



Module



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# Outline

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- ▶ Built-in module
- ▶ 3<sup>rd</sup> party module
- ▶ User-Defined module



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# Built-in Module



# Built-in Module

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- ▶ Python's standard library offer a wide range of facilities such as os, math, date...
- ▶ How to use module:
  - ▶ Import <module name>

```
1 import time
2
3 time.time()
```

1584428360.938571

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# Built-in Module

## ► OS

method	Description
Os.system()	Executing a shell command
Os.environ()	Get the users environment
Os.getcwd()	Returns the current working directory.
Os.getgid()	Return the real <b>group</b> id <b>of</b> the current process.
Os.getuid()	Return the current process's user id.
Os.getpid()	Returns the real process ID <b>of</b> the current process.
Os.umask(mask)	Set the current numeric umask <b>and return</b> the previous umask.
Os.uname()	Return information identifying the current operating system.
Os.chroot(path)	Change the root directory <b>of</b> the current process to path.
Os.listdir(path)	Return a list <b>of</b> the entries <b>in</b> the directory given <b>by</b> path.
Os.mkdir(path)	Create a directory named path <b>with</b> numeric mode mode.
Os.makedirs(path)	Recursive directory creation <b>function</b> .

# Built-in Module

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## ► OS

method	Description
Os.remove(path)	Remove ( <b>delete</b> ) the file path.
Os.removedirs(path)	Remove directories recursively.
Os.rename(src, dst)	Rename the file <b>or</b> directory src to dst.
Os.rmdir(path)	Remove ( <b>delete</b> ) the directory path.
Os.walk()	Generate all file name under current directory
Os.chdir()	Change the directory path.

## ► Example

```
1 import os
2
3 os.getcwd()
```

'/Users/'

..

# Built-in Module

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## ► Shutil module example:

method	Description
<code>Shutil.copy(src, dst)</code>	Copy file from path source to destination.
<code>Shutil.copytree(src,dst)</code>	Copy all files under whole directory from path source to destination.
<code>Shutil.move(src, dst)</code>	Move file from path source to destination.
<code>Shutil.rmtree()</code>	Remove all files under whole directory.
<code>Shutil.copystat()</code>	Copy file with file property.

# Built-in Module

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## ► Math module:

method	Description
<code>acos(x)</code>	Returns the arc cosine of x
<code>acosh(x)</code>	Returns the inverse hyperbolic cosine of x
<code>asin(x)</code>	Returns the arc sine of x
<code>asinh(x)</code>	Returns the inverse hyperbolic sine of x
<code>atan(x)</code>	Returns the arc tangent of x
<code>atan2(y, x)</code>	Returns <code>atan(y / x)</code>
<code>atanh(x)</code>	Returns the inverse hyperbolic tangent of x
<code>ceil(x)</code>	Returns the smallest integer greater than or equal to x.
<code>copysign(x, y)</code>	Returns x with the sign of y
<code>cos(x)</code>	Returns the cosine of x
<code>cosh(x)</code>	Returns the hyperbolic cosine of x



# Built-in Module

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## ► Math module:

method	Description
degrees(x)	Converts angle x from radians to degrees
e	mathematical constant e (2.71828...)
erf(x)	Returns the error function at x
erfc(x)	Returns the complementary error function at x
exp(x)	Returns $e^{**x}$
expm1(x)	Returns $e^{**x} - 1$
fabs(x)	Returns the absolute value of x
factorial(x)	Returns the factorial of x
floor(x)	Returns the largest integer less than or equal to x
fmod(x, y)	Returns the remainder when x is divided by y
frexp(x)	Returns the mantissa and exponent of x as the pair (m, e)

# Built-in Module

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## ► Math module:

method	Description
fsum(iterable)	Returns an accurate floating point sum of values in the iterable
gamma(x)	Returns the Gamma function at x
hypot(x, y)	Returns the Euclidean norm, $\sqrt{x^2 + y^2}$
isfinite(x)	Returns True if x is neither an infinity nor a NaN (Not a Number)
isinf(x)	Returns True if x is a positive or negative infinity
isnan(x)	Returns True if x is a NaN
ldexp(x, i)	Returns $x * (2^i)$
lgamma(x)	Returns the natural logarithm of the absolute value of the Gamma function at x
log(x[, base])	Returns the logarithm of x to the base (defaults to e)
log10(x)	Returns the base-10 logarithm of x
log1p(x)	Returns the natural logarithm of 1+x

# Built-in Module

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## ► Math module:

method	Description
<code>log2(x)</code>	Returns the base-2 logarithm of x
<code>modf(x)</code>	Returns the fractional and integer parts of x
<code>pi</code>	Mathematical constant, the ratio of circumference of a circle to it's diameter (3.14159...)
<code>pow(x, y)</code>	Returns x raised to the power y
<code>radians(x)</code>	Converts angle x from degrees to radians
<code>sin(x)</code>	Returns the sine of x
<code>sinh(x)</code>	Returns the hyperbolic cosine of x
<code>sqrt(x)</code>	Returns the square root of x
<code>tan(x)</code>	Returns the tangent of x
<code>tanh(x)</code>	Returns the hyperbolic tangent of x
<code>trunc(x)</code>	Returns the truncated integer value of x

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## 3rd party Module



## 3<sup>rd</sup> party module

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- ▶ Python community provide massive 3<sup>rd</sup> party modules. (<https://pypi.org/>)
- ▶ Installation:
  - ▶ Manually: download from website, manually execute setup.py to install.
  - ▶ Automatically: use pip/conda to install.

```
% pip install numpy
```

```
Requirement already satisfied: numpy in /Users/  
_____/lib/python3.7/site-packages (1.18.1)
```

# 3rd party module

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- ▶ **Module management using pip:**
- ▶ **Common method:**
  - ▶ Pip install <pkg name>
  - ▶ Pip install <pkg\_name> == 1.x.x
  - ▶ Pip install -U <pkg name>
  - ▶ Pip uninstall <pkg name>
  - ▶ Python -m pip install --upgrade pip

# 3<sup>rd</sup> party common module

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- ▶ **Imaging library**
  - ▶ Pillow
- ▶ **Scientific & math**
  - ▶ Numpy
  - ▶ Pandas
  - ▶ Matplotlib
- ▶ **File handling**
  - ▶ lxml
  - ▶ xlrd
  - ▶ xlwt

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# User-Defined Module





# User-Defined Module

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## ► Steps:

- Build a py file contains specific function.

```
► makefood.py x
1 def make_drink(size, drink):
2     print(size.title())
3     print(drink.title())
4
5 def make_icecream(*toppings):
6     print('toppings as below:\n')
7     for topping in toppings:
8         print(topping)
```

- Build another py file, then import previous module.

```
3 import makefood
4
5 makefood.make_drink('large', 'cola')|
```

Large  
Cola