

# Packages (1A)

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# Package (1)

**modules** are **files** containing Python statements and definitions, like function and class definitions.

how to bundle multiple **modules** together to form a **package**.

a **package** is basically a **directory** with **Python files** and a **file** with the name **`__init__.py`**.

every **directory** inside of the **Python path**, contains a file named **`__init__.py`**, will be treated as a **package** by Python.

several **modules** into a **package**.

[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# Package (2)

**packages** are a way of structuring Python's **module namespace** by using "**dotted module names**".

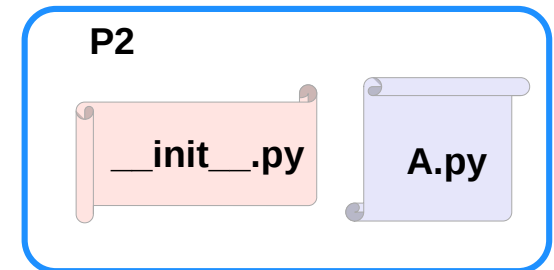
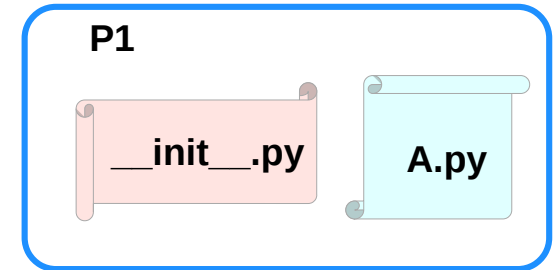
**A.B** stands for a **submodule** named **B** in a **package** named **A**.

two different **packages** like **P1** and **P2** can both have **modules** with the same name, let's say **A**, for example.

The **submodule A** of the **package P1** and the **submodule A** of the **package P2** can be totally different.

**P1.A**  
**P2.A**

A **package** is imported like a "normal" **module**.



[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# Creating a package (1)

Need a directory.

The **name** of this **directory** will be the **name** of the **package**, which we want to create.

call our **package** "simple\_package".

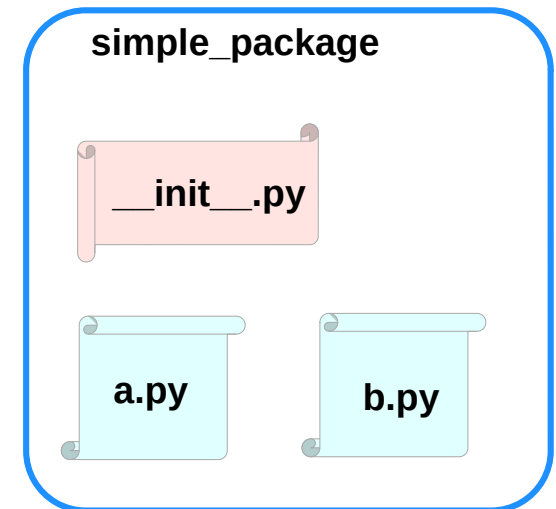
This directory needs to contain a file with the name **\_\_init\_\_.py**.

This file can be empty, or it can contain valid Python code.

This code will be executed when a **package** is imported, so it can be used to initialize a **package**, e.g. to make sure that some other modules are imported or some values set.

Now we can put all of the **Python files** which will be the **submodules** of our module into this directory.

We create two simple files **a.py** and **b.py**



[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# Creating a package (2)

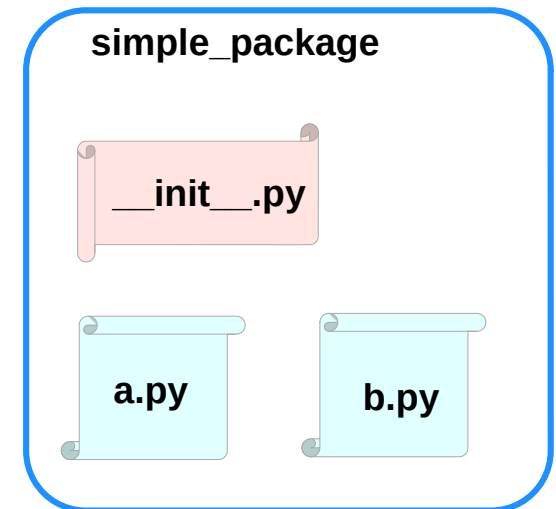
a.py:

```
def bar():  
    print("Hello, function 'bar' from module 'a' calling")
```

b.py:

```
def foo():  
    print("Hello, function 'foo' from module 'b' calling")
```

an empty file with the name `__init__.py`  
inside of `simple_package` directory



[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# Creating a package (3)

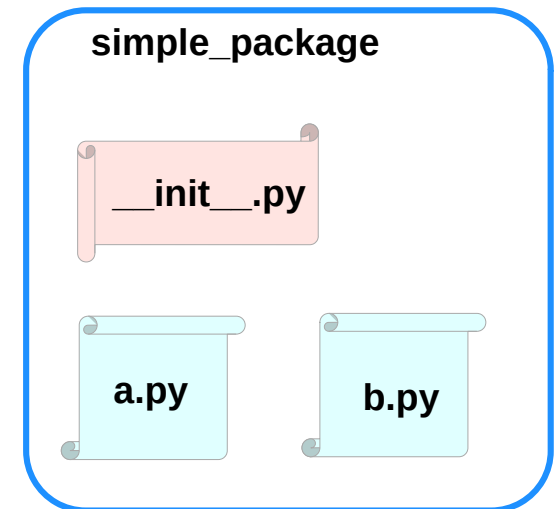
`import simple_package` from the interactive Python shell, assuming that the directory `simple_package` is either in the directory from which you call the shell or that it is contained in the search path or environment variable "`PYTHONPATH`" (from your operating system):

```
import simple_package  
simple_package/a
```

```
-----  
NameError                                Traceback (most recent call last)  
<ipython-input-3-347df8a711cc> in <module>  
----> 1 simple_package/a  
NameError: name 'a' is not defined
```

```
simple_package/b
```

```
-----  
NameError                                Traceback (most recent call last)  
<ipython-input-4-e71d2904d2bd> in <module>  
----> 1 simple_package/b  
NameError: name 'b' is not defined
```



[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# Creating a package (4)

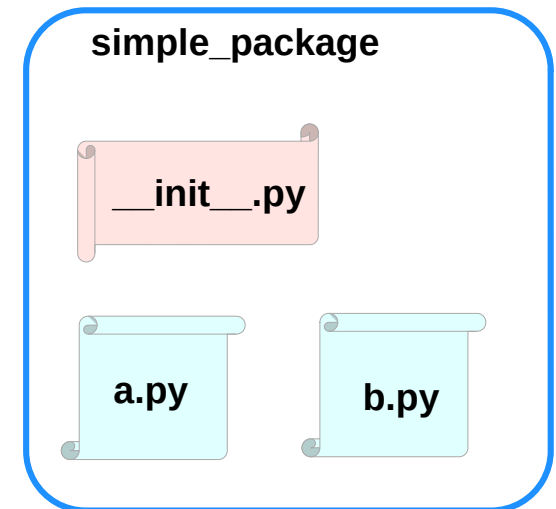
the package `simple_package` has been loaded  
but neither the module `"a"` nor the module `"b"`!

import the modules `a` and `b` as follows

```
from simple_package import a, b
a.bar()
b.foo()
```

Hello, function 'bar' from module 'a' calling  
Hello, function 'foo' from module 'b' calling

we can't access neither `"a"` nor `"b"`  
by solely importing `simple_package`.



[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)



# Creating a package (4)

automatically load these **modules**.

We can use the file **\_\_init\_\_.py** for this purpose.

add the following lines to the file **\_\_init\_\_.py**:

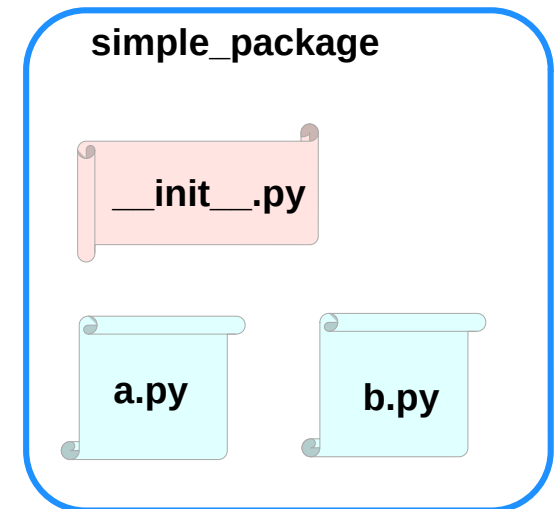
```
import simple_package.a  
import simple_package.b
```

Then

```
import simple_package  
simple_package.a.bar()  
simple_package.b.foo()
```

OUTPUT:

```
Hello, function 'bar' from module 'a' calling  
Hello, function 'foo' from module 'b' calling
```



[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# Package Examples (1)

```
sound
|-- effects
|   |-- __init__.py
|   |-- echo.py
|   |-- reverse.py
|   |-- surround.py
|-- filters
|   |-- __init__.py
|   |-- equalizer.py
|   |-- karaoke.py
|   |-- vocoder.py
|-- formats
|   |-- __init__.py
|   |-- aiffread.py
|   |-- aiffwrite.py
|   |-- auread.py
|   |-- auwrite.py
|   |-- wavread.py
|   |-- wavwrite.py
|-- __init__.py
```

sound

\_\_init\_\_.py

effects

\_\_init\_\_.py

echo.py  
reverse.py  
surround.py

filters

\_\_init\_\_.py

equalizer.py  
karaoke.py  
vocoder.py

formats

\_\_init\_\_.py

aiffread.py    aurwrite.py  
aiffwrite.py    wavred.py  
auread.py    wavwrite.py

[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)

# sound1

*effects/\_\_init\_\_.py*

```
print("effects package is getting imported!")
```

*effects/echo.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module echo.py has been loaded!")
```

*effects/reverse.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module reverse.py has been loaded!")
```

*effects/surround.py*

```
def func1():  
    print("Function func1 has been called!")
```

*filters/\_\_init\_\_.py*

```
print("filters package is getting imported!")
```

*filters/equalizer.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module equalizer.py has been loaded!")
```

*filters/karaoke.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module karaoke.py has been loaded!")
```

*filters/vocoder.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module vocoder.py has been loaded!")
```

*formats/\_\_init\_\_.py*

```
print("formats package is getting imported!")
```

*formats/aiffread.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module aiffread.py has been loaded!")
```

*formats/aiffwrite.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module aiffwrite.py has been loaded!")
```

*formats/auread.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module auread.py has been loaded!")
```

*formats/auwrite.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module auwrite.py has been loaded!")
```

*formats/wavread.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module wavread.py has been loaded!")
```

*formats/wavwrite.py*

```
def func1():  
    print("Function func1 has been called!")  
    print("Module wavwrite.py has been loaded!")
```

[https://www.w3schools.com/python/python\\_modules.asp](https://www.w3schools.com/python/python_modules.asp)