	Finolex Academy of Management and Technology, Ratnagiri		
	Department of Information Technology		
Subject name: Intelligent Systems Labs			Subject Code: BEITC703
Class	BE IT	Semester – VII (CBGS)	Academic year: 2019-20
Name of Student	**Kazi Jawwad A Rahim**	**QUIZ Score :**	
Roll No	**29**	Assignment/Experiment No.	08
Title: **To implement Family information system using PROLOG.**			

1. Course objectives applicable: COB5 Implementation of family tree in AI using PROLOG programming.

2. Course outcomes applicable:

CO5 –To study how to do programming in Artificial Intelligence using PROLOG.

3. Learning Objectives:

1. To understand expressions, operators, functions, facts in PROLOG.
2. To use PROLOG for programming in AI to show the relations.

4. Practical applications of the assignment/experiment: Used in development of algorithms based on relations in different agents in Expert systems.

5. Prerequisites:

1. To learn knowledge base.
2. To understand how knowledge base agent behaves and performs.
3. To use First order and propositional logic.

6. Hardware Requirements:

1. PC with minimum 2GB RAM

7. Software Requirements:

1. Windows installed
2. PROLOG installed

8. Quiz Questions (if any): (Online Exam will be taken separately batch wise, attach the certificate/ Marks obtained)

1. What do you mean by Facts?
2. What is Logic?
3. What do you mean by Inference?
4. Fact must start with predicate and end with full stop in PROLOG (True or False)?

9. Experiment/Assignment Evaluation:

Sr. No.	**Parameters**	**Marks obtained**	**Out of**
1	Technical Understanding (Assessment may be done based on Q & A **or** any other relevant method.) Teacher should mention the other method used -		6
2	Neatness/presentation		2
3	Punctuality		2
Date of performance (DOP)		**Total marks obtained**	**10**
Date of checking (DOC)		**Signature of teacher**	

11. Programs and results

```
predicates
   male(symbol).
   female(symbol).
   father(symbol,symbol).
   husband(symbol,symbol).
   brother(symbol,symbol).
   sister(symbol,symbol).
   listbrothers(symbol).
   listsisters(symbol).
   mother(symbol,symbol).
   grandfather(symbol).
   grandmother(symbol).
   uncle(symbol).
   aunt(symbol).
   cousin(symbol).
   listgrandsons(symbol).
   listgranddaughters(symbol).
   printmenu.
   action(integer).
   repeat.

clauses
   male(dashrath).
   male(ram).
   male(laxman).
   male(bharat).
   male(luv).
   male(kush).
   male(son_of_laxman).
   female(kaushalya).
   female(sita).
   female(urmila).
   female(daughter_of_dashrath).
   father(dashrath,ram).
   father(dashrath,laxman).
   father(dashrath,bharat).
   father(ram,luv).
   father(ram,kush).
   father(laxman,son_of_laxman).
   father(dashrath,daughter_of_dashrath).
   husband(dashrath,kaushalya).
   husband(ram,sita).
   husband(laxman,urmila).
   mother(X,Y):- husband(Z,X),
         father(Z,Y).
   brother(X,Y):- father(Z,X),
         father(Z,Y),
         X<>Y,
         male(X).
   sister(X,Y):- father(Z,X),
         father(Z,Y),
         X<>Y,
         female(X).
```

```
listbrothers(X) :- brother(Z,X),
        write(Z).
listsisters(X):- sister(Z,X),
        write(Z).
grandfather(X):- father(Y, Z),
        father(Z,X),
        write(Y, " is the grandfather of ",X,"\n").
grandmother(X):- husband(Z,X),
        father(Z,V),
        father(V,Y),
        write(Y, " is the grandmother of ",X,"\n").
listgrandsons(X):- father(X,Z),
        father(Z,Y),
        male(Y),
        write(Y,"\n"),
        fail.
listgrandsons(X):- husband(Y,X),
        father(Y,V),
        father(V,Z),
        male(Z),
        write(Z,"\n"),
        fail.
listgranddaughters(X):- father(X,Z),
        father(Z,Y),
        female(Y),
        write(Y,"\n"),
        fail.
listgranddaughters(X):- husband(Y,X),
        father(Y,V),
        father(V,Z),
        female(Z),
        write(Z,"\n"),
        fail.
uncle(X):- brother(Z,Y),
      father(Z,X),
      male(Y),
      write(Y,"\n"),
      fail.
aunt(X):- husband(Z,Y),
      brother(Z,V),
      father(V,X),
      write(Y,"\n"),
      fail.
cousin(X):- father(Z,X),
      father(V,Y),
      Z<>V,
      brother(V,Z),
      write(Y,"\n").
repeat.
repeat:- repeat.

action(1):-  write("\nEnter name of person whose father is to be found : "),
      readln(X),
      write("\n"),
      write("Father of ",X," is:"),
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        father(Z,X),
        write(Z,"\n"),
        fail.

action(2):-  write("\nEnter name of person whose mother is to be found : "),
        readln(X),
        write("\n"),
        write("Mother of ",X," is:"),
        mother(Z,X),
        write(Z,"\n"),
        fail.

action(3):- write("\nEnter name of person whose brothers are to be found : "),
        readln(X),
        write("\n"),
        write("Brothers of ",X," are:\n"),
        listbrothers(X),
        write("\n"),
        fail.

action(4):- write("\nEnter name of person whose sisters are to be found : "),
        readln(X),
        write("\n"),
        write("Sisters of ",X," are:\n"),
        listsisters(X),
        write("\n"),
        fail.

action(5):-write("\nEnter name of person whose grandsons are to be found : "),
        readln(X),
        write("\n"),
        write("Grandsons of ",X," are:\n"),
        listgrandsons(X),
        write("\n"),
        fail.

action(6):-write("\nEnter name of person whose granddaughters are to be found : "),
        readln(X),
        write("\n"),
        write("Granddaughters of ",X," are:\n"),
        listgranddaughters(X),
        write("\n"),
        fail.

action(7):- write("\nEnter name of person whose uncles are to be found : "),
        readln(X),
        write("\n"),
        write("Uncles of ",X," are:\n"),
        uncle(X),
        write("\n"),
        fail.
action(8):-  write("\nEnter name of person whose aunties are to be found : "),
        readln(X),
        write("\n"),
        write("Aunties of ",X," are:\n"),
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        aunt(X),
        write("\n"),
        fail.


    action(9):- write("\nEnter name of person whose cousins are to be found : "),
        readln(X),
        write("\n"),
        write("Cousins of ",X," are:\n"),
        cousin(X),
        write("\n"),
        fail.

    action(0).
    printmenu :-
      repeat,
      write("\n1. Display Father of?\n"),
      write("2. Display Mother of?\n"),
      write("3. List all brothers of?\n"),
      write("4. List all sisters of?\n"),
      write("5. List all grandson of?\n"),
      write("6. List all granddaughter of?\n"),
      write("7. List all uncles of?\n"),
      write("8. List all aunty of?\n"),
      write("9. list all cousins of?\n"),
      write("0. exit\n"),
      write("Enter your choice : "),
      readInt(Choice),
      action(Choice),
      write("\n"),
      repeat.

goal
    makewindow(1,2,3,"Family Tree",0,0,25,80),
    printmenu.
```

Output

```
+---------------------------------Family Tree---------------------------------+
¦                                                                              ¦
¦1. Display Father of?                                                         ¦
¦2. Display Mother of?                                                         ¦
¦3. List all brothers of?                                                      ¦
¦4. List all sisters of?                                                       ¦
¦5. List all grandson of?                                                      ¦
¦6. List all granddaughter of?                                                 ¦
¦7. List all uncles of?                                                        ¦
¦8. List all aunty of?                                                         ¦
¦9. list all cousins of?                                                       ¦
¦0. exit                                                                       ¦
¦Enter your choice : 1                                                         ¦
¦                                                                              ¦
¦Enter name of person whose father is to be found : ram                        ¦
¦                                                                              ¦
¦Father of ram is:dashrath                                                     ¦
¦                                                                              ¦
¦1. Display Father of?                                                         ¦
¦2. Display Mother of?                                                         ¦
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```
3. List all brothers of?
4. List all sisters of?
5. List all grandson of?
6. List all granddaughter of?
7. List all uncles of?
8. List all aunty of?
9. list all cousins of?
0. exit
Enter your choice : 3

Enter name of person whose brothers are to be found : ram

Brothers of ram are:
laxman
bharat

1. Display Father of?
2. Display Mother of?
3. List all brothers of?
4. List all sisters of?
5. List all grandson of?
6. List all granddaughter of?
7. List all uncles of?
8. List all aunty of?
9. list all cousins of?
0. exit
Enter your choice : 5

Enter name of person whose grandsons are to be found : dashrath

Grandsons of dashrath are:
luv
kush
son_of_laxman

1. Display Father of?
2. Display Mother of?
3. List all brothers of?
4. List all sisters of?
5. List all grandson of?
6. List all granddaughter of?
7. List all uncles of?
8. List all aunty of?
9. list all cousins of?
0. exit
Enter your choice : 7

Enter name of person whose uncles are to be found : kush

Uncles of kush are:
laxman
bharat

1. Display Father of?
2. Display Mother of?
3. List all brothers of?
4. List all sisters of?
5. List all grandson of?
6. List all granddaughter of?
7. List all uncles of?
8. List all aunty of?
9. list all cousins of?
0. exit
Enter your choice : 0


Press the SPACE bar
```

12. Learning Outcomes Achieved

1. Understood programming in PROLOG.
2. Implemented Family tree in AI using PROLOG.

13. Conclusion:

1. **Applications of the studied technique in industry**
    a. Development of algorithms in machine learning.
    b. expert systems
    c. specification language
    d. machine learning
    e. robot planning
    f. automated reasoning

2. **Engineering Relevance**
    a. Such algorithms are used to develop algorithms for complex problems NLP and Machine learning.
3. **Skills Developed**
    a. Implementation of programs using PROLOG

14. References :

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[3] Aristotle “On Interpretation”, 350 B.C.E, see: http://classics.mit.edu/Aristotle/interpretation.html
[4] Artificial Intelligence: A modern approach, Stuart Russel and Peter Norvig, Pearson.
[5] Artificial Intelligence, Elaine Rich and Kevin Knight, Tata McGraw.
[6] Principles of Artificial Intelligence, Nils J. Nilson, Narosa Publications.
[7] Basics of PROLOG available at http://www.cse.unsw.edu.au/~billw/cs9414/notes/prolog/facts03