Experiment No. 5

Title: Family tree in PROLOG using condition-action rules based agent

Batch: A1 (honours) **Roll No.: 16010421059** **Experiment No.: 5**

Aim: Write a program for implementation of family tree in PROLOG using condition-action rules based agent.

Resources needed: Internet

Theory

A simple agent program can be defined mathematically as an agent function which maps every possible percepts sequence to a possible action the agent can perform or to a coefficient, feedback element, function or constant that affects eventual actions:

$F: P^* -> A$

Procedure:

This approach follows a table for lookup of condition-action pairs defining all possible condition-action rules necessary to interact in an environment.

Create a family tree program to include following rules –

- M is the mother of P, if she is a parent of P and is female
- F is Father of P, if he is parent of P and is male
- X is Sibling of Y, if they have same parent
- Then add rules for sister, brother, grandfather, grandmother, uncle, aunty, cousins etc (consider 3 generations of your own family and build the family tree)

Based on the facts, define goals to answer questions related to family tree.

Predicates used in Program:

- **father(person,person)**
- **male(person)**
- **child(person,person)**
- **female(person)**
- **mother(person,person)**
- **spouse(person,person)**
- **brother(person,person)**

- **grandparent(person,person)**
- **uncle(person,person)**
- **aunt(person,person)**
- **cousin(person,person)**

Questions:

1. The PROLOG suit is based on
   a. Interpreter
   b. Compiler
   c. None of the above d. Both
2. State true of false

There must be at least one fact pertaining to each predicate written in the PROLOG program.

3. State true of false

In PROLOG program the variable declaration is a compulsory part.

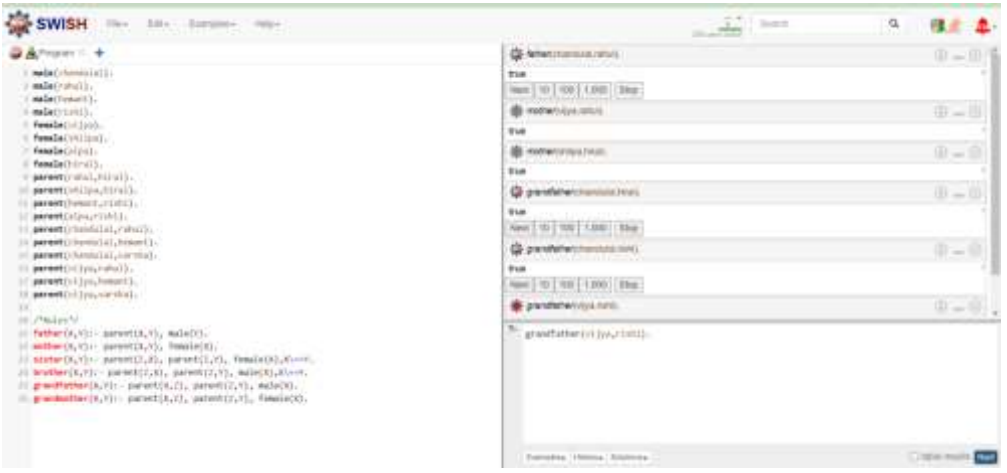
4. Differentiate between a fact and a predicate with syntax.
5. Differentiate between knowledge base and Rule base approach.

Code:

```
male(chandulal).
male(rahul).
male(hemant).
male(rishi).
female(vijya).
female(shilpa).
female(alpa).
female(hiral).
parent(rahul,hiral).
parent(shilpa,hiral).
parent(hemant,rishi).
parent(alpa,rishi).
parent(chandulal,rahul).
parent(chandulal,hemant).
parent(chandulal,varsha).
parent(vijya,rahul).
parent(vijya,hemant).
parent(vijya,varsha).
/*Rules*/
father(X,Y):- parent(X,Y), male(Y).
mother(X,Y):- parent(X,Y), female(X).
sister(X,Y):- parent(Z,X), parent(Z,Y), female(X),X\==Y.
brother(X,Y):- parent(Z,X), parent(Z,Y), male(X),X\==Y.
grandfather(X,Y):- parent(X,Z), parent(Z,Y), male(X).
```

```
grandmother(X,Y):- parent(X,Z), parent(Z,Y), female(X).
```

Output:



Outcomes:
CO3: Ability to formally state the problem and develop the appropriate proof for a given logical deduction problem.
Conclusion (based on the Results and outcomes achieved): The family tree in PROLOG using condition-action rules-based agent was studied and implemented successfully.

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of faculty in-charge with date

References:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Second Edition, Pearson Publication
2. Luger, George F. Artificial Intelligence : Structures and strategies for complex problem solving , 2009 ,6th Edition, Pearson Education
3. https://www.101computing.net/prolog-family-tree/

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