Modules and Packages in Python

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Lets see the example...

- Modules are used to categorize code in Python into smaller part.
- A module is simply a file, where classes, functions and variables are defined.
- Grouping similar code into a single file makes it easy to access.
- Types:
  - System modules
  - User defined modules

Advantages

- Python provides the following advantages for using module:
  - **1) Reusability:** Module can be used in some other python code. Hence it provides the facility of code reusability.
  - **2) Categorization:** Similar type of attributes can be placed in one module.

Using system modules

- import keyword
- import as
- from import

The import statement

```
>>> import math
>>> print(math.sin(67))
-0.855519978975
>>> print(math.log(67))
4.20469261939
>>> print(math.sqrt(67))
8.18535277187
>>> print(math.pi)
3.14159265359
>>> print(math.e)
2.71828182846
```

Import using alias

```
>>> import math as m
>>> print(m.sin(90)
0.893996663601
>>> print(m.log(90))
4.49980967033
>>> print(m.sqrt(90))
9.48683298051
>>> print(m.pi)
3.14159265359
>>> print(m.e)
2.71828182846
```

Selective import

- from..import statement is used to import particular attribute from a module.
- In case you do not want whole of the module to be imported then you can use from ?import statement.

Example:

```
>>> from math import sin, log, pi
>>> print(sin(55))
-0.999755173359
>>> print(log(55))
4.00733318523
>>> print(pi)
3.14159265359
>>> from math import *
>>> print(cos(55))
0.022126756262
>>> print(e)
2.71828182846
```

User defined modules

- Any program stored in current working directory can be imported by import statement.
- When such program (module) is imported, we can use all functions, classes and global variables from that program in your program.
- The import, import...as and from...import will work in the same fashion..
- It creates a python compiled file with extension .pyc in current working directory

Example:

fact.py

```
def factorial(n):
    if n <= 1:
        return 1
    else:
        return n * factorial(n-1)

def hello(s):
    print ("Hello", s)

name = "MITU Skillologies"
```

main_prog.py

```
import fact as f
print(f.factorial(5))
f.hello('Tushar')

print(f.name)
```

Python Package

- A Package is simply a collection of similar modules, sub-packages etc..
- Steps to create and import Package:
  - 1) Create a directory, say Info
  - 2) Place different modules inside the directory. We are placing 3 modules **`msg1.py, msg2.py`** and **`msg3.py`** respectively and place corresponding codes in respective modules. Let us place msg1() in msg1.py, msg2() in msg2.py and msg3() in msg3.py.
  - 3) Create a file **`__init__.py`** which specifies attributes in each module.
  - 4) Import the package and use the attributes using package.

Example:

msg1.py

```
def show():
    print("Module-1")
```

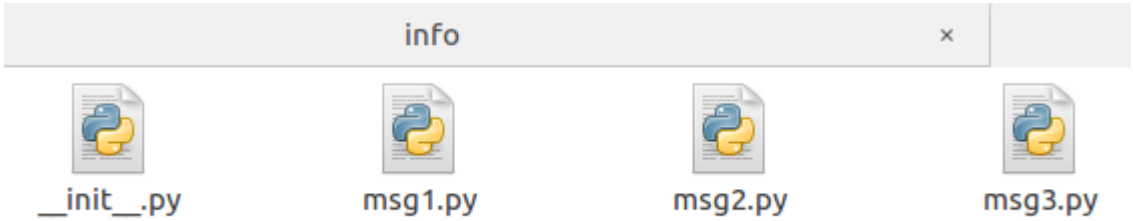
msg2.py

```
def display():
    print("Module-2")
```

msg3.py

```
def output():
    print("Module-3")
```

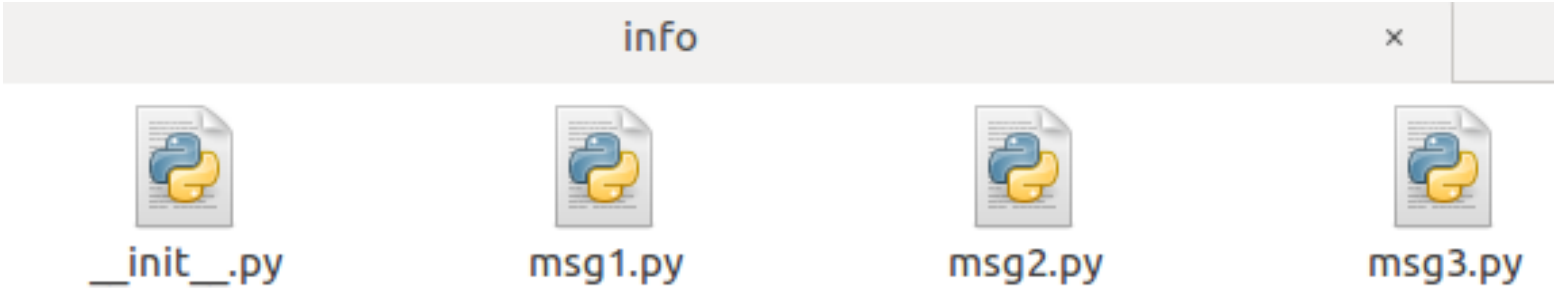
files



folder

__init__.py

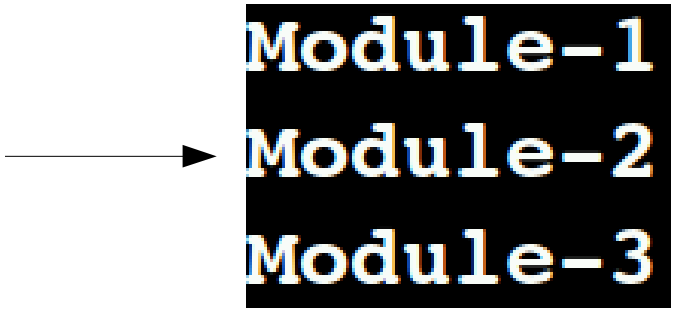
```
from info.msg1 import show
from info.msg2 import display
from info.msg3 import output
```



Using packages

- Now create a new file outside of ‘info’ to import the given package. We can apply all import methods to use the package.

```
import info
info.show()
info.display()
info.output()
```



- It creates a new folder named __pycache__ in info folder.

Thank you

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