

CMPSCI4250 Project3 Question1

10/20/19

```
1  male(pete).
2  male(mark).
3  male(john).
4  male(frank).
5  male(tom).
6  male(matt).
7  male(henry).
8  male(todd).
9
10 female(lilly).
11 female(kate).
12 female(anne).
13 female(alice).
14 female(jenny).
15
16 parent(pete, mark).
17 parent(pete, tom).
18 parent(pete, anne).
19 parent(mark, lilly).
20 parent(mark, john).
21 parent(mark, frank).
22 parent(tom, kate).
23 parent(anne, alice).
24 parent(anne, matt).
25 parent(alice, henry).
26 parent(matt, jenny).
27 parent(matt, todd).
28
29 sister(Sis, Sibling) :- female(Sis), parent(Parent, Sis), parent(Parent, Sibling), Sis \= Sibling
30
31 brother(Bro, Sibling) :- male(Bro), parent(Parent, Bro), parent(Parent, Sibling), Bro \= Sibling
32
33 sibling(Sibling1, Sibling2) :- parent(Parent, Sibling1), parent(Parent, Sibling2), Sibling1 \= Sibling2
34
35 father(Dad, Child) :- male(Dad), parent(Dad, Child).
36
37 mother(Mom, Child) :- female(Mom), parent(Mom, Child).
38
39 grandparent(GrandParent, Child) :- parent(Parent, Child), parent(GrandParent, Parent).
```

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 *parent*(pete, mark)

true

 *parent*(anne, jenny)

false

 *father*(X, todd)

X = matt

false

 *sibling*(todd, X)

X = jenny

false

 *brother*(X, lilly)

X = john

X = frank

false

 *grandparent*(X, henry)

X = anne

 *sister*(X, alice)

false

 *brother*(frank, kate)

false

 *mother*(X, matt)

X = anne

false

 *brother*(mark, anne)

true

CMPSCI4250 Project3 Question2

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

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trace, maximum_number([1, 2], X).

Call: maximum_number([1, 2], _3998)

Call: maximum_number([2], _4310)

Exit: maximum_number([2], 2)

Call: 1>=2

Fail: 1>=2

Redo: maximum_number([2], _4314)

Call: maximum_number([], _4310)

Fail: maximum_number([], _4310)

Redo: maximum_number([2], _4314)

Call: maximum_number([], _4310)

Fail: maximum_number([], _4310)

Fail: maximum_number([2], _4310)

Redo: maximum_number([1, 2], _3998)

Call: maximum_number([2], _3998)

Exit: maximum_number([2], 2)

Call: 2>1

Exit: 2>1

Exit: maximum_number([1, 2], 2)

X = 2

Redo: maximum_number([2], _3998)

Call: maximum_number([], _4730)

Fail: maximum_number([], _4730)

Redo: maximum_number([2], _3998)

Call: maximum_number([], _3998)

Fail: maximum_number([], _3998)

Fail: maximum_number([2], _3998)

Fail: maximum_number([1, 2], _3998)

false



maximum_number([-2, -1, 0, 1, 2, 3, 4.999, 5], **X**).

X = 5

false

CMPSCI4250 Project3 Question3

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

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union_list([1, 2, 3], [4, 5, 6], **X**).

X = [1, 2, 3, 4, 5, 6]