). How these libraries are used in QAL can be explained to the students.

More Details: Contact moez@alexu.edu.eg or moez@cs.rice.edu.