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**Lab 8**

Scheme is another programming language that many hackers enjoy using. According to the tutorial that was given to us by Professor Chuang, Scheme is mainly used for writing beautiful programs and to enjoy programming. Scheme has many uses but one of the coolest ones that I’ve seen is using Scheme to make a calculator. According to the author of the tutorial, Takafumi Shido, Scheme’s approach to showcasing a calculator is more convenient than the calculator equipped with Windows.

On startup, Scheme’s console shows “ **1 ]=> “**and that is how you know when you can start typing in commands. In order to use the calculator, the syntax is basically operation then the numbers. For example, in order to tell the calculator to do **1+3**, the user would have to input **(+ 1 3)** which would then return the number 4. This is an example of the prefix notation that we learned about in CISC 3130. The prefix notation tells us that the operators would come before the operands which is different from the standardized infix notation, where the operator is placed in between the operands. Addition isn’t the only operator that can be used in the Scheme calculator. There are many others like subtraction, multiplication, division, etc. The syntax is the same for all the operations. For example, if the user would like to do **12 \* 12**, then the input would have to be **(\* 12 12)**. This would result in the system returning 144. Users can also nest parentheses to make sure that some operations come before another. One of the examples that Shido presents is **(\* (+2 3) (- 5 3))**. To start off, Scheme does the operations of whatever is in parentheses so, it would first add 2 and 3 then subtract 3 from 5. This would result in **(\* (5) (2))** and then it’d just be basic multiplication. The result would be 10.

There are other arithmetic operations like quotient, remainder, modulo and square root but it would be a little different. Instead of having a symbol for operation, the syntax for these would be typing out words in place of the operation symbols. For example, in order to the modulo of 7 and 3, the user inputs **(modulo 7 3)**. This would result in 1. This applies to trigonometric functions too. Instead of inputting a symbol for operation, the user would type sin, cos, tan, asin, acos or atan.

**SCHEME CALCULATOR TUTORIAL:** http://www.shido.info/lisp/scheme2\_e.html