Lab Report 1 Date:2081/03/28

Title: Introduction to Prolog and Basic Syntax.

1. Objective:The objective of this lab-work is to understand the basics of Prolog, learn the syntax of prolog, implement logical reasoning, and to solve problem using Prolog.
2. Theory:

2.1 Prolog Basics::

Prolog (Programming in logic) is a declarative programming language used mainly in artificial intelligence and computational linguistics. In Prolog, the program consists of facts, rules, and queries. The facts represent information about the world, the rules define relationships between facts, and the queries allow us to ask questions about the facts and rules.

2.1.1 Key concepts:

Facts: A fact is a basic assertion about some knowledge. It is written as a predicate with a list of parameters. The predicate represents a relation, and the parameters represent the objects involved. Example: parent(john, mary). Meaning that John is the parent of Mary.

Rules: A rule is a logical implication that defines relationship between facts. It follows the structure **Head :- Body,** where the head is what we want to prove, and the body consists that must hold true for the head to be true. Example: grandparent(X, Y) :- parent(X, Z), parent(Z, Y). States that

X is a grandparent of Y if X is a parent of Z and Z is a parent of Y.

Queries: A query is used to ask Prolog questions about the facts and rules. It is written as a goal to be satisfied, and Prolog tries to find the solutions based on the provided facts and rules. Example: ?- parent(john, mary). asks whether John is the parent of Mary.

Variables: In prolog, variables are used to represent unknown or unspecified values in logical expressions. They are placeholders that can stand for any term, and they are essential for pattern matching, querying, and reasoning within the language.Example: X in parent (X, mary) is a variable.

Facts :

A little Prolog program consisting of four facts:

* likes(john,prolog).
* likes(john,football).
* likes(john,mary).
* likes(mary,football).

Queries After compilation we can query the Prolog system:

?- likes(john,prolog).

true

?- likes(mary,john).

false

For query “is there something that both john and mary likes”?-

* likes(john,X),likes(mary,X).
* X=football (It uses the backtracking to solve the above problem)

The order of fact and queries is important.

Prolog would solve the above query faster if it is adjusted slightly to:

* ?- likes(mary,X),likes(john,X).
* X=football

This is succeed without any backtracking.

1. Conclusion:

Through this lab, we explored the basic syntax of Prolog, including facts, rules, and queries, and demonstrated their usage in a simple family tree example.