SWE514 Project STM2IR - Report

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STM2IR is a script that takes in simple arithmetic statements and converts them into LLVM instructions. The project was implemented in Python 3.10. The script “stm2ir.py” must be run with an argument (“test1.txt”, “test2.txt”, “test3.txt”), and the output will be written into “file.ll”.

Implementation

The script does the following in order:

1) Parse the input text and store each line as elements of a set
2) Iterate over statements to identify variables and store them
3) Parse each statement into tokens, iterate over tokens to convert from infix to postfix notation, using the stack structure
4) Iterate over postfix statements to form LLVM IR commands using the stack structure and store them in a list. Form load, save, print and arithmetic operation commands (udiv, add, sub, mul)
5) Finalize the LLVM IR list by adding return statement
6) Output the LLVM instructions into file.ll

Testing

Three test cases have been provided. Their input and output can be viewed in the folders test1, test2 and test3. All three LLVM IR outputs have been tested on https://kripken.github.io/llvm.js/demo.html and compiled successfully.