Homework 4

This homework is due Wednesday, Feb. 28 (in class).

Feel free to do this homework with pencil and paper. Typesetting denotational semantics is hard. However, if you want to type up your homework solutions using LaTeX, you may want to use the file `~leavens/cs541public/math-notations.tex` on snowhite.

1. (5 points) Do exercise 12 on page 32 of Schmidt's book.

2. (13 points) Do exercise 3 on page 55 of Schmidt's book.

3. (6 points) Do exercise 4 on page 55 of Schmidt's book.

4. (12 points) Do exercise 12 on page 57 of Schmidt's book.

5. (20 points) This problem requires you to add constructs `add` and `conjunction` to the denotational semantics of FL. The semantics of these constructs is as follows:

   - `(and` e_1 e_2`)` returns the value of e_2 if e_1 evaluates to `#t`; returns `#f` if e_1 evaluates to `#f`; and otherwise is undefined. (e_2 is not evaluated when e_1 is `#f`.)
   - `(conjunction` e_1 e_2`)` returns `#t` if both e_1 and e_2 evaluate to `#t`; returns `#f` if e_1 and e_2 evaluates to some other combination of boolean values; and is otherwise undefined.

   You are to extend the valuation functions in the denotational semantics of FL to handle these new constructs.

6. (32 points) Do exercise 8 on page 72 of Schmidt's book. (Hint: you may want to try exercises 4, 5, and 6 first.)