**Practical No: 5**

**A program to implement Rule Based System.**

**AIM:** Write a program which contains three predicates: male, female, parent. Make rules for following family relations: father, mother, grandfather, grandmother, brother, sister, uncle, aunt, nephew and niece, cousin.

**Code:**

male(vijay).

male(mahadev).

male(gaurihar).

male(omkar).

male(bajrang).

male(chaitanya).

female(vasanti).

female(indubai).

female(ashwini).

female(gayatri).

female(sangita).

parent(vijay,chaitanya).

parent(vasanti,chaitanya).

parent(vijay,gaurihar).

parent(vasanti,gaurihar).

parent(vijay,ashwini).

parent(vasanti,ashwini).

parent(mahadev,vijay).

parent(indubai,vijay).

mother(X,Y):-parent(X,Y),female(X).

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

grandmother(GM,X):- mother(GM,Y) ,parent(Y,X).

grandfather(GF,X):- father(GF,Y) ,parent(Y,X).

greatgrandmother(GGM,X):- mother(GGM,GM) ,parent(GM,F),parent(F,Y),parent(Y,X).

greatgrandfather(GGF,X):- father(GGF,GF) ,parent(GF,F),parent(F,Y),parent(Y,X).

sibling(X,Y):-mother(M,X), mother(M,Y),X\=Y, father(F,X), father(F,Y).

brother(X,Y):-sibling(X,Y), male(X).

sister(X,Y):-sibling(X,Y), female(X).

uncle(U,X):- parent(Y,X), brother(U,Y).

aunt(A,X):- parent(Y,X), sister(A,Y).

nephew(N,X):- sibling(S,X),parent(S,N),male(N).

niece(N,X):-sibling(S,X), parent(S,N), female(N).

cousin(X,Y):-parent(P,Y),sibling(S,P),parent(S,X).

**OUTPUT:**

**A screenshot of a phone

Description automatically generated**

**A screenshot of a phone

Description automatically generated A screenshot of a cell phone

Description automatically generated**

**b)**

**Code:**

/\* Facts \*/

male(jack).

male(oliver).

male(ali).

male(james).

male(simon).

male(harry).

female(helen).

female(sophie).

female(jess).

female(lily).

parent\_of(jack, jess).

parent\_of(jack, lily).

parent\_of(helen, jess).

parent\_of(helen, lily).

parent\_of(oliver, james).

parent\_of(sophie, james).

parent\_of(jess, simon).

parent\_of(ali, simon).

parent\_of(lily, harry).

parent\_of(james, harry).

/\* Rules \*/

father\_of(X, Y):- male(X), parent\_of(X, Y).

mother\_of(X, Y):- female(X), parent\_of(X, Y).

grandfather\_of(X, Y):- male(X), parent\_of(X, Z), parent\_of(Z, Y).

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

sister\_of(X, Y):- female(X), father\_of(F, Y), father\_of(F, X), X \= Y.

sister\_of(X, Y):- female(X), mother\_of(M, Y), mother\_of(M, X), X \= Y.

aunt\_of(X, Y):- female(X), parent\_of(Z, Y), sister\_of(Z, X), !.

brother\_of(X, Y):- male(X), father\_of(F, Y), father\_of(F, X), X \= Y.

brother\_of(X, Y):- male(X), mother\_of(M, Y), mother\_of(M, X), X \= Y.

uncle\_of(X, Y):- parent\_of(Z, Y), brother\_of(Z, X).

ancestor\_of(X, Y):- parent\_of(X, Y).

ancestor\_of(X, Y):- parent\_of(X, Z), ancestor\_of(Z, Y).

**OUTPUT:**

**A screenshot of a phone

Description automatically generated A screenshot of a phone

Description automatically generated A screenshot of a phone

Description automatically generated**