

Compiler Design : CS 6241 A
Homework II: Due September 23rd, Monday
Total points : 30

A very busy expression at a program point is defined as an expression which is evaluated on all paths starting at that program point before any of its operands are redefined. Our goal is to devise an algorithm to capture all the very busy expressions and then devise an algorithm to move them if possible.

Specification:

- Input: An intra-procedural CFG.
- Output: Very busy expressions at the input and output of each basic block. Devise an algorithm using dataflow equations to solve this problem. Is this forward or backward problem? What is the unification operator used?
- Devise an algorithm to hoist a very busy expression at a given program point. Is it always safe? What are the conditions under which motion of expression evaluation to a given point at which it is very busy safe? (Hint: Think of conditions in a similar manner as invariant motion)
- One of the goals of motion of very busy expression is to minimize code size by removing multiple evaluations of an expression and moving them to a single program point of evaluation. How to determine such a program point is an issue. Can you give an algorithmic solution to determine such a program point?