Harvey Mudd College
Computer Science 60
Spring 2010

Assignment 3
Unicalc CLI
Due. 11:59 p.m., Wed., 10 February 2010

CLI stands for "Command-Line Interface", an application that executes user commands from a command line. As before, **Unicalc** is a calculator that includes physical and other units, rather than just numbers. Use your Unicalc API from the previous assignment, or the one in the solution set, to construct a unit calculator based on a read-eval-print loop (REPL), which reads an S expression from the user, then prints the result. The following are legitimate expressions (defined recursively):

a numeral (integer, rational, or scientific)

a symbol *not* beginning with $, which will be interpreted as a unit (such as mile, meter, second, etc.)

a symbol beginning with $, which will be interpreted as a *variable* that has a Quantity as its value.

(/ N D)	where N and D are expressions, returning the quotient N divided by D, as a normalized Quantity
(* E_1 E_2 …)	where E_1 E_2 … represents zero or more expressions, returning the product of its arguments, as a normalized Quantity. The result for zero arguments is the Quantity 1.
(= V E)	where V is a variable and E is any expression. This sets the variable V to have the *normalized* value of the expression E.

If a Quantity has an empty numerator and denominator, it should be rendered as just the multiplier. Here are some examples of input to your CLI and the corresponding output:

```
> 3.14
3.14

> mile
(1609.3149259968 (meter) ())

> (/ mile hour)
(0.447031923888 (meter) (second))

> (/ (* acre foot) year)
(3.9111332681348173e-05 (meter meter meter) (second))

> (/ joule (/ (* kg m m)(* second second)))
1

> (= $x (* acre foot))
$x is (1233.414987438996 (meter meter meter) ())

> (/ $x (* meter meter meter))
1233.414987438996
```