Please hand in the solutions to the theoretical exercises until the beginning of the next lecture, Wed. 2011-05-18, 10:00. Please write the number of your tutorial group and/or the date/time slot on the first sheet of your solution.

Exercise 4.1: Interval Analysis (Points: 4)

At the end of today’s lecture, we arrived at the (again disappointing) result shown in Figure 1.28, page 62 of the book (sent to you today by e-mail). Verify that this result is really correct, i.e. recompute it by hand. Please write down all iteration steps and indicate your exact computations leading to the intermediate and final results. Keep in mind that widening is applied at all program points.

Exercise 4.2: Sign Analysis (Points: 6+6)

In this exercise you are to modify the constant propagation presented in the lecture to get a sign analysis that determines not the values but the signs (+, −, 0) of the values stored in the program variables at the different program points.

Design  Design a sign analysis by defining the complete lattice (that is used as information carrier), adapting the abstract expression evaluation, defining the abstract edge effects and the MOP, and defining how to construct the system of inequalities that has to be solved in order to compute the analysis results. Please define your abstract expression evaluation in such a way that it preserves as much information as possible.

Implementation  Implement your sign analysis in PAG/WWW.