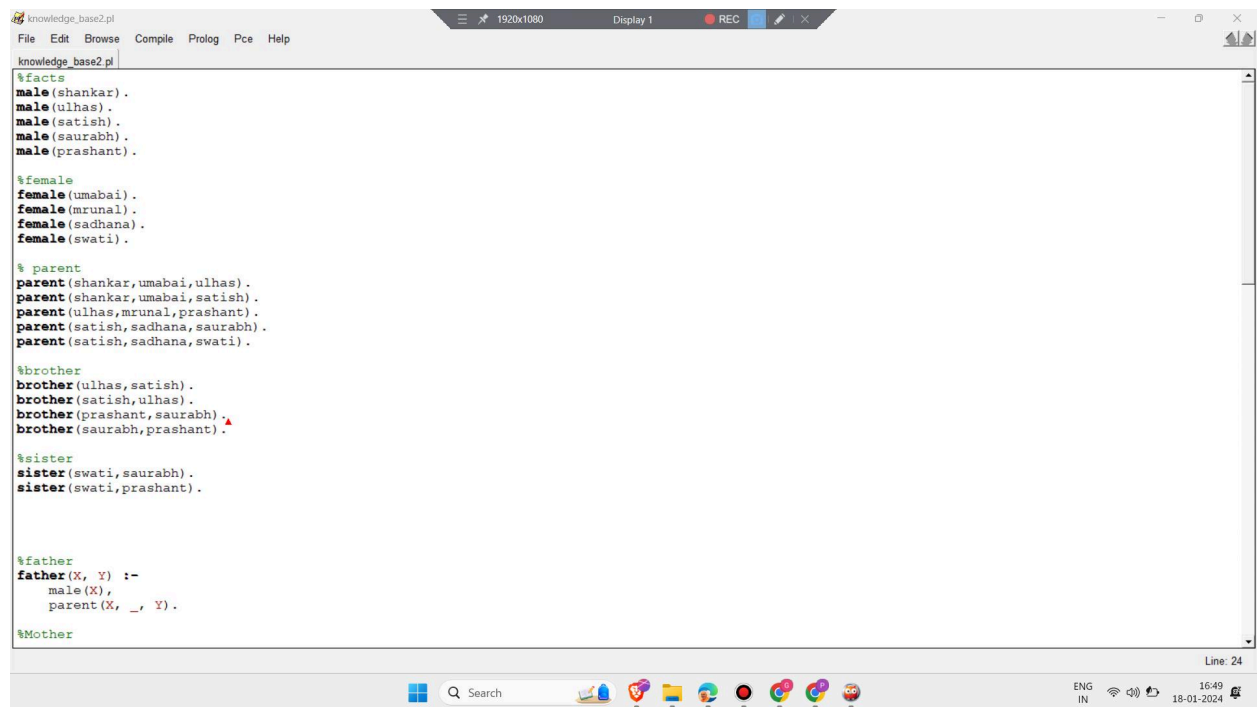# AI ASSIGNMENT -02

ROLL NO: U21CS052

NAME : PANCHAL GUNGUN PARESH

Prolog Queries.

1. Implementation of Family tree with using these following facts like male, female, parent, brother, sister.

Knowledge Base :

```prolog
%facts
male(shankar).
male(ulhas).
male(satish).
male(saurabh).
male(prashant).

%female
female(umabai).
female(mrunal).
female(sadhana).
female(swati).

% parent
parent(shankar,umabai,ulhas).
parent(shankar,umabai,satish).
parent(ulhas,mrunal,prashant).
parent(satish,sadhana,saurabh).
parent(satish,sadhana,swati).

%brother
brother(ulhas,satish).
brother(satish,ulhas).
brother(prashant,saurabh).
brother(saurabh,prashant).

%sister
sister(swati,saurabh).
sister(swati,prashant).


%father
father(X, Y) :-
    male(X),
    parent(X, _, Y).

%Mother
```

```prolog
sister_of(X, Y) :-
    findall(Sister, (sister(Sister , Y)  ; sister(Y,Sister) ),  X).
parents_of(X, Y) :-
    findall(Parent, (parent(Parent,_ , Y)  ; parent(_,Parent, Y) ),  X).
```

```
?-
% c:/users/dell/desktop/study/allstudymaterial-/sem 6/02_ai/02_labs/02_prolog queries/kno
wledge_base2 compiled 0.00 sec, 0 clauses
?- sister_of(X, prashant).
X = [swati].

?-
```

```prolog
grandfather(GF, GS) :-
    male(GF),
    (father(GF, Parent), father(Parent, GS) ;
     mother(GF, Parent), father(Parent, GS)).
```

```prolog
aunt(A, C) :-
    female(A),
    ( (mother(M,C), sister(A,M)) ;(father(F,C), sister(A,F)) ).
```

GrandMother

```prolog
grandmother(GM, C) :-
    female(GM),
    (mother(GM, Parent), mother(Parent, C) ;
     mother(GM, Parent), father(Parent, C)).
```

```
Unknown action: 0 (h for help)
Action? .

?- grandmother(X,prashant).
X = umabai ,

?- grandmother(X,saurabh).
X = umabai ,

?-
```

Daughter

```prolog
%daughter
daughter(X, Y):-
    female(X),
    (parent(_, Y, X)  ; parent(Y, _, X)).
```

```
?-
% c:/users/dell/desktop/study/allstudymaterial-/sem 6/02_ai/02_labs/02_prolog queries/kno
wledge_base2 compiled 0.00 sec, 0 clauses
?- daughter(X, satish).
X = swati.

?- daughter(X, sadhana).
X = swati
```

Son

%son

```prolog
son(X, Y):-
    male(X),
    parent(_, Y, X)  ; parent(Y, _, X).
```

```
Action?
Unknown action: (h for help)
Action? ,

?-
|     son(X, umabai).
X = ulhas ,

?- son(X, satish).
X = saurabh
```

Mother

```
wledge_base2.pl compiled 0.00 sec, 22 clauses
?- mother(X, satish ).
X = umabai
```

%Mother

```prolog
mother(X, Y):-
    female(X),
    parent(_, X, Y).
```

Father

```
ERROR: Unknown procedure: father/2 (DWIM could not correct goal)
?-
% c:/users/dell/desktop/study/allstudymaterial-/sem 6/02_ai/02_labs/02_prolog queries/kno
wledge_base2 compiled 0.00 sec, -1 clauses
?- father(X,ulhas).
X = shankar
```

%father

father(X, Y) :-

    male(X),

    parent(X, _, Y).

Ancestor

ancestor(Ancestor, Descendant) :-

    parent(Ancestor, _, Descendant).

ancestor(Ancestor, Descendant) :-

    parent(Parent, _, Descendant),

    ancestor(Ancestor, Parent).

```
?-
% c:/users/dell/desktop/study/allstudymaterial-/sem 6/02_ai/02_labs/02_prolog queries/kno
wledge_base2 compiled 0.00 sec, 2 clauses
?- ancestor(X, saurabh).
X = satish ,

?-
```

Uncle

```
uncle(A, C) :-
    male(A),
    ( (mother(M,C), brother(A,M)) ;(father(F,C), brother(A,F)) ).
```

```
?-
% c:/users/dell/desktop/study/allstudymaterial-/sem 6/02_ai/02_labs/02_prolog queries/kno
wledge_base2 compiled 0.00 sec, 1 clauses
?- uncle(X, saurabh).
X = ulhas .

?- uncle(X, swati).
X = ulhas .

?- uncle(X, prashant).
X = satish .
```

Parent_of

```
parents_of(X, Y) :-
    findall(Parent, (parent(Parent,_ , Y)  ; parent(_,Parent, Y) ),  X).
```

```
?- parent_of(X,swati).
Correct to: "parents_of(X,swati)"?
Please answer 'y' or 'n'? yes
X = [satish, sadhana].

?-
|    parents_of(X, swati).
X = [satish, sadhana].

?-
```

Count the GrandChildren

```
grandchildren_count(Person, Count) :-
    findall(GrandChild, (
        parent(Person, _, Child),
        parent(Child, _, GrandChild)
    ), GrandChildren),
    length(GrandChildren, Count).
```

```
?- grandchildren_count(shankar,Count).
Count = 3.

?-
```

Find all Males.

```
?-
% c:/Users/Dell/Desktop/study/allStudyMaterial-/sem 6/02_AI/02_labs/02_prolog queries/kno
wledge_base2.pl compiled 0.00 sec, 32 clauses
?- findall(M, male(M), Males).
Males = [shankar, ulhas, satish, saurabh, prashant].

?-
```

Find all Females.

```
?-
% c:/Users/Dell/Desktop/study/allStudyMaterial-/sem 6/02_AI/02_labs/02_prolog queries/kno
wledge_base2.pl compiled 0.00 sec, 32 clauses
?- findall(F, female(F), Females).
Females = [umabai, mrunal, sadhana, swati].

?-
```

%cousins
% Cousin predicate
cousin(Cousin, Person) :-
    parent(Parent1, Person, _),
    parent(Parent2, Cousin, _),
    Parent1 \= Parent2,
    (sibling(Parent1, Parent2) ; sibling(Spouse1, Parent1),
sibling(Spouse1, Parent2)).

% Sibling predicate
sibling(X, Y) :- brother(X, Y) ; brother(Y, X) ; sister(X, Y) ; sister(Y,
X).