

CMSC 430 Programming Exercise

Byte Code Optimizer

Due Date: Wed, Dec 11th, 11:59pm.

In this project you will add some optimizations to your C- code generator. Your tasks are to implement two classes of optimizations.

Peephole optimizations (during AST and bytecode generation):

- evaluate constant arithmetic expressions (e.g., $1+2 \rightarrow 3$)
- fold constant relational expressions (e.g., $1 == 1 \rightarrow \text{true}$)
- simplify boolean expressions (e.g., $\text{true} \ \&\& \ x \rightarrow x$)
- apply algebraic simplification (e.g., $0+x \rightarrow x$)
- simplify IF statements (e.g., $\text{IF}(\text{true}) \text{ stmt1} \ \text{ELSE} \ \text{stmt2} \rightarrow \text{stmt1}$)
- simplify WHILE loops (e.g., $\text{WHILE}(\text{true}) \ \text{stmts} \rightarrow \text{L} \ \text{stmts} \ \text{GOTO} \ \text{L}$)

Global optimizations: (after bytecode generation):

1. build basic blocks
2. construct control flow graph
3. compute variable live ranges
4. eliminate dead code
5. assign local variable slots

Getting Started

There are additions and changes to the ClassFile.java file you should incorporate into your code from project 4. All your code changes for this project should be in mycc.cup and ClassFile.java. You can get a copy of the go scripts, test files, and new copy of the skeleton parser by typing:

```
cp -r ~ctseng/proj5 ~/proj5
```

Submission Instructions

You can turn in your assignment using the `submit` program. To use `submit`, add the following line to your `.login` file.

```
alias submit ~ctseng/bin/submit
```

To submit, go to your directory containing the code and type:

```
submit 5 mycc.lex mycc.cup *.java
```

The submit program will accept multiple submissions up to the submission deadline, overwriting previous submissions. Feel free to submit your project as many time as you desire before the deadline. The late submission policy is: 20% penalty for first 24 hours, 10% each additional day. Maximum 5 days late.