Tutorial on Prolog

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Outline

What is Prolog?

- Prolog is a logic programming language.
- **Declarative**: the logic is expressed in terms of relations (clauses)
  - Facts
  - Rules
- A computation is initiated by running a query over these relations.
- Popular system: SWI-Prolog
  - Login: **linprog.cs.fsu.edu**
  - Type: **pl** to start SWI-Prolog
  - Type: **[**myfile**].** to add database files (*.pl)
  - Type: **halt.** to halt Prolog (note that a period is used as a command terminator)
- Example codes: http://www.cs.fsu.edu/~cap5605/

Outline

Representing facts and rules

- Terms: building blocks of Prolog
  - Predicate names and bound variables: a sequence of alphanumeric characters beginning with an alphabetic
  - Variables: a string of alphanumeric characters beginning (at least) with an UPPERCASE alphabetic
- Symbols:

ENGLISH	PREDICATE CALUCULUS	PROLOG
and	$\wedge$	,
or	$\vee$	;
not	$\neg$	not
only if	$\leftarrow$	:-

Representing facts and rules – Continue

- Example facts: likes.pl
  - Query 1: likes(george, kate).
  - Query 2: likes(kate, susie).
  - Query 3: likes(george, X).
  - Query 4: likes(george, beer).
- Example rules: likes.pl
  - Query 1: friends(george, susie).

Outline

Creating, changing, and monitoring the Prolog environment

- Type: **consult(**myfile**)** to add the database file
- Type: **assert(**likes(susie,kate)**)** to add the new predicate to database
- Type: **trace.** to monitor the progress of the Prolog interpreter
- Example: friends(george, susie).

Outline

Lists and recursion in Prolog

- List: [the first elements |the tail]
- **member(**X,Y**)** check
- Query examples of **member**:
  - member(a,[a,b,c,d,e]).
  - member(a, [1,2,3,4]).
  - member(X, [a,b,c]).
- Define **member** recursively: member*.pl
  - Example: member(c,[a,b,c]).
- **nl.**: new line

Outline

Recursive search in Prolog

- Example code: knight1.pl
  - Use of global predicate **been**: path-a(1,3).
  - Use of local parameter: path-b(1,3,[1]).

Outline

The use of cut to control search in Prolog

- Cut: exclamation mark !
- Example code: knight1.pl
  - Without cut: path2-a(1,W).
  - With cut: path2-b(1,W).