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
```