



FACULTY OF ENGINEERING & TECHNOLOGY

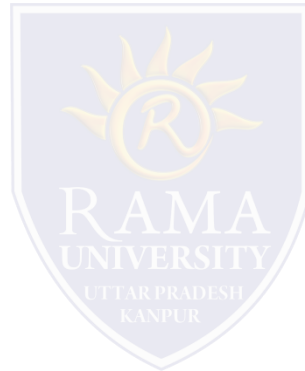
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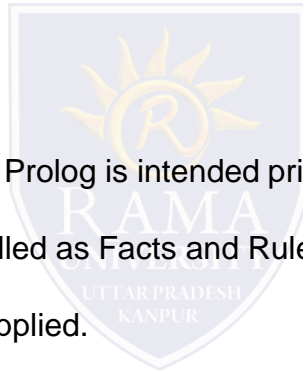
Topics Covered

Prolog
Prolog Syntax
Prolog execution



Prolog

- Prolog is a logic programming language.
- It has important role in artificial intelligence.
- Unlike many other programming languages, Prolog is intended primarily as a declarative programming language.
- In prolog, logic is expressed as relations (called as Facts and Rules).
- Core heart of prolog lies at the logic being applied.
- Formulation or Computation is carried out by running a query over these relations.



Prolog Syntax

- A program, or *database*, in Prolog consists of one or more *predicates*; each predicate consists of one or more *clauses*. A clause is a *base clause* if it is unconditionally true, that is, it has no "if part."

`<program> ::= <predicate> | <program><predicate>`
`<predicate> ::= <clause> | <predicate><clause>`
`<clause> ::= <base clause> | <nonbase clause>`

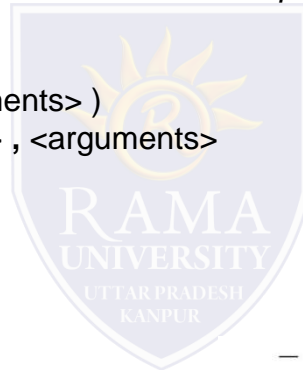
- Two clauses belong to the same predicate if they have the same *functor* (name) and the same *arity* (number of arguments). Thus, `mother(jane)` and `mother(jane, jim)` are different predicates.

`<base clause> ::= <structure> .`
`<nonbase clause> ::= <structure> :- <structures> .`
`<structures> ::= <structure> | <structure> , <structures>`

Prolog syntax

- A *structure* is a functor followed by zero or more arguments; the arguments are enclosed in parentheses and separated by commas. *There must be no space between the functor and the opening parenthesis!* If there are no arguments, the parentheses are omitted.

`<structure> ::= <name> | <name> (<arguments>)`
`<arguments> ::= <argument> | <argument> , <arguments>`



- Terms (Data objects)
 - Atoms
 - (symbolic) constants
 - » E.g., `anna`, `x_25`, `'Tom_'`, `::=`, `<--->`, etc
 - Numbers
 - » E.g., `-25`, `100.25e+5`, etc
 - Variables
 - » E.g., `X`, `Result`, `_23`, `_`, `AnonymousVariable`, etc
 - Structures
 - » E.g., `f(X,23,g('Tom',2))`, etc
- Formulae (Predicate-logic clauses)
 - Facts
 - Rules

Prolog syntax

- Arguments may be any legal Prolog values or variables. A *variable* is written as a sequence of letters and digits, beginning with a capital letter. The underscore (_) is considered to be a capital letter.
- An *atom* is any sequence of letters and digits, beginning with a lowercase letter.
- Alternatively, an atom is any sequence of characters, enclosed by single quotes ('); an internal single quote must be doubled.
- Examples: cat, r124c41, max_value, maxValue, 'max value', 'Don"t go'.
- As syntactic sugar, Prolog allows certain infix operators: ',' (comma), ';' (semicolon), ':-' (turnstile), +, -, *, /, =, ==, and many others. These are the same as the operator written as the functor of a structure; for example, 2+2 is the same as '+'(2,2).
- *Comments* begin with the characters /* and end with */. Comments are not restricted to a single line, but may not be nested.

Prolog execution

- Most Prolog clauses have both a *declarative reading* and a procedural reading. Whenever possible, the declarative reading is to be preferred.

`mother(X, Y) :- parent(X, Y), female(X).`

- Declarative reading: X is the mother of Y *if* X is a parent of Y *and* X is female.

