Joshua Clune

Reachable at 201-218-7654 or by email at jclune@andrew.cmu.edu

EDUCATION

Pursuing PhD in Computer Science, Carnegie Mellon University
Advisor: Professor Jeremy Avigad Sep 2021-Present

B.S. in Computer Science, Carnegie Mellon University
Computer Science major, Philosophy additional major (GPA: 3.86/4) Sep 2017-May 2021

RESEARCH

A Formalized Reduction of Keller's Conjecture
Advisor: Jeremy Avigad (CMU) Sep 2021-Present

- Formalizing the connection between Keller graphs and Keller's original conjecture on cube tilings in Lean

A Polymorphic Logical Framework
Advisor: Karl Crary (CMU) Sep 2020-Present

- Working on an extension to the LF logical framework that includes polymorphic types
- Main goals include proving identity expansion and cut elimination, and subsequently formalizing said proofs with Coq

Program Equivalence for Assisted Grading of Functional Programs
Advisors: Umut Acar (CMU) and Ruben Martins (CMU) May 2019-Nov 2020

- Developed a technique for checking for equivalence between purely functional programs
- Implemented the technique for use on thousands of Standard ML programming submissions from an introductory functional programming course
- Proved the soundness of the technique so that if the technique identifies two programs as equivalent, it is necessarily the case that the two programs exhibit identical behavior

WORK EXPERIENCE

Teaching Assistant
Carnegie Mellon University Aug-Dec 2018 and 2019
Served as a teaching assistant for the class Mathematical Foundations for Computer Science

- Prepared lessons for and lead recitations twice a week
- Created and gave two extracurricular lectures for students interested in tangential material
- Participated in the creation and grading of homework and exam problems
- Held weekly office hours and met students individually to provide additional tutoring

Software Engineering Intern
Bloomberg L.P. Sep 2016-Aug 2017, Jun-Aug 2018
Personally lead and completed the following development projects for the Bloomberg Terminal:

- Created a Terminal function to help sales representatives monitor how effectively their customers engaged in various workflows, both at the aggregate level to discover widespread trends and the individual level for closer monitoring

- Created a Terminal function to display specific Terminal user information while simultaneously running internal checks to ascertain the consistency of the displayed data

General Coding Intern
Readorium June 2016-Aug 2016
Worked with a team of interns to complete various development projects:

- Migrated Readorium's main product from Flash to HTML5
- Developed a system of recording user transactions that can be used both to identify bugs and to determine whether a user improperly bypassed certain security features. I personally served as the lead developer for this system

PUBLICATIONS/AWARDS

- Joshua Clune, Vijay Ramamurthy, Ruben Martins, and Umut A. Acar. 2020. Program Equivalence for Assisted Grading of Functional Programs. Proc. ACM Program. Lang. 4, OOPSLA, Article 171 (November 2020), 29 pages. https://doi.org/10.1145/3428239
- Received Honorable Mention for 2021 CRA Outstanding Undergraduate Researcher Award