**Language Reference Manual**

Key words for mathematical operations:

* add
* subtract
* times
* divides
* equals

Key words for mathematical comparisons:

* lessThan
* greaterThan
* sameAs

Key words for statements and loops:

* while
* for
* if
* else
* endBlock

Key words for object oriented programming:

* print
* s (denotes attributes of an object)

Key words for number ranges in statements:

* between
* and

Key word to terminate the program and output the intermediate code file:

* end

To create a name for an object, we use the regular expression:

* r'[a-zA-Z\_][a-zA-Z\_0-9]\*'

This permits the programmer type any name for an object as long as it begins with a letters.

For numbers, we use the regular expression:

* r'\d+'

**How it works:**

Once the program is started, beginner programmers input one line of code and press enter. The translator will grab the line of code and pass it through the lexical analyzer where its parts will be tokenized and identified with their respective IDs. The array of tokens will be sent to the syntax analyzer which creates an output file and will use a syntax rule table to determine what is the proper representation of that line of code in terms of the intermediate code. Once the syntax analyzer has the correct representation, and makes sure no errors appear within the tokens or expressions, a line of code in terms of the intermediate code is outputted to the intermediate code file. Once the programmer is done writing their program, they need to type “end” and press enter so the program terminates and the syntax analyzer closes the output file. Later, the programmer can run the output file in the python IDLE.

Exceptions to this flow of events is when the programmer makes a mistake and uses an incorrect code structure or misrepresents a key word. The program will notify the programmer that they have made a mistake and will not output any line of code to the output intermediate code file.

**Special rules to follow:**

While and for loops, and if statements have a special code structure within the intermediate code. This means that when they are entered into the syntax analyzer, they increment a variable that controls the code’s indentation from then on. To specify the end of a block of code started by these keywords, the programmer needs to use the keyword “endBlock” which will decrement the variable that controls the indentations. This keyword is meant to be used alone and should not have anything written before or after. Failing to do so will cause an error within the program, and the variable will not be decremented.