4. **Catalan numbers:** The Catalan numbers C_n are a sequence of integers 1, 1, 2, 5, 14, 42, 132...that play an important role in quantum mechanics and the theory of disordered systems. (They were central to Eugene Wigner's proof of the so-called semicircle law.) They are defined by

$$C_0 = 1, \qquad C_{n+1} = \frac{4n+2}{n+2} C_n.$$

Write a program that prints in increasing order all Catalan numbers less than or equal to one billion.

1) This is a recursive function that takes in the input of the catalan number, and then the iteration to calculate for.

2) At each iteration the function prints out its answer.