

UNIVERSITY OF ASIA PACIFIC

Department of Computer Science & Engineering



Artificial Intelligence Lab

Course Code: CSE 404

Assignment -1

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Section : B1

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Problem Statement: Develop a program to represent your family tree in Prolog. Also show the below relationships:

- First Cousin
- First Cousin Once Removed
- First Cousin Second Removed
- Second Cousin
- Second Cousin Once Removed
- Second Cousin Twice Removed
- Third Cousin Once Removed
- Third Cousin Twice Removed

Used Tools : SWI – Prolog, Microsoft Word

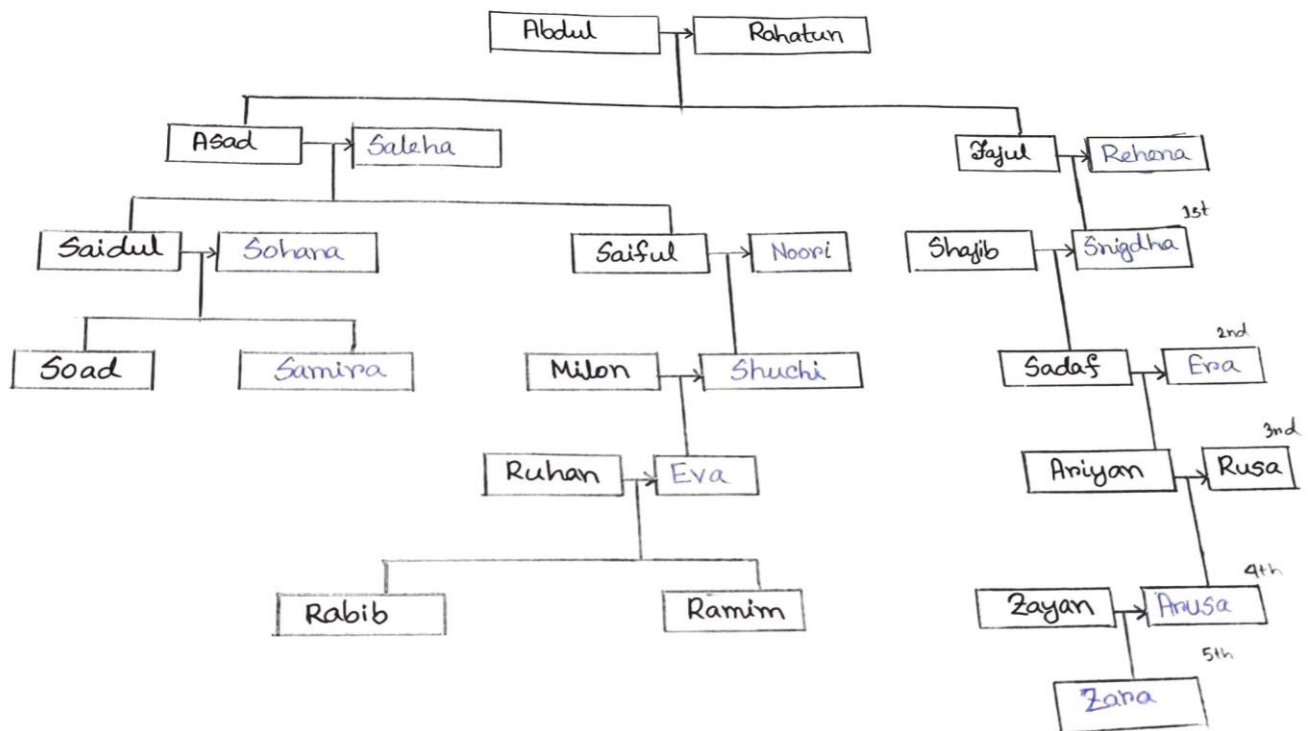


Fig: Family Tree

Output:

Male Persons :

```
% c:/Users/sohan/OneDrive/Documents/Prolog/test_tree.pl compiled 0.00 sec, 66 clauses
```

```
?- male(Who).
```

```
Who = abdul ;  
Who = asad ;  
Who = tajul ;  
Who = saidul ;  
Who = saiful ;  
Who = shajib ;  
Who = sadaf ;  
Who = milon ;  
Who = soad ;  
Who = ariyan ;  
Who = zayan ;  
Who = ramim ;  
Who = rabib.
```

Female Persons:

```
?- female(Who).
```

```
Who = rahatun ;  
Who = saleha ;  
Who = rehena ;  
Who = sohana ;  
Who = noori ;  
Who = snigdha ;  
Who = era ;  
Who = shuchi ;  
Who = samira ;  
Who = eva ;  
Who = rusa ;  
Who = arusa ;  
Who = zara.
```

Father – Son Relation:

```
?- father(Child,Father).
```

```
Child = asad,  
Father = abdul ;  
Child = tajul,  
Father = abdul ;  
Child = saidul,  
Father = asad ;  
Child = saiful,  
Father = asad ;  
Child = snigdha,  
Father = tajul ;  
Child = soad,  
Father = saidul ;  
Child = samira,  
Father = saidul ;  
Child = shuchi,  
Father = saiful ;
```

```
Child = sadaf,  
Father = shajib ;  
Child = ariyan,  
Father = sadaf ;  
Child = eva,  
Father = milon ;  
Child = rabib,  
Father = ruhan ;  
Child = ramim,  
Father = ruhan ;  
Child = zara,  
Father = zayan.
```

Mother-Child Relation:

```
?- mother(Child,Father).  
Child = asad,  
Father = rahatun ;  
Child = tajul,  
Father = rahatun ;  
Child = saidul,  
Father = saleha ;  
Child = saiful,  
Father = saleha ;  
Child = snigdha,  
Father = rehena ;  
Child = soad,  
Father = sohana ;  
Child = samira,  
Father = sohana ;  
Child = shuchi,  
Father = noori ;  
Child = sadaf,  
Father = snigdha ;  
Child = ariyan,  
Father = era ;  
Child = eva,  
Father = shuchi ;  
Child = rabib,  
Father = eva ;  
Child = ramim,  
Father = eva ;  
Child = zara,  
Father = arusa.
```

Siblings:

```
?- sibling(X,Y).  
X = asad,  
Y = tajul ;  
X = tajul,  
Y = asad ;  
X = saidul,  
Y = saiful ;  
X = saiful,  
Y = saidul ;  
X = soad,  
Y = samira ;  
X = samira,  
Y = soad ;  
X = rabib,
```

```

Y = rabib ;
X = asad,
Y = tajul ;
X = tajul,
Y = asad ;
X = saidul,
Y = saiful ;
X = saiful,
Y = saidul ;
X = soad,
Y = samira ;
X = samira,
Y = soad ;
X = rabib,
Y = ramim ;
X = ramim,
Y = rabib ;

```

Grandparents:

```

?- grandparent(GrandChild,GrandParent).

```

```

GrandChild = saidul,
GrandParent = abdul ;
GrandChild = saidul,
GrandParent = rahatun ;
GrandChild = saiful,
GrandParent = abdul ;
GrandChild = saiful,
GrandParent = rahatun ;
GrandChild = snigdha,
GrandParent = abdul ;
GrandChild = snigdha,
GrandParent = rahatun ;
GrandChild = soad,
GrandParent = asad ;
GrandChild = soad,
GrandParent = saleha ;
GrandChild = samira,
GrandParent = asad ;
GrandChild = samira,
GrandParent = saleha ;
GrandChild = shuchi,
GrandParent = asad ;
GrandChild = shuchi,
GrandParent = saleha ;
GrandChild = ariyan,
GrandParent = shajib ;
GrandChild = ariyan,
GrandParent = snigdha ;
GrandChild = sadaf,
GrandParent = tajul ;
GrandChild = sadaf,

```

```

GrandParent = rehena ;
GrandChild = eva,
GrandParent = saiful ;
GrandChild = eva,
GrandParent = noori ;
GrandChild = rabib,
GrandParent = milon ;
GrandChild = rabib,
GrandParent = shuchi ;
GrandChild = ramim,
GrandParent = milon ;
GrandChild = ramim,
GrandParent = shuchi ;

```

Great-Grandparent:

```
?- greatgrandparent(GreatGrandChild,GreatGrandParent).
GreatGrandChild = soad,
GreatGrandParent = abdul ;
GreatGrandChild = soad,
GreatGrandParent = rahatun ;
GreatGrandChild = samira,
GreatGrandParent = abdul ;
GreatGrandChild = samira,
GreatGrandParent = rahatun ;
GreatGrandChild = shuchi,
GreatGrandParent = abdul ;
GreatGrandChild = shuchi,
GreatGrandParent = rahatun ;
GreatGrandChild = ariyan,
GreatGrandParent = tajul ;
GreatGrandChild = ariyan,
GreatGrandParent = rehena ;
GreatGrandChild = sadaf,
GreatGrandParent = abdul ;
GreatGrandChild = sadaf,
GreatGrandParent = rahatun ;
GreatGrandChild = eva,
GreatGrandParent = asad ;
GreatGrandChild = eva,
GreatGrandParent = saleha ;
GreatGrandChild = rabib,
GreatGrandParent = saiful ;
GreatGrandChild = rabib,
GreatGrandParent = noori ;
GreatGrandChild = ramim,
GreatGrandParent = saiful ;
GreatGrandChild = ramim,
GreatGrandParent = noori ;
```

Great-Great-Grandparent:

```
?- greatgreatgrandparent(GreatGreatGrandChild,GreatGreatGrandParent).
GreatGreatGrandChild = ariyan,
GreatGreatGrandParent = abdul ;
GreatGreatGrandChild = ariyan,
GreatGreatGrandParent = rahatun ;
GreatGreatGrandChild = eva,
GreatGreatGrandParent = abdul ;
GreatGreatGrandChild = eva,
GreatGreatGrandParent = rahatun ;
GreatGreatGrandChild = rabib,
GreatGreatGrandParent = asad ;
GreatGreatGrandChild = rabib,
GreatGreatGrandParent = saleha ;
GreatGreatGrandChild = ramim,
GreatGreatGrandParent = asad ;
GreatGreatGrandChild = ramim,
GreatGreatGrandParent = saleha ;
```

First-Cousin:

```
?- first_cousin(X,Y).  
X = saidul,  
Y = snigdha ;  
X = saidul,  
Y = snigdha ;  
X = saiful,  
Y = snigdha ;  
X = saiful,  
Y = snigdha ;  
X = snigdha,  
Y = saidul ;  
X = snigdha,  
Y = saiful ;  
X = snigdha,  
Y = saidul ;  
X = snigdha,  
Y = saiful ;  
X = soad,  
Y = shuchi ;  
X = soad,  
Y = shuchi ;  
X = samira,  
Y = shuchi ;  
X = samira,  
Y = shuchi ;  
X = shuchi,  
Y = soad ;  
X = shuchi,  
Y = samira ;  
X = shuchi,  
Y = soad ;  
X = shuchi,  
Y = samira ;
```

First Cousin Once Removed:

```
?- first_cousin_once_removed(X,Y).  
X = snigdha,  
Y = soad ;  
X = snigdha,  
Y = soad ;  
X = snigdha,  
Y = samira ;  
X = snigdha,  
Y = samira ;  
X = snigdha,  
Y = shuchi ;  
X = snigdha,  
Y = shuchi ;
```


First Cousin Twice Removed:

```
?- first_cousin_twice_removed(X,Y).  
X = saidul,  
Y = ariyan ;  
X = saidul,  
Y = ariyan ;  
X = saiful,  
Y = ariyan ;  
X = saiful,  
Y = ariyan ;  
X = snigdha,  
Y = eva ;  
X = snigdha,  
Y = eva ;  
X = soad,  
Y = rabib ;  
X = soad,  
Y = rabib ;  
X = samira,  
Y = rabib ;  
X = samira,  
Y = rabib ;  
X = soad,  
Y = ramim ;  
X = soad,  
Y = ramim ;  
X = samira,  
Y = ramim ;  
X = samira,  
Y = ramim ;
```

Second Cousin:

```
?- second_cousin(X,Y).  
X = soad,  
Y = sadaf ;  
X = soad,  
Y = sadaf ;  
X = samira,  
Y = sadaf ;  
X = samira,  
Y = sadaf ;  
X = shuchi,  
Y = sadaf ;  
X = shuchi,  
Y = sadaf ;  
X = sadaf,  
Y = soad ;  
X = sadaf,  
Y = samira ;  
X = sadaf,  
Y = shuchi ;  
X = sadaf,  
Y = soad ;  
X = sadaf,  
Y = samira ;  
X = sadaf,  
Y = shuchi ;
```

Second Cousin Once Removed:

```
?- second_cousin_once_removed(X,Y).  
X = soad,  
Y = ariyan ;  
X = soad,  
Y = ariyan ;  
X = samira,  
Y = ariyan ;  
X = samira,  
Y = ariyan ;  
X = shuchi,  
Y = ariyan ;  
X = shuchi,  
Y = ariyan ;  
- -
```

Second Cousin Twice Removed:

```
?- second_cousin_twice_removed(X,Y).  
X = sadaf,  
Y = rabib ;  
X = sadaf,  
Y = rabib ;  
X = sadaf,  
Y = ramim ;  
X = sadaf,  
Y = ramim ;
```

Third Cousin:

```
?- third_cousin(X,Y).  
X = ariyan,  
Y = eva ;  
X = ariyan,  
Y = eva ;  
X = eva,  
Y = ariyan ;  
X = eva,  
Y = ariyan ;
```

Third Cousin Once Removed:

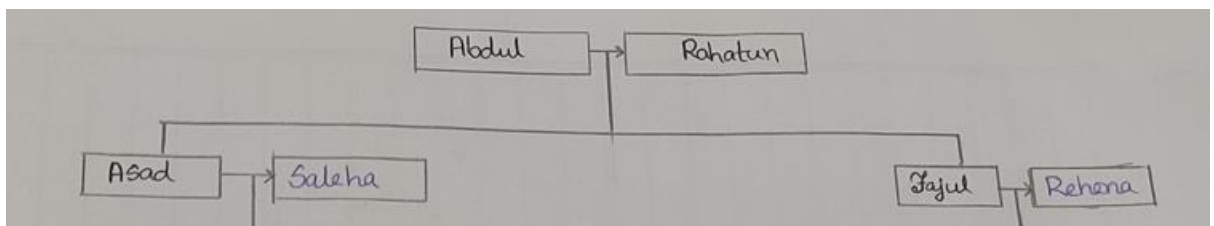
```
?- third_cousin_once_removed(X,Y).  
X = ariyan,  
Y = rabib ;  
X = ariyan,  
Y = rabib ;  
X = ariyan,  
Y = ramim ;  
X = ariyan,  
Y = ramim ;
```

Third Cousin Twice Removed:

```
X = eva,  
Y = shajib ;  
X = eva,  
Y = shajib ;  
X = eva,  
Y = snigdha ;  
X = eva,  
Y = snigdha ;  
X = ariyan,  
Y = saiful ;  
X = ariyan,  
Y = saiful ;  
X = ariyan,  
Y = noori ;  
X = ariyan,  
Y = noori ;
```

Query Checks:

1. Parents Check:



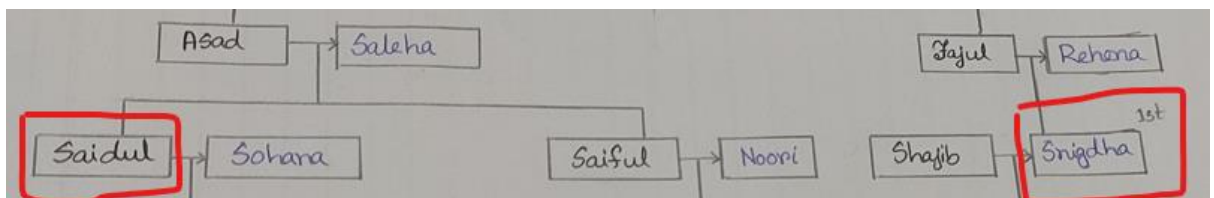
```
?- parent(asad,abdul).
```

```
true .
```

```
?- parent(asad,rahatun).
```

```
true.
```

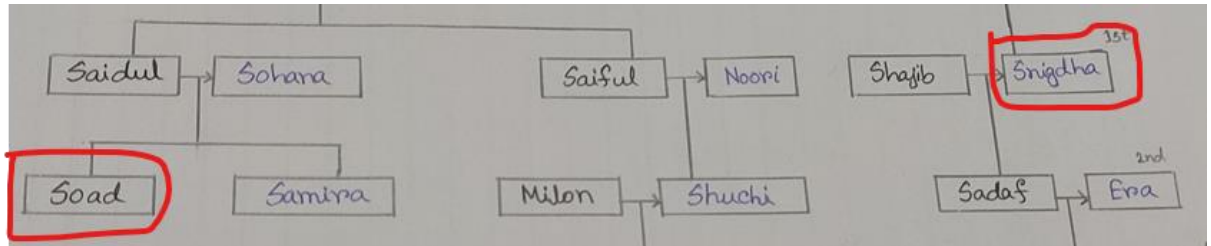
2. First Cousin Check:



```
?- first_cousin(saidul,snigdha).
```

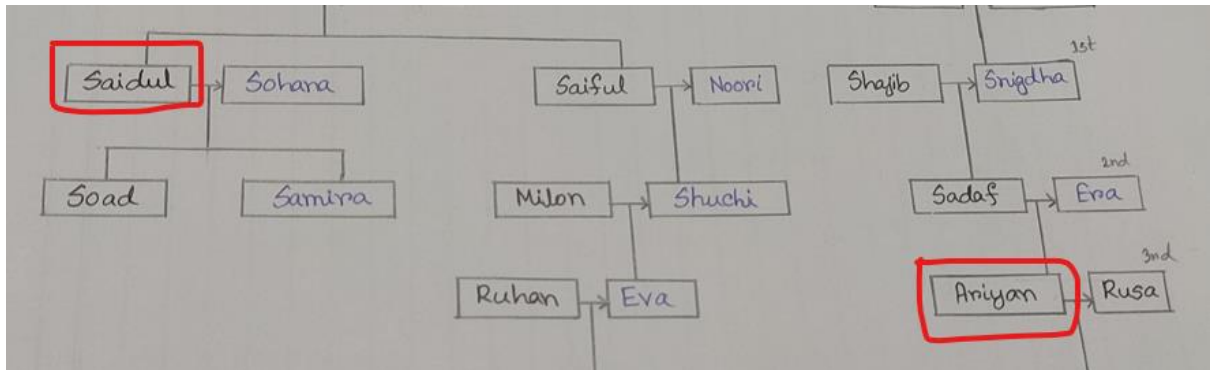
```
true
```

3. First Cousin Once Removed:



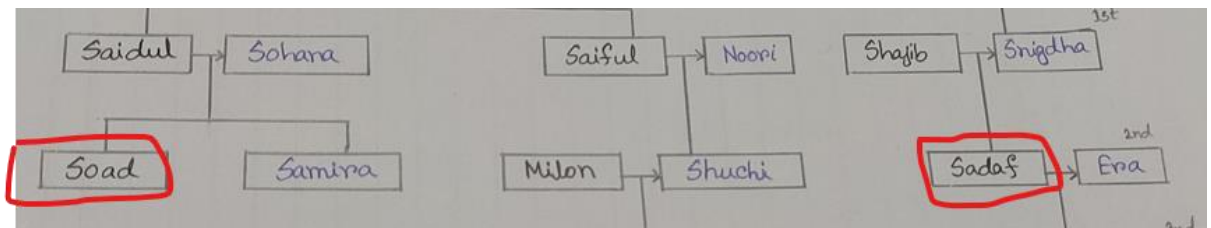
?- first_cousin_once_removed(snigdha, soad).
true

4. First Cousin Twice Removed:



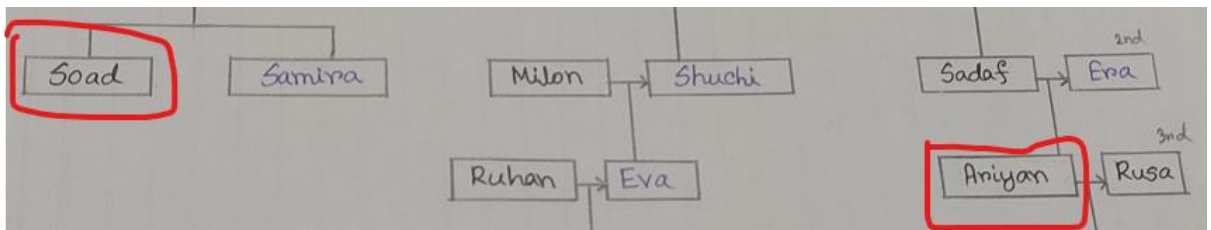
?- first_cousin_twice_removed(saidul, arian).
true

5. Second Cousin:



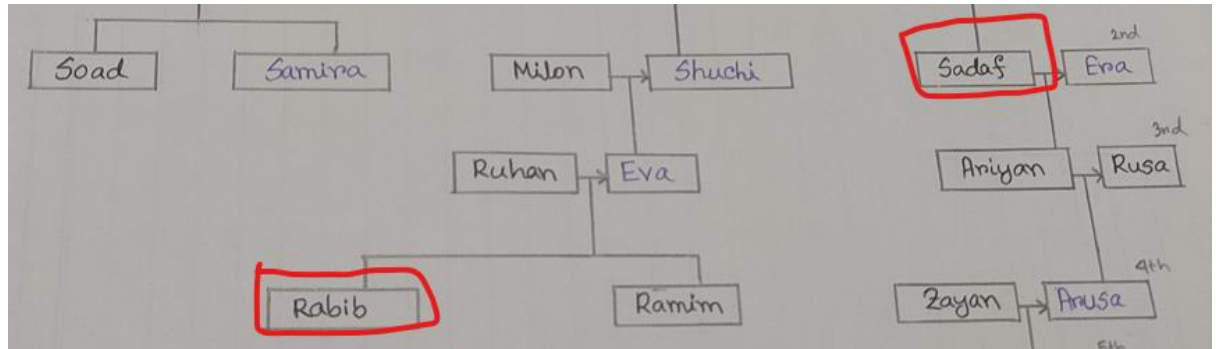
?- second_cousin(soad, sadaf).
true

6. Second Cousin Once Removed:



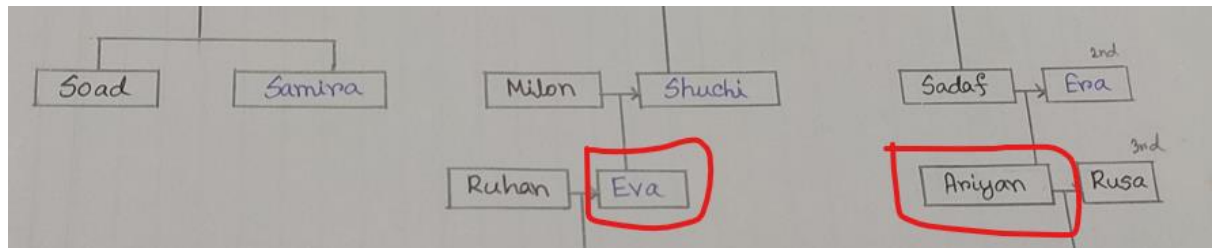
?- second_cousin_once_removed(soad, arian).
true

7. Second Cousin Twice Removed:



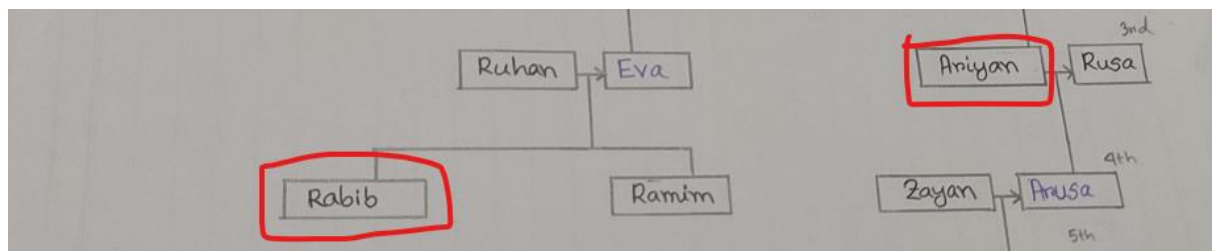
?- second_cousin_twice_removed(sadaaf,rabib).
true

8. Third Cousin:



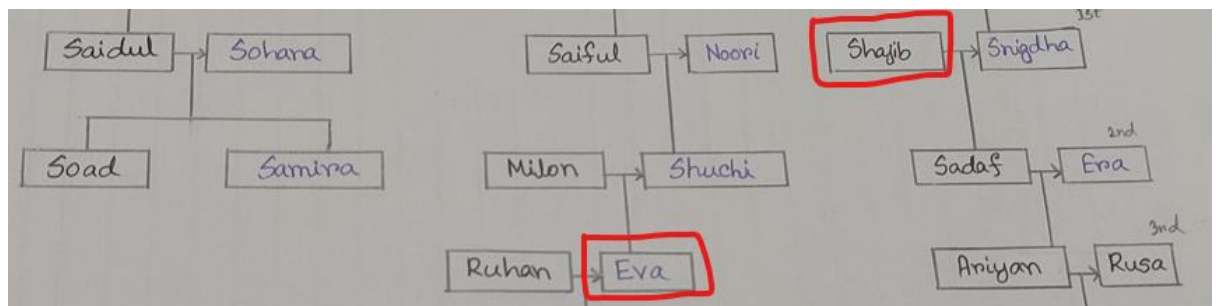
?- third_cousin(ariyan,eva).
true

9. Third Cousin Once Removed:



?- third_cousin_once_removed(ariyan,rabib).
true

10. Third Cousin Twice Removed:



?- third_cousin_twice_removed(eva,shajib).
true

Conclusion:

For Solve this problem I used some resource from Internet and Read about some problem and solution in Stack overflow.