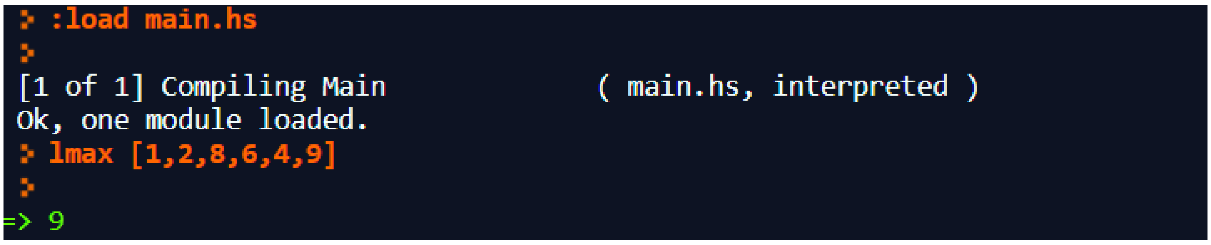
Himanish Pathak/Hp1235

Haskell

Code Snippets and Screenshot:

1. Write a program that finds the maximum of a list of numbers.

```
lmax :: [Int] -> Int
lmax (x:[]) = x
lmax (x:xs) | (lmax xs) > x = lmax xs
            | otherwise     = x
```



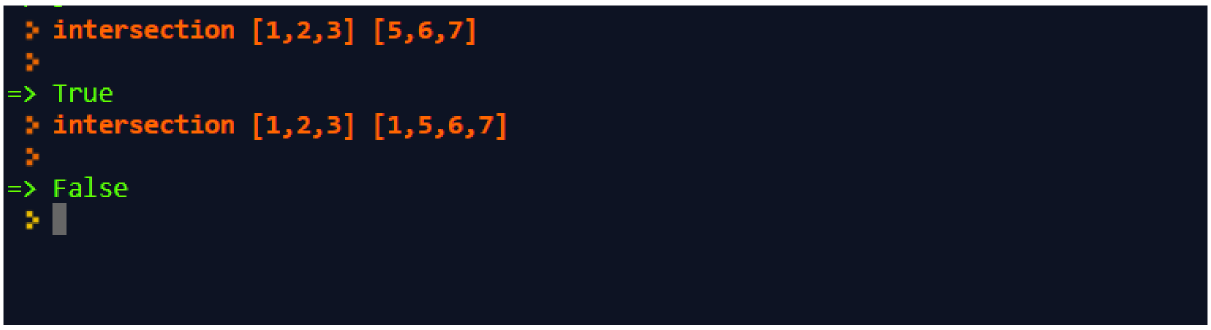
```
⁑ :load main.hs
⁑
[1 of 1] Compiling Main             ( main.hs, interpreted )
Ok, one module loaded.
⁑ lmax [1,2,8,6,4,9]
⁑
=> 9
```

2. Write a program that succeeds if the intersection of two given list parameters is empty.

```
intersect (x:xs) (y:ys)
 | x == y    = x : intersect xs ys
 | x < y     = intersect xs (y:ys)
 | x > y     = intersect (x:xs) ys
intersect x [] = []
intersect [] y = []

length_of_list []  = 0
length_of_list (x:xs) = 1 + length_of_list xs

intersection xs ys =
          if length_of_list (intersect (sort xs) (sort ys)) == 0 then True
          else False
```



```
⁑ intersection [1,2,3] [5,6,7]
⁑
=> True
⁑ intersection [1,2,3] [1,5,6,7]
⁑
=> False
⁑ 
```

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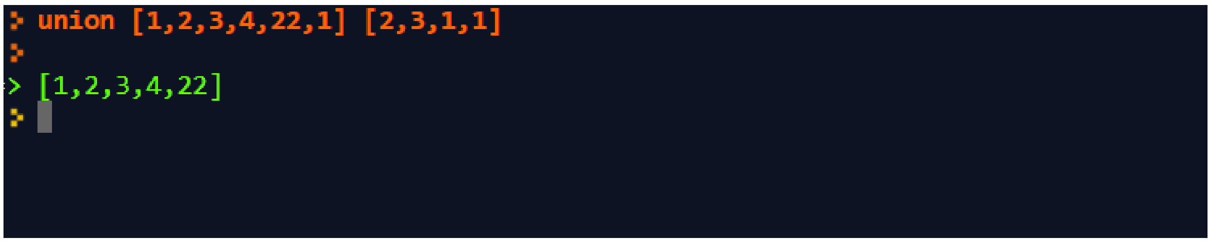
3. Write a program that returns a list containing the union of the elements of two given lists.

```
add_lists (x:xs) (y:ys) =
  if x == y then x: union xs ys
  else if x > y then y: union (x:xs) ys
  else x: union xs (y:ys)
add_lists [] ys = ys
add_lists xs [] = xs

duplicate [] = []
duplicate [x] = [x]
duplicate (x:xs) =
   if x == y then duplicate xs
   else x:duplicate xs
   where y = head(xs)


union (x) (y) = add_lists (duplicate (sort x)) (duplicate (sort y))
```

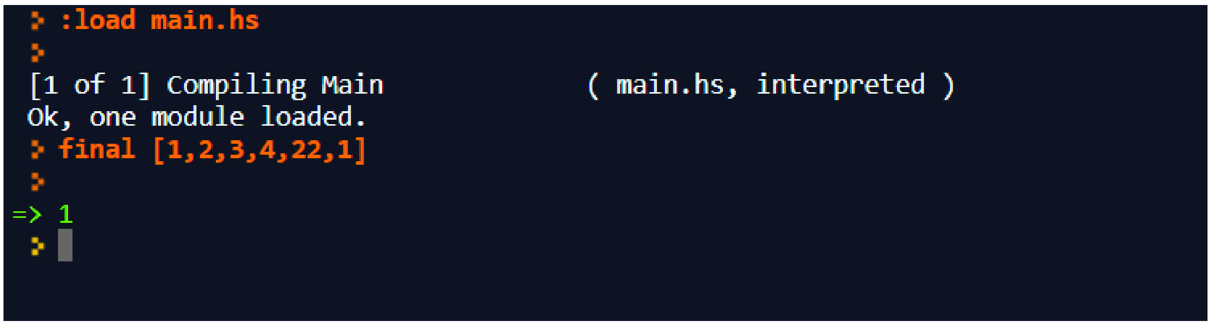


```
 union [1,2,3,4,22,1] [2,3,1,1]

> [1,2,3,4,22]
```

4. Write a program that returns the final element of a list

```
final (x:[]) = x
final (x:xs) = final xs
```



```
 :load main.hs

[1 of 1] Compiling Main             ( main.hs, interpreted )
Ok, one module loaded.
 final [1,2,3,4,22,1]

=> 1
```

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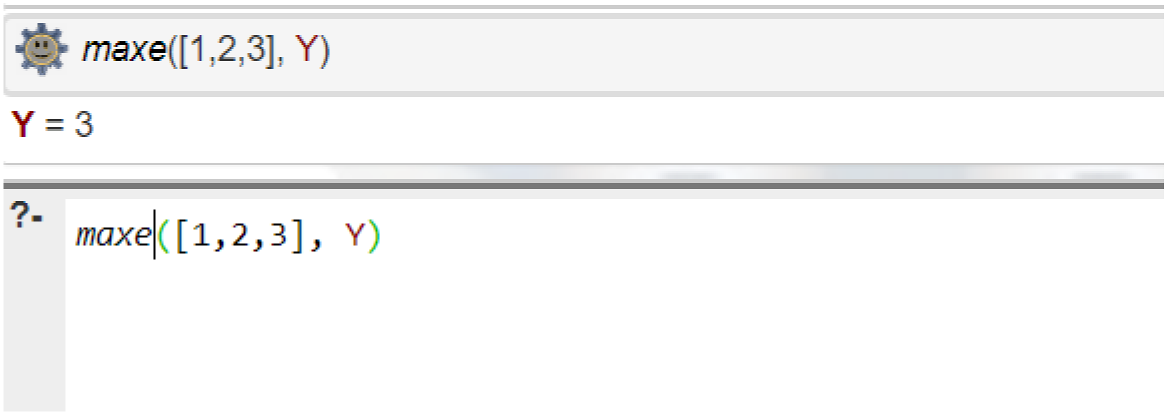
Prolog

Code Snippets and Screenshot:

1. Write a program that finds the maximum of a list of numbers.

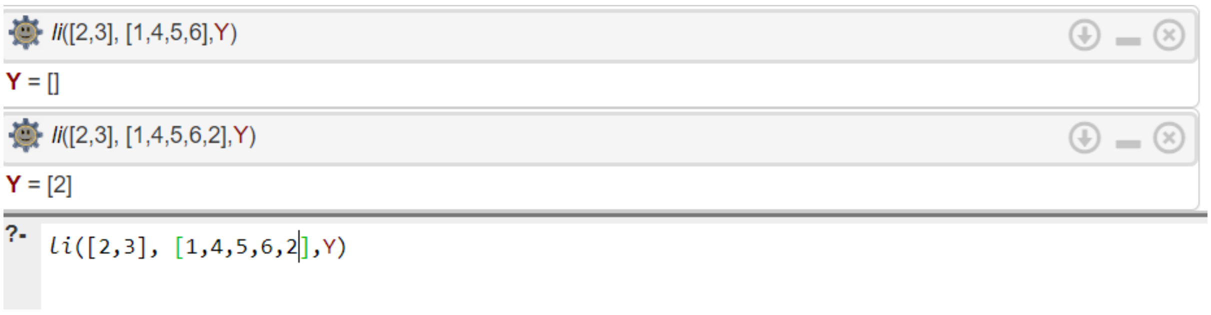
```
maxe([X],X).
maxe([X|Y],X):- maxe(Y,P), X >= P.
maxe([X|Y],Q):- maxe(Y,Q), Q > X.
```



```
maxe([1,2,3], Y)
Y = 3
?- maxe([1,2,3], Y)
```

2. Write a program that succeeds if the intersection of two given list parameters is empty.

```
li([], _, []).
li([Head|L1tail], L2, L3) :-
      memberchk(Head, L2),
      !,
      L3 = [Head|L3tail],
      li(L1tail, L2, L3tail).
                  li([_|L1tail], L2, L3) :-
      li(L1tail, L2, L3).
```



```
li([2,3], [1,4,5,6],Y)
Y = []
li([2,3], [1,4,5,6,2],Y)
Y = [2]
?- li([2,3], [1,4,5,6,2],Y)
```

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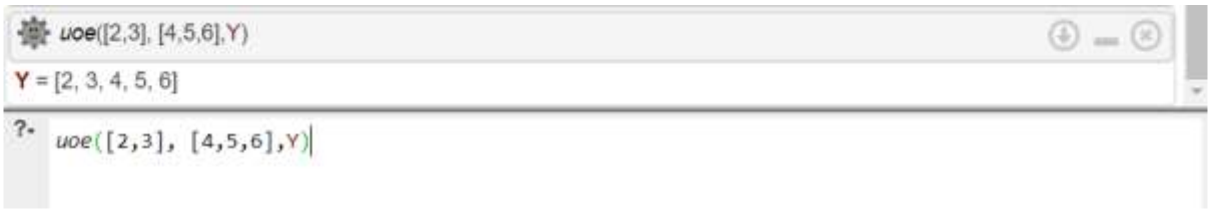
3. Write a program that returns a list containing the union of the elements of two given lists.

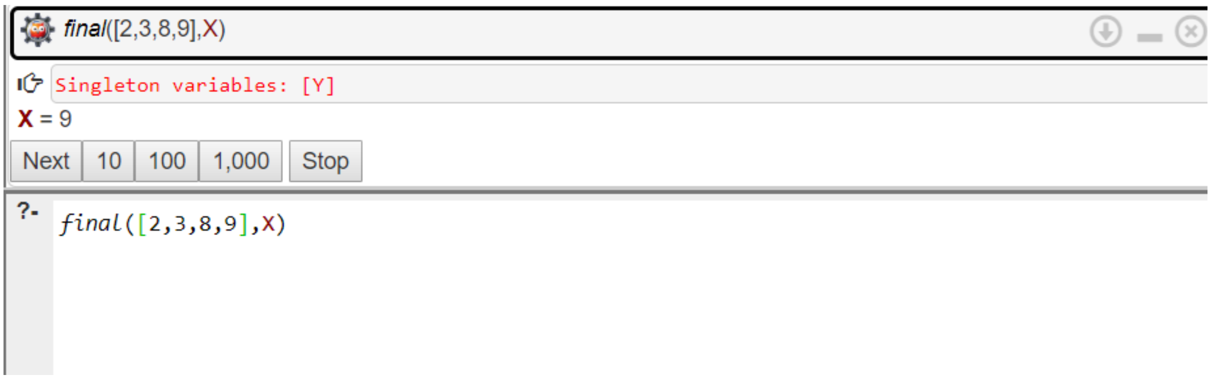
```
uoe([],X,X).
uoe([X|Y],P,Q):- member(X,P),!,uoe(Y,P,Q).
uoe([X|Y],P,[X|Q]):- uoe(Y,P,Q).
```



```
uoe([2,3], [4,5,6],Y)
Y = [2, 3, 4, 5, 6]
?- uoe([2,3], [4,5,6],Y)
```

4. Write a program that returns the final element of a list

```
final([X],X).
final([Y|X],H):- final(X,H).
```



```
final([2,3,8,9],X)
Singleton variables: [Y]
X = 9
?- final([2,3,8,9],X)
```