**AI Assignment 5**

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**Problem Statement**- Implementation of predicate logic using PROLOG.

**What is Predicate Logic?**

* Predicate logic or first-order logic in AI is a formal system used in logic and mathematics to represent and reason about complex relationships and structures.
* It plays a crucial role in knowledge representation, which is a field within AI and philosophy concerned with representing knowledge in a way that machines or humans can use for reasoning and problem-solving.

**Basic Components of Predicate Logic-**

1. **Predicates:**

* Predicates are statements or propositions that can be either true or false depending on the values of their arguments. They represent properties, relations, or characteristics of objects.
* For example, "IsHungry(x)" can be a predicate, where "x" is a variable representing an object, and the predicate evaluates to true if that object is hungry.

1. **Variables:**

* Variables are symbols that can take different values. In predicate logic, variables are used to represent objects or entities in the domain of discourse.
* For example, "x" in "IsHungry(x)" can represent any object in the domain, such as a person, animal, or thing.

1. **Constants:**

* Constants are specific values that do not change. They represent particular objects in the domain.
* For instance, in a knowledge base about people, "Alice" and "Bob" might be constants representing specific individuals.

1. **Quantifiers:**

* Quantifiers are used to specify the scope of variables in logical expressions.
* Existential Quantifier (∃): Denoted as ∃, it indicates that there exists at least one object for which the statement within the quantifier is true. For example, "∃x IsHungry(x)" asserts that there is at least one object that is hungry.
* Universal Quantifier (∀): Denoted as ∀, it indicates that the statement within the quantifier is true for all objects in the domain. For example, "∀x IsHuman(x) → IsMortal(x)" asserts that all humans are mortal.

**What is Prolog?**

* Prolog (PROgramming in LOGic) is one of the most widely used programming languages in artificial intelligence research.
* It is declarative. (unlike C++/Java/Python- imperative)
* Instead of specifying how to achieve a certain goal in a certain situation, we specify what the situation (rules and facts) and the goal (query) is and let the Prolog interpreter derive the solution for us.
* Programming in Prolog means describing the world and asking questions on it

Below is an implementation of predicate logic

The knowledge base includes facts about certain trees and their characteristics like their height, the fruits they bear, region they are found.



