Calculator with Variables

You are to write a program using flex and bison to implement a calculator somewhat like the Linux bc command. Basically your program will implement the 4 basic math operations, the sqrt function, and the pow function on numbers which are either constants or variables. You will also need to implement an assignment statement. All numbers will be doubles.

Your grammar should allow a sequence of expressions or assignments with a semicolon after each expression or assignment. You can use the files in /orca/seyfarth/csc415/bison as your starting point for the project.

A variable name will be defined as starting with a letter and having letters or digits after that. You can implement a symbol table using whatever technique you wish. The book's code from Chapter 2 is OK, though crude. You can also choose the STL map template class for the symbol table. This may require writing a set of C to C++ interface functions (simply place `extern "C"` before the function definition).

Please include an error production to allow recovery from errors in interactive use. You do not have to generate good error messages.

It should be an error if you attempt to use a variable which has not been assigned a value. This is a semantic error and should not affect the grammar as an error production. Instead it would result in an error message rather than a printed result.

Values should be printed with printf's `%g` format or the C++ equivalent.

For CSC 515 students, the basic arithmetic should be done using the gmp package which implements extended precision integers, rationals and floats. You should use the extended precision floating point type. As a default you should plan for 20 digits of precision. You need to add a statement to control the precision using a syntax like "digits = 30;". This would affect creation of new variables and the output precision.