

# First-order Logic

## Computer exercises

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# Outline

- 1 Setup
- 2 Simple test
- 3 Observations
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**1** (I suggest to) Boot Linux

**2** Download Prover9

`http://www.cs.unm.edu/~mccune/prover9/download/`

**3** Build the binary `bin/prover9` with

`make all`

or

`make all CFLAGS=-Wl,-no-as-needed`

**4** Have a look at the help

`$ ./bin/prover9 --help`

# Simple test

- Write the following lines in a file

```
formulas (assumptions) .  
    man(x) -> mortal(x) .  
    man(socrates) .  
end_of_list.  
  
formulas (goals) .  
    mortal(socrates) .  
end_of_list.
```

- Run with

```
./bin/prover9 -f <filename>
```

- Prover9 solves the following computational problem:

*assumptions*  $\vdash$  *goals*

Specify only one goal!

# Observations

- Free variables start with (lower case)  $u$  through  $z$
- For example, in  $P(a, x)$ ,  $a$  is a constant and  $x$  is a variable
- Formulas are transformed into Skolem conjunctive normal form
- Goals are negated and added to the assumptions
- The search procedure (resolution) looks for a  $\square$

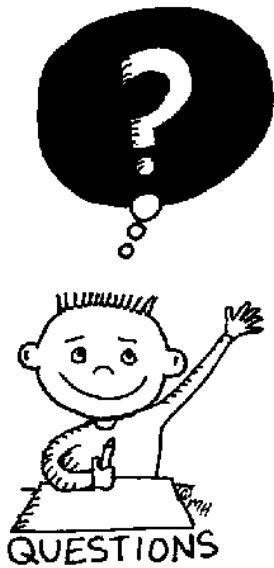
# Examples

Let's have a look at a few examples available on the web site of the course.

Your turn!



- Practice with a few examples
- Consider previous exercises solved using sequent calculus



END OF THE  
LECTURE