Prolog Code:

/*binds NewList to a list formed by interchanging pairs of members of the list.

If the list has an odd number of members, then the final one is left unchanged at the end of the NewList */

```prolog
main :- write('This Prolog program performs list operations.'),

write(' This Prolog program is written into the list_oper.pl file').


%spin2(List, NewList).


%Base cases
spin2([],[]).
spin2([X], [X]).


%Recursive case
spin2([X, Y|L1], [Y, X|L2]) :- spin2(L1, L2).
```

/* binds MaxItem to the value of the largest number in the list */

```prolog
%lgst(List, MaxItem).


%Base cases
lgst([], list_is_empty).
lgst([X], X).
```

%Recursive cases

lgst([X, Y|L1], MAX) :- X>Y, lgst([X|L1], MAX).

lgst([X, Y|L1], MAX) :- X=<Y, lgst([Y|L1], MAX).

/*binds MaxPos to the position of the first occurrence of the largest number in the list. The first item has position 1*/

%lgst_pos(List, MaxPos).

%Base cases

lgst_pos([], list_is_empty).

%lgst_pos([X], 1).

lgst_pos([X|L1], 1) :- lgst([X|L1], X).

%Recursive case

lgst_pos([X|L1], INDEX) :- \+ lgst([X|L1], X), lgst_pos(L1, INDEX1), INDEX is INDEX1 + 1.

/* binds NewList to a list that consists of the original List with first occurrence of the largest item removed */

%remove_lgst(List, NewList).
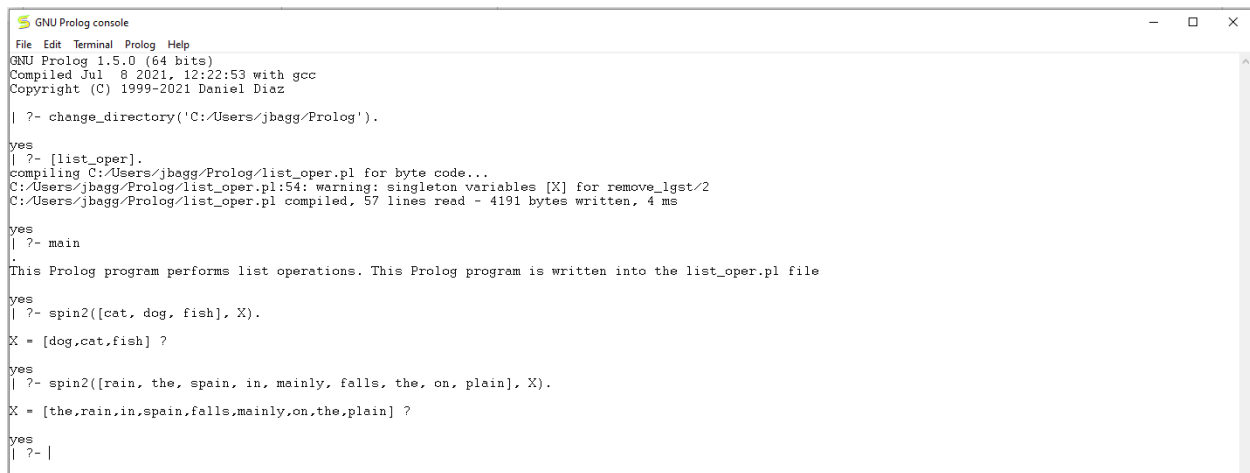
%Base cases

remove_lgst([], list_is_empty).

remove_lgst([X], []). %if list only contains one element, return empty list

remove_lgst([X|L1], L1) :- lgst([X|L1], X). %return L1 if largest value is the head

%Recursive case

remove_lgst([X|L1], [X|L2]) :- \+ lgst([X|L1], X), remove_lgst(L1, L2). %if largest value not in head, cut off head to recursively search for it

Screenshots:


```
GNU Prolog console                                                    —  □  ✕

File  Edit  Terminal  Prolog  Help
GNU Prolog 1.5.0 (64 bits)
Compiled Jul  8 2021, 12:22:53 with gcc
Copyright (C) 1999-2021 Daniel Diaz

| ?- change_directory('C:/Users/jbagg/Prolog').

yes
| ?- [list_oper].
compiling C:/Users/jbagg/Prolog/list_oper.pl for byte code...
C:/Users/jbagg/Prolog/list_oper.pl:54: warning: singleton variables [X] for remove_lgst/2
C:/Users/jbagg/Prolog/list_oper.pl compiled, 57 lines read - 4191 bytes written, 4 ms

yes
| ?- main
.
This Prolog program performs list operations. This Prolog program is written into the list_oper.pl file

yes
| ?- spin2([cat, dog, fish], X).

X = [dog,cat,fish] ?

yes
| ?- spin2([rain, the, spain, in, mainly, falls, the, on, plain], X).

X = [the,rain,in,spain,falls,mainly,on,the,plain] ?

yes
| ?- |
```

File   Edit   Terminal   Prolog   Help

```
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yes
| ?- main
.
This Prolog program performs list operations. This Prolog program is written into the list_oper.pl file

yes
| ?- spin2([cat, dog, fish], X).

X = [dog,cat,fish] ?

yes
| ?- spin2([rain, the, spain, in, mainly, falls, the, on, plain], X).

X = [the,rain,in,spain,falls,mainly,on,the,plain] ?

yes
| ?- lgst([1,3,5,9,7,4,5], X).

X = 9 ?

yes
| ?- lgst_pos([1,3,5,9,7,4,5], X).

X = 4 ?

yes
| ?- lgst_pos([1,9,5,9,7,4,5], X).

X = 2 ? |
```

```
yes
| ?- main
.
This Prolog program performs list operations. This Prolog program is written into the list_oper.pl file

yes
| ?- spin2([cat, dog, fish], X).

X = [dog,cat,fish] ?

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| ?- spin2([rain, the, spain, in, mainly, falls, the, on, plain], X).

X = [the,rain,in,spain,falls,mainly,on,the,plain] ?

yes
| ?- lgst([1,3,5,9,7,4,5], X).

X = 9 ?

yes
| ?- lgst_pos([1,3,5,9,7,4,5], X).

X = 4 ?

yes
| ?- lgst_pos([1,9,5,9,7,4,5], X).

X = 2 ?

yes
| ?- remove_lgst([1,3,5,9,7,4,5], X).

X = [1,3,5,7,4,5] ?

yes
| ?- remove_lgst([1,9,5,9,7,4,5], X).

X = [1,5,9,7,4,5] ?

yes
| ?- |
```