

CprE 492 - sdmay20-08

Cirq: A Python Framework for Creating, Editing, and Invoking Quantum Circuits

Week 2 Report

1/31/2020 - 2/13/2020

AJ Hanus - Researcher, Developer
Andrew Hancock - Researcher, Developer
Austin Garcia - Researcher, Developer
Calista Carey - Researcher, Developer
Jake Shedenhelm - Researcher, Developer
Jordan Cowen - Researcher, Developer

Client: Victory Omele

Faculty Advisor: Akhilesh Tyagi

Weekly Summary:

Each pair has met at least once a week to work on their individual Pull Requests. Also, members have put in their own individual work into these PRs. Each Sunday, we met as a large group to discuss the project and the process of each three individual groups. We also spend these Sundays working together to connect all three pull requests. We have a great start and have created files that correspond to our individual pull requests on a common fork of the GitHub repository.

Past week accomplishments:

- Met as a group and ensured everyone was on the same page in terms of what we plan to do by Spring Break
- Met in our individual Pull request groups to split up the tasks.
- Fully understand the QASM output class and how it relates to the QUIL output.

Pending Issues:

The current issues we are working on are the three pull requests we have in the Cirq repository. We plan to have these all completed before Spring Break.

We have had issues getting the Virtual Machines running on our individual computers so we decided that using an EC2 instance from AWS will make it easier for the team.

Individual Contributions:

Name	Individual Contributions	Hours this week	Hours Cumulative
Calista Carey	<ul style="list-style-type: none">• My partner and I met to split up the gates that need to be completed within our pull request. During this meeting, 12	6 (1/31-2/7) 6.5 (2/7-2/13)	14.5

	<p>gates were assigned to each person.</p> <ul style="list-style-type: none"> • Jake and I met to work on our gates/ pull request to ensure we are on track to finish the first implementation by our goal, Spring break. • I have been having issues with Virtual box, so I had to take time to set up a different environment, and with AJ's help, I was given access to his AWS instance of the environment for testing. • Every Sunday, our group has a full group meeting for about three hours to catch each other up on individual group progress, and work to connect every one's PRs. During the meeting on Sunday, I started working on the Cirq to QUIL translation for the SWAP gates. This work is still in progress. • I have been looking more into QUIL and the difference between QUIL and QASM so that I know how my implementation of QUIL needs to be different than the already existing translation to QASM. 		
Jordan Cowen	<ul style="list-style-type: none"> • Met with Andrew and ran through all the gates supported by Cirq determining which gates were nonstandard to QUIL and could not be decomposed into other cirq gates. • We plan to begin work on implementing these gates in QUIL this week • We emailed our sponsor victory to verify we're working on the right gates • We have planned coding sessions to all meet and work on our pull requests. 	5(1/31-2/7) 5(2/7-2/13)	10

<p>AJ Hanus</p>	<ul style="list-style-type: none"> ● Austin and I met on Thursdays at the library to go over the QASM code to try to understand the similarities with the QUIL code. ● Created basic starting files and ensured that the pytests worked ● Created an EC2 instance for the team to give everyone an easy way to work on the code. People were having troubles with their local VirtualBox machines and mine was working great so I just gave them the private key to log on. ● Met with Jake and Calista to go over what they had discovered about the similarities with QASM. ● Met on a Sunday for a deep dive into a hackathon/coding jam. Ended up running into a lot of issues with logging into EC2 instance so I had to completely redo it. Ended with offering the EC2 instance with the rest of the group so I think it was productive. 	<p>7 (1/31-2/7) 8 (2/7-2/13)</p>	<p>17</p>
<p>Austin Garcia</p>	<ul style="list-style-type: none"> ● Met with AJ on Thursdays to work on understanding QASM similarities with QUIL. ● Setup a shared folder on my local machine so that it was easier to run and edit code between the Ubuntu Virtual Machine and my local Windows machine. ● Had some setup issues in my Ubuntu Virtual Machine so had to spend some time doing reinstallations in order to properly run Cirq. 	<p>5 (1/31-2/7) 4 (2/7-2/13)</p>	<p>9</p>
<p>Andrew Hancock</p>	<ul style="list-style-type: none"> ● Decided on a meeting time with Jordan since we share a pull 	<p>5(1/31-2/7) 6.5(2/7-2/13)</p>	<p>11.5</p>

	<p>request.</p> <ul style="list-style-type: none"> ● Planning to begin work on our pull request next week. ● Met with Jordan and went through all gates in the repository to figure out which ones were going to require changes from us and which weren't ● Sent an email to Victory to verify with him the list of gates Jordan and I came up with. He let us know that the six gates we listed looked good and should be all we have to change for our pull request. We also verified our method of finding gates with him to ensure we chose the right ones. ● We have planned code jams to get together and work on the code for large periods at a time. ● Also forked the repository for our pull request to give us a place to start making changes 		
Jacob Shedenhelm	<ul style="list-style-type: none"> ● Calista and I met and split up the gates that we will be working on. ● As well, we met again to begin working on our pull request. Primarily, the focus of this meeting was understanding the flow and finding all the components we will need to get our pull request complete. ● We had a couple questions regarding code that may or not be required. As well, some design decisions (whether or not to add a specific file) that I reached out to our client, Victory Omole, to get his input. ● Our group plans to have several "code jams" where we all meet and work on our pull requests together. We think this will be 	<p>5 (1/31-2/7) 8 (2/7-2/13)</p>	15

	<p>beneficial because our pull requests are closely intertwined.</p> <ul style="list-style-type: none">• Lastly, I have been studying up on QUIL to gain a better understanding of what our output format should be.		
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Plans for Coming Week:

Continue working on each Pull Request with individual partners and book study rooms on Sundays to work as a large group.