CS 6340 – Spring 2013 – Assignment 3 **Name**_____
Assigned: January 23, 2013
Due: January 30, 2013 **Name**_____

At the beginning of class on the due date, submit your neatly presented solution with this page stapled to the front (40 points).

NOTE: All work on this problem set is to be done with your partner and without solutions from other past or current students. Any violations will be dealt with according to the Georgia Tech Academic Honor Code and according to the College of Computing process for resolving academic honor code violations. All work must be done using some document creation tool. In addition, graphs must be drawn with a graph-drawing tool—no hand-drawn graphs will be accepted. We'll discuss this requirement more in class.

Given the following program and the statement-based control-flow graph for that program (which you created in Problem Set 1):

```
   procedure sqrt(real x):real
      real x1,x2,x3,eps,errval;

      begin
1.      x3 = 1
2.      errval = 0.0
3.      eps = .001
4.      if (x <= 0.0)
5.         output("illegal operand");
6.         return errval;
7.      else
8.         if (x < 1)
9.            x1 = x;
10.           x2 = 1;
11.        else
12.           x1 = eps;
13.           x2 = x;
14.        endif
15.        while ( (x2-x1) >= 2.0*eps )
16.           x3 = (x1+x2)/2.0
17.           if ( (x3*x3-x)*(x1*x1-x) < 0)
18.              x2 = x3;
19.           else
20.              x1 = x3;
21.           endif;
22.        endwhile;
23.        return x3;
24.     endif;
25. end.
```

1. Use the Ferrante, Ottenstein, Warren algorithm to construct the control-dependence graph for the program without regions. Show all steps in the construction (30 points)
2. Use the dominance-frontier approach to the construct the program-dependence graph, without regions, for the program. Show all steps in the construction (30 points).