Experiment 08

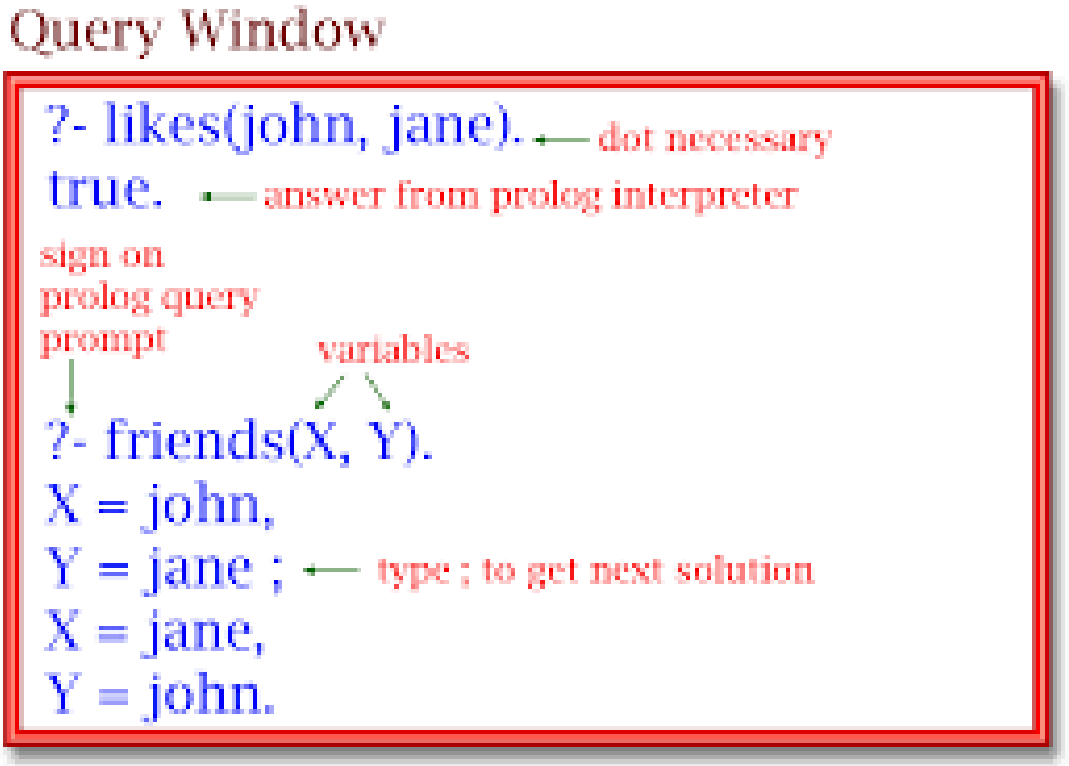
Aim: Write Simple Programs Using PROLOG as an AI Programming Language

Theory:

PROLOG (Programming in Logic) is a declarative programming language primarily used for solving problems that involve relationships and logical reasoning. In PROLOG, a program consists of facts, rules, and queries.

- **Facts**: Statements that represent knowledge about the problem domain.
- **Rules**: Logical constructs that define relationships between facts.
- **Queries**: Questions asked to the system to retrieve knowledge or infer new facts based on existing ones.

PROLOG is widely used in artificial intelligence applications such as **natural**



language processing, **knowledge representation**, and **automated reasoning**, where logic and rules are critical.

Code:

1. **Program -**

```
% Facts
parent(john, mary).
parent(mary, alice).
parent(mary, bob).

% Rule: X is a grandparent of Z if X is the parent of Y and Y is the parent of Z
grandparent(X, Z) :- parent(X, Y), parent(Y, Z).

% Query
?- grandparent(john, alice).
```

2. **Program -**

```
% Fact: X is a member of a list if X is the head of the list
member(X, [X|_]).

% Rule: X is a member of a list if X is a member of the tail
member(X, [_|T]) :- member(X, T).

% Query
?- member(3, [1, 2, 3, 4]).
```

3. **Program -**

```
% Rule: X is greater than Y
greater(X, Y) :- X > Y.

% Rule: The maximum of X and Y is X if X > Y
max(X, Y, X) :- X > Y.

% Rule: The maximum of X and Y is Y if Y >= X
max(X, Y, Y) :- Y >= X.

% Query
?- max(5, 10, M).
```

Output:

Code 1:

```
Output:

Yes, John is the grandparent of Alice
```

Code 2:

```
Output:

Yes, 3 is a member of the list
```

Code 3:

```
Output:

The maximum of 5 and 10 is: 10
```

Conclusion:

In this experiment, we successfully implemented and ran simple PROLOG programs to solve logic-based problems.
LO2 mapped.