Lecture #2. 파이썬 기초 (3)

2D 게임 프로그래밍

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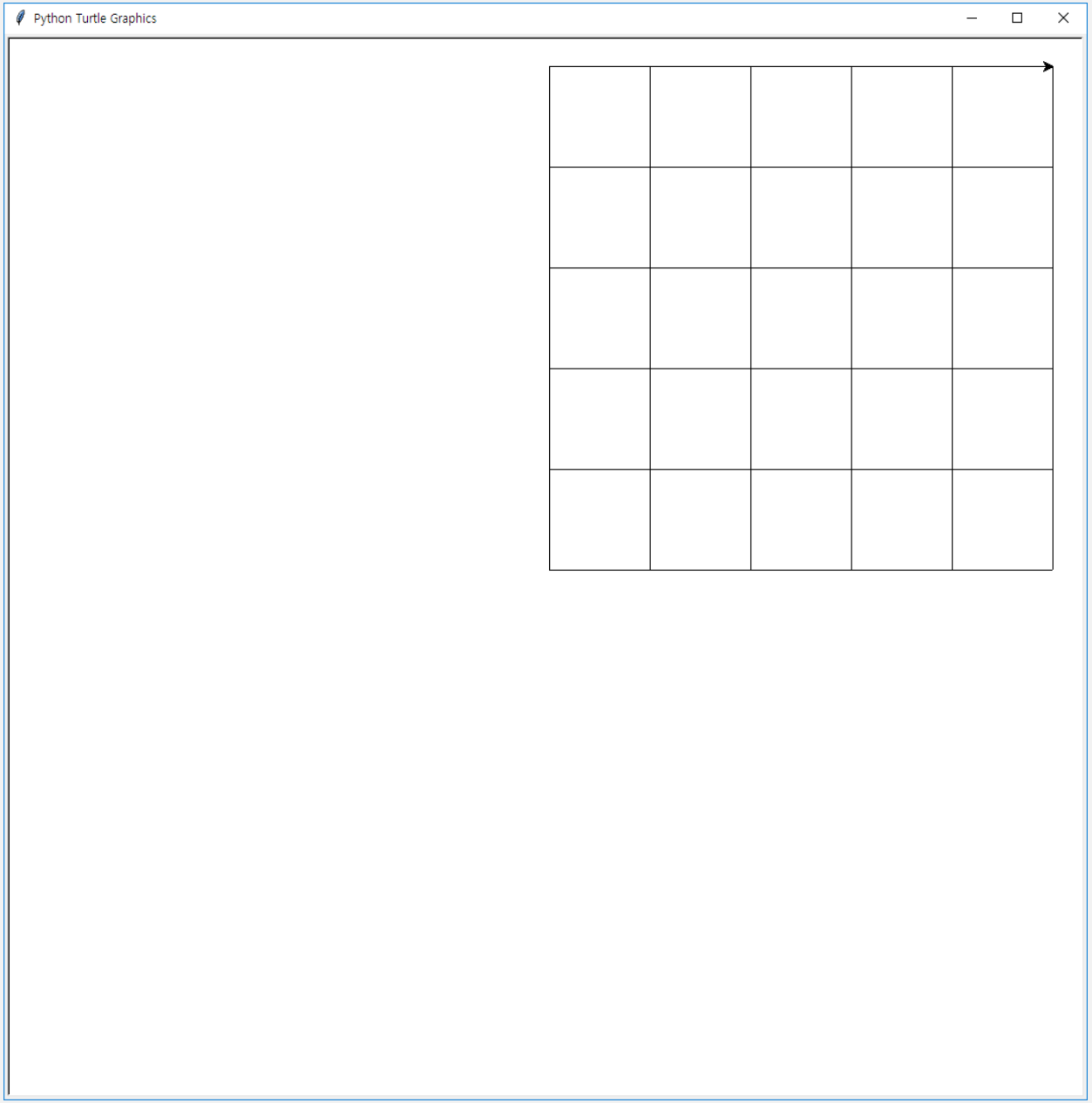
모눈 그리기(길이 500, 간격 100)



하나의 답안

ten_lines.py - W:/work2018/KPU/동계파이썬교육/ten_lines.py (3.6.2)

File Edit Format Run Options Window Help

```
import turtle

count = 0
while (count <= 5):
    turtle.penup()
    turtle.goto(count * 100, 500)
    turtle.pendown()
    turtle.goto(count * 100, 0)
    count = count + 1

count = 0
while (count <= 5):
    turtle.penup()
    turtle.goto(0, count * 100)
    turtle.pendown()
    turtle.goto(500, count * 100)
    count = count + 1
```

Ln: 7 Col: 20

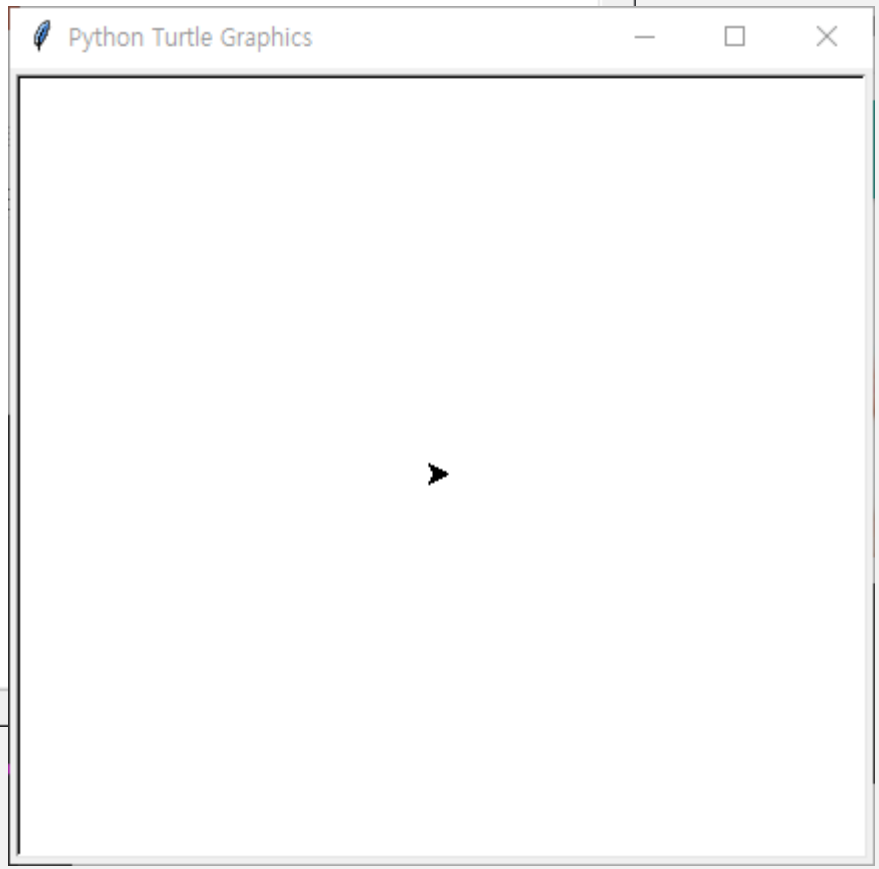
거북이의 방향 설정

turtle.setheading(각도)

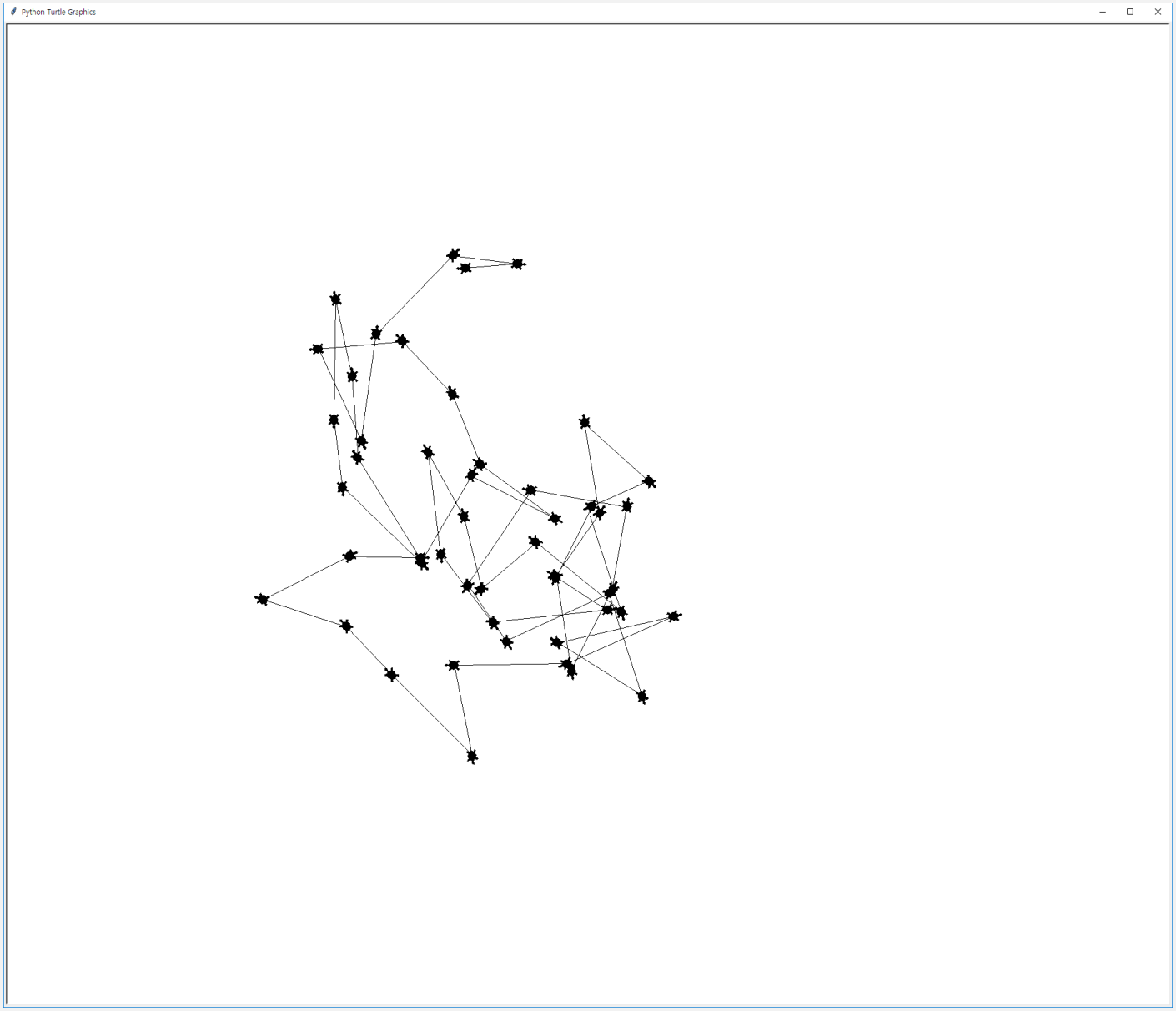
Python 3.6.2 Shell

File Edit Shell Debug Options Window Help

```
>>>
>>>
>>> import turtle
>>> turtle.setheading(90)   윗쪽
>>> turtle.setheading(0)    오른쪽
>>> turtle.setheading(180)  왼쪽
>>> turtle.setheading(-90)  아래쪽
>>> turtle.setheading(360)  오른쪽
>>>
>>>
>>>
>>>
>>>
```



술취한 거북이?



drunken_turtle.py

drunken_turtle.py - W:₩work2018₩KPU₩등계파이썬교육₩drunken_turtle.py (3.6.2)

File Edit Format Run Options Window Help

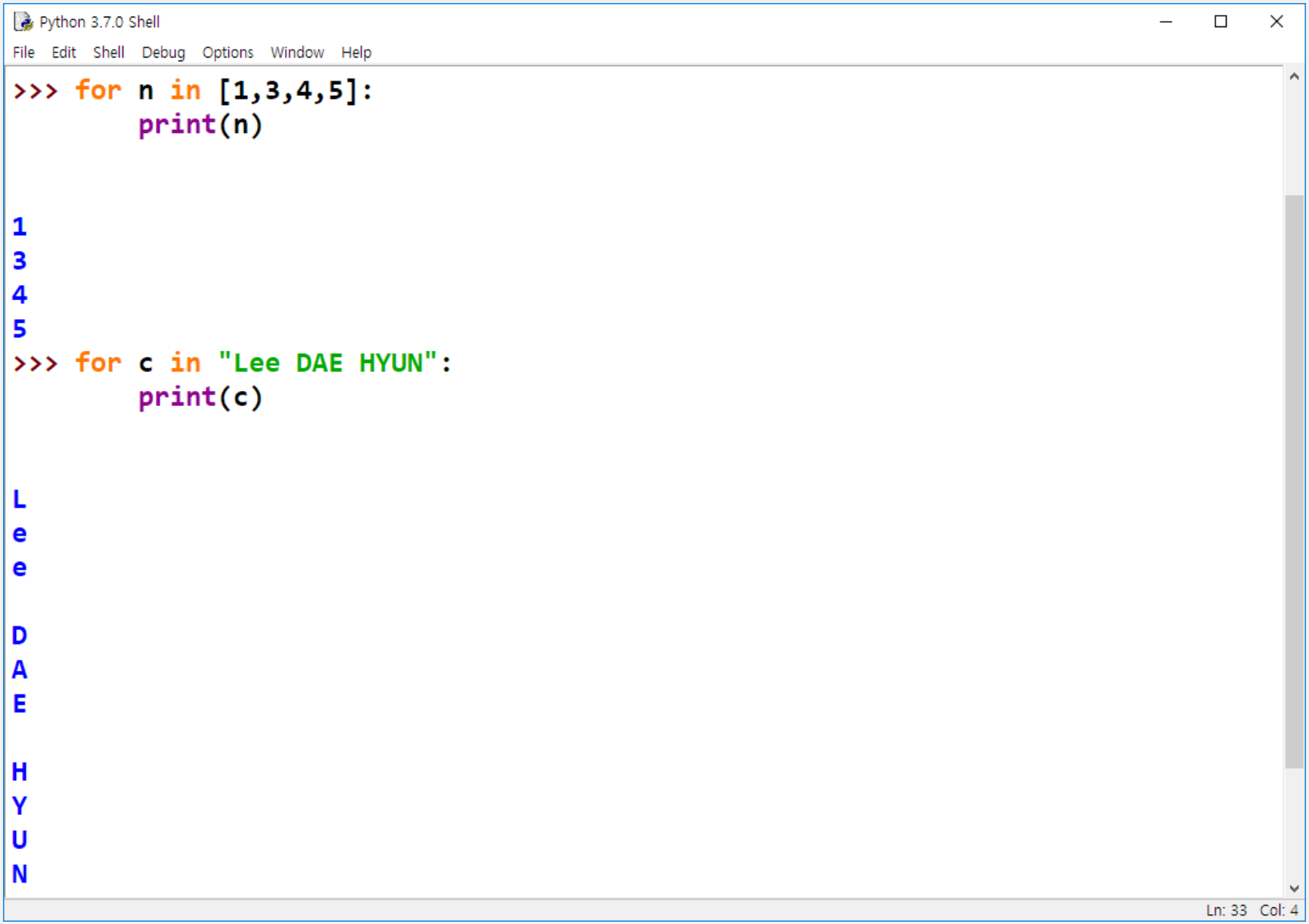
```
import turtle
import random

turtle.shape('turtle')
while (True):
    turtle.setheading(random.randint(0, 360))
    turtle.forward(random.randint(100,200))
    turtle.stamp()
```

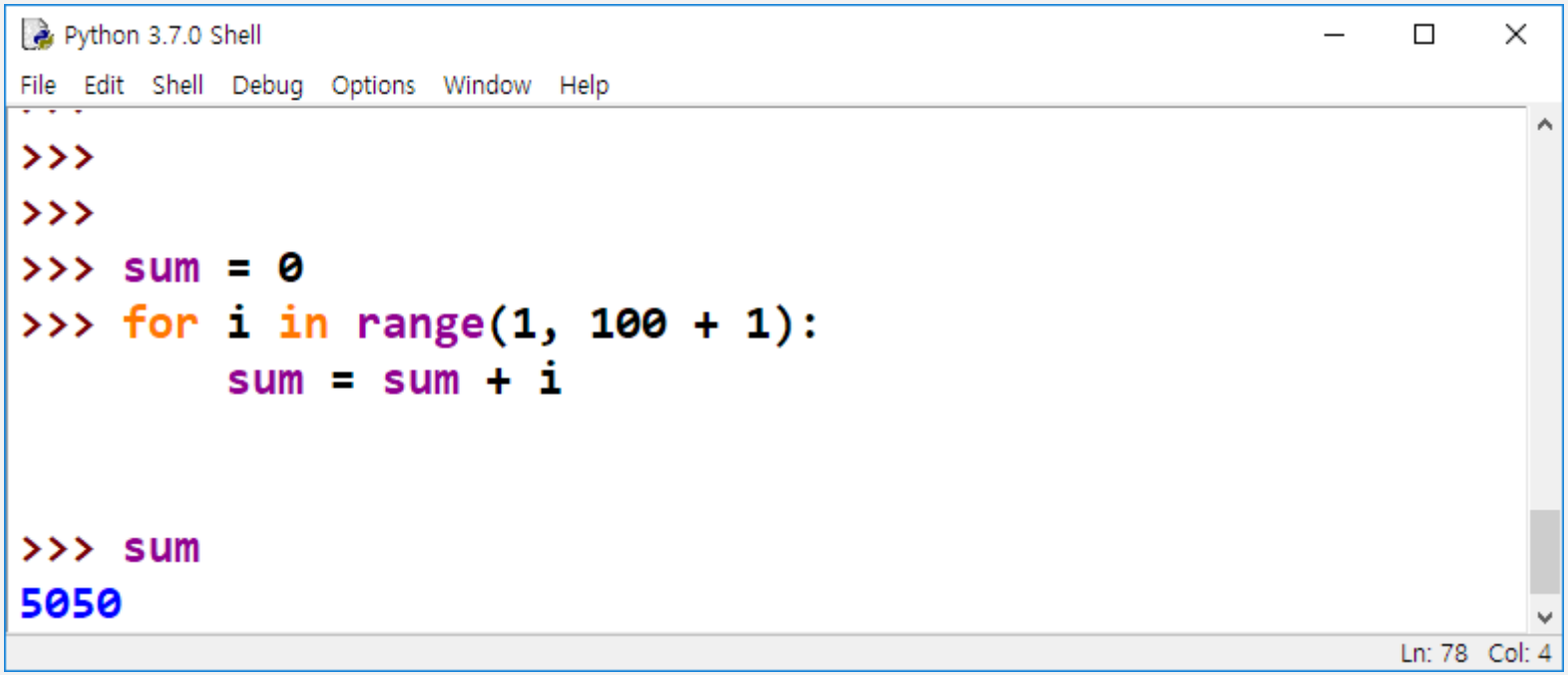
Ln: 8 Col: 18

문법: for 반복문

- 집합적 데이터의 각 요소를 하나씩 꺼내서 반복적으로 처리

```
for 변수 in 리스트(또는 튜플, 문자열):
    수행할 문장1
    수행할 문장2
    ...
```



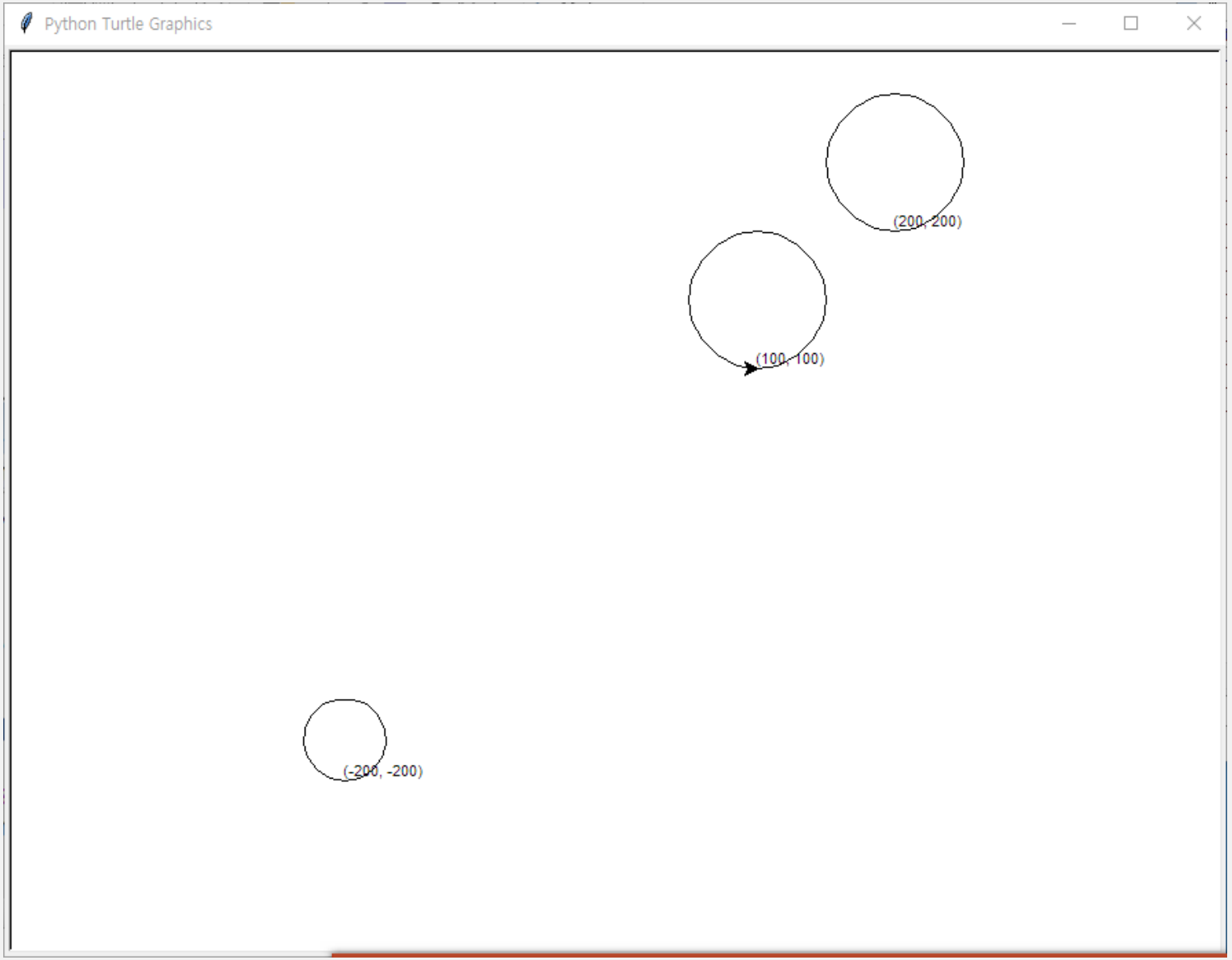


draw_circle2.py - W:/workCoding/2018-2DGP/Labs/Lab01/draw_circle2.py (3.7.0)

File Edit Format Run Options Window Help

```
import turtle

for x,y,r in [(200,200,50), (-200,-200,30), (100, 100, 50)]:
    turtle.penup()
    turtle.goto(x,y)
    turtle.pendown()
    turtle.circle(r)
    turtle.write(str((x,y)))
```

Ln: 11 Col: 0



draw_circle2.py - W:/workCoding/2018-2DGP/Labs/Lab01/draw_circle2.py (3.7.0)

File Edit Format Run Options Window Help

```
import turtle

for x,y,r in [(200,200,50), (-200,-200,30), (100, 100, 50)]:
    turtle.penup()
    turtle.goto(x,y)
    turtle.pendown()
    turtle.circle(r)
    turtle.write((x,y))
```

Ln: 11 Col: 0

함수(function)

- 수학에서 함수는, 어떤 수식을 정의한 것.

$$f(a, b) = a + b$$

$$f(3,4)=?$$

$$f(100,10)=?$$

프로그래밍에서 함수(function)란?

- 어떤 특정한 일을 처리하는 기능을 모아놓은 것, 수학적인 함수도 구현 가능.
- 일반적으로 라이브러리, 모듈은 여러 개의 함수들로 구성됨.
- 프로그래머는 자기만의 함수를 만들 수 있음.
- 함수의 이름은 그 함수의 기능을 정확히 나타내는 것이 좋음.

```
turtle.forward(100)
turtle.right(90)
turtle.undo()
```

문법: 함수 정의 – 함수를 만들기

```
def 함수명(매개변수):
    <수행할 문장1>
    <수행할 문장2>
    ...
```

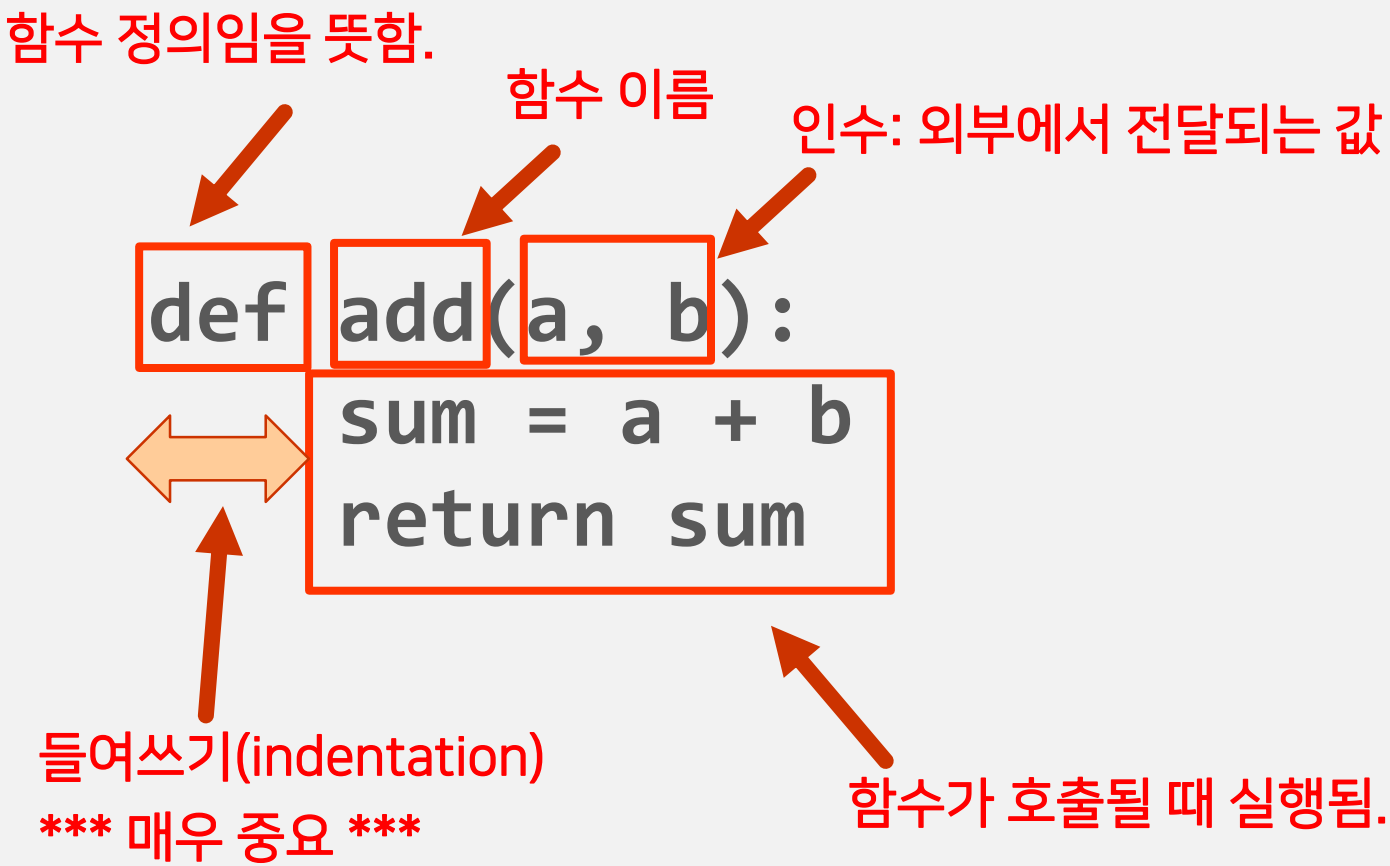
add 함수 만들기

a와 b 두개의 값을 받아서,

```
def add(a, b):
    sum = a + b
    return sum
```

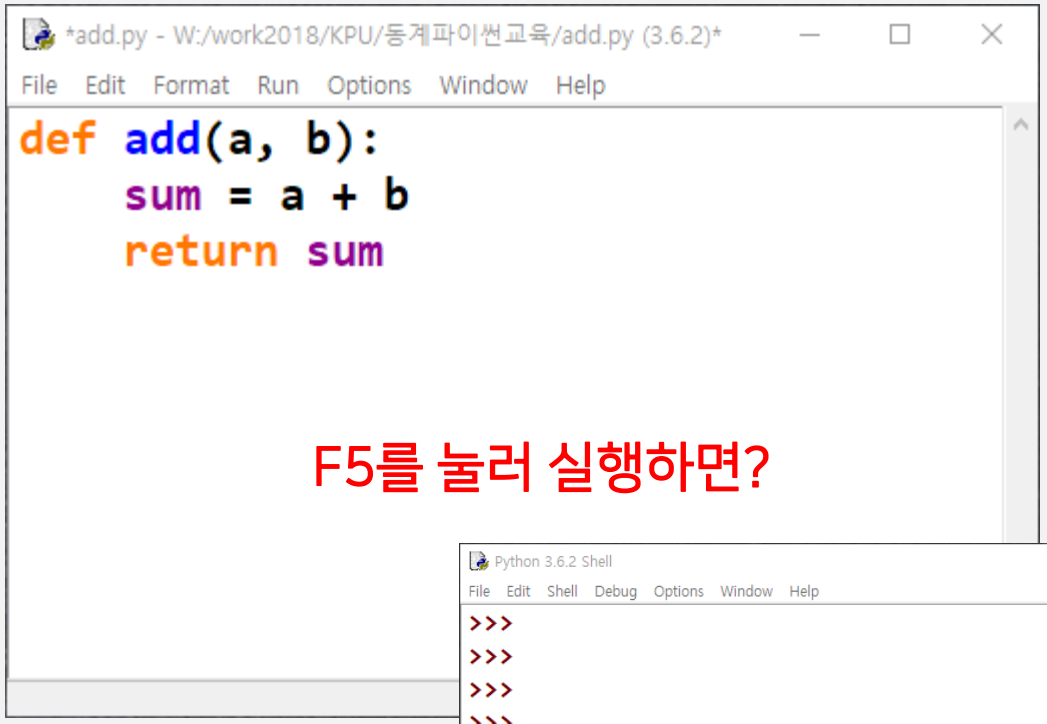
a와 b를 더해, sum을 계산

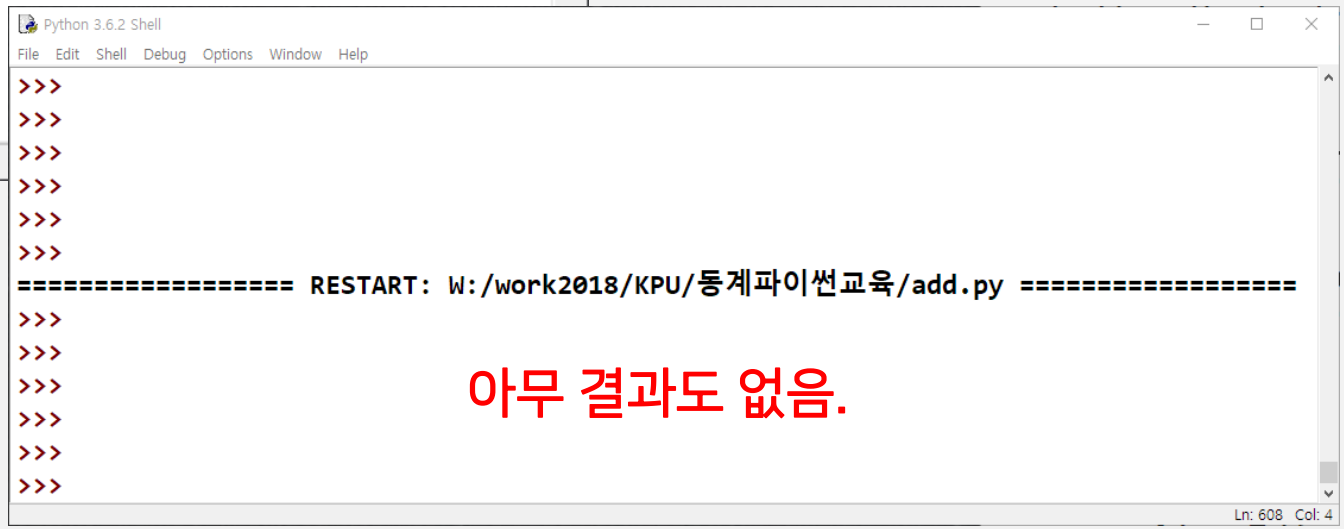
sum의 값을 되돌려줌(return)



함수 정의, 그 자체로는 실행되지 않음.

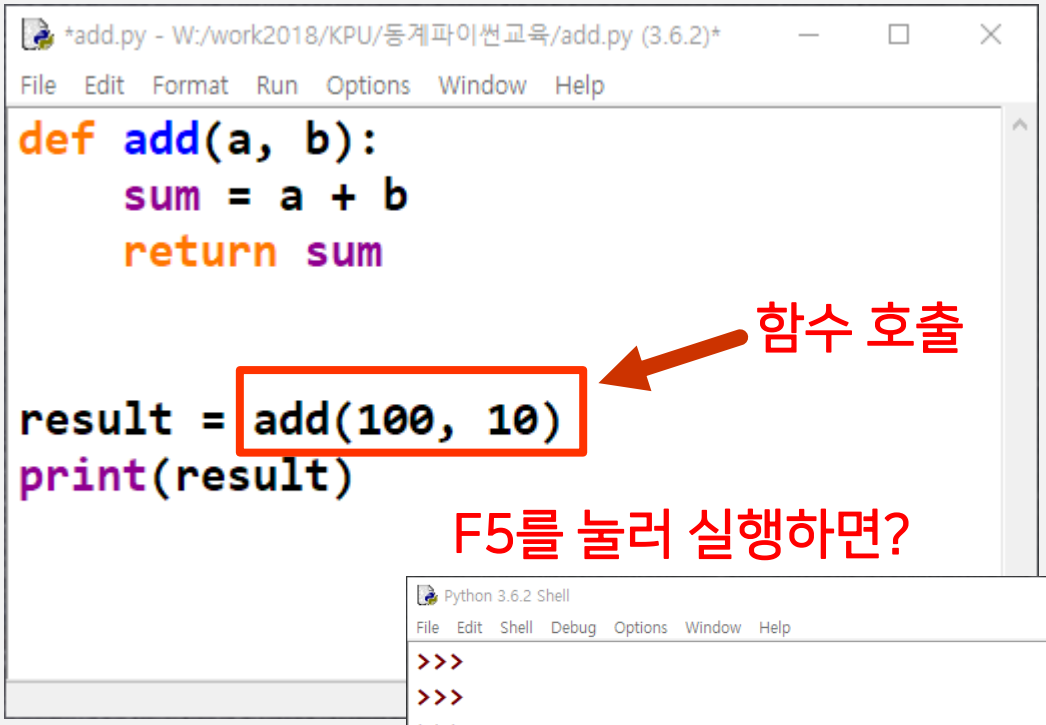
add.py

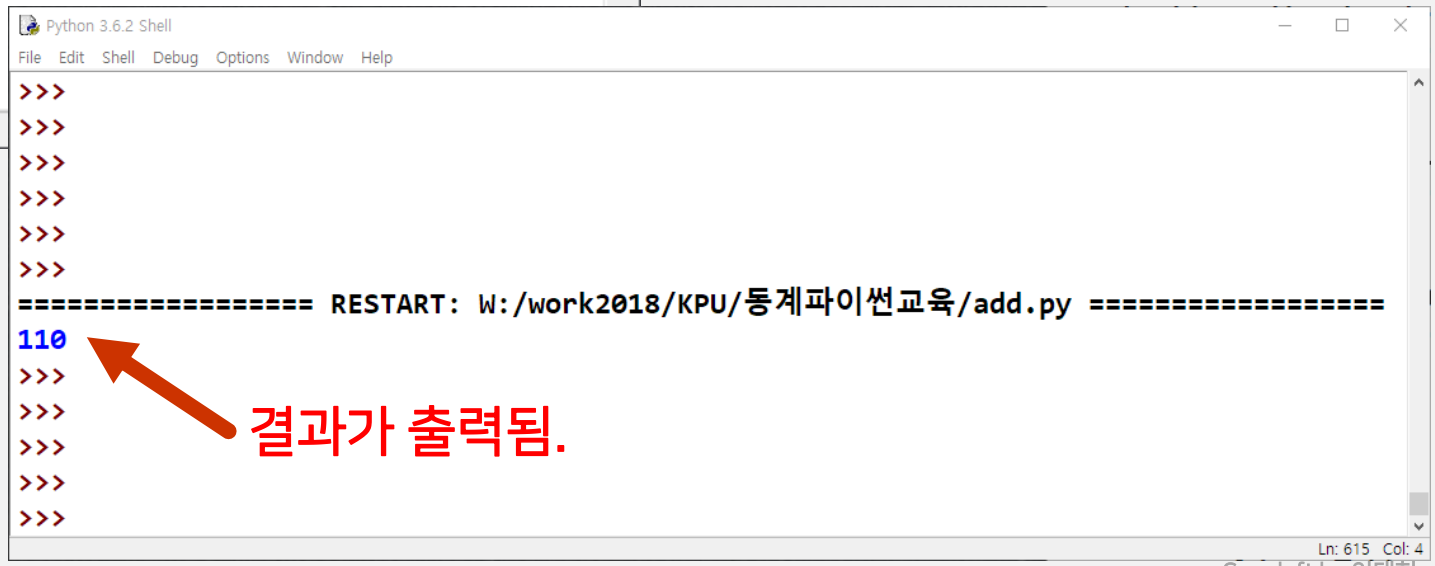




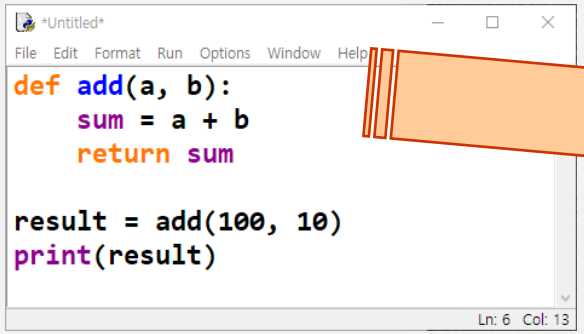
함수를 실행하려면, 함수 호출을 해야 함.

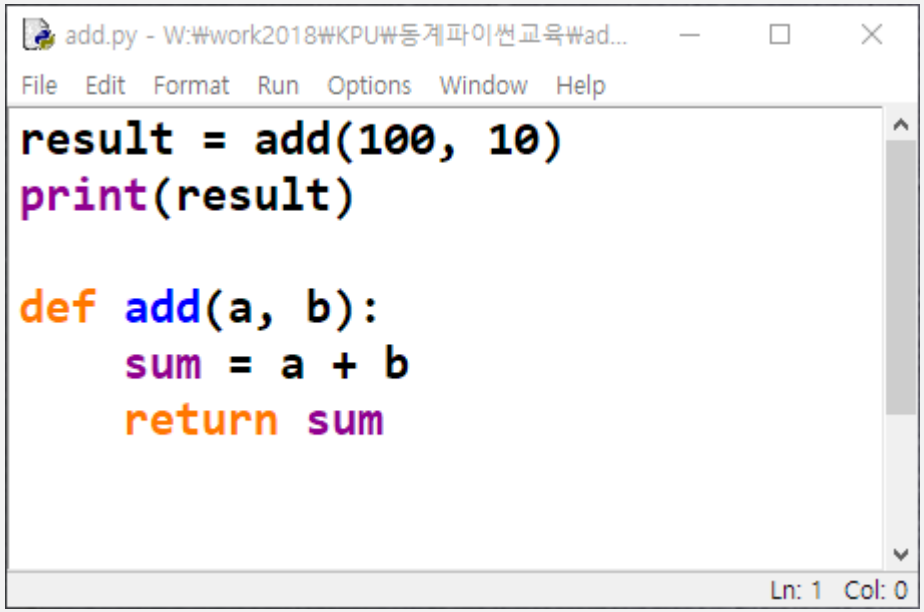
add.py

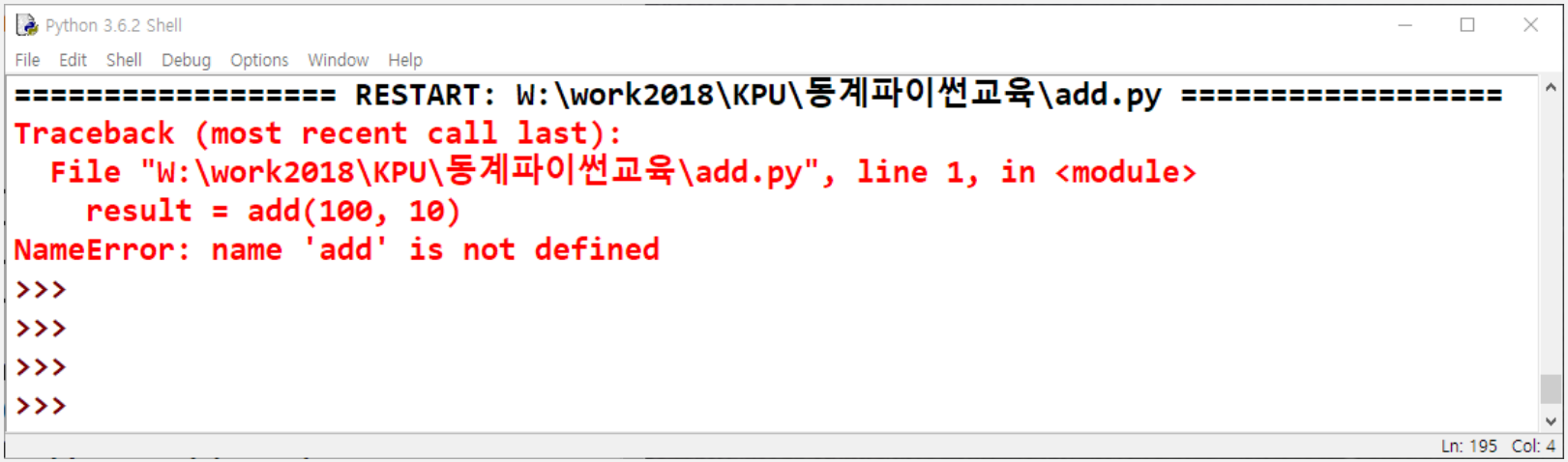




함수를 호출하려면, 함수 정의가 먼저 되어 있어야 함.







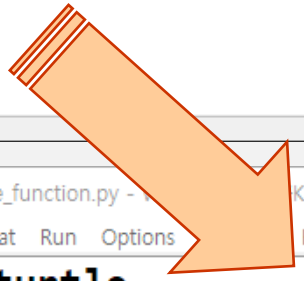
함수는 여러 작업을 모아서 하나로 처리할 수 있게 해 줌.

drunken_turtle.py - W:₩work2018₩KPU₩동계파이썬교육₩drunken_turtle.py (3.6.2)

File Edit Format Run Options Window Help

```
import turtle
import random

turtle.shape('turtle')
while (True):
    turtle.setheading(random.randint(0, 360))
    turtle.forward(random.randint(100,200))
    turtle.stamp()
```

Ln: 8 Col: 18



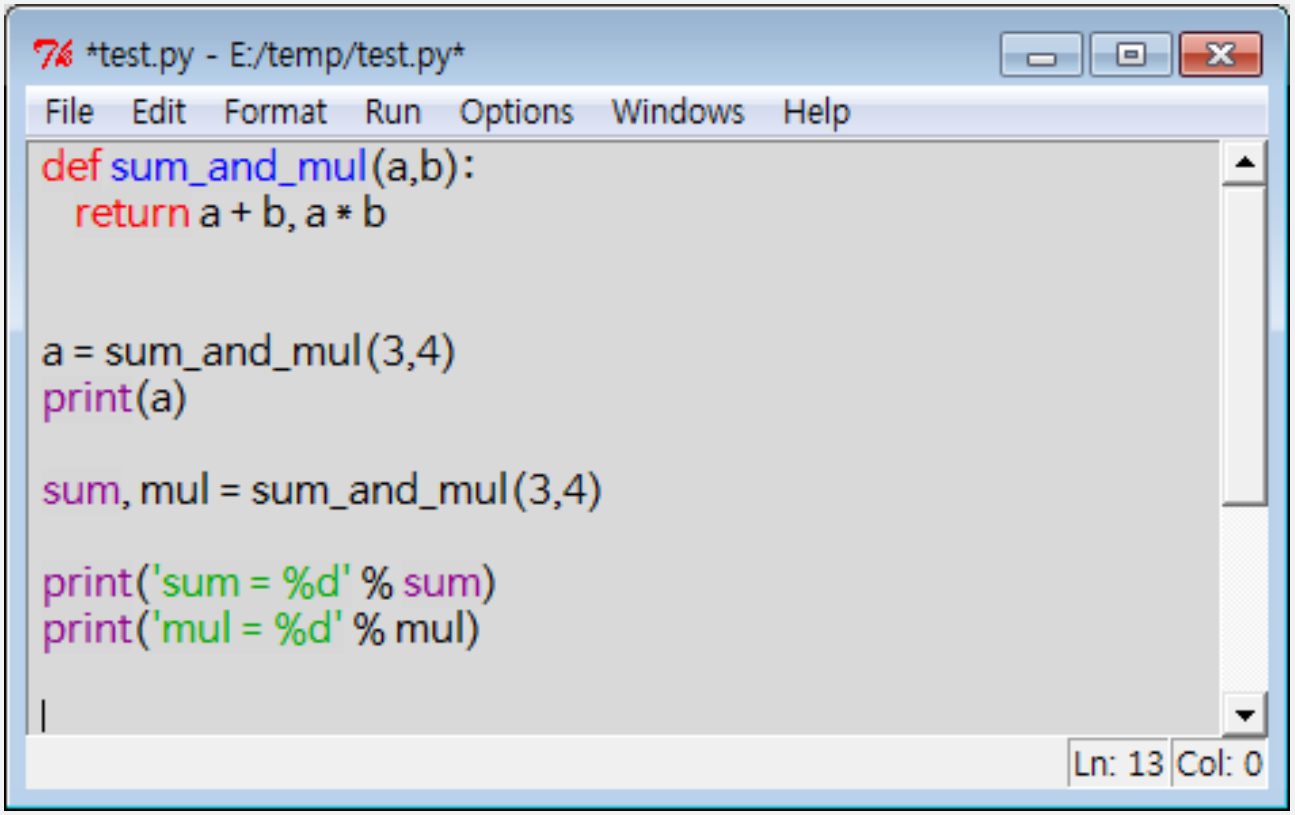
random_turtle_function.py - W:₩work2018₩KPU₩동계파이썬교육₩random_turtle_function.py (3.6.2)

File Edit Format Run Options Window Help

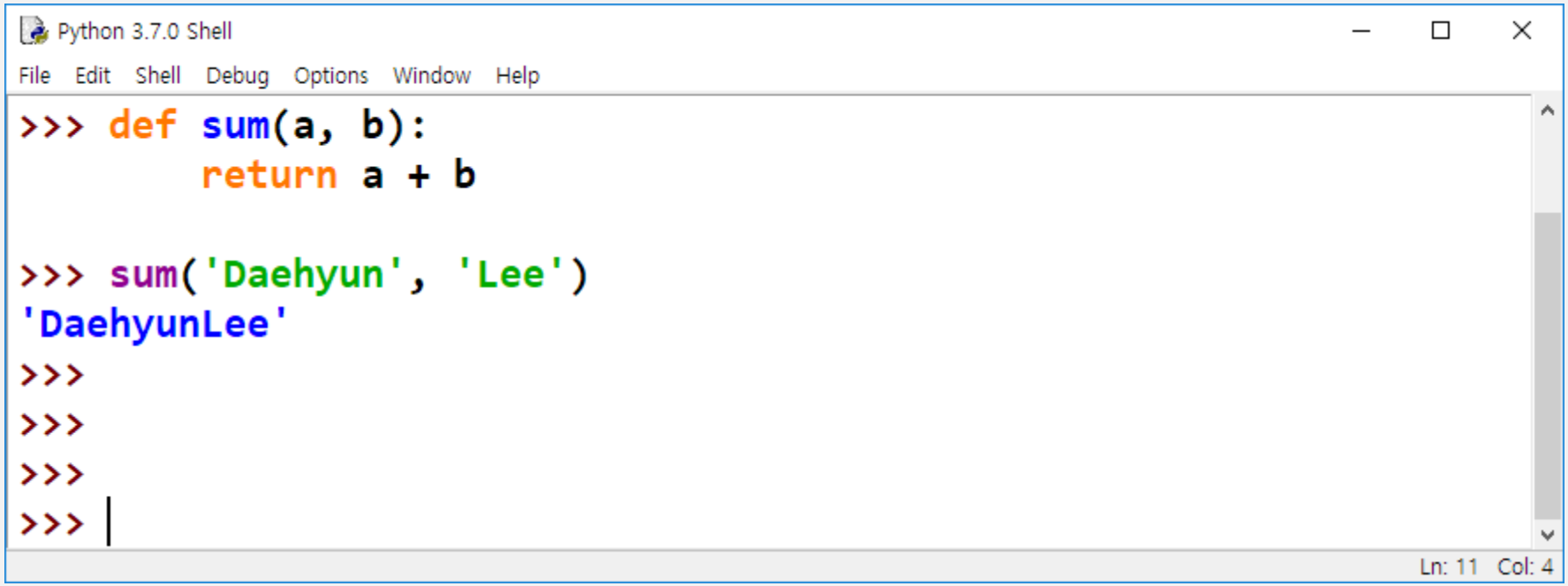
```
import turtle
import random

def drunken_move():
    turtle.setheading(random.randint(0, 360))
    turtle.forward(random.randint(100,200))
    turtle.stamp()

turtle.shape('turtle')
while (True):
    drunken_move()
```

Ln: 7 Col: 18

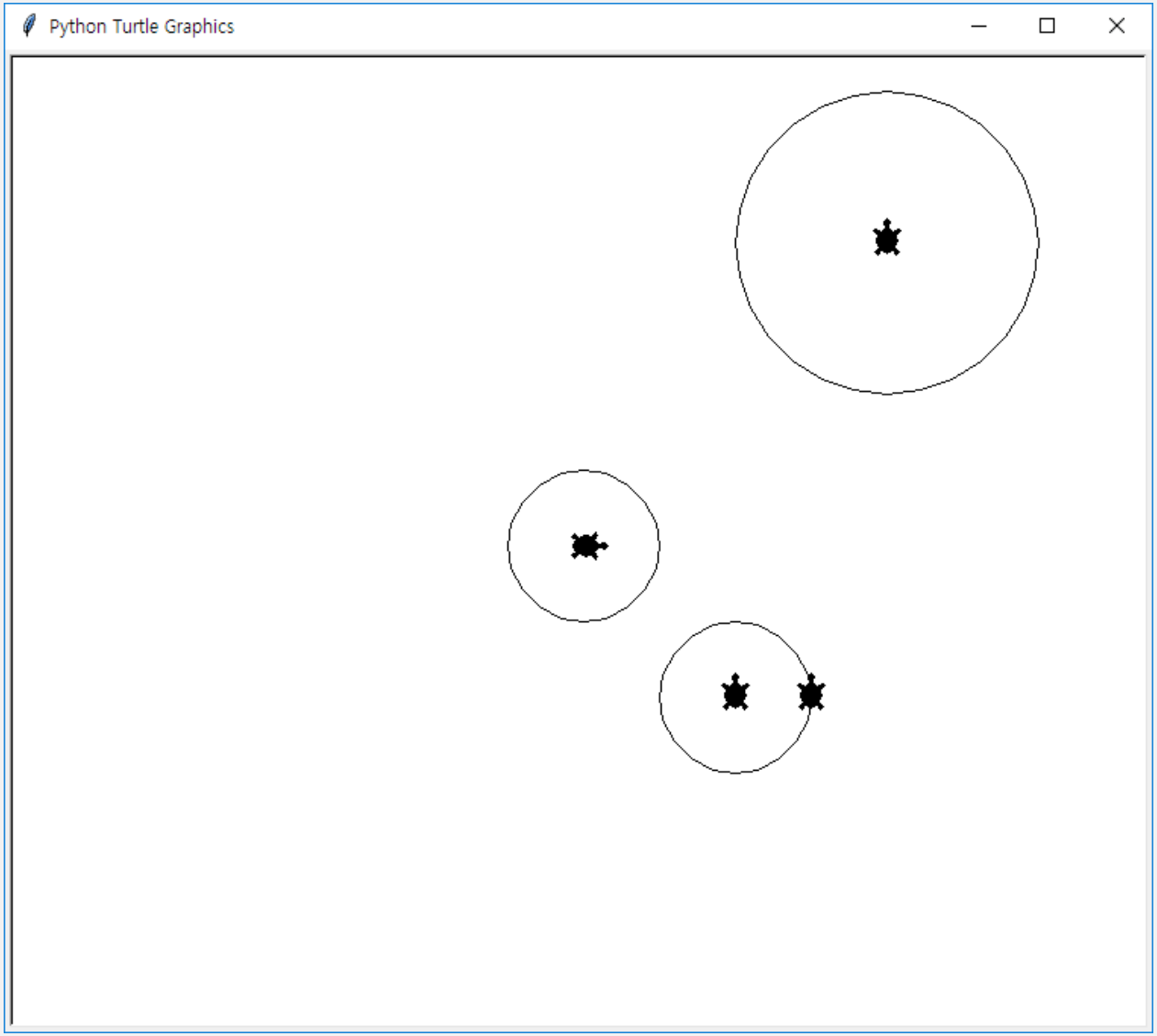
여러 개의 return 값 가능



인자의 타입에 따라 자동으로 연산 기능이 결정



실습 #2-1(0.3점): 지정 위치를 중심으로 원을 그리는 함수 만들기



*draw_circle.py - W:/work2018/KPU/동계파이썬교육/draw_circle.py ...

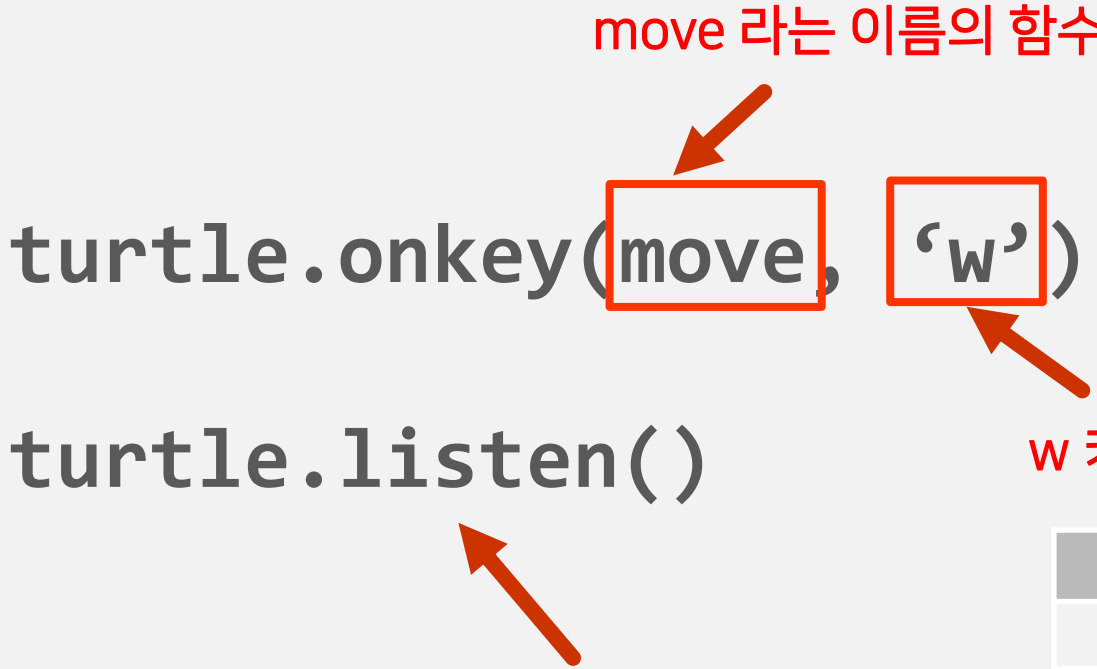
File Edit Format Run Options Window Help

```python
import turtle

def draw_circle(x, y, r):




turtle.shape("turtle")
draw_circle(0, 0, 50)
draw_circle(200, 200, 100)
draw_circle(100, -100, 50)
```

Ln: 15 Col: 0

거북이를 키 입력을 통해서 조정하기

- onkey() 함수를 이용해여, 키 입력에 따라 반응하는 함수를 연결.
- listen() 함수를 이용해서, 거북이가 키 입력을 확인할 수 있게 함.



기호	뜻
'w'	w 키이
'a'	a 키이
's'	s 키이
'd'	d 키이
' '	스페이스 키이
'Escape'	ESC 키이

거북이 채찍질하기

hit_turtle.py - W:/work2018/KPU/동계파이썬교육/hit_turtle.py (3.6.2)

File Edit Format Run Options Window Help

```
import turtle
import random

def drunken_move():
    turtle.setheading(random.randint(0, 360))
    turtle.forward(random.randint(50,300))
    turtle.stamp()

turtle.shape('turtle')

turtle.onkey(drunken_move, ' ')
turtle.listen()
```

Ln: 8 Col: 0

ESC 키이를 누르면 다시 시작

hit_turtle.py - W:/work2018/KPU/동계파이썬교육/hit_turtle.py (3.6.2)

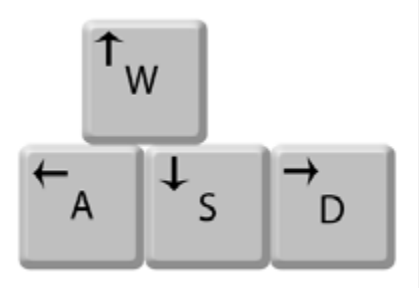
File Edit Format Run Options Window Help

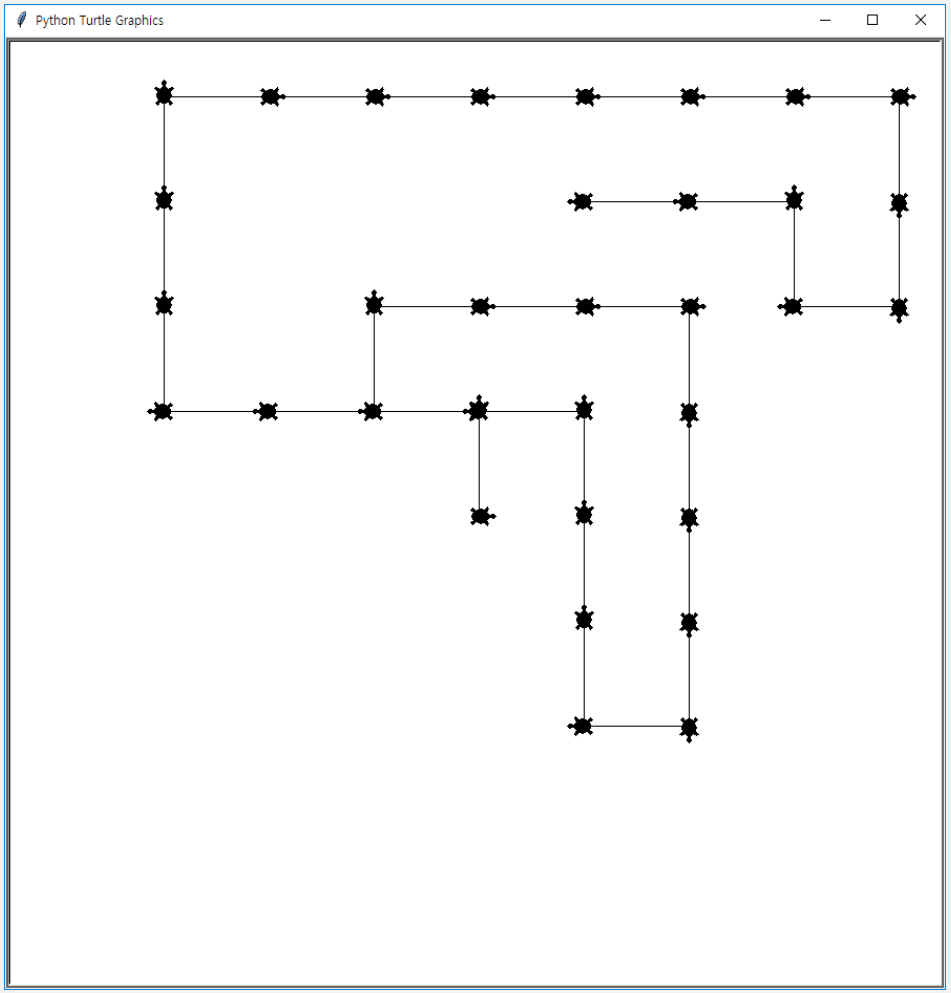
```
import turtle
import random

def drunken_move():
    turtle.setheading(random.randint(0, 360))
    turtle.forward(random.randint(50,00))
    turtle.stamp()

def restart():
    turtle.reset()

turtle.shape('turtle')

turtle.onkey(drunken_move, ' ')
turtle.onkey(restart, 'Escape')
turtle.listen()
```

Ln: 6 Col: 37

실습 과제#2-2(0.7점): 거북이를 “WASD”키로 조종하기

- WASD를 이용하여, 거북이를 상하좌우로 이동할 수 있음.한번 이동 거리는 50포인트
- ESC 키를 누르면 처음부터 다시 시작함.





심화 개별 학습

심화과제: 원 따먹기 게임

- 무작위 위치에 원이 만들어짐.
- 거북이를 이동시켜서 원에 닿으면, 다시 게임 시작
- global 변수를 쓸 줄 알아야 함.
- 거북이의 현재 위치는 turtle.position()으로 알아낼 수 있음.