

TITLE

Introduction to Prolog: facts, rules, and queries.

Weeks 3, 4

OBJECTIVES

- Presenting SWI Prolog: [online](#) and offline tools.
- Presenting Prolog Language.
- Presenting facts, rules queries.
- Doing some small exercises to get familiar with Prolog.

RESOURCES

- Course Slides
- [SWI Prolog official learning book](#)

DELIVERABLES

- Prolog code files
- A document describing the observations and conclusions.

LAB

What is Prolog?

Prolog -> PROgramming in LOGic;

Declarative programming language.

[The Practical Application of Prolog](#)

Prolog program consists of a number of clauses always ended with a . (dot)

An **atom** is a group of alphanumeric characters (including underscore [_] character) always starting with a small letter.

Eg.: father, mother, in_room

A **variable** is a group of alphanumeric characters starting with a capital letter or _ (underscore character).

Eg.: A, A1, _test, Temp

Prolog is case sensitive which means *xyz* != *xyZ* (both are atoms).

Closed World Assumption - The Prolog interpreter assumes that the database is a closed world -- that is, if it cannot prove something is true, it assumes that it is false.

Comments in prolog -> /* This is a comment */ or using % character for single line comments.

Eg.: % member(Item, List) - succeeds if the item is a member of the list;

How to use comments: <http://www.cse.unsw.edu.au/~billw/dictionaries/prolog/comment.html>

Details: <http://lpn.swi-prolog.org/lpnpage.php?pagetype=html&pageid=lpn-htmlse2>

Symbols

English	Predicate Calculus	PROLOG
and	\wedge	,
or	\vee	;
if	\rightarrow	$:-$
not	\sim	not

Facts, Rules, Goals, and Queries

A fact is a predicate expression that makes a declarative statement about the problem domain. Whenever a variable occurs in a Prolog expression, it is assumed to be universally quantified. Note that all Prolog sentences must end with a period.

Eg.:

```
likes(john, susie).      /* John likes Susie */
likes(X, susie).        /* Everyone likes Susie */
likes(john, Y).         /* John likes everybody */
```

A rule is a predicate expression that uses logical implication ($:-$) to describe a relationship among facts.

Eg.: left_hand_side $:-$ right_hand_side.

```
likes(andrei, mihai).
likes(mihai, andrei).
friends(X,Y) :- likes(X,Y), likes(Y,X).
```

```
?- friends(X,Y).
?- friends(mihai, X).
?- friends(mihai, andrei).
```

Goals and queries are statements starting with a predicate and probably followed by its arguments. The predicate must have appeared in at least one fact, or rule in the consulting program, and the number of arguments in the goal must be the same.

Exercises

1. All men are mortal.
Socrates is a man.
Hence(prin urmare), Socrates is mortal.
2. Represent the following in Prolog:

- a. Butch is a killer.
- b. Mia and Marsellus are married.
- c. Zed is dead.
- d. Marsellus kills everyone who gives Mia a flower.
- e. Mia loves everyone who is a good dancer.
- f. Jules eats anything that is nutritious or tasty.

3.

