

# Hello NumPy !

## OBJECTIVE: Familiarize yourself with Numpy

- This page was created for students to learn Python in the AI (717005) class at Hallym University.
- 본 페이지는 한림대학교 인공지능개론(717005) 수업에서 학생들의 Python 학습을 위해 만든 페이지입니다.

In [1]:

```
import numpy as np
```

In [2]:

```
a = np.array([1, 2, 3])

print(type(a))          # "<type 'numpy.ndarray' >"
print(a.shape)          # "(3,)"
print(a[0], a[1], a[2]) # "1 2 3"
a[0] = 5                # 요소를 변경
print(a)                # 출력 "[5, 2, 3]"
```

```
<type 'numpy.ndarray'>
(3,)
(1, 2, 3)
[5 2 3]
```

In [3]:

```
b = np.array([[1,2,3],[4,5,6]]) # rank가 2인 배열 생성
print(b.shape)                 # 출력 "(2, 3)"
print(b[0, 0], b[0, 1], b[1, 0]) # 출력 "1 2 4"
```

```
(2, 3)
(1, 2, 4)
```

## Axis / axes

- the nth coordinate to index an array in Numpy.
- multidimensional arrays can have one index per axis.

In [4]:

```
import numpy as np

a = np.array([[1, 2], [3, 4]])
print a
```

```
[[1 2]
 [3 4]]
```

- If not specified, the overall mean will be obtained (지정하지 않으면 전체 평균을 구하게 됨)

In [5]:

```
print np.mean(a) # 2.5
```

2.5

Axis 0 (↓)

In [6]:

```
print np.mean(a, axis=0) # [ 2.  3.]
```

[ 2. 3.]

Axis 1 (→)

In [7]:

```
print np.mean(a, axis=1) # [ 1.5  3.5]
```

[ 1.5 3.5]

## Broadcast

- Calculate arrays with different shapes 형상이 다른 배열을 계산하기 위해서 지원하는 기능

In [8]:

```
A = np.array([[1, 2], [3, 4]])  
B = np.array([10, 20])  
print(A)  
print('-----')  
print(B)
```

[[1 2]

[3 4]]

-----  
[10 20]

Please observe how it is multiplied. (어떻게 곱해지는지 잘 관찰바랍니다.)

In [9]:

```
print(A*B)
```

[[10 40]

[30 80]]

## Stack

In [10]:

```
a = np.array([1,2,3,4])  
b = np.array([5,6,7,8])
```

- stack vertically (세로로 쌓기)

In [11]:

```
c = np.vstack((a,b))  
print(c)
```

```
[[1 2 3 4]  
 [5 6 7 8]]
```

In [12]:

```
print(c.shape)
```

```
(2, 4)
```

- stack horizontally (가로로 쌓기)

In [13]:

```
d = np.hstack((a,b))  
print(d)
```

```
[1 2 3 4 5 6 7 8]
```

In [14]:

```
print(d.shape)
```

```
(8,)
```