CSE 231 Fall 2003 HW 1 Due Thurs Oct 6 in class

Please check the web page for homework policy.

Problems:
Consider the following code:

<s1> L0:  a := 1
<s2> L0:  b := 2
<s3> L1:  if (a+b > 10) then go to L2
<s4> L1:  c := c * sqrt(a)
<s5> L2:  b := b * c
<s6> L2:  go to L3
<s7> L3:  c := b * b
<s8> L3:  a := a/d
<s9> L4:  go to L3
<s10> L4: if (c > 5) then go to L1
<s11> L4: print(a,b)

1. Control Flow Graph, Dominator, Depth First Spanning Tree
   (a) Give the Control Flow Graph for the code, showing the basic blocks and the edges between them.
   (b) Give the Dominator Tree for your CFG.
   (c) Determine the natural loops of the CFG.
   (d) Give a Depth First Spanning tree of the CFG, and show a preorder numbering of the nodes.
   (e) Determine the back, forward and cross edges for your numbering.
2. Compute the Reaching Definitions for this problem, using the iterative method with sets of assignments of variables (numbered by statement number) being the unit of propagation.

(a) Show the Gen and Kill sets for each basic block.

(b) Show the dataflow equations for Reachin and ReachOut, and solve the equations iteratively, showing your work. Indicate the final values of the Reachin and Reachout sets.

(c) What iteration is the first of the computation where the Reachin and Reachout information is the same as on the previous iteration?