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Problem 1:

male(pete).

male(mark).

male(tom).

male(john).

male(frank).

male(matt).

male(henry).

male(todd).

female(anne).

female(lilly).

female(kate).

female(alice).

female(jenny).

/* parent (child, parent). */

parent(mark, pete).

parent(tom, pete).

parent(anne, pete).

parent(lilly, mark).

parent(john, mark).

parent(frank, mark).

parent(kate, tom).

parent(alice, anne).

parent(matt, anne).

parent(henry, alice).

parent(jenny, matt).

parent(todd, matt).

father(Child, Dad) :- male(Dad), parent(Child, Dad).

mother(Child, Mom) :- female(Mom), parent(Child, Mom).

brother(Sibling, Bro) :- male(Bro), parent(Sibling, Parent), parent(Bro, Parent), Bro \= Sibling.

sibling(Siblingone, Siblingtwo) :- parent(Siblingone, Parent), parent(Siblingtwo, Parent),
Siblingone \= Siblingtwo.

sister(Sibling, Sis) :- female(Sis), parent(Sibling, Parent), parent(Sis, Parent), Sis \= Sibling.

grandparent(Grandchild, Grandparent) :- parent(Grandchild, Parent), parent(Parent,
Grandparent).

Problem 1 Output:

<code>parent(mark,pete).</code>	
true	1
<code>parent(jenny,anne).</code>	
false	
<code>father(todd,X).</code>	
X = matt	
false	
<code>sibling(tom,X).</code>	
X = mark	
X = anne	
<code>brother(lilly,X).</code>	
X = john	
X = frank	
false	
<code>grandparent(henry,X).</code>	
X = anne	
<code>sister(alice,X).</code>	
false	
<code>brother(kate,frank).</code>	
false	

<code>mother(matt,X).</code>	
X = anne	
false	
<code>brother(anne,mark).</code>	
true	1

Problem 2:

`maximum_number([X],X).`

`maximum_number([X|Y],X):- maximum_number(Y,Z), X >= Z.`

`maximum_number([X|Y],N):- maximum_number(Y,N), N > X.`

Problem 2 output:

```
trace,maximum_number([23,12],X).  
  
Call: maximum_number([23, 12], _3736)  
Call: maximum_number([12], _4048)  
Exit: maximum_number([12], 12)  
Call: 23>=12  
Exit: 23>=12  
Exit: maximum_number([23, 12], 23)  
  
X = 23
```

```
maximum_number([23,12,12,32,43,54,76,23],X).  
  
X = 76  
false
```

Problem 3:

union_list([],X,X).

union_list([X|Y],Z,W):- member(X,Z),!,union_list(Y,Z,W).

union_list([X|Y],Z,[X|W]):- union_list(Y,Z,W).

Problem 3 output:

```
union_list([1,4,2,5],[1,2,5,2],X).  
  
X = [4, 1, 2, 5, 2]
```