## 17-355/17-655/17-819: Program Analysis In-Class Exercises January 28, 2019

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1. Specify an imprecise domain for integer sign analysis. Indicate (A) the set of lattice elements, (B) the relation between them, (c) the top element and (d) the bottom element.

2. Specify a more precise domain, and one or two cases of the flow function, for integer sign analysis.

3. For constant propagation analysis, define the flow function for "x := y op z" Be sure to think what happens for all elements of the constant propagation lattice.

- 4. Use the worklist algorithm to apply reaching definitions analysis to this program, showing intermediate analysis results as well as the worklist contents at each step:
- 1 : y := x 2 : z := 1 3 : if y = 0 goto 7 4 : z := z \* y 5 : y := y - 1 6 : goto 3 7 : y := 0

3. What is the right initial dataflow information for live variables analysis?