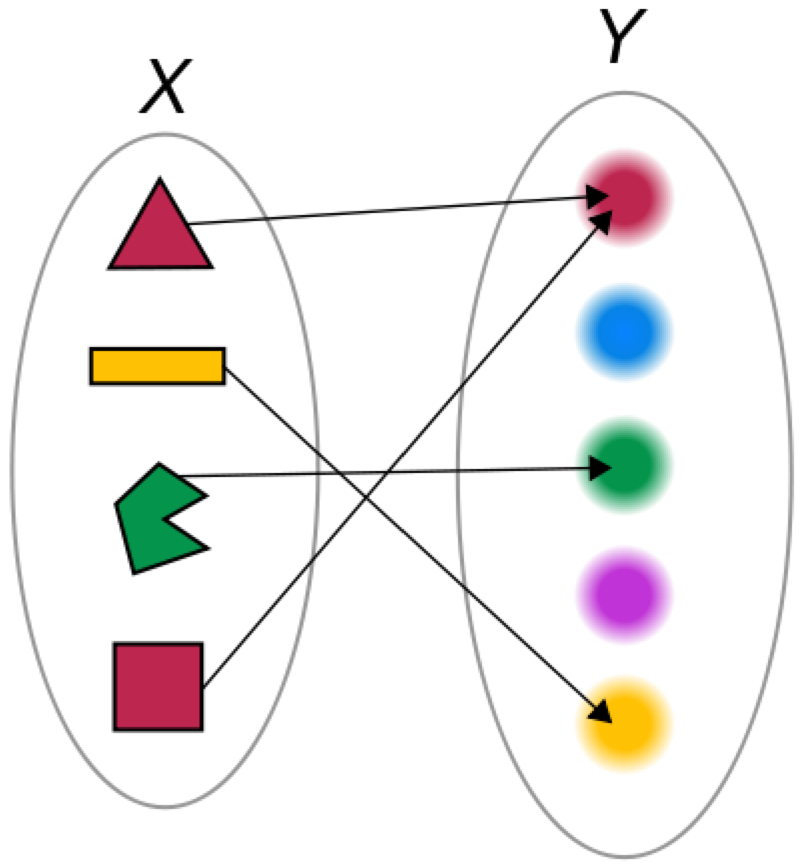
Fastcampus

Computer Science Extension School

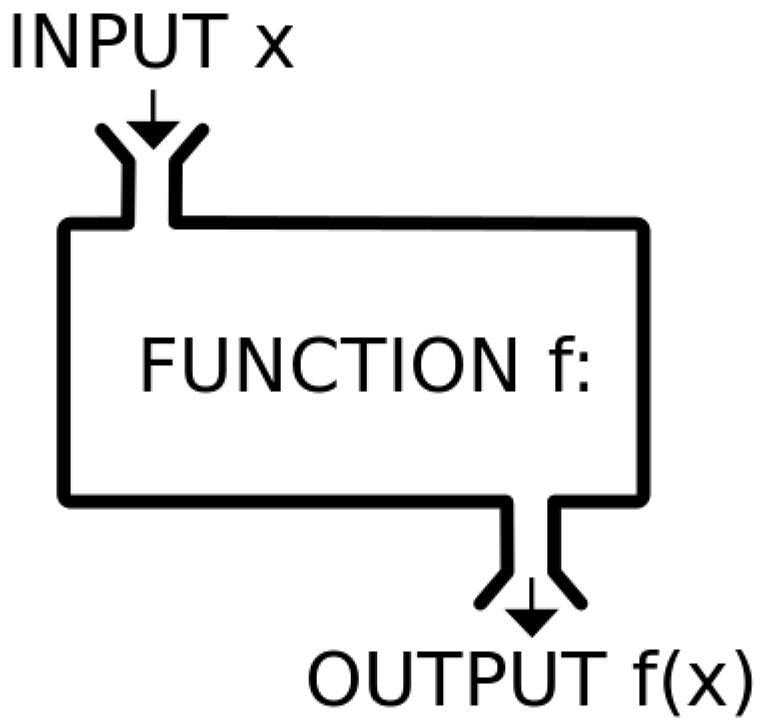
Python Basic_Day3

function



- 수학적 정의: 첫 번째 집합의 임의의 한 원소를 두 번째 집합의 오직 한 원소에 대응시키는 대응 관계
- x: 정의역 y: 공역

function



- 프로그래밍에서의 함수: 입력값을 내부에서 어떤 처리를 통해 결과값을 출력하는 것

function

```
def function(parameter):
        실행문1
        실행문2
        ...
        return output
```

function

```
def awe_sum(a,b):
        result = a + b
    return result

a = 2
b = 3
print(awe_sum(a,b))
```

function without input

```python
def print_hello():
    return "hello"

result_hello = print_hello()
print(result_hello)
```

function without return

```
def func_wo_return(a):
    print("This is function without return for " + str(a) + " ti

func_wo_return()
```

function with multiple return

```
def mul_return(a):
    b = a + 1
        return a,b
```

return skill

```
def id_check(id):
        if id == "admin":
                print("invalid id: admin")
                return
        print("valid id: ", id)
```

parameter with initialize

```
def say_hello(name="Fool", nick=True):
        print("Hi, ", name)
        if nick == True:
                print("But, you are Fool")
        else:
                print("Oh, you are not Fool")
```

`초기값을 설정할땐 항상 그 인자를 마지막에 두어야 합니다.`

arguments

```python
def mul_sum(*args):
        sum = 0
        for i in args:
                sum += i
        return sum
```

keyword arguments

```
def show_kwargs(**kwargs):
        print(str(kwargs))

show_kwargs(a=10, b="google")
```

keyword arguments

```
def kwargs_url(server, port, **query):
        url = "https://" + server + ":" + port + "?"
        for key in query.keys():
                url += key + "=" + query[key] + "&"
        return url

kwargs_url("localhost","8080", utm_source="google", keyword="nav
```

variable outside function

```
a = "hello"
def glob_test(a):
        a += "world"
        return a

glob_test(a)
print(a)
```

```
a = "hello"
def glob_test(x):
        x += "world"
        return x

glob_test(a)
print(a)
```

variable outside function

```python
def glob_test2(x):
        x += "world"
        return x

glob_test2("hello")
glob_test2(x)
```

So, how to globalize

(1) using return

```
a = "hello"
def glob_test(a):
        a += "world"
    return a

a = glob_test(a)
print(a)
```

So, how to globalize

(2) use global

```python
a = "hello"
def glob_test(a):
        global a
        a += "world"
    return a

glob_test(a)
print(a)
```

`global` 이라는 명령을 사용하여 전역변수로 사용하게 되면 함수는 독립성을 잃게 되어 함수가 외부변수에 의존적이게 됩니다.

Leap year

4로 나뉘어 떨어지면 윤년,

100으로 나뉘어 떨어지면 평년,

400으로 나뉘어 떨어질땐 윤년

Leap year(answer)

```
leap = False
def is_leap(y):
        if y % 4 == 0 and (y % 100 != 0 or y % 400 == 0)
                leap = True
        return leap

y = int(input("Is leap?? "))
print(is_leap(y))
```

numguess with function

```
def guesser(guess):
        if guess == answer:
                print("Correct! The answer was ", str(answer))
                break
        else:
                print("That's not what I wanted!! Try again!!")
```

Recursive

```
times = int(input("How many times want to curse the beast??: "))
def recurse_beast(a):
        if a == 0:
                print("curse complete!")
        else:
                print("Fusion!!!(%d times left)" % a - 1)
                recurse_beast(a-1)

recurse_beast(times)
```

Ethiopian Multiplication

2로 나누고 곱하는 과정으로 두 수의 곱을 구현하는 방법

https://en.wikipedia.org/wiki/Ancient_Egyptian_multiplication

```
12 *     7      struck  ---
 6      14      struck  ---
 3      28      keep     28
 1      56      keep     56
--> 28 + 56 = 84
```

Ethiopian Multiplication

```
numbers = str(input("two nums with space: ")).split()

result = 0
num1 = int(numbers[0])
num2 = int(numbers[1])
```

Ethiopian Multiplication

```python
while num1 >= 1:
    if num1 % 2 == 0:
        print("%4d %7d struck" % (num1, num2))
    else:
        print("%4d %7d keep" % (num1, num2))
        result += num2
        # result = result + num2

    num1 = num1 // 2
    num2 = num2 * 2
```

Ethiopian Multiplication

```python
print("The result is ", result)
```

List Comprehension

존재하는 리스트를 활용하여 새로운 리스트를 생성하는 방법

비슷한 표현들

- Set Comprehension
- Dictionary Comprehension
- Parallel list Comprehension

List Comprehension

```python
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        doubled_list.append(i * 2)
```

List Comprehension

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        doubled_list.append(i * 2)
```

```
doubled_list = []
```

List Comprehension

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        doubled_list.append(i * 2)
```

```
doubled_list = [i * 2]
```

List Comprehension

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        doubled_list.append(i * 2)
```

```
doubled_list = [i * 2 for i in old_list]
```

List Comprehension - another example

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        if i % 2 == 0:
                doubled_list.append(i * 2)
```

List Comprehension - another example

```python
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        if i % 2 == 0:
                doubled_list.append(i * 2)
```

```python
doubled_list = []
```

List Comprehension - another example

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        if i % 2 == 0:
                doubled_list.append(i * 2)
```

```
doubled_list = [i * 2]
```

List Comprehension - another example

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        if i % 2 == 0:
                doubled_list.append(i * 2)
```

```
doubled_list = [i * 2 for i in old_list]
```

List Comprehension - another example

```
old_list = [1, 2, 3, 4, 5,]

doubled_list = []
for i in old_list:
        if i % 2 == 0:
                doubled_list.append(i * 2)
```

```
doubled_list = [i * 2 for i in old_list if i % 2 == 0]
```

Mini Project

- List comprehension 으로 FizzBuzz 한줄로 구현하기

```
 ["Fizz"*(not i%3) + "Buzz"*(not i%5) or i for i in
range(1,100)]
```

Dictionary Comprehension

Just like List comprehension

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        new_d[i[0]] = i[1] ** 2
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        new_d[i[0]] = i[1] ** 2
```

```
new_d = {}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        new_d[i[0]] = i[1] ** 2
```

```
new_d = {i[0]:i[1]**2}
```

```
new_d = {key:value**2}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        new_d[i[0]] = i[1] ** 2
```

```
new_d = {i[0]:i[1]**2 for i in d.items()}
```

```
new_d = {key:value**2 for (key,value) in d.items()}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        if i[1] % 2 == 0:
                new_d[i[0]] = i[1] ** 2
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        if i[1] % 2 == 0:
                new_d[i[0]] = i[1] ** 2
```

```
new_d = {}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        if i[1] % 2 == 0:
                new_d[i[0]] = i[1] ** 2
```

```
new_d = {i[0]:i[1]**2}
```

```
new_d = {key:value**2}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        if i[1] % 2 == 0:
                new_d[i[0]] = i[1] ** 2
```

```
new_d = {i[0]:i[1]**2 for i in d.items()}
```

```
new_d = {key:value**2 for (key,value) in d.items()}
```

Dictionary comprehension

```
d = {'a':1,'b':2,'c':3}

new_d = {}
for i in d.items():
        if i[1] % 2 == 0:
                new_d[i[0]] = i[1] ** 2
```

```
new_d = {key:value**2 for i in d.items() if i[1] % 2 == 0}
```

```
new_d = {i[0]:i[1]**2 for (key,value) in d.items() if value % 2
```

File I/O

File I/O

```
f = open(filename, mode)
f.close()
```

mode

r - 읽기모드

w - 쓰기모드

a - 추가모드(파일의 마지막에 새로운 내용을 추가)

Create New File

```
f = open("Newfile.txt", 'w')
f.close()
```

Write text

```
f = open("Newfile.txt", 'a')
for i in range(1,11):
    text = "line %d. \n" % i
    f.write(text)
f.close()
```

Read text

```
f = open("Newfile.txt", 'r')
text = f.readline()
print(text)
f.close()
```

Read All text

```
f = open("Newfile.txt", 'r')
while True:
        text = f.readline()
        if not text: break
        print(text)
f.close()
```

Read All text using readlines

```python
f = open("Newfile.txt", 'r')
texts = f.readlines()
for text in texts:
        print(texts)
f.close()
```

Add text

```
f = open("Newfile.txt", 'a')
for i in range(11, 20):
        text = "New line %d \n" % i
        f.write(text)
f.close()
```

Get rid of f.close()

```
with open("foo.txt", 'w') as f:
        f.write("foo is text dummy")
```

Error Handle

by using `try, except`

필요한 만큼만 적절히 사용하셔야 합니다 by PEP 8

Error Handle - Syntax

```
try:
        실행문
except:
        실행문
```

Error Handle - ValueError

```
try:
        some_input = int(input("type some number: "))
except ValueError:
        print("I said type some NUMBER!!!!")
```

Error Handle - ValueError

```
try:
        some_input = int(input("type some number: "))
except ValueError as e:
        print("I said type some NUMBER!!!!")
    print(e)
```

Error Handle - FileNotFoundError

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

Error Handle - Multiple Error

```
try:
        ...
except error type 1:
        ...
except error type 2:
        ...
```

Error Handle - Pass Error

```
try:
        f = open('error_example.txt', 'r')
except FileNotFoundError as e:
        pass
else:
        text = f.read()
    f.close()
```