

## Assignment 2

Name: Krunal Rank

Roll No: U18CO081

Question 1: Find the last element of a list.

Answer 1:

```
last([Y|Tail]):-  
    last(Tail).  
  
last([X]):-  
    write(X).
```

```
?- last([1,3,2]).  
2  
true
```

Question 2: Find K'th element of the list.

Answer 2:

```
kelement([X|Y],K):-  
    K1 is K - 1,  
    kelement(Y,K1).  
  
kelement([],K):-  
    false.  
  
kelement([Y|X],1):-  
    write(Y).
```

```
?- kelement([1,3,2],3).  
2
```

Question 3: Find number of elements in the list.

Answer 3:

```
countlistelements([X|Y]):-  
    count([X|Y],0).  
countlistelements([]):-  
    write(0).  
  
count([],K):-  
    write(K).  
count([X|Y],K):-  
    K1 is K + 1,  
    count(Y,K1).
```

```
?- countlistelements([1,2,3,4,5]).  
5  
true.
```

Question 4: Find out whether list is a palindrome.

Answer 4:

```
ispalindrome([]).  
ispalindrome([_]).  
ispalindrome(P) :-  
    append([H|T], [H], P),  
    ispalindrome(T).
```

```
?- ispalindrome([1,2,3,1]).  
false.  
  
?- ispalindrome([1,2,2,1]).  
true .  
  
?- ispalindrome([]).  
true
```

Question 5: Eliminate consecutive duplicates of the elements.

Answer 5:

```
removeduplicates([], []).
removeduplicates([X], [X]).

removeduplicates([X,X|T], [X|R]) :-
    removeduplicates([X|T], [X|R]).

removeduplicates([X,Y|T], [X|R]) :-
    X \== Y,
    removeduplicates([Y|T], R).
```

```
?- removeduplicates([1,1,2,3,4,4],L).
L = [1, 2, 3, 4] ■
```

Question 6: Duplicate the list elements K times.

Answer 6:

```
duplicate(L1,N,L2) :-
    duplicate(L1,N,L2,N).
duplicate([],_,[],_).
duplicate([_|Xs],N,Ys,0) :-
    duplicate(Xs,N,Ys,N).
duplicate([X|Xs],N,[X|Ys],K) :- K > 0, K1 is K - 1,
    duplicate([X|Xs],N,Ys,K1).
```

```
?- duplicate([1,2,3],3,L).
L = [1, 1, 1, 2, 2, 2, 3, 3, 3] .
```

Question 7: Drop every N'th element from the list.

Answer 7:

```
drop(1,[_|T],T).
drop(P,[X|Y],[X|R]) :-
    P1 is P-1,
    drop(P1,Y,R).
```

```
?- drop(3,[1,2,3,4],Y).
Y = [1, 2, 4] ■
```

Question 8: Rotate the list N places to the left.

Answer 8:


```
split(L,0,[],L).
split([X|Xs],N,[X|Ys],Zs) :-
    N > 0,
    N1 is N - 1,
    split(Xs,N1,Ys,Zs).
```

```
rotate(L1,N,L2) :-
    N >= 0,
    length(L1,NL1),
    N1 is N mod NL1,
    rotate_left(L1,N1,L2).
```

```
rotate(L1,N,L2) :-
    N < 0,
    length(L1,NL1),
    N1 is NL1 + (N mod NL1),
    rotate_left(L1,N1,L2).
```

```
rotate_left(L,0,L).
```

```
rotate_left(L1,N,L2) :-
    N > 0,
    split(L1,N,S1,S2),
    append(S2,S1,L2).
```

```
?- rotate([1,2,3,4,5],2,Y).
Y = [3, 4, 5, 1, 2] 
```

Question 9: Extract a given number of randomly selected elements from a list.

Answer 9:

```
randomizer(X, N,Y) :-  
    random_permutation(X, L1),  
    take(N,L1,Y).  
  
take(N, _, Xs) :-  
    N <= 0,  
    !,  
    N == 0,  
    Xs = [].  
take(_, [], []).  
take(N, [X|Xs], [X|Ys]) :-  
    M is N-1,  
    take(M, Xs, Ys).
```

```
?- randomizer([1,2,3,4],3,Y).  
Y = [2, 4, 3].  
  
?- randomizer([1,2,3,4,5,6,8,7],5,Y).  
Y = [5, 1, 6, 3, 2].
```

Question 10: Generate a random permutation of the elements of a list.

Answer 10:

```
?- random_permutation([1,2,3,4,5],Y).  
Y = [3, 4, 2, 1, 5].
```