연구윤리 및 연구지도 4주차 보고서
(1.5-1.6 실습)

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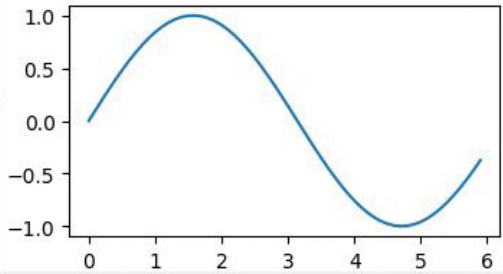
```
(base) C:\Users\김남영>python
Python 3.7.6 (default, Jan  8 2020, 20:23:39) [MSC v.19
Type "help", "copyright", "credits" or "license" for mo
>>> import numpy as np
>>> x = np.array([1.0, 2.0, 3.0)]
  File "<stdin>", line 1
    x = np.array([1.0, 2.0, 3.0)]
                              ^
SyntaxError: invalid syntax
>>> x = np.array([1.0, 2.0, 3.0])
>>> print(x)
[1. 2. 3.]
>>> type(x)
<class 'numpy.ndarray'>
>>> y = np.array([2.0, 4.0, 6.0])
>>> x+y
array([3., 6., 9.])
>>> x*y
array([ 2.,  8., 18.])
>>> x/y
array([0.5, 0.5, 0.5])
>>> x/2
array([0.5, 1. , 1.5])
>>> x/2.0
array([0.5, 1. , 1.5])
>>> A = np.array([[1,2], [3,4]])
>>> print(A)
[[1 2]
 [3 4]]
>>> A.shape
(2, 2)
>>> A.dtype
dtype('int32')
>>> B = np.array([[3,0], [0,6]])
>>> A+B
array([[ 4,  2],
       [ 3, 10]])
>>> A*B
array([[ 3,  0],
       [ 0, 24]])
>>> A*10
array([[10, 20],
       [30, 40]])
>>> B = np.array([10,20])
>>> A*B
array([[10, 40],
       [30, 80]])
```

⇒ 곱을 할 때도 원소별연산

```
>>> X = np.array([[51, 55], [14, 19], [0,4]])
>>> print(X)
[[51 55]
 [14 19]
 [ 0  4]]
>>> X[0]
array([51, 55])
>>> X[0][1]
55
>>> for row in X:
...     print(row)
...
[51 55]
[14 19]
[0 4]
>>> X = X.flatten()
>>> print(X)
[51 55 14 19  0  4]
>>> X[np.array([0, 2, 4])]
array([51, 14,  0])
>>> X([0, 2, 4])
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
TypeError: 'numpy.ndarray' object is not callable
>>> X([0, 2, 4])
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
TypeError: 'numpy.ndarray' object is not callable
>>> X>15
array([ True,  True, False,  True, False, False])
>>> X[X>15]
array([51, 55, 19])
>>> X[[0,2,4]]
array([51, 14,  0])
>>>
```

└ 리스트로 바꿔줘도 가능

```
>>> import matplotlib.pyplot as plt
>>> x = np.arange(0, 6, 0.1)
>>> y = np.sin(x)
>>> plt.plot(x, y)
[<matplotlib.lines.Line2D object at 0x0000
>>> plt.show()
```



```
>>> import matplotlib.pyplot as plt
>>> x = np.arange(0, 6, 0.1)
>>> y = np.sin(x)
>>> plt.plot(x, y)
[<matplotlib.lines.Line2D object at 0x00000216FD07E0C8>]
>>> plt.show()
>>> x= np.arange(0, 6, 0.1)
>>> y1= np.sin(x)
>>> y2= np.cos(x)
>>> plt.plot(x, y1, label="sin")
[<matplotlib.lines.Line2D object at 0x00000216FDB19188>]
>>> plt.plot(x, y2, linestyle="--", label="cos")
[<matplotlib.lines.Line2D object at 0x00000216FB733E08>]
>>> plt.xlabel("x")
Text(0.5, 0, 'x')
>>> plt.ylabel("y")
Text(0, 0.5, 'y')
>>> plt.title('sin&cos')
Text(0.5, 1.0, 'sin&cos')
>>> plt.legend()
<matplotlib.legend.Legend object at 0x00000216FB7434C8>
>>> plt.show()
```
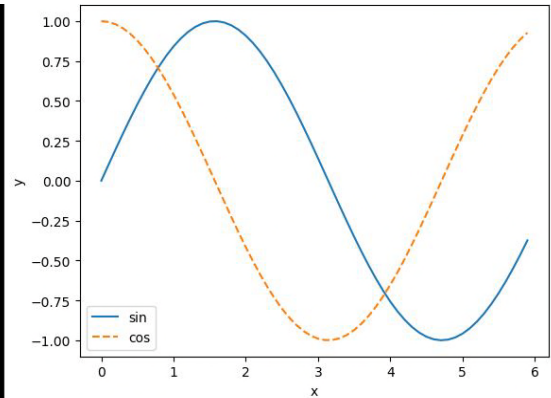

x=5.47534   y=1.08346

```
>>> from matplotlib.image import imread
>>> img = imread('lenna.bmp')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "D:\anaconda3\lib\site-packages\matplotlib\image.py",
    with Image.open(fname) as image:
  File "D:\anaconda3\lib\site-packages\PIL\Image.py", line 280
    fp = builtins.open(filename, "rb")
FileNotFoundError: [Errno 2] No such file or directory: 'lenna
>>> img = imread('lenna.bmp')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "D:\anaconda3\lib\site-packages\matplotlib\image.py",
    with Image.open(fname) as image:
  File "D:\anaconda3\lib\site-packages\PIL\Image.py", line 280
    fp = builtins.open(filename, "rb")
FileNotFoundError: [Errno 2] No such file or directory: 'lenna
>>> img = imread('lenna.bmp')
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
  File "D:\anaconda3\lib\site-packages\matplotlib\image.py",
    with Image.open(fname) as image:
  File "D:\anaconda3\lib\site-packages\PIL\Image.py", line 280
    fp = builtins.open(filename, "rb")
FileNotFoundError: [Errno 2] No such file or directory: 'lenna
>>> img = imread('D:/anaconda3/lenna.bmp')
>>> plt.imshow(img)
<matplotlib.image.AxesImage object at 0x00000216FD041508>
>>> plt.show
<function show at 0x00000216F9046AF8>
>>> plt.show()
```

Figure 1