Summary of Accomplishments Computability and the Study of Formal Languages 2010-2011

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May 27, 2011

Abstract

I have really enjoyed this class and am afraid that I will sorely miss it when the year is over. I have completed all the assigned work and at least 90% of the work for Spring quarter, which I will finish before the year is over. I have achieved a good foundational understanding of logical systems, Haskell and its type model, parsing and language design, computability, Prolog and Curry, SETL, Agda, Smalltalk, the static/dynamic typing debate, polymorphism, and type inference.

1 Fall Quarter

In the fall quarter, I spent a lot of time working with the Formal Languages and Logic for Applications books. I finished all the assigned homework.

- Did assignments 1 - 8 for Haskell.
- Did the assignments from chapter 1 through chapter 8 in the Programming Language Design texbooks.
- Finished the Clite parser and modified it to be more object oriented.
- Did all assignments from chapter 1 through chapter 5 in the Formal Languages textbook.
- Did all the assignments from part 1, chapter 1 through part 2, chapter 5 in the Logic textboo.

2 Winter Quarter

I focused a little more on Haskell this quarter, but still was able to finish all the prescribed assignments. I also continued my work on the object oriented version of the Clite interpreter.

- Finished assignments 1 - 9 for the Haskell class.

- Read Typeclassopedia, Learn You a Haskell, and Applicative Programming with Effects.
- Did the assignments for the Programming Language design class (chapters 9 - 14).
- Finished the object oriented version of the interpreter for Clite. Implemented part of CliteF (enough to understand the concepts).
- Completed assignments for chapters 5 - 12 in the Formal Languages textbook.
- Completed assignments from page 118 - 191 from the Logic textbook.

3 Spring Quarter

I accomplished the most in Spring Quarter. I did all the seminar readings, and implemented or wrote out the examples wherever I could. I finished all the assignments and for my project, I learned the foundations of Agda, Smalltalk, and SETL.

- Finished the assignments from chapters 11, 12, 13, and 18. (Chapters 14 and 19 I will complete before the end of the quarter).
- Implemented the algorithm for an LL parser generator in SETL, Agda, and Smalltalk. This includes the algorithm for finding the FIRST set, the FOLLOW set, and the parser itself.
- Read and completed selected exercises from 'Computer Programming Using GNU Smalltalk'.
- Read Part 1 (89 pages) of 'Smalltalk-80: The Language and Its Implementation'
- Read 'The SETL Programming Language' by Robert Dewar and did selected exercises.
- Implemented the topological sorting problem as well as Project Euler problem 18, 67, and 21 in SETL.
- Implemented an interactive Text Adventure interpreter in Smalltalk.
- Read 'Dependent Types at Work' and implemented all the examples and exercises in Agda.
- Wrote a large tutorial paper on all three of the above languages with many examples.
- Did all the seminar assignments, including the Curry exercises and the implementation of a type inference algorithm in Haskell.