**Mini Assignment 2**

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Q.16 **Drop every N'th element from a list.**

Ans. **Fact & Rules:**

dropList(X,Z,Y) :- dropList(X,Z,Y,Z).

dropList([],\_,[],\_).

dropList([\_|L1],Z,L2,1) :- dropList(L1,Z,L2,Z).

dropList([H|L1],Z,[H|L2],Z1) :- Z1 > 1, Z2 is Z1 - 1, dropList(L1,Z,L2,Z2).

**Sample run queries and results:**

?- dropList([a,b,c,d,e,f,g,h,i,k],3,X)

**X = [a, b, d, e, g, h, k]**

?- dropList([1,4,5,6,24,6,7],3,X)

**X = [1, 4, 6, 24, 7]**

Q.17 **Split a list into two parts; the length of the first part is given.**

Ans. **Fact & Rules:**

divide(X,0,[],X).

divide([H|T],X,[H|T1],Z) :- X > 0, X1 is X - 1, divide(T,X1,T1,Z).

**Sample run queries and results:**

?- divide([1,2,4,b,c,8,e,4,g,h,9,k],5,L1,L2).

**L1 = [1, 2, 4, b, c],  
 L2 = [8, e, 4, g, h, 9, k]**

?- divide(['henry','adam','john','madhua'],2,L1,L2).

**L1 = [henry, adam],  
 L2 = [john, madhua]**

Q.19 **Rotate a list N places to the left.**

Ans. **Fact & Rules:**

divide(X,0,[],X).

divide([H|T],X,[H|T1],Z) :- X > 0, X1 is X - 1, divide(T,X1,T1,Z).

flip(L1,X,L2) :- X >= 0, length(L1,X1), X2 is X mod X1, flip\_list(L1,X2,L2).

flip(L1,X,L2) :- X < 0, length(L1,X1), X2 is X1 + (X mod X1), flip\_list(L1,X2,L2).

flip\_list(L,0,L).

flip\_list(L1,X,L2) :- X > 0, divide(L1,X,S1,S2), append(S2,S1,L2).

**Sample run queries and results:**

?- flip(['henry','adam','john','madhua'],2,L1).

**L1 = [john, madhua, henry, adam]**

?- flip([1,2,4,b,c,8,e,4,g,h,9,k],5,L1).

**L1 = [8, e, 4, g, h, 9, k, 1, 2, 4, b, c]**

Q.21 **Insert an element at a given position into a list.**

Ans. **Fact & Rules:**

insert(Z, L, 1, [Z|L]).

insert(Z, [H|T], X, [H|T1]) :- X1 is X - 1, insert(Z, T, X1, T1).

**Sample run queries and results:**

?- insert(a,[1,3,4,5],2,Z).

**Z = [1, a, 3, 4, 5]**

?- insert(adam,[1,'henry','john',3,4,5],4,Z).

**Z = [1, henry, john, adam, 3, 4, 5]**

Q.22 **Create a list containing all integers within a given range.**

Ans. **Fact & Rules:**

range(X,X,[X]).

range(X,X1,[X|T]) :- X > 0 ,N1 is X + 1 ,range(N1,X1,T).

**Sample run queries and results:**

?- range(1,4,L).

**L = [1, 2, 3, 4]**

?- range(7,9,L).

**L = [7, 8, 9]**

Q.22 **Generate the combinations of K distinct objects chosen from the N elements of a list**

Ans. **Fact & Rules:**

possibleList(0, \_, []).

possibleList(N, [H|T], [H|L]) :- N1 is (N - 1), possibleList(N1, T, L).

possibleList(N, [\_|T], L) :- N > 0, possibleList(N, T, L).

**Sample run queries and results:**

?- possibleList(3,[1,b,4,d,2,f],L).

**L** = [1, b, 4]

**L** = [1, b, d]

**L** = [1, b, 2]

**L** = [1, b, f]

**L** = [1, 4, d]

**L** = [1, 4, 2]

**L** = [1, 4, f]

**L** = [1, d, 2]

**L** = [1, d, f]

**L** = [1, 2, f]

**L** = [b, 4, d]

**L** = [b, 4, 2]

**L** = [b, 4, f]

**L** = [b, d, 2]

**L** = [b, d, f]

**L** = [b, 2, f]

**L** = [4, d, 2]

**L** = [4, d, f]

**L** = [4, 2, f]

**L** = [d, 2, f]

?- possibleList(2,[z,x,v,r,t,w],L).

**L** = [z, x]

**L** = [z, v]

**L** = [z, r]

**L** = [z, t]

**L** = [z, w]

**L** = [x, v]

**L** = [x, r]

**L** = [x, t]

**L** = [x, w]

**L** = [v, r]

**L** = [v, t]

**L** = [v, w]

**L** = [r, t]

**L** = [r, w]

**L** = [t, w]

Q.31 **Determine whether a given integer number is prime.**

Ans. **Fact & Rules:**

div(X, Y, Z) :- Z is X / Y.

greater(X, Y) :- X < Y.

divisible(X, Y) :- div(X, Y, Z), integer(Z).

notPrime(X, Y) :- Y > 1, divisible(X, Y).

notPrime(X, Y) :- greater(Y, X / 2), notPrime(X, Y+1).

notPrime(Z) :- Z > 2, notPrime(Z, 2).

prime(Z) :- not(notPrime(Z)).

**Sample run queries and results:**

?- prime(13).

**true**

?- prime(12).

**False**

Q.32 **Determine the greatest common divisor of two positive integer numbers.**

Ans. **Fact & Rules:**

divisor(Z,0,Z).

divisor(X,Y,Z):-Y>0,X1 is X mod Y, divisor(Y,X1,Z).

**Sample run queries and results:**

?- divisor(36,63,Z).

**Z = 9**

?- divisor(18,16,Z).

**Z = 2**