Recursion

```
#-------------------------------------------------------------------------------

def CountDown( n ) :

    # Output the numbers from the non-negative integer 'n' down to 1,
    # one per line, followed by the string "Lift-Off!"

    if n == 0 :
        print( "Lift-Off!" )
    else :
        print( n )
        CountDown( n - 1 )

#-------------------------------------------------------------------------------

def iFactorial( n ) :  # iterative version

    # The value 1 * 2 * 3 * ... * n, if 'n' is a positive integer,
    # or 1 if 'n' is zero

    factorial = 1

    for multiplier in range( 2, n + 1 ) :
        factorial *= multiplier

    return factorial

#-------------------------------------------------------------------------------

def rFactorial( n ) :  # recursive version

    # The value 1 * 2 * 3 * ... * n, if 'n' is a positive integer,
    # or 1 if 'n' is zero

    if n == 0 :
        return 1
    else :
        return rFactorial( n - 1 ) * n

#-------------------------------------------------------------------------------

def Choose( n, k ) :

    # The number of ways of selecting 'k' out of 'n' items,
    # for integers 'k' and 'n' where  0 <= k <= n

    if k == 0 or k == n :
        return 1
    else :
        return Choose( n - 1, k - 1 ) + Choose( n - 1, k )

#-------------------------------------------------------------------------------
```

```
>>> CountDown( 5 )
5
4
3
2
1
Lift-Off!

>>> CountDown( 0 )
Lift-Off!


>>> iFactorial( 5 )
120

>>> iFactorial( 0 )
1

>>> iFactorial( 50 )
30414093201713378043612608166064768844377641568960512000000000000


>>> rFactorial( 5 )
120

>>> rFactorial( 0 )
1

>>> rFactorial( 50 )
30414093201713378043612608166064768844377641568960512000000000000


>>> Choose( 4, 2 )
6

>>> Choose( 4, 0 )
1

>>> Choose( 4, 4 )
1

>>> [ Choose( 6, k ) for k in range( 7 ) ]
[ 1, 6, 15, 20, 15, 6, 1 ]
```