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Program Optimisation

Winter Semester 2004

6. Homework *Deadline: 7 Dec 2004 12:00*

Exercise 1: *10 Points*

Eliminate loop-invariant code from the following program.

```
for (i=0;i<n;i++){
  b = a+2;
  T2 = b+i;
  M[T2] = i;
  if (j>i) break;
}
```

To this end, execute the sequence of transformations and analyses as in the lecture.
Can the invariant computation also be adjusted when the statement `if (j>1) ...` is at the beginning of the body of the loop? Justify your answer.

Exercise 2: *10 Points*

A program is called *loop dominated* if each loop contains exactly one entry point, i.e. contains a point u which dominates every node in the loop.

a) Show: the set of such points u is a loop separator of the program.
b) Transform the loop of the example program for interval-analysis into a `do-while`-loop.
c) Apply the interval-analysis (without narrowing) on the transformed program. Compare the output with that of the lecture.