CALIFORNIA STATE UNIVERSITY, LOS ANGELES
PROGFEST 2013

Problem 6

Propositional Logic

A propositional logical formula is either, or consists of,
- An *atom*, denoted by a letter (upper and lower case are distinct)
- A *composite formula:* (A|B) meaning "A or B ", (A&B), "meaning A & B" and "
  ~A " meaning "not A" and (A->B), meaning " A implies B," or equivalently " not
  A or B ".

This is a rigid syntax. Only and all the parentheses mentioned must be there, and no
whitespace.
A formula is *satisfiable* if some assignment of truth values ('true' or 'false') to the atoms
in it
yields true. For example, the following formula are each satisfiable.

q
(a|(b&c))
((a&~a)->z)

The following are not satisfiable.
(q&~q)
(((a|~b)&(~a|b))&(a&~b))

Write a program that reads any number of formula from the standard input—each written
with no whitespace inside it, and — echoes the formula followed by either "is satisfiable"
or "is
unsatisfiable."

Sample Input
q
(a|(b&c))
(((a|~b)&(~a|b))&(a&~b))
((a&~a)->z)

Sample Output
q is satisfiable
(a|(b&c)) is satisfiable
 (((a|~b)&(~a|b))&(a&~b)) is unsatisfiable
((a&~a)->z) is satisfiable