CSE 440/598, Fall 2010
Project 2
Assigned: September 28, 2010
Due: October 14, 2010

Submission checklist

- Your code should be submitted in one "tar" file
- Make sure you test your code on stats before submitting it
- Code that does not compile will not get any credit
- Documentation is important. Document early and often!

Project description

In this project, you are asked to generate three-address code and implement some basic optimizations on the code.

For this project, you can assume that your program is semantically correct so you do not have to worry about most of project1 issues in this project.

All the code that you will process will be in the "main" method of the "main" class. As explained in the previous project, the "main" method and class are the class whose name matches the program name and the constructor for that class.

The input code will have declarations for boolean and integer variables and assignments on the variables as well as conditional and branches that are controlled by the boolean variables or by boolean expressions. There will be no declarations of classes other than the main class and all variables are local to the main() method.

As a first step, you will consider basic blocks. As explained in class, in basic blocks there are no entry points other than the first statement in the block and no exit point other than the last statement in the block.

For programs

1. You should identify basic blocks. The basic blocks should be maximal with no possibility of merging blocks.
2. Build a control flow graph.

For basic blocks, you should do

3. evaluation of constant expressions
4. elimination of redundant expressions using value numbering including
   a. handling commutative operands
   b. constant folding

For extended basic blocks, you should do

5. Value Numbering

For Control Flow Graph, you should do

6. 3-address code generation
7. Global redundancy elimination

Extra

8. Add a goto and label constructs for the language

You should definitely do 1-4 for this project. Graduate students are expected to do 5 and undergraduate students can get bonus for doing 5.

This project is more involved as far as data structures are concerned, but is otherwise simpler than the first project.

The output is the three-address code. This is a symbolic IR and is not executable.

You code should provide separate outputs for value numbering and for global redundancy elimination.