

T-106.5450 Advanced Course on Compilers

The exam contains four questions. The maximum points for each question are listed in the beginning of the questions. Read the questions carefully. Give clear and compact answers. Remember to write the name of the course and your own personal information on each of the papers that you return. No extra appliances are allowed in the exam.

- 1 (6p) Give short and clear definitions for the following.
 - a) What is a dominator?
 - b) What is speculative execution?
 - c) What is a privatizable variable?
 - d) What is register spilling?
 - e) What is divergence (in SIMT execution)?
 - f) What is SSA?

- 2 (6p) Solve *all* live variables at basic block boundaries for the following program by using iterative data-flow analysis (read is an input and write is an output instruction). Give the data-flow equations that you used and explain your solution.

```
    x = read;
    y = read;
    z = x / 2;
L0: x = x - 1;
    if x < z goto L1;
    v = x + z;
    w = 0;
    goto L2;
L1: v = x * w;
    w = w - 1;
L2: write(v);
    if w > y goto L0;
```