CS 565 Out: April 2, 1998
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Homework 10:

Implement a Constraint Solver

1. Implement in Java the constraint solver from Lecture Note 10, pages 10–14. To do this, go to the directory code/solver on the CS 565 webpage. Find the file Solver.java and fill in the blanks. The file looks like this:

```
public class Solver {

  public void insertStartConstraint(String c, String v) {
  }

  public void insertPropConstraint(String v1, String v2) {
  }

  public void insertCondConstraint(String c, String v1,
                                   String v2, String v3) {
  }

  public Vector readConstants(String v) {
  }
}
```

The idea is that if s is of type Solver, then

- s.`insertStartConstraint`(c,v) inserts in s a representation of the constraint $c \in v$,
- s.`insertPropConstraint`(v_1,v_2) inserts in s a representation of the constraint $v_1 \subseteq v_2$, and
- s.`insertCondConstraint`(c,v_1,v_2,v_3) inserts in s a representation of the constraint $c \in v_1 \Rightarrow v_2 \subseteq v_3$.

I use c to range over constants, and I use v to range over variables.

In the directory code/solver you will also find the files with which we will test your solution. There are three examples of test files, called test1, test2, and test3. For example, test3 looks like this:

```
1 sub 2
3 sub 4
a in 1
b in 3
c in 3
a in 2 => 1 sub 3
b in 1 => 4 sub 1
a in 4
b in 4

print 1
print 2
print 3
print 4

/* Correct result:
1: a
2: a
3: b c a
4: b c a
*/
```

The convention is that an integer (say, '1') is a variable, and an identifier say, 'a') is a constant. A print statement, say 'print 1' will print the set for the variable '1' in the minimal solution of the constraint read so far.

To parse a file like test1, we will use the files constraint.input.jj, Main.java, and ProcessVisitor.java in code/solver. The visitor will read the constraints and print statements in order, and it will generate calls to the solver.