Assignment 3: PRE Algorithm of Morel and Renvoise

Optimizing Compilers – WT 2012

Deadline: December, 19th

1 PRE

The PRE algorithm of Morel and Renvoise relies on the properties of

- Availability
- Anticipability
- Partial Availability

and

- Placement possible

Together with the predicate CONST that can be computed for every node of the flow graph once the equation systems for partial availability and anticipability have been computed, the set of program points, where a computation has to be placed and where it has to be replaced by a reference to the temporary can be computed.

Implement the data-flow analyses required by the PRE algorithm of Morel and Renvoise in WebPAG and apply their algorithm to the program G_1 shown on the last slide of Section "6.2 The PRE Algorithm of Morel&Renvoise" – i.e. implement the above unidirectional bit-vector analyses (AV, ANT, PAV), manually compute the values of the PP-predicates, and then apply the PRE transformations on the example. Similarly for G_2 (Fig. 1).

Compare how far computations are hoisted in the three branches of the program. What does this mean regarding the minimization of the number of computations along a path with respect to minimum register pressure?

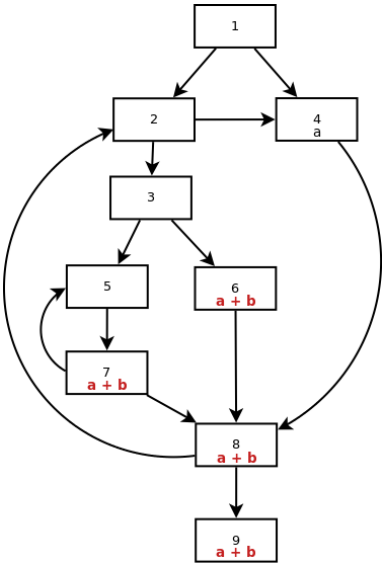

Figure 1: Example graph G_2.

2 Deadline

Send your solution via email to jakob@complang.tuwien.ac.at, subject line "OC-ASGN3-studentid" containing your analysis specification and equations until the 19th of December, 2012. Your submission should include all solutions to the exercises (text in pdf format), together with examples and short explanations of your solutions.