Project #3 – Report on Adding Class-Based Objects to Scheme
CS 152 Section 5 – Fall 2020
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Introduction

In this course, we covered four programming paradigms:

- Procedural programming
- Functional programming
- Logic programming
- Object-oriented programming

By now you should be comfortable with implementing various different programming language paradigms. In Lab #1 you implemented a calculator that supports infix and postfix notation. In Project #1 you implemented a Scheme interpreter by using strictly functional Scheme. In Project #2 you implemented a basic Prolog interpreter that uses unification when resolving queries. You should also have an intuition regarding how to add features to these interpreters, such as adding support for variables in Lab #1, adding let and let* to Project #1, and adding numbers to Project #2.

Project #3 is less implementation-focused and more design-focused. Your assignment is to write a report where you describe how you would add a class-based object system to Scheme. Note that an implementation is not necessary; this is strictly a design document.

At the minimum, your objects need to support methods, inheritance, and encapsulation (i.e., the protection of instance variables). Your paper must describe how your design will implement these features, including what changes you'll need to make to the Scheme interpreter. It is up to you to decide the other details of your object system, including syntax (though your syntax must be expressed as S-expressions). Make sure you show at least one example of your object system that takes advantage of inheritance. Feel free to use other object-oriented programming languages such as Common Lisp (which has the Common Lisp Object System), Smalltalk, and Java as inspiration, but make sure you cite your sources.

Below are some details regarding the structure of your report:

- As in Project #2, you may work with a partner. Only one partner needs to hand in the report, but
- There is no minimum page limit, and there is a maximum page size of six (including figures, bibliography, etc.). Use single-spacing with a reasonable font and reasonable margins. I will be grading on completeness and correctness. A shorter paper that describes in full, correct detail how you would add objects to Scheme will earn more points than a longer paper whose details are either incorrect or incomplete.

- Make sure you show at least one example of your object system that takes advantage of inheritance. If there is no example code, then your submission will lose points.
- Make sure you cite your sources, and make sure you have a bibliography (list of cited papers, textbooks, and other works) at the end of your report; a bibliography is required. I will not be imposing a particular citation format such as MLA or APA, but I greatly appreciate consistency.
- Grammar counts.

Deliverable

Your deliverable is a PDF document that contains your report.