

# Principles of Programming Language

## Assignment 2

### Student Details

Name: Krunal Rank

Adm No: U18C0081

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```
female(mary).  
female(sandra).  
female(juliet).  
female(lisa).  
  
male(peter).  
male(paul).  
male(dick).  
male(bob).  
male(harry).  
  
parent(bob, lisa).  
parent(bob, paul).  
parent(bob, mary).  
parent(juliet, lisa).  
parent(juliet, paul).  
parent(juliet, mary).  
parent(peter, harry).  
parent(lisa, harry).  
parent(mary, dick).  
parent(mary, sandra).  
  
husband(bob,juliet).  
husband(peter,lisa).  
  
child(X,Y) :- parent(Y,X).  
  
mother(X,Y) :- parent(X,Y),female(X).  
father(X,Y) :- parent(X,Y),male(X).  
  
wife(X,Y) :- husband(Y,X).  
  
son(X,Y) :- parent(Y,X),male(X).
```

```

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

brother(X,Y) :- parent(Z,X),parent(Z,Y),X \= Y,male(X) .
sister(X,Y) :- parent(Z,X),parent(Z,Y),X \= Y,female(X) .

uncle(X,Y) :- parent(G,X),parent(G,F),parent(F,Y),not(parent(X,Y)),male(X) .
aunt(X,Y) :- parent(G,X),parent(G,F),parent(F,Y),not(parent(X,Y)),female(X) .

nephew(X,Y) :- parent(G,Y),parent(G,F),parent(F,X),not(parent(Y,X)),male(X) .
niece(X,Y) :- parent(G,Y),parent(G,F),parent(F,X),not(parent(Y,X)),female(X) .

```

```

?- setof(t,child(X,Y),_).
X = dick,
Y = mary ;
X = harry,
Y = lisa ;
X = harry,
Y = peter ;
X = lisa,
Y = bob ;
X = lisa,
Y = juliet ;
X = mary,
Y = bob ;
X = mary,
Y = juliet ;
X = paul,
Y = bob ;
X = paul,
Y = juliet ;
X = sandra,
Y = mary.

```

```

?- setof(t,mother(X,Y),_).
X = juliet,
Y = lisa ;
X = juliet,
Y = mary ;
X = juliet,
Y = paul ;
X = lisa,
Y = harry ;
X = mary,
Y = dick ;
X = mary,
Y = sandra.

```

```

?- setof(t,wife(X,Y),_).
X = juliet,
Y = bob ;
X = lisa,
Y = peter.

```

```
?- setof(t,son(X,Y),_).  
X = dick,  
Y = mary ;  
X = harry,  
Y = lisa ;  
X = harry,  
Y = peter ;  
X = paul,  
Y = bob ;  
X = paul,  
Y = juliet.
```

```
?- setof(t,father(X,Y),_).  
X = bob,  
Y = lisa ;  
X = bob,  
Y = mary ;  
X = bob,  
Y = paul ;  
X = peter,  
Y = harry.
```

```
?- setof(t,daughter(X,Y),_).  
X = lisa,  
Y = bob ;  
X = lisa,  
Y = juliet ;  
X = mary,  
Y = bob ;  
X = mary,  
Y = juliet ;  
X = sandra,  
Y = mary.
```

```
?- setof(t,brother(X,Y),_).  
X = dick,  
Y = sandra ;  
X = paul,  
Y = lisa ;  
X = paul,  
Y = mary.
```

```
?- setof(t,sister(X,Y),_).  
X = lisa,  
Y = mary ;  
X = lisa,  
Y = paul ;  
X = mary,  
Y = lisa ;  
X = mary,  
Y = paul ;  
X = sandra,  
Y = dick.
```

```
?- setof(t,uncle(X,Y),_).  
X = paul,  
Y = dick ;  
X = paul,  
Y = harry ;  
X = paul,  
Y = sandra.
```

```
?- setof(t,aunt(X,Y),_).  
X = lisa,  
Y = dick ;  
X = lisa,  
Y = sandra ;  
X = mary,  
Y = harry.
```

```
?- setof(t,nephew(X,Y),_).  
X = dick,  
Y = lisa ;  
X = dick,  
Y = paul ;  
X = harry,  
Y = mary ;  
X = harry,  
Y = paul.
```

```
?- setof(t,niece(X,Y),_).  
X = sandra,  
Y = lisa ;  
X = sandra,  
Y = paul.
```