05장 파이썬 날개달기

클래스, 모듈, 예외 처리

05-1 파이썬 프로그래밍의 핵심, 클래스

클래스는 도대체 왜 필요한가?

```
result = 0

def adder(num):
    global result
    result += num
    return result
```

05-1 파이썬 프로그래밍의 핵심, 클래스

두 개의 계산기

```
result1 = 0
result2 = 0

def adder1(num):
    global result1
    result1 += num
    return result1

def adder2(num):
    global result2
    result2 += num
    return result2
```

05-1 파이썬 프로그래밍의 핵심, 클래스

클래스를 이용한 계산기

```
class Calculator:
    def __init__(self):
        self.result = 0

    def adder(self, num):
        self.result += num
        return self.result

cal1 = Calculator()
cal2 = Calculator()
```

05-1 파이썬 프로그래밍의 핵심, 클래스

사칙연산 클래스 1

```
>>> class FourCal:
...     pass
...
>>>
```

```
>>> a = FourCal()
>>> type(a)
<class '__main__.FourCal'>
```

05-1 파이썬 프로그래밍의 핵심, 클래스

사칙연산 클래스 2

```
>>> a.setdata(4, 2)
```

```
>>> class FourCal:
...     def setdata(self, first, second):
...         self.first = first
...         self.second = second
...
>>>
```

05-1 파이썬 프로그래밍의 핵심, 클래스

사칙연산 클래스 3

```
>>> a = FourCal()
>>> a.setdata(4, 2)
>>> print(a.add())
6
```

05-1 파이썬 프로그래밍의 핵심, 클래스

사칙연산 클래스 4

```
>>> class FourCal:
...     def setdata(self, first, second):
...         self.first = first
...         self.second = second
...     def add(self):
...         result = self.first + self.second
...         return result
...
>>>
```

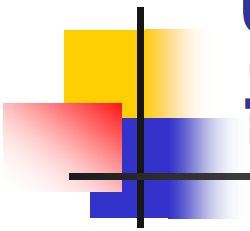
05-1 파이썬 프로그래밍의 핵심, 클래스

클래스의 상속

```
>>> class MoreFourCal(FourCal):
...     pass
...
>>>
```

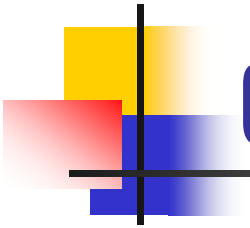
```
>>> a = MoreFourCal(4, 2)
>>> a.add()
6
```

05-1 파이썬 프로그래밍의 핵심, 클래스



메서드 오버라이딩

```
>>> class SafeFourCal(FourCal):
...     def div(self):
...         if self.second == 0:
...             return 0
...         else:
...             return self.first / self.second
...
>>>
```



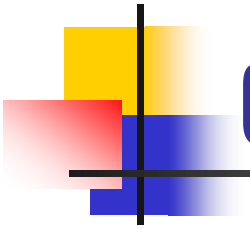
05-2 모듈

모듈 만들고 불러 보기

```
# C:\doit\mod1.py
def sum(a, b):
    return a + b
```

```
cd C:\doit
```

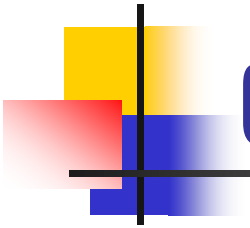
```
>>> import mod1
>>> print(mod1.sum(3,4))
7
```



05-2 모듈

from 모듈이름 import 모듈함수

```
>>> from mod1 import sum
>>> sum(3, 4)
7
```

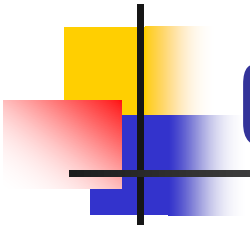


05-2 모듈

sys.path.append

```
>>> import sys
>>> sys.path
['', 'C:\\Windows\\SYSTEM32\\python35.zip',
'c:\\Python35\\DLLs',
'c:\\Python35\\lib', 'c:\\Python35',
'c:\\Python35\\lib\\site-packages']
```

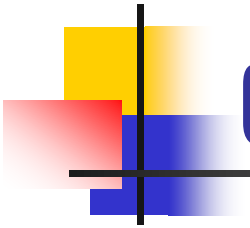
```
sys.path.append("C:/doit")
```



05-2 모듈

PYTHONPATH 환경 변수 사용하기

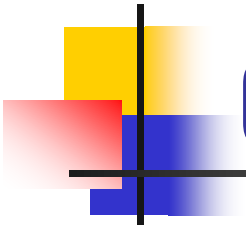
```
C:\Users\home>set PYTHONPATH=C:\doit
C:\Users\home>python
Python 3.5.1 (v3.5.1:37a07cee5969, Dec 6 2015, 01:54:25) [MSC
v.1900 64 bit (AM...
Type "help", "copyright", "credits" or "license" for more
information.
>>> import mod1
```



05-3 패키지

가상의 game 패키지 예

```
game/
    __init__.py
    sound/
        __init__.py
        echo.py
        wav.py
    graphic/
        __init__.py
        screen.py
        render.py
    play/
        __init__.py
        run.py
        test.py
```



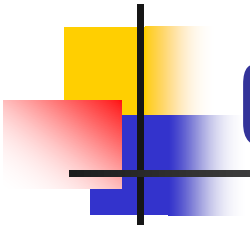
05-3 패키지

테스트를 위해 패키지 만들기

```
C:/doit/game/__init__.py
C:/doit/game/sound/__init__.py
C:/doit/game/sound/echo.py
C:/doit/game/graphic/__init__.py
C:/doit/game/graphic/render.py
```

```
# echo.py
def echo_test():
    print ("echo")
```

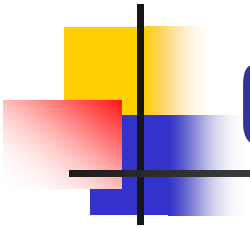
```
# render.py
def render_test():
    print ("render")
```



05-3 패키지

패키지 안의 함수 실행하기 1

```
C:\> set PYTHONPATH=C:/doit
C:\> python
Python 3.5.1 (v3.5.1:37a07cee5969, Dec 6 2015, 01:54:25) [MSC
v.1900 64 bit (AM...
Type "help", "copyright", "credits" or "license" for more
information.
>>>
```



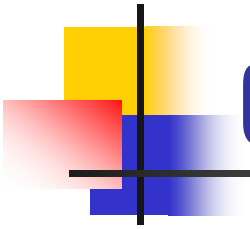
05-3 패키지

패키지 안의 함수 실행하기 2

```
>>> import game.sound.echo
>>> game.sound.echo.echo_test()
echo
```

```
>>> from game.sound import echo
>>> echo.echo_test()
echo
```

```
>>> from game.sound.echo import echo_test
>>> echo_test()
echo
```

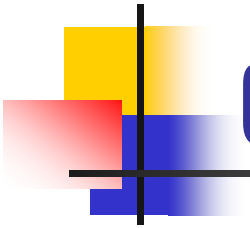


05-3 패키지

__all__

```
>>> from game.sound import *
>>> echo.echo_test()
Traceback (most recent call last):
    File "<stdin>", line 1, in <module>
NameError: name 'echo' is not defined
```

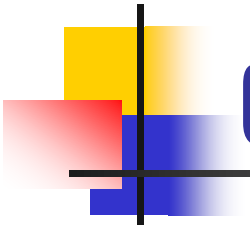
```
# C:/Python/game/sound/__init__.py
__all__ = ['echo']
```



05-3 패키지

relative 패키지

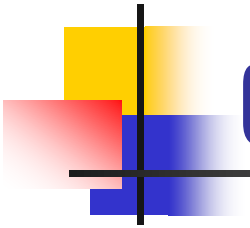
```
# render.py
from ..sound.echo import echo_test

def render_test():
    print ("render")
    echo_test()
```



05-4 예외처리

오류는 어떤 때 발생하는가?

```
>>> f = open("나없는파일", 'r')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
FileNotFoundError: [Errno 2] No such file or directory:
'나없는파일'
```

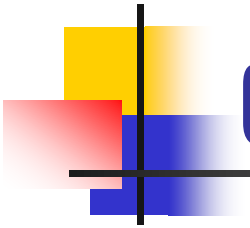


05-4 예외처리

try, except문

```
try:
    ...
except [발생 오류[as 오류 메시지 변수]]:
    ...
```

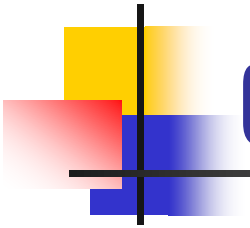
```
try:
    4 / 0
except ZeroDivisionError as e:
    print(e)
```



05-4 예외처리

try .. else

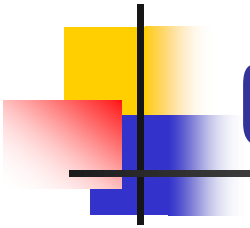
```
try:
    f = open('foo.txt', 'r')
except FileNotFoundError as e:
    print(str(e))
else:
    data = f.read()
    f.close()
```



05-4 예외처리

try .. finally

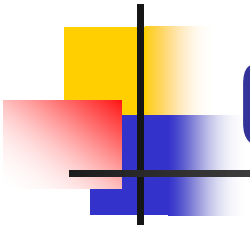
```
f = open('foo.txt', 'w')
try:
    # 무언가를 수행한다.
finally:
    f.close()
```



05-4 예외처리

오류 회피하기

```
try:
    f = open("나없는파일", 'r')
except FileNotFoundError:
    pass
```

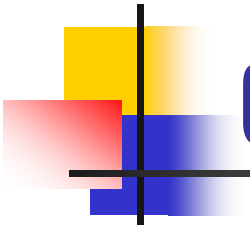


05-4 예외처리

오류 일부러 발생시키기

```
class Bird:
    def fly(self):
        raise NotImplementedError
```

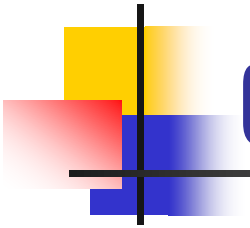
```
class Eagle(Bird):
    def fly(self):
        print("very fast")

eagle = Eagle()
eagle.fly()
```



05-5 내장함수

abs

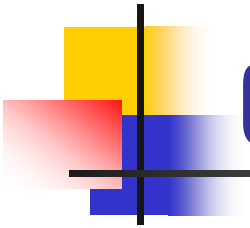
```
>>> abs(3)
3
>>> abs(-3)
3
>>> abs(-1.2)
1.2
```



05-5 내장함수

all

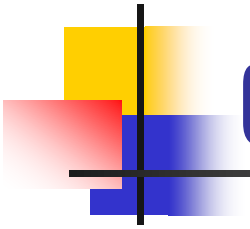
```
>>> all([1, 2, 3])
True
>>> all([1, 2, 3, 0])
False
```



05-5 내장함수

any

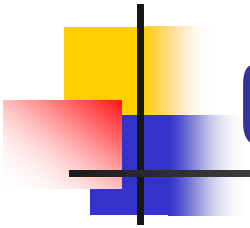
```
>>> any([1, 2, 3, 0])
True
>>> any([0, ""])
False
```



05-5 내장함수

chr

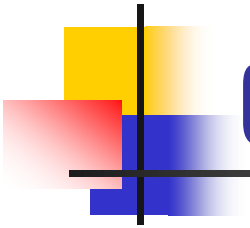
```
>>> chr(97)
'a'
>>> chr(48)
'0'
```



05-5 내장함수

dir

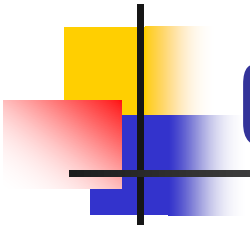
```
>>> dir([1, 2, 3])
['append', 'count', 'extend', 'index', 'insert', 'pop',...]
>>> dir({'1':'a'})
['clear', 'copy', 'get', 'has_key', 'items', 'keys',...]
```



05-5 내장함수

divmod

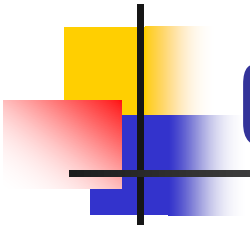
```
>>> divmod(7, 3)
(2, 1)
>>> divmod(1.3, 0.2)
(6.0, 0.09999999999999978)
```



05-5 내장함수

enumerate

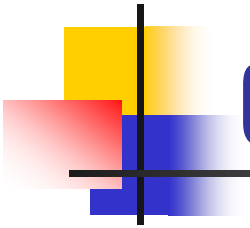
```
>>> for i, name in enumerate(['body', 'foo', 'bar']):
...     print(i, name)
...
0 body
1 foo
2 bar
```



05-5 내장함수

eval

```
>>> eval('1+2')
3
>>> eval("'hi' + 'a'")
'hia'
>>> eval('divmod(4, 3)')
(1, 1)
```

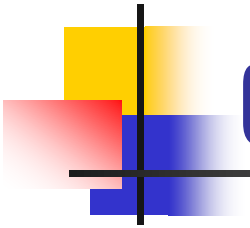


05-5 내장함수

filter

```
def positive(x):
    return x > 0

print(list(filter(positive, [1, -3, 2, 0, -5, 6])))
```

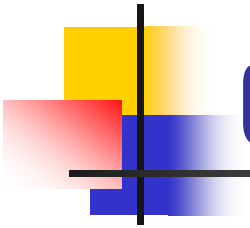
```
>>> print(list(filter(lambda x: x > 0, [1, -3, 2, 0, -5,
6])))
```



05-5 내장함수

hex

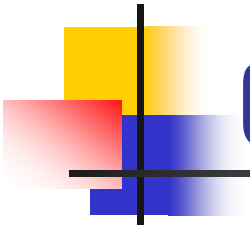
```
>>> hex(234)
'0xea'
>>> hex(3)
'0x3'
```



05-5 내장함수

id

```
>>> a = 3
>>> id(3)
135072304
>>> id(a)
135072304
>>> b = a
>>> id(b)
135072304
```

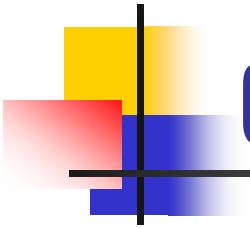


05-5 내장함수

input

```
>>> a = input()
hi
>>> a
'hi'
>>> b = input("Enter: ")
Enter: hi
```

```
>>> b
'hi'
```

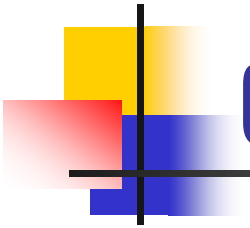


05-5 내장함수

int

```
>>> int('3')
3
>>> int(3.4)
3
```

```
>>> int('11', 2)
3
>>> int('1A', 16)
26
```

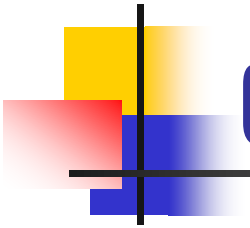


05-5 내장함수

isinstance

```
>>> class Person: pass
...
>>> a = Person()
>>> isinstance(a, Person)
True
```

```
>>> b = 3
>>> isinstance(b, Person)
False
```

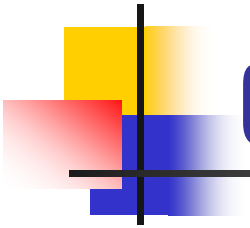


05-5 내장함수

lambda

```
>>> sum = lambda a, b: a+b
>>> sum(3,4)
7
```

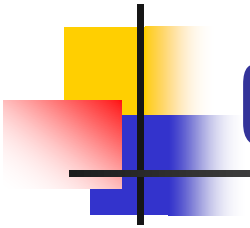
```
>>> myList = [lambda a,b:a+b, lambda a,b:a*b]
>>> myList
[at 0x811eb2c>, at 0x811eb64>]
```



05-5 내장함수

len

```
>>> len("python")
6
>>> len([1,2,3])
3
>>> len((1, 'a'))
2
```

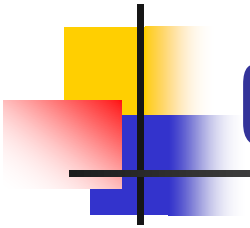


05-5 내장함수

list

```
>>> list("python")
['p', 'y', 't', 'h', 'o', 'n']
>>> list((1,2,3))
[1, 2, 3]
```

```
>>> a = [1, 2, 3]
>>> b = list(a)
>>> b
[1, 2, 3]
```



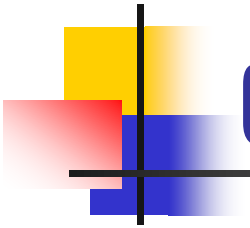
05-5 내장함수

map

```
>>> def two_times(x): return x*2
```

```
>>> list(map(two_times, [1, 2, 3, 4]))
[2, 4, 6, 8]
```

```
>>> list(map(lambda a: a*2, [1, 2, 3, 4]))
[2, 4, 6, 8]
```



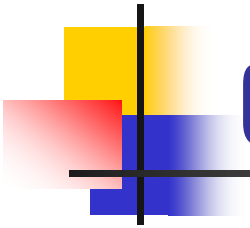
05-5 내장함수

max

```
>>> max([1, 2, 3])
3
>>> max("python")
'y'
```

min

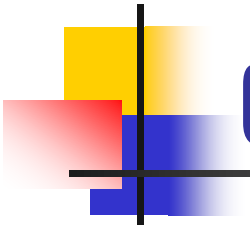
```
>>> min([1, 2, 3])
1
>>> min("python")
'h'
```



05-5 내장함수

oct

```
>>> oct(34)
'0o42'
>>> oct(12345)
'0o30071'
```

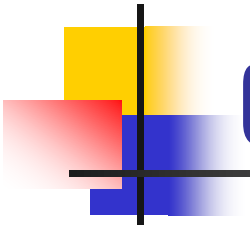


05-5 내장함수

open

mode	설명
w	쓰기 모드로 파일 열기
r	읽기 모드로 파일 열기
a	추가 모드로 파일 열기
b	바이너리 모드로 파일 열기

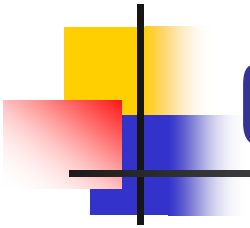
```
>>> f = open("binary_file", "rb")
```



05-5 내장함수

ord

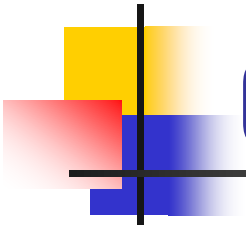
```
>>> ord('a')
97
>>> ord('0')
48
```



05-5 내장함수

pow

```
>>> pow(2, 4)
16
>>> pow(3, 3)
27
```



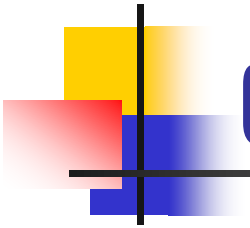
05-5 내장함수

range

```
>>> list(range(5))
[0, 1, 2, 3, 4]
```

```
>>> list(range(5, 10))
[5, 6, 7, 8, 9]
```

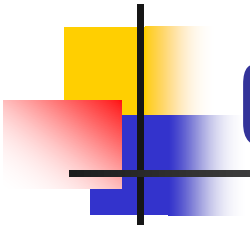
```
>>> list(range(1, 10, 2))
[1, 3, 5, 7, 9]
>>> list(range(0, -10, -1))
[0, -1, -2, -3, -4, -5, -6, -7, -8, -9]
```



05-5 내장함수

sorted

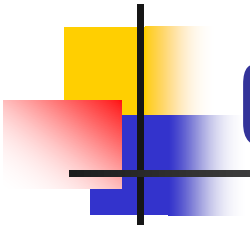
```
>>> sorted([3, 1, 2])
[1, 2, 3]
>>> sorted(['a', 'c', 'b'])
['a', 'b', 'c']
>>> sorted("zero")
['e', 'o', 'r', 'z']
>>> sorted((3, 2, 1))
[1, 2, 3]
```



05-5 내장함수

str

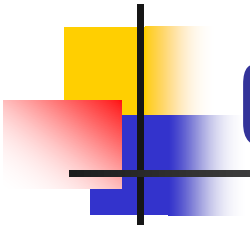
```
>>> str(3)
'3'
>>> str('hi')
'hi'
>>> str('hi'.upper())
'HI'
```



05-5 내장함수

tuple

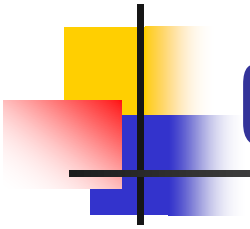
```
>>> tuple("abc")
('a', 'b', 'c')
>>> tuple([1, 2, 3])
(1, 2, 3)
>>> tuple((1, 2, 3))
(1, 2, 3)
```



05-5 내장함수

type

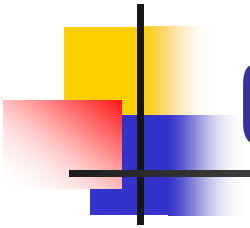
```
>>> type("abc")
<class 'str'>
>>> type([ ])
<class 'list'>
>>> type(open("test", 'w'))
<class '_io.TextIOWrapper'>
```



05-5 내장함수

zip

```
>>> list(zip([1, 2, 3], [4, 5, 6]))
[(1, 4), (2, 5), (3, 6)]
>>> list(zip([1, 2, 3], [4, 5, 6], [7, 8, 9]))
[(1, 4, 7), (2, 5, 8), (3, 6, 9)]
>>> list(zip("abc", "def"))
[('a', 'd'), ('b', 'e'), ('c', 'f')]
```

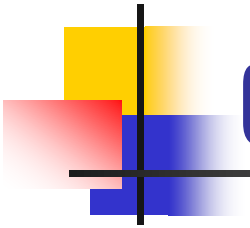


05-6 외장함수

sys.argv

```
# argv_test.py
import sys
print(sys.argv)
```

```
C:/Python/Mymodules>python argv_test.py you need python
['argv_test.py', 'you', 'need', 'python']
```



05-6 외장함수

pickle

```
>>> import pickle
>>> f = open("test.txt", 'wb')
>>> data = {1: 'python', 2: 'you need'}
>>> pickle.dump(data, f)
>>> f.close()
```

```
>>> import pickle
>>> f = open("test.txt", 'rb')
>>> data = pickle.load(f)
>>> print(data)
{2:'you need', 1:'python'}
```

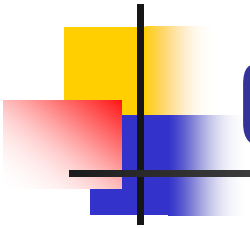
05-6 외장함수

OS

```
>>> import os
>>> os.environ
environ({'PROGRAMFILES': 'C:\\Program Files', 'APPDATA': …
생략 …})
>>> os.chdir("C:\WINDOWS")
>>> os.getcwd()
'C:\WINDOWS‘
>>> os.system("dir")
>>> f = os.popen("dir")
>>> print(f.read())
```

기타 유용한 os 관련 함수

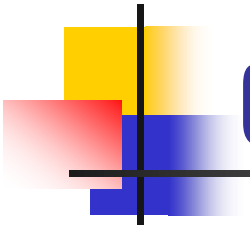
함수	설명
os.mkdir(디렉터리)	디렉터리를 생성한다.
os.rmdir(디렉터리)	디렉터리를 삭제한다. 단 디렉터리가 비어 있어야 삭제가 가능하다.
os.unlink(파일 이름)	파일을 지운다.
os.rename(src, dst)	src라는 이름의 파일을 dst라는 이름으로 바꾼다.



05-6 외장함수

shutil

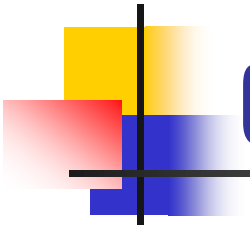
```
>>> import shutil
>>> shutil.copy("src.txt", "dst.txt")
```



05-6 외장함수

glob

```
>>> import glob
>>> glob.glob("C:/Python/q*")
['C:\Python\quiz.py', 'C:\Python\quiz.py.bak']
>>>
```

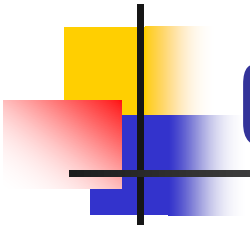


05-6 외장함수

tempfile

```
>>> import tempfile
>>> filename = tempfile.mktemp()
>>> filename
'C:\WINDOWS\TEMP\~-275151-0'
```

```
>>> import tempfile
>>> f = tempfile.TemporaryFile()
>>> f.close()
```

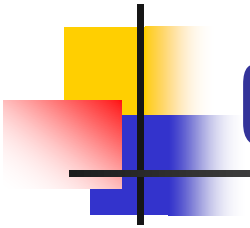


05-6 외장함수

time 1

```
>>> import time
>>> time.time()
988458015.73417199
```

```
>>> time.localtime(time.time())
time.struct_time(tm_year=2013, tm_mon=5, tm_mday=21,
tm_hour=16,
    tm_min=48, tm_sec=42, tm_wday=1, tm_yday=141, tm_isdst=0)
```



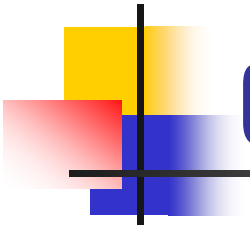
05-6 외장함수

time 2

```
>>> time.asctime(time.localtime(time.time()))
'Sat Apr 28 20:50:20 2001'
```

```
>>> time.ctime()
'Sat Apr 28 20:56:31 2001'
```

```
>>> import time
>>> time.strftime('%x', time.localtime(time.time()))
'05/01/01'
>>> time.strftime('%c', time.localtime(time.time()))
'05/01/01 17:22:21'
```

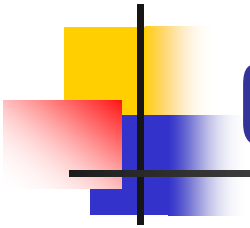


05-6 외장함수

calendar

```
>>> calendar.weekday(2015, 12, 31)
3
```

```
>>> calendar.monthrange(2015,12)
(1, 31)
```



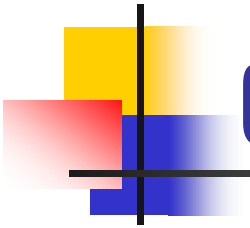
05-6 외장함수

random

```
>>> import random
>>> random.random()
0.5384010330509867 4
```

```
>>> random.randint(1, 10)
6
```

```
>>> data = [1, 2, 3, 4, 5]
>>> random.shuffle(data)
>>> data
[5, 1, 3, 4, 2]
```

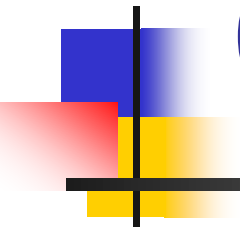


05-6 외장함수

webbrowser

```
>>> import webbrowser
>>> webbrowser.open("http://google.com")
```

```
>>> webbrowser.open_new("http://google.com")
```



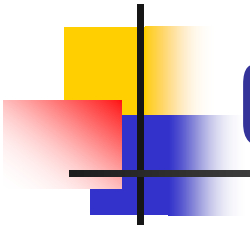
06장 파이썬 프로그래밍, 어떻게 시작해야 할까?

짤막한 스크립트와 함수들을
만들어 본다

06-1 내가 프로그램을 만들 수 있을까?

구구단

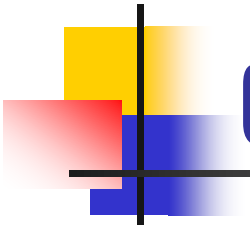
```
def GuGu(n):
    result = []
    i = 1
    while i < 10:
        result.append(n * i)
        i = i + 1
    return result
```



06-2 3과 5의 배수 합하기

0 미만의 자연수에서 3과 5의 배수를 구하면 3, 5, 6, 9이다. 이들의 총합은 23이다. 1000 미만의 자연수에서 3의 배수와 5의 배수의 총합을 구하라.

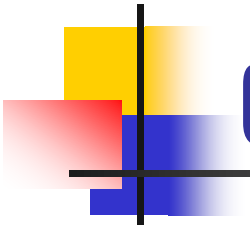
```
result = 0
for n in range(1, 1000):
    if n % 3 == 0 or n % 5 == 0:
        result += n
print(result)
```



06-3 게시판 페이징하기

게시물의 총 건수와 한 페이지에 보여줄 게시물 수를 입력으로 주었을 때 총 페이지수를 출력하는 프로그램

```
def getTotalPage(m, n):
    if m % n == 0:
        return m // n
    else:
        return m // n + 1
```



06-4 간단한 메모장 만들기

메모를 파일에 저장하고 추가 및 조회가 가능한 간단한 메모장을 만들어 보자

```
import sys

option = sys.argv[1]

if option == '-a':
    memo = sys.argv[2]
    f = open('memo.txt', 'a')
    f.write(memo)
    f.write('\n')
    f.close()
elif option == '-v':
    f = open('memo.txt')
    memo = f.read()
    f.close()
    print(memo)
```

06-5 탭을 4개의 공백으로 바꾸기

탭(tab)을 공백(space) 4개로 바꾸어주는 스크립트를 작성해 보자.

```
import sys

src = sys.argv[1]
dst = sys.argv[2]

f = open(src)
tab_content = f.read()
f.close()

space_content = tab_content.replace("\t", " "*4)

f = open(dst, 'w')
f.write(space_content)
f.close()
```

06-6 하위 디렉터리 검색하기

하위의 모든 파일 중 파이썬 파일(`*.py`)만 출력해 주는 프로그램

```
import os

def search(dirname):
    try:
        filenames = os.listdir(dirname)
        for filename in filenames:
            full_filename = os.path.join(dirname, filename)
            if os.path.isdir(full_filename):
                search(full_filename)
            else:
                ext = os.path.splitext(full_filename)[-1]
                if ext == '.py':
                    print(full_filename)
    except PermissionError:
        pass

search("c:/")
```