School of Computer Science and Engineering
VIT-AP University
Artificial Intelligence: CSE 3002
Laboratory Assignment-1

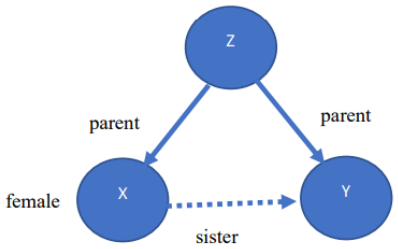
Topic: Basics of Prolog programming

Q1. Write the rules and analyse the query for following relation:
For any X and Y,

X is a sister of Y if

a) both X and Y have the same parent, and

b) X is a female



The following rules for the above program is :-

myKB.pl

```
parent(X).
parent(Y).
female(X).
sister(C,D):-parent(C), parent(D), female(C).
```

The following is the resultant output :-

```
2 ?- parent(X).
true .

3 ?- parent(Y).
true .

4 ?- female(X).
true.

5 ?- sister(X,Y).
true .
```

Q2 For the given knowledge base the rule are

thief(wini).

thief(john).

thief(william).

likes(wini,ball).

likes(william,shoes).

likes(john,snow).

likes(john,dollar).

may_steal(john,X):-thief(john),likes(john,X).

Analyse the the logic based on varied query provided.

The following rules for the above program is :-

myKB.pl

```
1  thief(wini).
2  thief(john).
3  thief(william).
4  likes(wini,ball).
5  likes(william,shoes).
6  likes(john,snow).
7  likes(john,dollar).
8  may_steal(john,X):-thief(john),likes(john,X).
```

The following is the resultant output :-

```
1 ?- consult("myKB.pl")
.
true.

2 ?- may_steal(john, X).
X = snow .

3 ?-
```

Q3 For the given knowledge base the rule are

reign(ram,1900,1950).

reign(mike,1951,1970).

reign(dilsan,1971,1985).

reign(ravi,986,2010).

ruler(X,Y):-reign(X,A,B),Y>=A,Y=<B.

Analyse the the logic based on varied query provided.

The following rules for the above program is :-

myKB.pl

```
1   reign(ram, 1900, 1950).
2   reign(mike, 1951, 1970).
3   reign(dilsan, 1971 , 1985).
4   reign(ravi,986,2010).
5   ruler(X,Y):-reign(X,A,B),Y>=A,Y=<B.
```

The following is the resultant output :-

```
1 ?- consult("myKB").
true.

2 ?- ruler(X, 1900).
X = ram .

3 ?- ruler(X, 1900).
X = ram ;
X = ravi.
```

Q4. Write the predicate or rules rules for knowledge base based on the diagram given below.

Ex: parent(pam,bob)

Verify the following queries and provide appropriate explanation

a) parent(jim, X)
b) parent(X, jim).
c) parent(paffi, X), parent(X, pat).
d) parent(paffi, X), parent(X, Y), parent(Y, jim).

The following rules for the above program is :-

```
parent(pam,bob).
parent(tom,bob).
parent(tom,liz).
parent(bob,ann).
parent(bob,pat).
parent(pat,jim).
```

The following is the resultant output :-

```
?- parent(jim,X).
false.

?- parent(X,jim).
X = pat.

?- parent(paffi,X),parent(X,pat).
false.

?- parent(paffi,X), parent(X,Y), parent(Y,jim).
false.
```

Explanation :-

For command 1 :- the program checks if jim is a parent of some arbitrary person X since jim is the youngest person in the family tree the result provided is false

For command 2 :- the program checks if X is parent of jim through it's database it finds that pat is the parent of X hence it displays that X = pat

For command 3 :- the program checks if paffi is the parent of someone called X and also checks if X is parent of pat (which there is that is bob) but since there's no paffi it produces false hence the and operation between both provides false .

For command 4 :- there's no paffi since the first result is false and since its and operation the final result is false .