

```
%Inorder-insert element in list
insert(X,[],[X]).
insert(X,[A|Y],[X|[A|Y]]) :-
    X <= A.
insert(X,[A|Y],[A|W]) :-
    X > A,
    insert(X,Y,W).

%Insertion sort.
isort([],[]).
isort([A|X],Y) :-
    isort(X,Z),
    insert(A,Z,Y).

%Pivot clauses used by the quick-sort algorithm
pivot(_,[],L,G,L,G).

pivot(P,[X|Y],L,G,Lr,Gr) :-
    X <= P,
    pivot(P,Y,[X|L],G,Lr,Gr).
pivot(P,[X|Y],L,G,Lr,Gr) :-
    X > P,
    pivot(P,Y,L,[X|G],Lr,Gr).

%quick-sort clauses.
qsort([],[]).
qsort([P|Li],Lo) :-
    pivot(P,Li,[],[],Lr,Gr),
    qsort(Lr,QLr),
    qsort(Gr,QGr),
    append(QLr,[P|QGr],Lo).

% -----
% -----EXAMPLE QUERY-----
% -----
%
% Sort the list [2,1,4,3,5] using isort
% -----
%
% ?- isort([2,1,4,3,5],X).
% X = [1,2,3,4,5]
%
% Sort the list [2,1,4,3,5] using qsort
% -----
%
% ?- qsort([2,1,4,3,5],X).
% X = [1,2,3,4,5]
%
% Check if [1, 3, 5, 9] is a valid sort of the list [3, 1, 9, 5] using isort
% -----
%
% ?- isort([3, 1, 9, 5],[1, 3, 5, 9]).
% yes;
%
% Check if [1, 3, 5, 9] is a valid sort of the list [3, 1, 9, 5] using qsort
% -----
%
% ?- qsort([3, 1, 9, 5],[1, 3, 5, 9]).
% yes;
```