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Modules

- Python comes with a rich standard library of modules, which are organized in packages.
- A module is a Python file which you can import in your project.
- A package is a collection of modules.
- Please take a look at the standard library https://docs.python.org/3/library/ (https://docs.python.org/3/library/).

- The import of modules is done by `import` keyword.
- Next we will import the statistics module from Python's standard lib.

In [1]:
```
import statistics
```

Explicit import

- This import was done explicitly. All names of the module are preserved.
- You can access the methods with a period `.`.

In [2]:
```
statistics.mean([0, 1, 2, 3, 4])
```

Out[2]:
```
2
```

In [3]:
```
statistics.median([0, 1, 2, 4])
```

Out[3]:
```
1.5
```

Import with alias

- It is often convenient to use a short hand alias.

In [4]:
```
import statistics as stat
```

In [5]:
```
stat.mean([5, 3, 2])
```

Out[5]:
```
3.3333333333333335
```

Import specific module content

- You can also import just one function or any other object of a module.

In [6]:
```
from statistics import mean as my_mean
```

In [7]:
```
my_mean([1, 2, 3])
```

Out[7]: 2

Implicit import

- With an asterisk `*`, you can also import all module content in an implicit way.
- However, this could override some older imports or self defined functions! So please use it rarely.
- The syntax is `from module import *`.

Self written modules

- If you want to write your own module, you just have to add an empty `__init__.py` in the directory where the module is saved.
- So the structure could look like

```
scritpt.py # a script which imports the module
src # a folder
  |    __init__.py # empty file
  |    my_module.py # your module which contains for instance some functions
```

Exercise: Modules (5 minutes)

- Write a function, which returns the standard deviation of the list `[1.5, 2.5, 2.5, 2.75, 3.25, 4.75]`

Hint

- You are free to implement the standard deviation from scratch, but is it already out there?

Solution

Please find one possible solution in `solution_module.py` (solution_module.py) file.

In [2]:
```
import sys
sys.path.append("01_basic-python")

from solution_module import my_std

my_std([1.5, 2.5, 2.5, 2.75, 3.25, 4.75])
```

Out[2]:
```
1.0810874155219827
```

Congrats

- These were the basics in Python.
- We will move now to Python supporting tools and explore some of the best third party packages, which make Python so powerful.