Objectives

To explore different subsets of programming languages and to gain understanding of the general features of various small/toy programming languages. To identify two small programming languages that can be utilized for a new compiler construction. To explain the key elements of the conducted research in a Markdown document, detailing the findings and providing reflections.

Reading Assignment

If you have not done so already, please read the “Mastering Markdown” and “Documenting Your Projects on GitHub” GitHub Guides available at https://guides.github.com/. To have a better understanding of the compiler overview and its connection to programming languages, you should also read Chapters 1.1-1.5 in the BCD course textbook.

Accessing the Laboratory Assignment on GitHub

To access the laboratory assignment, you should go into the #labs channel in our Slack team and find the announcement that provides a link for it. Copy this link and paste it into your web browser. Now, you should accept the laboratory assignment and see that GitHub Classroom created a new GitHub repository for you to access the assignment’s starting materials and to store the completed version of your assignment. Specifically, to access your new GitHub repository for this assignment, please click the green “Accept” button and then click the link that is prefaced with the label “Your assignment has been created here”. Click the “Clone or download” button and, after ensuring that you have selected “Clone with SSH”, please copy this command to your clipboard. Unless you provide the instructor with documentation of the extenuating circumstances that you are facing, not accepting the assignment means that you automatically receive a failing grade for it.

Small/Toy Programming Languages

In this course you will be invited to implement a full compiler for a language of your choice. To keep the task at hand manageable you are to select a “toy” programming language or a subset of an existing programming language created for educational purposes. For example, appropriate languages to consider would be Decaf or CMU’s C0 language. Other (smaller) languages can be found at The Programming Languages Zoo and other online resources. While the main goal of the labs is to implement various phases of a compiler, it is imperative to have a good understanding of the source language you are attempting to compile.

Your task in this assignment is to research various small/toy programming languages and to study their key features. At this point you do not need to understand specific language grammars but should be able, for example, to describe in general terms what is allowed and not allowed in a specific language. After your preliminary research, select two programming languages, and explore them further. You are to write a markdown document that explains the key elements and features of these languages. Include all information about the language that could be relevant for the compiler phases which we have broadly reviewed. For example, you should discuss the syntax
of the language, program structure, scoping, variables, data structures, functions, etc. Finally, add your personal reflection on why each selected language could be an appropriate source language for a new compiler development. If you find existing compiler implementations for the selected source language, please provide references.

**Summary of the Required Deliverables**

This assignment invites you to submit, using GitHub, the following deliverable.

1. Stored in a reflection.md, a two-paragraph (at least 200 words each) report on two selected languages and your reflection on the applicability of compiler development to them. Specifically, add your thoughts on the question:
   “If you had to develop a compiler for a mini-language, which language would you choose?”

**Evaluation of Your Laboratory Assignment**

Your grade for the assignment will be a function of the whether or not it was submitted in a timely fashion and if your writing is clear of mistakes and satisfies the length requirement. If your submission does not meet these basic requirements, the instructor will reduce your grade for the assignment while still considering the regularity with which you committed to your GitHub repository and the overall quality of your partially completed work. Please see the instructor if you have questions about the evaluation of this laboratory assignment.

**Adhering to the Honor Code**

In adherence to the Honor Code, students should complete this assignment on an individual basis. While it is appropriate for students in this class to have high-level conversations about the assignment, it is necessary to distinguish carefully between the student who discusses the principles underlying a problem with others and the student who produces assignments that are identical to, or merely variations on, someone else’s work. Deliverables (e.g., Markdown-based technical writing) that are nearly identical to the work of others will be taken as evidence of violating the Honor Code. Please see the course instructor if you have questions about this policy.