

FIBONACCI NUMBERS

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...

notation:

$$F_0 = 0, F_1 = 1, F_2 = 1, F_3 = 2, \dots$$

$$F_n = F_{n-1} + F_{n-2} \text{ for } n \geq 2$$

Recursive Definition

$$\begin{aligned}
 F_{30} &= F_{29} + F_{28} \\
 &= (F_{28} + F_{27}) + (F_{27} + F_{26}) \\
 &= ((F_{27} + F_{26}) + (F_{26} + F_{25})) + ((F_{26} + F_{25}) + (F_{25} + F_{24})) \\
 &\quad \vdots \\
 &= F_1 + F_0 + F_1 + \dots + F_0
 \end{aligned}$$

Iterative Method: Use a loop with two accumulators to remember the two previous Fibonacci numbers

Variables	step 1	step 2	step 3	step 4
a	0	1	1	2
b	+1	+1	+2	+3
next	1	2	3	5

accumulators { a, b }

