

Example: Computing the factorial of a number

$$n! = n \cdot (n-1) \cdot (n-2) \cdot (n-3) \cdot \dots \cdot 1$$

n needs to be positive int ≥ 1 .

Define $0! = 1$

$$4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$$

$$3! = 3 \cdot 2 \cdot 1 = 6 \quad \begin{array}{l} \text{4. factorial(3)} \\ \text{3!} \end{array}$$

factorial(4)

$$4! = 4 \cdot 3 \cdot 2 \cdot 1 = 4 \cdot \overbrace{(3 \cdot 2 \cdot 1)}^{2!}$$

factorial(3)

$$3! = 3 \cdot 2 \cdot 1 = 3 \cdot \overbrace{(2 \cdot 1)}^{1!} \quad \left. \vphantom{3!} \right\} 3 \cdot \text{factorial}(2)$$

factorial(2)

$$2! = 2 \cdot 1 = 2 \cdot \overbrace{(1)}^{0!} \quad \left. \vphantom{2!} \right\} 2 \cdot \text{factorial}(1)$$

$$1! = 1 \cdot 1 = 1 \cdot \overbrace{(1)}^{0!} \quad \left. \vphantom{1!} \right\} 1 \cdot \text{factorial}(0)$$

$0!$ defined as 1

"base case"
problem boils down to
a fixed number: 1

factorial(1)

Lecture 35 Factorial Symbol table

print(factorial(3))

