

Simple functions and conditional branching

Exercises taken from the *Python Programming Primer*¹ (and updated with type hints).

Textbook *Introduction to Python for Computational Science and Engineering* (2022), Chapters 3-4.

Corresponding lecture slides from *Computational Science and Engineering in Python*:

- Functions
- Conditionals, if-else

Exercises. Define the following functions.

1. A function `seconds2days(n: int) -> float` which accepts a number of seconds (either as int or float) and converts the number of seconds in the corresponding number of days. The function should return the number of days as a floating point variable.

Example:

```
>>> seconds2days(43200)
0.5
```

For your entertainment: how many days are 10! seconds? (10! = 3628800).

2. A function `signum(x: int) -> int` that:

- returns 1 if $x > 0$
- returns 0 if $x = 0$
- returns -1 if $x < 0$

Example:

```
>>> print(signum(2012))
1
```

3. A function `triangle_area(a: float, b: float, c: float) -> float` that computes and returns the area A of a triangle with edge lengths a , b , and c . You can use the equation

$$A = \sqrt{s(s-a)(s-b)(s-c)} \quad \text{with} \quad s = \frac{a+b+c}{2}$$

1. *Python Programming Primer*, Hans Fangohr *et al.* University of Southampton (2016)