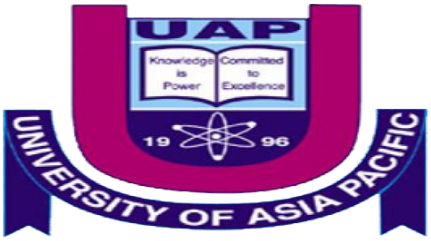

UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering

Report on Family Tree Assignment

Course Code : CSE 404

Course Title : Artificial Intelligence and Expert Systems Lab

Submitted by:

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Department of CSE

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Problem Title:

Implement a basic family relationship tree structure of your own family using Prolog. Write rules to determine the degree and removal for up to the 3rd degree and twice removed situation for cousin relationships.

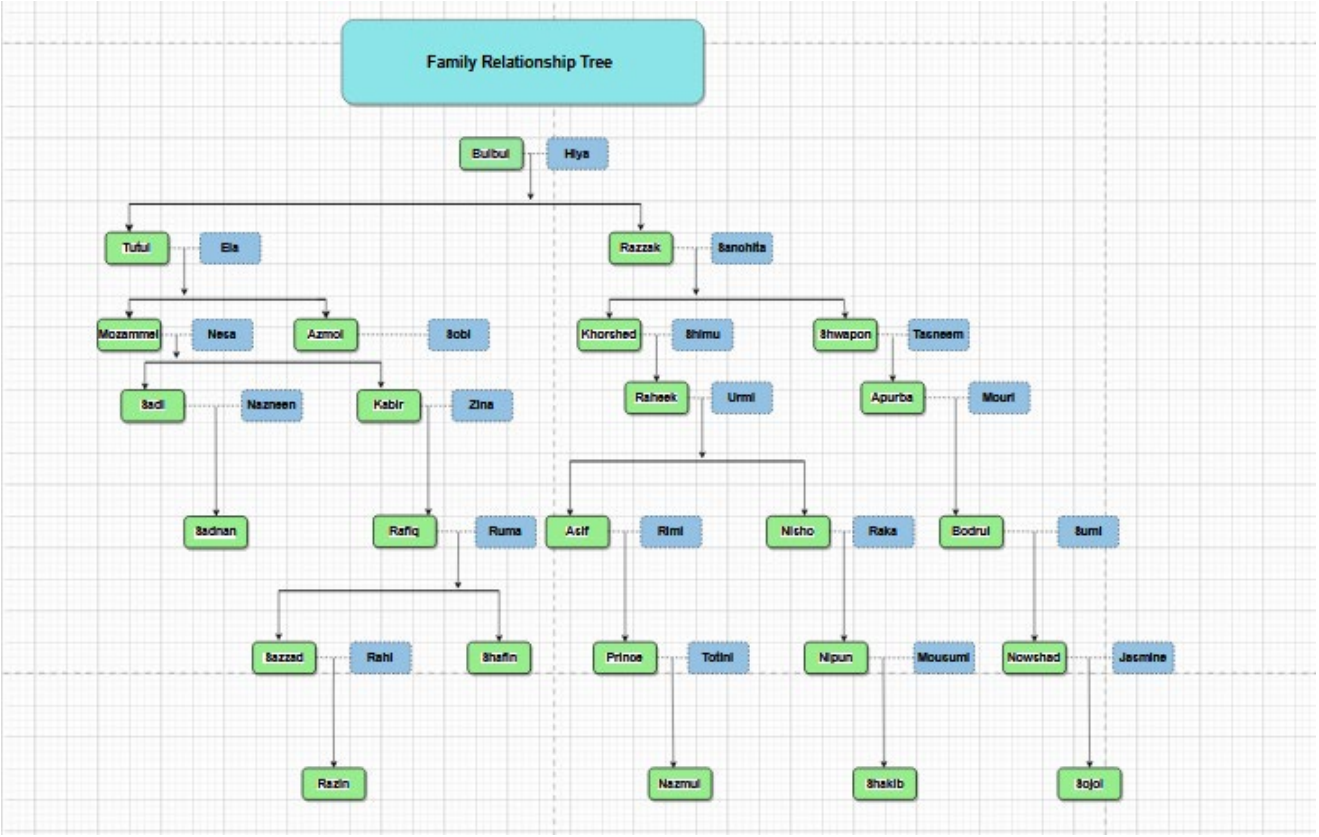
Problem Description:

Task is to create a family relationship tree using Prolog, defining family members' genders and roles. Also writing rules to identify cousin relationships up to the 3rd degree and in twice removed situations. Utilize Prolog queries to demonstrate cousin relationships among family members. This exercise aims to teach Prolog's logical programming while modeling intricate family ties.

Tools And Languages used:

1. Draw.io / Lucidchart
2. SWI-Prolog
3. Adobe Acrobat DC
4. Microsoft Word

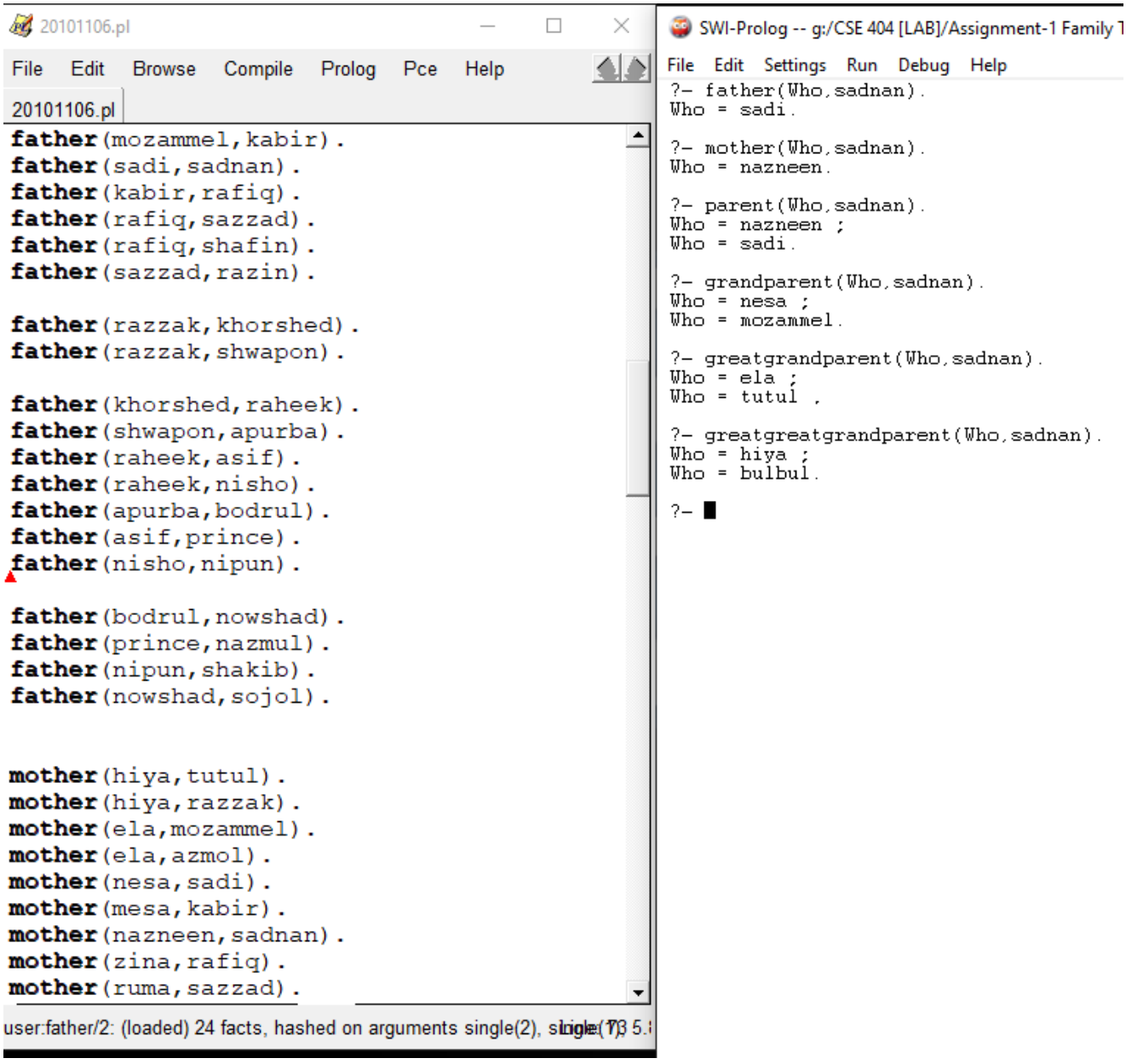
Diagram/Figure:



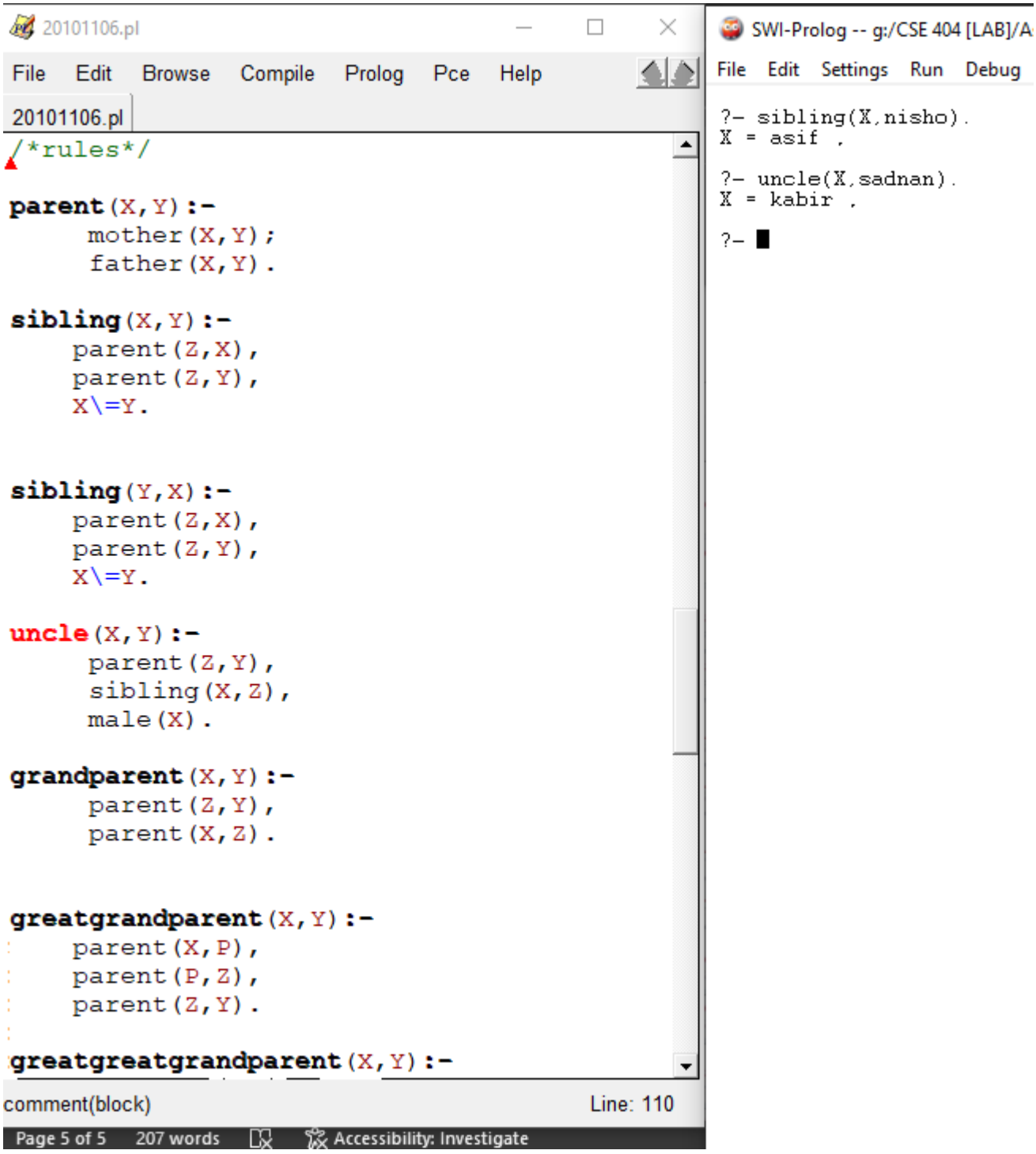
The above diagram is my family relationship tree structure. Here, green labeled names are male and blue labeled names are female.

Sample Input/Output:

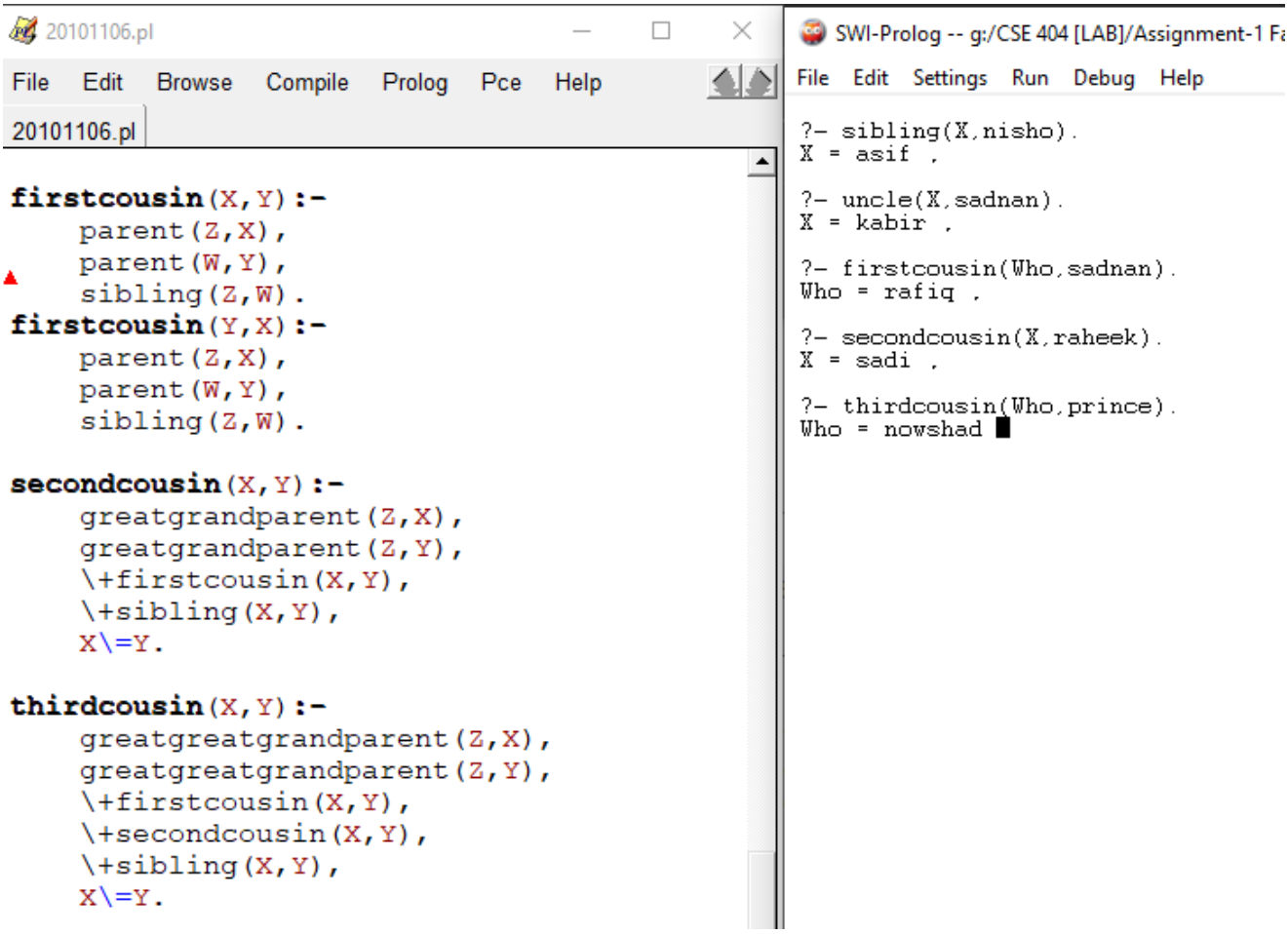
Below screenshot, here is sample output for father, mother, parent, grandparent, great-grandparent and great-great grand parent for myself. The fact has been already prescribed in prolog-



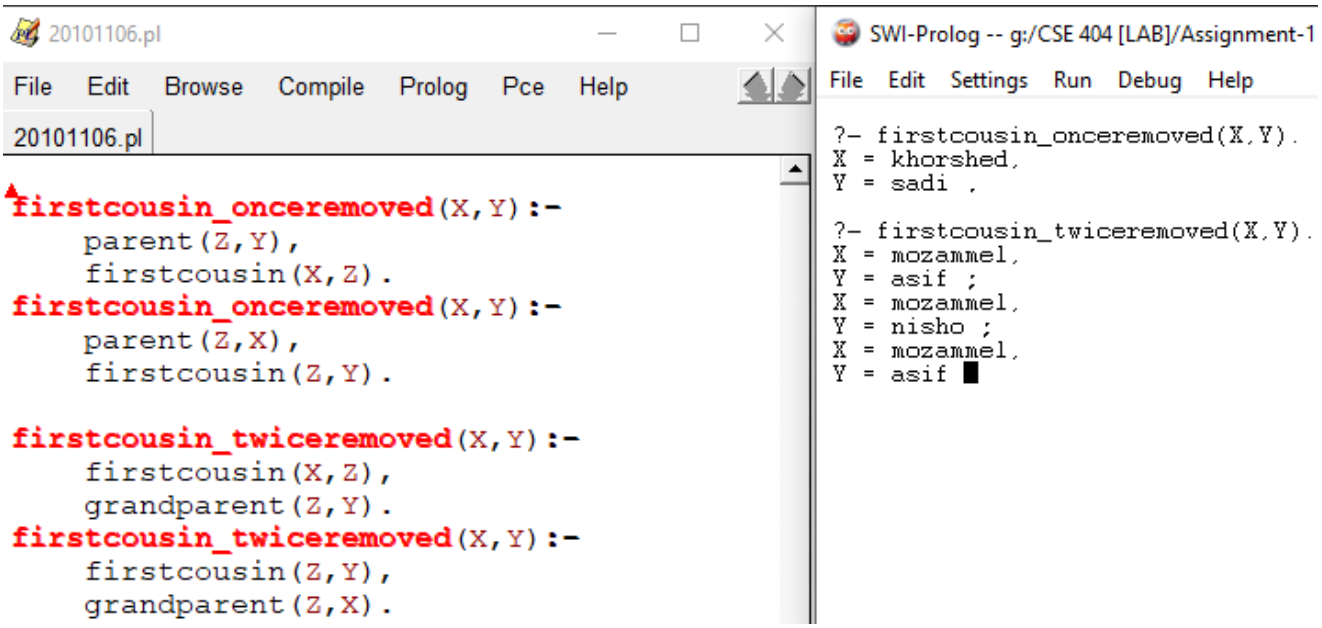
Sibling and uncle relationships example:



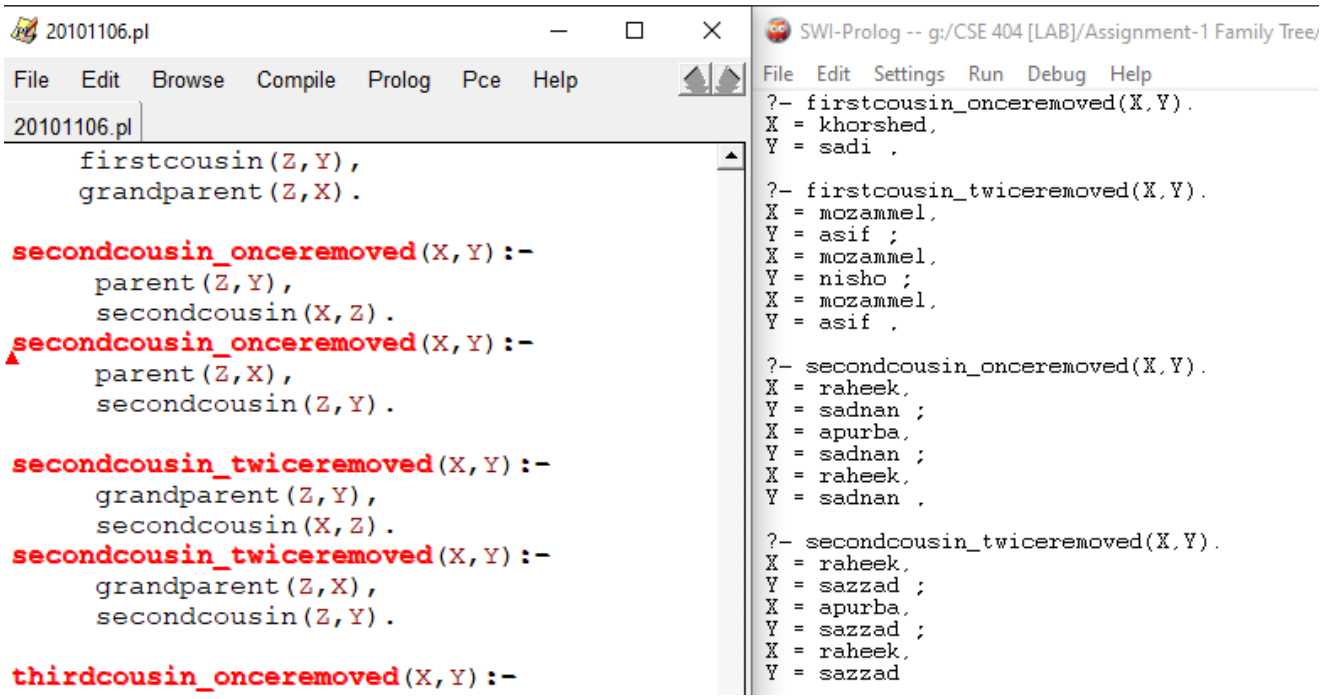
First cousin, second cousin and third cousin relationship example:



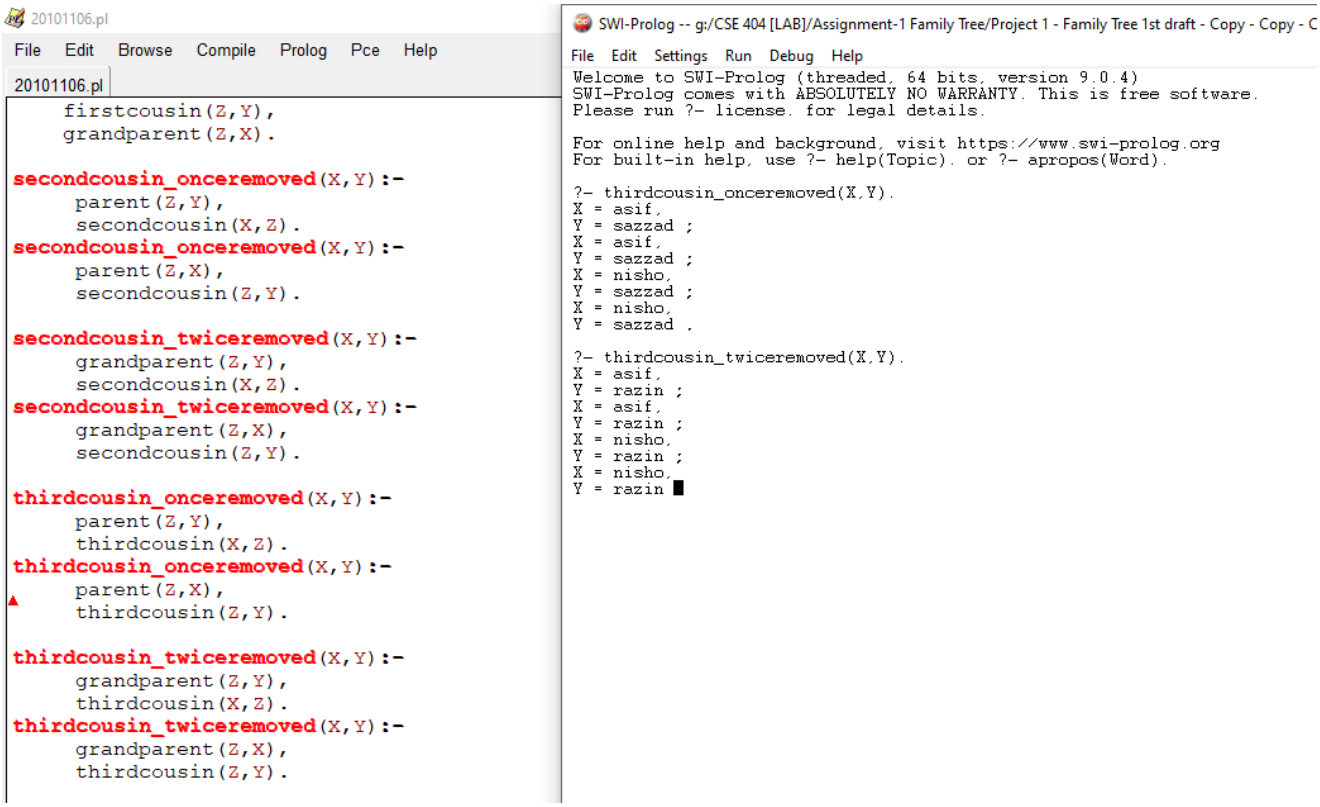
First cousin once and twice removed example:



Second cousin once and twice removed example:



Third cousin once and twice removed example:



```
20101106.pl
File  Edit  Browse  Compile  Prolog  Pce  Help
20101106.pl
    firstcousin(Z,Y),
    grandparent(Z,X).

secondcousin_onceremoved(X,Y):-
     parent(Z,Y),
     secondcousin(X,Z).
secondcousin_onceremoved(X,Y):-
     parent(Z,X),
     secondcousin(Z,Y).

secondcousin_twiceremoved(X,Y):-
     grandparent(Z,Y),
     secondcousin(X,Z).
secondcousin_twiceremoved(X,Y):-
     grandparent(Z,X),
     secondcousin(Z,Y).

thirdcousin_onceremoved(X,Y):-
     parent(Z,Y),
     thirdcousin(X,Z).
thirdcousin_onceremoved(X,Y):-
     parent(Z,X),
     thirdcousin(Z,Y).

thirdcousin_twiceremoved(X,Y):-
     grandparent(Z,Y),
     thirdcousin(X,Z).
thirdcousin_twiceremoved(X,Y):-
     grandparent(Z,X),
     thirdcousin(Z,Y).
```

```
SWI-Prolog -- g:/CSE 404 [LAB]/Assignment-1 Family Tree/Project 1 - Family Tree 1st draft - Copy - Copy - C
File  Edit  Settings  Run  Debug  Help
Welcome to SWI-Prolog (threaded, 64 bits, version 9.0.4)
SWI-Prolog comes with ABSOLUTELY NO WARRANTY. This is free software.
Please run ?- license. for legal details.

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- thirdcousin_onceremoved(X,Y).
X = asif,
Y = sazzad ;
X = asif,
Y = sazzad ;
X = nisho,
Y = sazzad ;
X = nisho,
Y = sazzad .

?- thirdcousin_twiceremoved(X,Y).
X = asif,
Y = razin ;
X = asif,
Y = razin ;
X = nisho,
Y = razin ;
X = nisho,
Y = razin
```

Conclusion and Challenges:

I've faced some lite issues during completing this assignment. SWI-Prolog was showing some errors, especially when implementing complicated cousin removed relationships. But after some debugging and troubleshooting I was able to fix all the errors of SWI-Prolog. Although it was an appropriate task for me to explore the field of prolog, it was enjoyable doing the assignment.