Advanced Compiler
Homework 1 Report

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1.How to run your program?

I use the Makefile example provided in the hw1 spec to be my Makefile, and I attempted to utilize the function "**getbounds**", so I added the '**$(OPT) -S -passes=mem2reg,loop-rotate,loop-simplify $@ -o $@**' command to my Makefile. Then**,** for each run**,** simply use the '**make clean && make run**' command**.** The result is displayed upon the terminator.

2.Describe the cases that you can handle

My hw1 project can handle the dependency in a simple for loop which only involves the instructions assigning the value from an array to another. While the number of instructions can be numerous, the index of the array can only be in the format : " a * i +/- b ". If everything runs smoothly, the result will indicate each type of dependency: anti, flow, output. The result will also provide the details, including the iteration in which the dependency occurs, and the direction of the dependency.

3.Experiment report – how you implement the pass

First, after analyzing the test.ll file, I found that the store instruction can be utilized to separate the array assigning instruction, so I ran through the for body block and stored the data into the struct S. Second, I got the iteration information by running getbounds function. Subsequently, I constructed the diophantine function, and gave it the struct of the instructions and the bounds of iteration. The function returns the iteration in which the dependency occurs. Last, I ran the function to get the dependency of each instruction, and also defined three strings that store the output of the result.