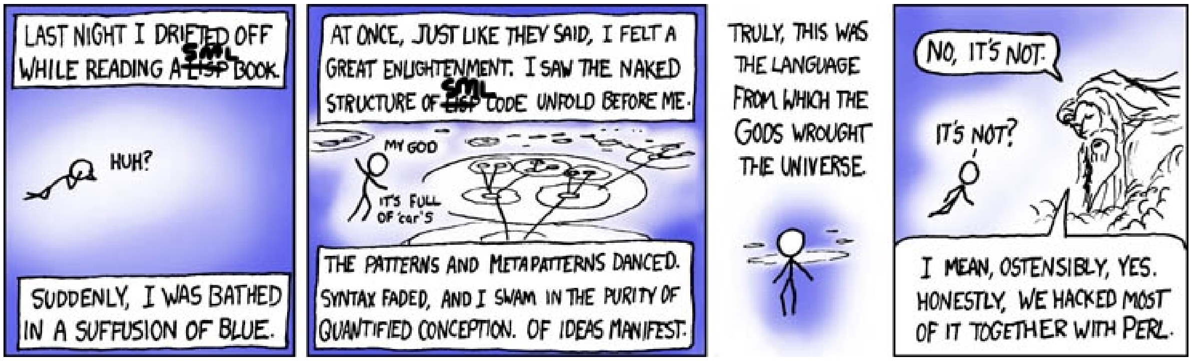
CS52 - Assignment 0

Due Friday 9/4 at 5:00pm


LAST NIGHT I DRIFTED OFF WHILE READING A ~~LISP~~ SML BOOK.
HUH?
SUDDENLY, I WAS BATHED IN A SUFFUSION OF BLUE.
AT ONCE, JUST LIKE THEY SAID, I FELT A GREAT ENLIGHTENMENT. I SAW THE NAKED STRUCTURE OF ~~LISP~~ SML CODE UNFOLD BEFORE ME.
MY GOD
IT'S FULL OF 'car'S
THE PATTERNS AND METAPATTERNS DANCED. SYNTAX FADED, AND I SWAM IN THE PURITY OF QUANTIFIED CONCEPTION. OF IDEAS MANIFEST.
TRULY, THIS WAS THE LANGUAGE FROM WHICH THE GODS WROUGHT THE UNIVERSE.
NO, IT'S NOT.
IT'S NOT?
I MEAN, OSTENSIBLY, YES. HONESTLY, WE HACKED MOST OF IT TOGETHER WITH PERL.

slightly modified from: `https://xkcd.com/224/`

This assignment is simply to check out that you have access to and can use the SML system. It is not factored into your course grade, but it is important that you complete it on time so that we can solve any problems that arise.

Reading

In addition to the readings from the course handouts (i.e. make sure you've read Part I from *A Brief Introduction to SML*), I *strongly* suggest that you also become familiar with some of the SML books that I have suggested (and have made available to you in the lab). There is no single one good book, so check out a few of them and see which one suits you best.

Take a look at the first few chapters of Ullman's book, Section 1.6 of Pucella's notes, the chapter "Simple Applicative Programming" by Gilmore, and Chapter 2 of Harper.

Academic Honesty

On the first day of class, I talked about academic honesty, as it relates to this course. It is *very* important that you understand what is and is not appropriate for this course. Read through the section on academic honesty from the course handout at:

`http://www.cs.pomona.edu/~dkauchak/classes/cs52/administrivia.html` including the general CS guidelines linked there:

`http://www.cs.pomona.edu/academichonesty`

After reading this material, please come talk to me if you have any questions or there are any ambiguities.

The Assignment

1. If you have never taken a CS class at Pomona College, obtain an account on the Computer Science Department's system. See *A Brief Introduction to SML* for information on obtaining an account and/or changing your password if you've forgotten it.

2. One of the goals of this class is to get you more comfortable using the command-line (aka as "Terminal" for Macs).

   (a) Follow the instructions in *A Brief Introduction to SML* to create a directory named `cs52` for your work in this course.

   (b) Make sure you understand the basic commands on page 7 and spend 10 minutes glancing through some of the resources under "Unix" to get a bit more comfortable with other commands available.

   (c) Try out a few commands :)

3. Create a file named `assign0.sml` which will hold your submission for this assignment.

   Below I've included a skeleton for the assignment for you to refer to. Do not copy and paste from this document to complete the steps below. Instead, *type* them. I know this may seem a bit tedious, but I want you to get comfortable with Emacs, formatting, parenthesis matching, etc. (humor me :).

   (a) *Type* the header comments with your name, the date, assignment number, etc.

   (b) *Type* in the `numList` function along with the provided comments. Before moving on to the next step, load (i.e. "use") your file in SML and then test to see that your `numList` function works by calling it with a number.

   (c) *Type* in the `sumIntegers` function. Look at the code and see if you can figure out what this function does. Add an appropriately formatted comment stating what it does. Make sure you follow proper convention (look at the other examples or the examples from class). Once you think you've got it figured out, again, load your file in SML and run the `sumIntegers` function and make sure it does what you think it does :)

   (d) *Type* in the `sumFormula` function along with the comments and test it.

   (e) *Type* in the `sameValues` function along with the comments and test it.

   (f) *Type* in the four statements at the end of the file. See if you can figure out what these four lines are doing. Load/run the file (i.e. using "use") and then see what values they generate. *Add a comment above these four lines summarizing what they do.*

4. At this point you should have a complete assignment with comments at the top, four function declarations all with comments describing them and a set of statements at the bottom with a comment describing them. Submit your assignment via the online submission mechanism.

Program Skeleton

```
(*
 *  asgt00.sml
 *
 *  <Your Name>
 *  <The Date>
 *  CS 52, Assignment 0
 *
 *  My first experiment with SML!
 *
 *)

(*
 *  numList n  creates a list of integers from
 *  n down to 1.
 *
 *)
fun numList n = if 0 < n
                   then n::(numList (n-1))
                   else nil;


fun sumIntegers n = if 0 < n
                       then n + sumIntegers (n-1)
                       else 0;

(*
 *  sumFormula n  computes the formula for the sum of integers
 *  from n down to 1.
 *
 *)
fun sumFormula n = n * (n+1) div 2;

(*
 *  sameValues listA listB  returns true if listA
 *  and listB are the same.
 *
 *  It would be easier to write simply  listA=listB.
 *  We write it in a more complicated way here to
 *  illustrate list recursion.
 *
 *)
fun sameValues nil     nil     = true
  | sameValues (x::xs) (y::ys) = x=y andalso sameValues xs ys
  | sameValues _       _       = false;


val baseList = numList 47;
val siValues = map sumIntegers baseList;
val sfValues = map sumFormula  baseList;
sameValues siValues sfValues;
```