Jorge Alonso, Victor Navas

Prof. Alcibiades Bustillo

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Final Report

Introduction:

JAV is a functional language, and it specializes in mathematics. There are many other languages that can be used for mathematical purposes such as MATHLAB and Julia, but this language specializes in the following math topics. Algebra, Pre-Calculus and Trigonometry. The main target for this language is the children in middle school who are interested in coding and like math. We created a basic syntax because it will make our code more manageable for children who are starting their coding experience. JAV can calculate the basic arithmetic operations and is able to manage different data types at once. It has other features available such as number comparison and trigonometric functions. Other tools available are conditions for the more advanced students that are willing to step their experience a lot further.

Language Tutorial:

- Basic Arithmetic Operation

>> Calcuate: ‘5+5’

<< *10*

>> Calcuate: ‘5-5’

<< *0*

>> Calcuate: ‘5*5’

<< *25*

>> Calculate: ‘5/5’

<< *10*

>> Calculate: ‘5^5’

<< *3125*

>> Calculate: ‘(5+5)*2’

<< *20*

>> Calcuate: ‘(5+5)^2’

<< *100*

- Variable manipulation

>> Calcuate: ‘a = 3’

>> Calcuate: ‘a’

<< *3*

>> Calculate: ‘a+1’

<< *4*

>> Calculate: ‘Andy = 30’

>> Calculate: ‘Andy + a’

<< *33*

- If-then-else

>> Calculate: ‘x = 5’

>> Calculate: ‘**if** x == 5 **then** 2 + 10 * 10 **else** 5-2’

<< *102*

>> Calculate: ‘**if** x == 6 **then** 2 + 10 * 10 **else** 5-2’

<< *3*

Language Reference Manual:

- "+" = used to sum
- "-" = used to subtract
- "/" = used to divide
- "*" = used to multiply
- "^" = used for power
- "=" = used to assign
- "==" = used to compare both number
- ">" = used to compare with more than
- "<" = used to compare with less than
- "sin" = used for the trigonometry or sin
- "cos" = used for the trigonometry or cos
- "tan" = used for the trigonometry or tan
- "csc" = used for the trigonometry or csc
- "sec" = used for the trigonometry or sec
- "cot" = used for the trigonometry or cot

Language Development:

- Translator architecture
    - As for the Translator Architecture we used the parsing method, applied by the library PLY. This recognizes the structure in the sequence using tokens which will be produced by the lexxer that will make a tree to organize all.
- Describe the interfaces between the modules.
    - JAV - Python language
    - PLY - Python language
    - Math - Python language
- Describe the software development environment used to create the translator.
    - JAV uses PyCharm since it's an easy software and it creates everything in their own environment. It also downloads all the libraries you need unless they already have it.
- Describe the test methodology used during development.
    - We used different types of testing methods, the most common one was the debugger, since it lets us have control over everything. The Other method was through the output or in our case, the terminal. For example, we put "x=3" and the enter "x" to see if the value was the same.
- Show programs used to test your translator.

Conclusion:

The group experience was very satisfying since we learned to program in Python, and it was an enriching project. Also, we learned about the libraries PLY and math which are the ones used in the project besides the system and are all very useful. Here is the example repository for PLY (https://github.com/dabeaz/ply) it’s the one we used as an example for the project. The PLY official page is (https://www.dabeaz.com/ply/ply.html#ply_nn22)