Artificial intelligence
Assignment - 2

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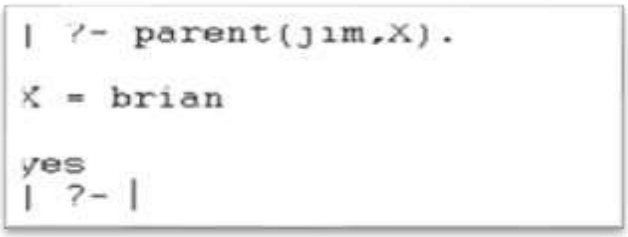
⇨ **Load the following facts into familytree.pl , consult the prolog file and answer the given questions**

```
% Program: family.pl

parent(albert, jim).
parent(albert, peter).
parent(jim, brian).
parent(john, darren).
parent(peter, lee).
parent(peter, sandra).
parent(peter, james).
parent(peter, kate).
parent(peter, kyle).
parent(brian, jenny).
parent(irene, jim).
parent(irene, peter).
parent(pat, brian).
parent(pat, darren).
parent(amanda, jenny).

% female(Person)
%
female(irene).
female(pat).
female(lee).
female(sandra).
female(jenny).
female(amanda).
female(kate).

% male(Person)
%
male(albert).
male(jim).
male(peter).
male(brian).
male(john).
male(darren).
```

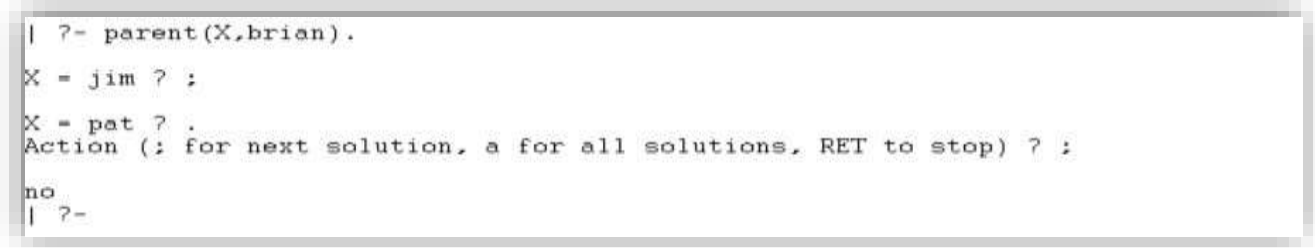
```
male(james).
male(kyle).

% yearOfBirth(Person, Year).
%
yearOfBirth(irene, 1923).
yearOfBirth(pat, 1954).
yearOfBirth(lee, 1970).
yearOfBirth(sandra, 1973).
yearOfBirth(jenny, 2004).
yearOfBirth(amanda, 1979).
yearOfBirth(albert, 1926).
yearOfBirth(jim, 1949).
yearOfBirth(peter, 1945).
yearOfBirth(brian, 1974).
yearOfBirth(john, 1955).
yearOfBirth(darren, 1976).
yearOfBirth(james, 1969).
yearOfBirth(kate, 1975).
yearOfBirth(kyle, 1976).


% grandparent(Gparent,Child)
grand_parent(X,Y) :- parent(X,Z),parent(Z,Y).

% older(Person1,Person2)
older(Person1,Person2) :- yearOfBirth(Person1,Year1),yearOfBirth(Person2,Year2),Year2 >
Year1.

% sibling(Child1,Child2)
sibling(X,Y) :- parent(Z,X),parent(Z,Y),X \= Y.

% elder_brother
elder_brother(X,Y) :- male(X),sibling(X,Y),older(X,Y).

% predecessor
predecessor(X,Y) :- parent(X,Z),predecessor(Z,Y).
predecessor(X,Y) :- parent(X,Y).

% sister
sister(X,Y) :- female(X),parent(Z,X),parent(Z,Y), X \= Y.

% count rule
person(X) :- female(X).
person(Y) :- male(Y).
```

Use Prolog for answering the following questions (load the rules in the file familytree.pl): 1) Is Albert a parent of Peter?

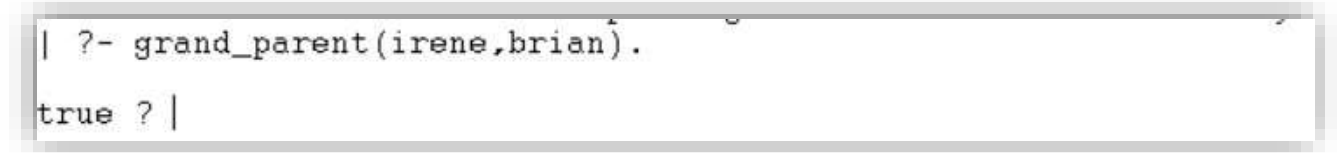
2) **Who is the child of Jim?**



3) **Who are the parents of Brian?**



4) **Is Irene a grandparent of Brian?** %grand_parent(Gparent,Child) grand_parent(X,Y) :- parent(X,Z),parent(Z,Y).



5) **Find all the grandchildren of Irene.**

```
| ?- grand_parent(irene,X).

X = brian ? ;

X = lee ? ;

X = sandra ? ;

X = james ? ;

X = kate ? ;

X = kyle

(47 ms) yes
| ?-
```

6) **Now add the following rule to familytree.pl and re-consult: older(Person1, Person2) :-** yearOfBirth(Person1, Year1), yearOfBirth(Person2, Year2), Year2 > Year1.

```
| ?- consult('family.pl').
compiling C:/Users/Sourabh Patel/Desktop/assignment/82/SEM6/AI/ASS2/family.pl for byte code...
C:/Users/Sourabh Patel/Desktop/assignment/82/SEM6/AI/ASS2/family.pl compiled, 81 lines read - 6780

(15 ms) yes
```

7) **Who is older than Pat?**

```
| ?- older(X,pat).

X = irene ? ;

X = albert ? ;

X = jim ? ;

X = peter ? ;

(47 ms) no
| ?-
```

8) **Who is younger than Darren?**

```
| ?- older(darren,X).

X = jenny ? ;

X = amanda ? ;

(16 ms) no
| ?-
```

9) **List the siblings of Sandra.** % sibling(Child1,Child2) sibling(X,Y) :- parent(Z,X),parent(Z,Y),X \= Y.

```
| ?- sibling(sandra,X).

X = lee ? ;

X = james ? ;

X = kate ? ;

X = kyle ? ;

(46 ms) no
| ?-
```

10) **Who is the older brother of Sandra?** % elder_brother elder_brother(X,Y) :- male(X),sibling(X,Y),older(X,Y).

```
| ?- elder_brother(X,sandra).

X = james ? ;

no
| ?-
```

11) **Find the predecessors of Kyle.** % predecessor predecessor(X,Y) :- parent(X,Z),predecessor(Z,Y). predecessor(X,Y) :- parent(X,Y).

```
| ?- predecessor(X,kyle).

X = albert ? ;

X = irene ? ;

X = peter ? ;

(31 ms) no
| ?-
```

12) **Does kate have a sister?**

% sister sister(X,Y) :- female(X),parent(Z,X),parent(Z,Y), X \= Y.

```
| ?- sister(X,kate).

X = lee ? ;

X = sandra ? ;

no
| ?-
```

13) **How many females and males are there in the knowledge base?**

% count rule person(X)
:- female(X). person(Y)
:- male(Y).

```
[?- aggregate_all(count,person(X),Count).
Count = 15.
```
