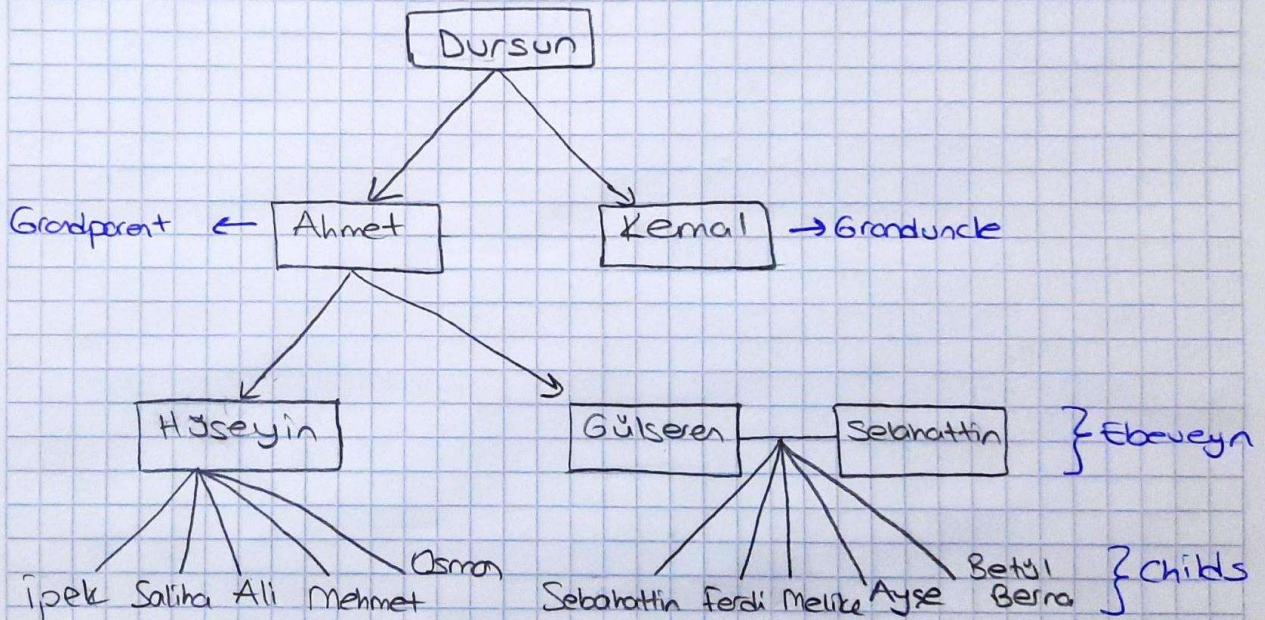


DECLARATIVE PROGRAMMING

Name-Surname: Betül Berna Soylu
Class: CSE313- 171805019

FINAL HOMEWORK

FAMILY MEMBERS RELATIONSHIPS



true.

2 ?- mother(X,Y).

```

X = gulseren,
Y = sebahattin ;
X = gulseren,
Y = ferdi ;
X = gulseren,
Y = melike ;
X = gulseren,
Y = ayse ;
X = gulseren,
Y = betulberna ;
false.
    
```

3 ?- father(X,Y).

```

X = selahattin,
Y = sebahattin ;
X = selahattin,
Y = ferdi ;
X = selahattin,
Y = melike ;
X = selahattin,
Y = ayse ;
X = selahattin,
Y = betulberna ;
X = ahmet,
Y = gulseren ;
X = ahmet,
Y = huseyin ;
X = dursun,
Y = ahmet ;
X = dursun,
Y = kemal.
    
```

4 ?-

4 ?- parent(X,Y).

```

X = selahattin,
Y = sebahattin ;
X = selahattin,
Y = ferdi ;
X = selahattin,
Y = melike ;
X = selahattin,
Y = ayse ;
X = selahattin,
Y = betulberna ;
X = gulseren,
Y = sebahattin ;
X = gulseren,
Y = ferdi ;
X = gulseren,
Y = melike ;
X = gulseren,
Y = ayse ;
X = gulseren,
Y = betulberna ;
X = huseyin,
Y = ipek ;
X = huseyin,
Y = saliha ;
X = huseyin,
Y = ali ;
X = huseyin,
Y = mehmet ;
X = huseyin,
Y = osman ;
X = ahmet,
Y = gulseren ;
X = ahmet,
Y = huseyin ;
X = dursun,
Y = ahmet ;
X = dursun,
Y = kemal.
    
```

5 ?-

true.

```
2 ?- brother(X,Y).
X = sebahattin,
Y = ferdi ;
X = sebahattin,
Y = melike ;
X = sebahattin,
Y = ayse ;
X = sebahattin,
Y = betulberna ;
X = sebahattin,
Y = ferdi ;
X = sebahattin,
Y = melike ;
X = sebahattin,
Y = ayse ;
X = sebahattin,
Y = betulberna ;
X = ferdi,
Y = sebahattin ;
X = ferdi,
Y = melike ;
X = ferdi,
Y = ayse ;
X = ferdi,
Y = betulberna ;
X = ferdi,
Y = sebahattin ;
X = ferdi,
Y = melike ;
X = ferdi,
Y = ayse ;
X = ferdi,
Y = betulberna ;
X = ali,
Y = ipek ;
X = ali,
Y = salih ;
X = ali,
Y = mehmet ;
X = ali,
Y = osman ;
X = mehmet,
Y = ipek ;
X = mehmet,
Y = salih ;
X = mehmet,
Y = ali ;
X = mehmet,
Y = osman ;
X = osman,
Y = ipek ;
X = osman,
Y = salih ;
```

```
Y = salih ;
X = osman,
Y = ali ;
X = osman,
Y = mehmet ;
X = kemal,
Y = ahmet ;
X = ahmet,
Y = kemal ;
false.
```

```
3 ?- sister(X,Y).
X = gulseren,
Y = huseyin ;
X = melike,
Y = sebahattin ;
X = melike,
Y = ferdi ;
X = melike,
Y = ayse ;
X = melike,
Y = betulberna ;
X = melike,
Y = sebahattin ;
X = melike,
Y = ferdi ;
X = melike,
Y = ayse ;
X = melike,
Y = betulberna ;
X = ayse,
Y = sebahattin ;
X = ayse,
Y = ferdi ;
X = ayse,
Y = melike ;
X = ayse,
Y = betulberna ;
X = ayse,
Y = sebahattin ;
X = ayse,
Y = ferdi ;
X = ayse,
Y = melike ;
X = ayse,
Y = betulberna ;
X = sebahattin,
Y = ferdi ;
X = betulberna,
Y = melike ;
X = betulberna,
Y = ayse ;
X = betulberna,
```

```
Y = sebahattin ;
X = ayse,
Y = ferdi ;
X = ayse,
Y = melike ;
X = ayse,
Y = betulberna ;
X = betulberna,
Y = sebahattin ;
X = betulberna,
Y = ferdi ;
X = betulberna,
Y = melike ;
X = betulberna,
Y = ayse ;
X = betulberna,
Y = sebahattin ;
X = betulberna,
Y = ferdi ;
X = betulberna,
Y = melike ;
X = betulberna,
Y = ayse ;
X = ipek,
Y = salih ;
X = ipek,
Y = ali ;
X = ipek,
Y = mehmet ;
X = ipek,
Y = osman ;
X = salih,
Y = ipek ;
X = salih,
Y = ali ;
X = salih,
Y = mehmet ;
X = salih,
Y = osman.
```

```
8 ?- uncle(X,Y) .
X = kemal ,
Y = gulseren ,
X = kemal ,
Y = huseyin ,
false.

9 ?- male(X) .
X = selahattin ,
X = sebahattin ,
X = ferdi ,
X = ali ,
X = mehmet ,
X = osman ,
X = kemal ,
X = ahmet ,
X = dursun.

10 ?- female(X) .
X = gulseren ,
X = melike ,
X = ayse ,
X = betulberna ,
X = ipek ,
X = saliha.
```

Question-3)

```
5 ?- grand_uncle(kemal,X) .
X = sebahattin ,
X = ferdi ,
X = melike ,
X = ayse ,
X = betulberna ,
X = ipek ,
X = saliha ,
X = ali ,
X = mehmet ,
X = osman ,
false.

6 ?-
```

IF THE CODE IS NOT OPENED, I ADDED IT BELOW.

SOURCE CODE

% this programs decipts family relationships

/*domains

name=symbol

predicates

parent(name,name)

female(name)

male(name)

mother(name,name)

father(name,name)

haschild(name)

sister(name,name)

brother(name,name)

clauses*/

%SOYLU FAMILY!!

male(selahattin).

female(gulseren).

male(sebahattin).

male(ferdi).

female(melike).

female(ayse).

female(betulberna).

female(ipek).

female(saliha).

male(ali).

male(mehmet).

male(osman).

uncle(huseyin).

male(kemal).

male(ahmet).

male(dursun).

%parent(X,Y): X is Y's parent!!!

parent(selahattin,sebahattin).

parent(selahattin,ferdi).

parent(selahattin,melike).

parent(selahattin,ayse).

parent(selahattin,betulberna).

parent(gulseren,sebahattin).

parent(gulseren,ferdi).

parent(gulseren,melike).

parent(gulseren,ayse).

parent(gulseren,betulberna).

parent(huseyin,ipek).

parent(huseyin,saliha).

parent(huseyin,ali).

parent(huseyin,mehmet).

parent(huseyin,osman).

parent(ahmet,gulseren).

parent(ahmet,huseyin).

parent(dursun,ahmet).

parent(dursun,kemal).

%RULES!!

%father(X,Y):X is Y's father.

father(X,Y):- male(X),parent(X,Y).

%mother(X,Y):X is Y's mother.

mother(X,Y):- female(X),parent(X,Y).

%sister(X,Y):X is Y's sister.

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

%brother(X,Y):X is Y's brother.

brother(X,Y) :- male(X),parent(Par,X),parent(Par,Y), X \= Y.

%uncle(X,Y):X is Y's uncle.

uncle(X,Y):- parent(Z,Y), brother(Z,X).

%grand_uncle(X,Y):X is Y's grand uncle.

grand_uncle(X,Y):- brother(X,Z),parent(Z,A),parent(A,Y),male(X).