CS 314: Final project

Spring 2019

Overview

The final project should be a substantial project that demonstrates what you've learned in the course. You're free to propose your own project idea, but it should relate to the course topic.

You can work solo or in small groups.

Please submit proposals (including group members) by 4/19 and the projects themselves by 5/12. Only one submission is necessary per group.

Sample project ideas

- Build a compiler / interpreter / typechecker for some language:
  - (a subset of) Scheme
  - CLite (http://myslu.stlawu.edu/ ehar/Spring10/364/clite_grammar.html)
  - an esoteric language (see https://esolangs.org/wiki/Main_Page)
  - lots of choices (see https://en.wikipedia.org/wiki/List_of_programming_languages_by_type)
  - or your own custom language!
- Look into more advanced features of one of the languages we covered and build some application that utilizes them.
- Look into an interesting language we didn't cover and build an application in that language:
  - Parallelize code on a GPU using CUDA
  - Write a parallel application using Erlang
  - Look into languages like Agda or Idris that are similar to Haskell but use a dependently-typed type system and demonstrate how that's useful
  - Learn Prolog and show how its tools for logic-based reasoning can be used to solve problems
  - etc.
- Build a (subset of) a computer algebra system
  - E.g., do symbolic differentiation of polynomials
  - Design a domain-specific language for the user to input their expressions
- Modify / improve an existing open-source application/library
- Build a GUI-based native application
- Build a web application using one of the languages we've covered (e.g., using ghcjs with Haskell).
- Build a library/application using an interesting novel language.
- Prove the correctness of a program/algorithm using Z3 (https://rise4fun.com/z3)
- Implement the same algorithm/data structure in multiple languages (e.g., functional vs. imperative, static vs. dynamic) and compare their performance / ease of implementation.

Evaluation

Your projects will be evaluated based on a number of factors:

- Proposal
- Scale of the project (note that larger groups should have correspondingly larger projects)
- Completeness / functionality
- Design / UI / polish / creativity

Submission

In addition to your project, please write a description (pdf or powerpoint) of your project, your goals, what worked, what didn't, etc. Be sure to describe how your project relates to the topics in this course.

Please submit a zip/tar file on Sakai with all relevant files.