SFWRENG 3XB3
Lab 3 - Assembly
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gitlabURL: https://gitlab.cas.mcmaster.ca/armanm5/l3-assembly

Assembly Lab

F1

What is a Global Variable?

In essence, a global variable is a variable which can be accessed from at any point in the function. This is different from local variables, which can only be accessed from certain scopes of the program. The easiest way to distinguish a global variable, is to see if it was declared outside of a function.

The Purpose Of NOP1 Instructions

NOP1 instructions are a unary no-operation instruction, meaning they do not do anything and are like assembly's version of python's "pass" statement. Oftentimes, compilers such as the GCC compiler use no-operation instructions to prevent hazards, timing reasons, or to occupy a delay slot [1].

The Role Of The Visitors And Generators

There are two visitors, GlobalVariables and TopLevelProgram. GlobalVariables extracts all the LHS and creates a set of all the global variables (all variables in the top level program). The second visiter, TopLevelProgram, determines the TopLevelProgram

The Current Limitations Of The Translator

Some limitations we noticed with the translator are issues with memory allocations and variable names. The translator always allocates variables with the .BLOCK keyword, but there are certain times where other variable declarations like .EQUATE (global constant) and .WORD (variable with a known integer value) are more appropriate. For example, .EQUATE makes variables immutable in PEP9 and saves 2 operations at runtime, making it more appropriate for global constants. Additionally, while manually translating add_sub.py to PEP9 code, we noticed PEP9 is unable to accommodate variable names longer than 8 characters. Therefore the translator has to account for that when translating variables to the equivalent PEP9 code.

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Citations

1. “NOP (code),” Wikipedia, 18-Nov-2022. [Online]. Available: https://en.wikipedia.org/wiki/NOP_(code). [Accessed: 20-Nov-2022].