CS243: Homework #1 Solutions

January 30, 2008

1. a. Yes b. No c. No d. No e. No f. No g. Yes

2. in[B1] = {}
   out[B1] = {a + b, x + y}
   in[B2] = {a + b, x + y}
   out[B2] = {a + b}
   in[B3] = {a + b}
   out[B3] = {a + b}
   in[B4] = {a + b}
   out[B4] = {a + b}
   in[B5] = {a + b}
   out[B5] = {a + b}

3. - Run the liveness and reaching definitions algorithms defined in class. Call the set of reaching definitions at any point p R_p and the set of live variables at point p L_p.
   - For a definition d to be live at a point p, the following two conditions must hold:
     - $d \in R_p$ (d reaches p
     - The variable v defined by d must be live at p ($v \in L_p$)

4. a. Yes, an imprecise boundary condition will pollute the flow through the rest of the flow graph

   b. i. Yes. ii. Yes. All of them. iii. No. iv. Yes. Acyclic graphs

5. The meet operator is conjunction.