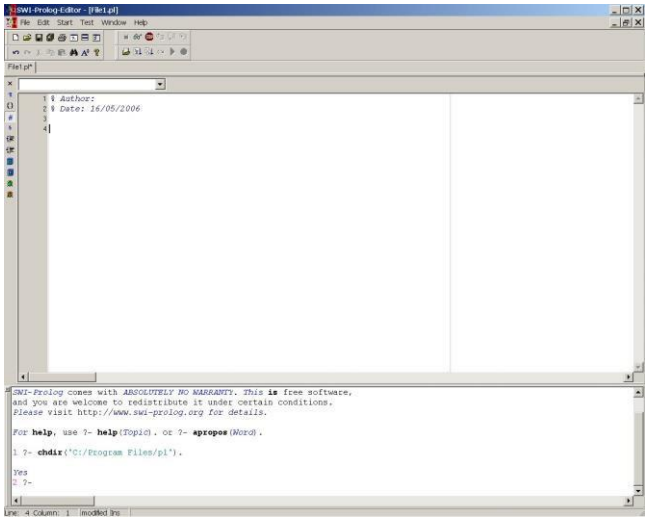
Practical 3

Today:
We are going to extend our genealogy database in Prolog and use it to find new facts derived from the knowledge base implemented.

Aims:
1. Extend the fact base.
2. Design and add new rules to the database.
3. Querying the database to find new facts.

Tasks:
1. Start *SWI Prolog Editor* and create a new Prolog file using **File->New**



2. Enter the following facts and rules into your Prolog program:

```
/* facts */

/* father(X, Y) : X is father of Y*/
father(george, elizabeth2).
father(george, margaret).
father(philip, charles).
father(philip, anne).
father(philip, andrew).
father(philip, edward).
father(charles, william).
father(charles, henry).
father(andrew, beatrice).
father(andrew, eugenie).
```

```
/* mother(X, Y) : X is mother of Y */
mother(elizabeth1, elizabeth2).
mother(elizabeth1, margaret).
mother(elizabeth2, charles).
mother(elizabeth2, anne).
mother(elizabeth2, andrew).
mother(elizabeth2, edward).
mother(diana, william).
mother(diana, henry).
mother(sarah, beatrice).
mother(sarah, eugenie).

/* male(X) : X is male */ male(george).
male(philip).
male(charles).
male(andrew).
male(edward).
male(william).
male(henry).

/* female(X) : X is female */
female(elizabeth1).
female(elizabeth2).
female(margaret).
female(anne).
female(diana).
female(sarah).
female(sophie).
female(Beatrice).
female(eugenie).

/* rules */

/* parent(X, Y) : X is parent of Y */
parent(X, Y) :-
   father(X,Y).
parent(X, Y) :-
   mother(X,Y).
```

3. Use **File->Save as …** to save the program into the file *gen2.pl*. Compile the program by either typing

```
?- consult('gen2.pl').
```

or

```
?- ['gen2.pl'].
```

Alternatively you can select **Start->Consult** or press F9.

4. Design and add the following rules to the knowledge base:

```
/* child(X, Y) X is a child of Y */
/* is_mother(X) X is a mother */
/* son(X, Y) X is son of Y */
/* uncle(X, Y) X is uncle of Y*/
/* grandfather(X, Y) X is grandfather of Y */
/* ancestor(X, Y) X is an ancestor Y */
/* descendent(X, Y) X is descendent of Y */
```

5. Verify your rules by querying the database:

```
?- is_mother(diana).
?- is_mother(beatrice).
?- son(X, elizabeth2).
?- grandfather(X, Y).
?- ancestor(george,X).
?- uncle(edward,X).
```

6. Use the program to find answers to the following questions (use the heraldic tree below to verify the correctness of the answers):

Is `andrew` a son of `elizabeth1`?

Who are the parents of `edward`?

Who is the grandfather of `eugenie`?

Who are `henry`'s ancestors?

Who is the uncle of `henry`?