Assignment 5:
Choose-Your-Own-Adventure Lab 6 Proposal

15-411/611: Course Staff

Due Wednesday, April 5, 2023 (11:59PM)

Note: You should complete this written assignment with your compiler partner.

A Project Proposal

Lab 6 involves extending your compiler with some interesting new feature(s). Each team is asked to choose one of a set of options for their project; these options include:

(1) targeting LLVM bytecode, or

(2) extending the source language of your compiler to C1 (and beyond), or

(3) implementing garbage collection, or

(4) defining and implementing your own project ("choose your own adventure").

To prepare for Lab 6, we ask you to provide a thorough written description of a possible "choose your own adventure" project. **You should complete this written description of a new, unique project even if you plan to implement one of the preset options for Lab 6.**

Choose-your-own-adventure ideas that have been pursued in the past include:

- New language features for C0 (functional programming constructs, exception handling, ...)

- New compilation targets/backends

- Additional safety/security guarantees (via the type system or static analysis passes)

- Major, complex optimizations

Again, to reiterate: even if you are planning to do one of the preset options for Lab 6, please explore a novel idea for this proposal. This is meant to get you thinking about ways to extend your compiler beyond the standard ways presented in the preset options for Lab 6. This proposal is not binding— we **will not** require you to implement it for Lab 6. But this is a good opportunity to get feedback from the course staff about whether your proposal is reasonable in scope, *before* you decide what direction to take for Lab 6.

Have fun with this! If you have any questions about the assignment (or would like to talk out if something is a "reasonable" amount of work), please post on Piazza or talk to the course staff at office hours.

Expectations

In more than one page but less than two (single spaced, 12pt font), tell us about a project that you think would be interesting and fun to implement by augmenting your compiler. This project should involve a reasonable amount of work (on the scale of the pre-defined options) but be something you think you can achieve in the allotted amount of time for the Lab 6 compiler.

You should propose a project that is not one of the predefined ones. In your proposal, you should be sure to include:

- A description of what you plan to do. This should be about 1/3 of the proposal.

- A brief motivation of why it is interesting.

- How you plan to implement it: what changes do you need to make to the high level structure of your compiler? Are there phases that you would like to add, and how do they interact with the end goal? This should be about 1/3 of the proposal.

- How you plan to test it: how do you know if your project is successful? What sort of testing suite would you provide?

- A timeline with at least 4 milestones and how long you would allocate for each.

Grading

You can earn 30 points for this assignment. We will roughly divide the points as follows: 10 points for the idea and description, 5 points for the motivation, 10 points for the implementation plan, and 5 points for testing and timeline.

Formatting

The document should be 1-2 pages, single spaced. Please use a standard/readable 12pt font. The document should also contains a header with the following information:

Team name:	YOUR TEAM
Title:	YOUR TITLE

Submitting

Submit before the deadline (**Wednesday, April 5**) a PDF file with your proposal to Gradescope. Group submission will be enabled on Gradescope; please submit once, as a team, rather than individually.