# Recursion

- Programming technique involving a function calling itself

- Requires a base case

    - Simplest immediately solvable instance of the problem

- Recursion can often replace loops

- In C, recursion is not always a good or efficient solution

- Can produce elegant solutions to certain problems

- Functional programming languages encourage recursion

Triangle Numbers

- The nth triangle number T_n is $1 + 2 + \ldots + n$

- T_0 is 0 (empty sum)
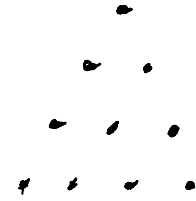
$$T_4 = \underbrace{1 + 2 + 3}_{T_3} + 4 = 10$$

$$T_4 = T_3 + 4$$

$$T_n = \begin{cases} 0 & \text{if } n = 0 \\ T_{n-1} + n & \text{otherwise} \end{cases}$$

$$n \in \mathbb{N}$$