

Packages (1A)

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Package (1)

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

to bundle multiple **modules** together,
create a **package**.

a **package** is
basically a **directory**
with several **Python files (modules)**
and a special file **`__init__.py`**

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

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**".

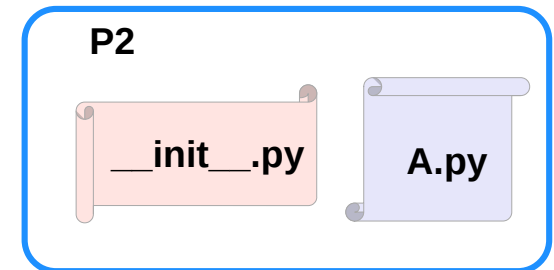
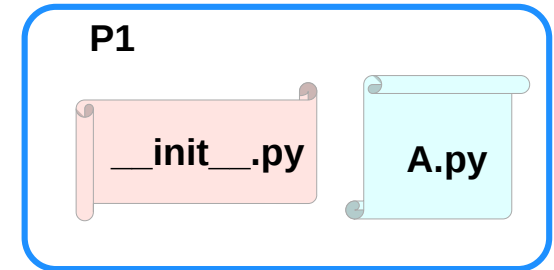
A.B stands for a **submodule** named **B** in a **package** named **A**.

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

Creating a package (1)

to create a **package**, we need a **directory**.

the **name** of this **directory** will be the **name** of the **package**,

assume we want to create "**simple_package**"

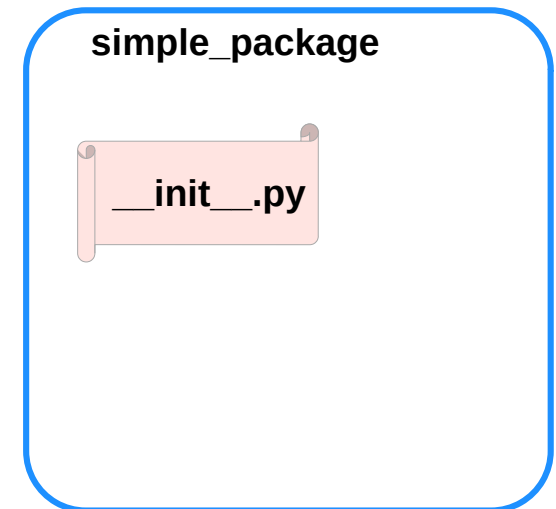
must create directory "**simple_package**" and this directory needs to contain the "**__init__.py**" file

this file can be empty, or 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.



https://www.w3schools.com/python/python_modules.asp

Creating a package (2)

put all of the **Python files** which will be the **submodules** into the directory for a **package**.

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

a.py:

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

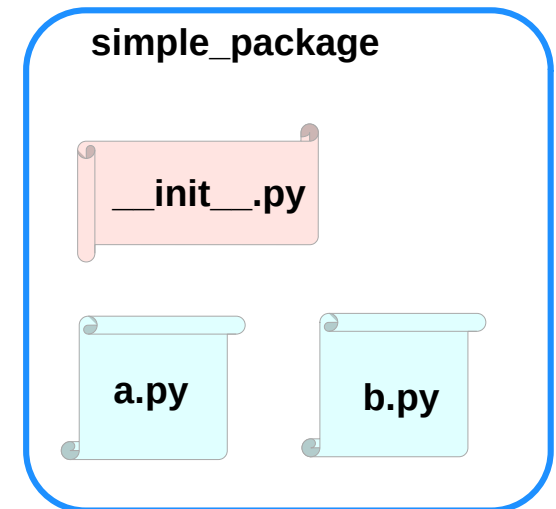
b.py:

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

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

__init__.py:

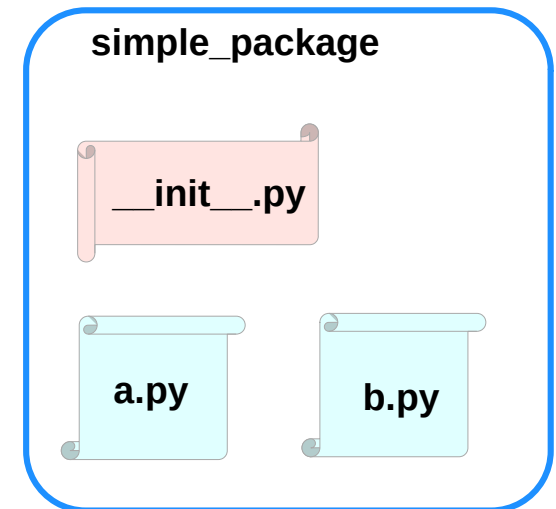
empty file



https://www.w3schools.com/python/python_modules.asp

Creating a package (3-1)

`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):



https://www.w3schools.com/python/python_modules.asp

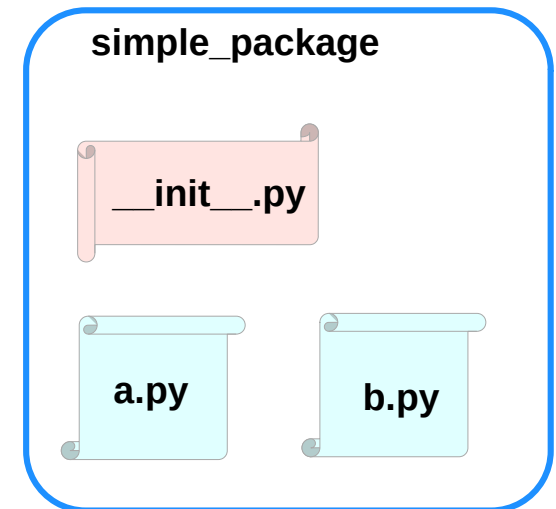
Creating a package (3-2)

```
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

Creating a package (4)

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

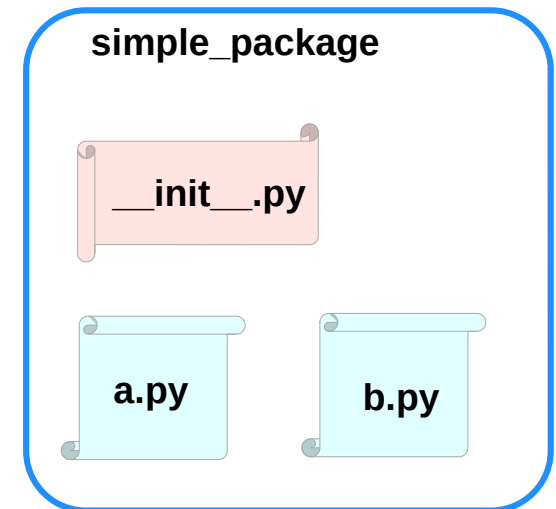
can't access neither `"a"` nor `"b"`
by solely importing `simple_package`.

must 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



https://www.w3schools.com/python/python_modules.asp

Creating a package (4)

to automatically load these **modules**.

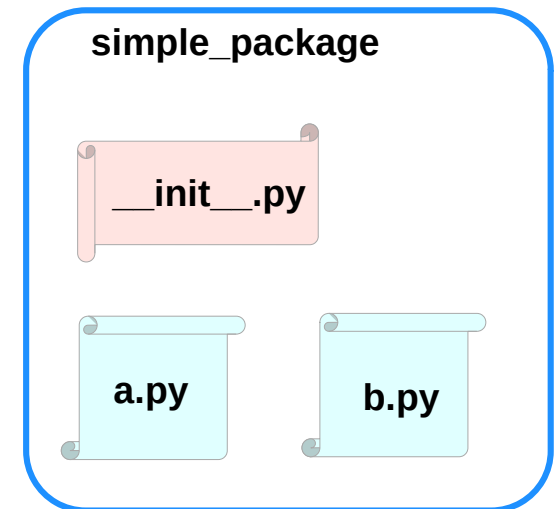
add the following lines to the file `__init__.py`:

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

Then

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

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



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

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