CODE:

```
% 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).

% Relationships
father_of(X,Y):-male(X),parent(X,Y).
mother_of(X,Y):-female(X),parent(X,Y).
grandparent(X,Y):-parent(X,Z),parent(Z,Y).
siblings(X,Y):-parent(Z,X),parent(Z,Y),X\==Y.
older_brother(X,Y):-siblings(X,Y),older(X,Y),male(X),X\==Y.
sister(X,Y):-siblings(X,Y),female(Y),X\==Y.
predecessor(X, Z) :- parent(X, Z).
predecessor(X, Z) :- parent(X, Y),predecessor(Y, Z).
```

Questions:

1. Is Albert a parent of peter?

```
?- parent(albert, peter).
true.
```

2. Who is the child of Jim?

```
?- parent(jim, Child).
Child = brian.
```

3. Who are parents of Brian?

```
?- parent(Parents, brian).
Parents = jim ;
Parents = pat.
```

4. Is Irene a grandparent of Brian?

```
?- grandparent(irene,brian).
true .
```

5. Find all the grandchildren of Irene.

```
?- grandparent(irene,Grandchildrens).
Grandchildrens = brian ;
Grandchildrens = lee ;
Grandchildrens = sandra ;
Grandchildrens = james ;
Grandchildrens = kate ;
Grandchildrens = kyle.
```

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

```
maxmax@madmax:~/Desktop/u19cs019_sem6/Artificial_Intelligence/lab2$ cat familytree.pl
older(Person1, Person2) :- yearOfBirth(Person1, Year1), yearOfBirth(Person2, Year2), Year2 > Year1.
maxmax@madmax:~/Desktop/u19cs019_sem6/Artificial_Intelligence/lab2$
```

```
?- consult("familytree.pl").
true.
```

7. Who is older than Pat?

```
?- older(pat, Elders).
Elders = lee ;
Elders = sandra ;
Elders = jenny ;
Elders = amanda ;
Elders = brian ;
Elders = john ;
Elders = darren ;
Elders = james ;
Elders = kate ;
Elders = kyle.
```

8. Who is younger than Daren?

```
?- older(Younger, darren).
Younger = irene ;
Younger = pat ;
Younger = lee ;
Younger = sandra ;
Younger = albert ;
Younger = jim ;
Younger = peter ;
Younger = brian ;
Younger = john ;
Younger = james ;
Younger = kate ;
```

9. List the siblings od Sandra.

```
?- siblings(sandra, Siblings).
Siblings = lee ;
Siblings = james ;
Siblings = kate ;
Siblings = kyle.
```

10. Who is the older brother of Sandra?

```
?- older_brother(Older_brother, sandra).
Older_brother = james ;
```

11. Find the predecessors of Kyle.

```
?- predecessor(Predecessors, kyle).
Predecessors = peter ;
Predecessors = albert ;
Predecessors = irene ;
false.
```

12. Does Kate have a sister?

```
?- sister(kate, Sister).
Sister = lee ;
Sister = sandra ;
```

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

```
?- aggregate_all(count, male(X), Count).
Count = 8.

?- aggregate_all(count, female(X), Count).
Count = 7.
```