The Effect of Optimizations at Different Levels in Quantum Compilation

Task Description:

During the compilation of a quantum program, there are different levels in which a quantum circuit can be optimized. However, it is not clear what kind of impact an optimization A in one level has on an optimization B at a later level. It might be that A boosts B, but it can also be that A makes B worse, or maybe it has no impact at all.
The idea of this thesis is to try to find out what impact optimizations at different levels have on each other.

Prerequisites:

- Prior knowledge on quantum computing
- Prior knowledge on how (quantum) compilers work is helpful but not mandatory

Overview of the Tasks:

1. Familiarize with one or more quantum compilers and how to apply optimizations
2. Investigate different optimization sequences
3. Analyze the impact of those optimization sequences on each other regarding multiple optimization criteria

Get in touch:

In case you are interested, please send a *short* e-mail (German or English) with your motivation and which prerequisites you fulfill to michelle.to@nm.ifi.lmu.de. Please do **not** send long e-mails generated by a large language model.
If you have any questions, please don't hesitate to get in touch.

Organisatorisches:

Aufgabensteller:
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Dauer der Arbeit:

- Masterarbeiten: 6 Monate

Anzahl Bearbeiter: 1

Betreuer:

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