● loadtxt: Text 형식의 데이터를 읽어오는 기능

```
a = np.loadtxt('./mabang1.txt')
                                         b = np.loadtxt('./mabang1.txt', np.int)
                                         b
array([[15., 8., 1., 24., 17.],
                                         array([[15, 8, 1,24,17],
      [16., 14., 7., 5., 23.],
                                                [16, 14, 7, 5, 23],
      [22., 20., 13., 6., 4.],
                                                [22, 20, 13, 6, 4],
      [ 3., 21., 19., 12., 10.],
                                                [ 3, 21, 19, 12, 10],
      [ 9., 2., 25., 18., 11.]])
                                                [ 9, 2, 25, 18, 11]])
a[1:-1, 1:-1]
                                         b[1:-1, 1:-1]
array([[14., 7., 5.],
                                         array([[14, 7, 5],
      [20., 13., 6.],
                                                [20, 13, 6],
      [21., 19., 12.]])
                                                [21, 19, 12]])
```

mabang1.txt

15	8	1	24	17
16	14	7	5	23
22	20	13	6	4
3	21	19	12	10
9	2	25	18	11

● loadtxt: Text 형식의 데이터를 읽어오는 기능

```
c = np.loadtxt('mabang2.txt', dtype=np.str)
С
array([['15,', '8,', '1,', '24,', '17,'],
       ['16,', '14,', '7,', '5,', '23,'],
['22,', '20,', '13,', '6,', '4,'],
['3,', '21,', '19,', '12,', '10,'],
       ['9,', '2,', '25,', '18,', '11,']], dtype='<U3')
c = np.loadtxt('mabang2.txt', dtype=np.str, delimiter=', ')
С
array([['15', '8', '1', '24', '17'], ['16', '14', '7', '5', '23'],
       ['22', '20', '13', '6', ' 4'],
       ['3', '21', '19', '12', '10'],
       ['9', '2', '25', '18', '11']], dtype='<U3')
                                                                  mabang2.txt
c = c.astype(np.int)
                                                                  15, 8, 1, 24, 17
С
                                                                  16, 14, 7, 5, 23
array([[15, 8, 1,24,17],
                                                                  22, 20, 13, 6, 4
       [16, 14, 7, 5, 23],
                                                                  3, 21, 19, 12, 10
       [22, 20, 13, 6, 4],
       [ 3, 21, 19, 12, 10],
                                                                  9, 2, 25, 18, 11
       [ 9, 2, 25, 18, 11]])
```

- savetxt: 데이터를 Text 형식으로 저장하는 기능
 - 기본 저장

```
d = np.arange(1, 26).reshape(5, 5)
array([[ 1, 2, 3, 4, 5],
                                                                                          🗂 jupyter
          [6, 7, 8, 9, 10],
          [11, 12, 13, 14, 15],
                                                                                                  Running
                                                                                                          Clusters
          [16, 17, 18, 19, 20],
                                                                                          Select items to perform actions on them.
          [21, 22, 23, 24, 25]])
                                                                                            ■ 10_01_numpy_ndarray.ipynb
np.savetxt('array1.csv', d) # 기본 사용
                                                                                            10_02_numpy_create_function.ipynb
                                                                                            10_03_numpy_operation_function.ipynb
np.loadtxt('array1.csv')
                                                                                            10_04_numpy_array_operation.ipynb
                                                                                            ■ 1 10 05 numpy comparison.ipynb
array([[ 1., 2., 3., 4., 5.],
                                                                                            ■ 10 06 numpy data io.ipynb
                                                                                            array1.csv
          [6., 7., 8., 9., 10.],
          [11., 12., 13., 14., 15.],

    Jupyter array1.csv

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          [16., 17., 18., 19., 20.].
                                                                     View Language
                                                                                                                               current mo
          [21., 22., 23., 24., 25.]])
                                                             5.000000000000000000e+00
                                                           2 | 6.000000000000000000e+00 7.000000000000000e+00 8.00000000000000e+00 9.000000000000000e+00
                                                              1.000000000000000000e+01
                                                             1.10000000000000000e+01 1.2000000000000000e+01 1.3000000000000e+01 1.40000000000000000+01
                                                              1.500000000000000000e+01
                                                           4 | 1.60000000000000000e+01 | 1.70000000000000000e+01 | 1.800000000000000e+01 | 1.90000000000000000000e+01
                                                             2.000000000000000000e+01
                                                           5 | 2.10000000000000000e+01 2.200000000000000000e+01 2.300000000000000000e+01 2.400000000000000e+01
                                                             2.500000000000000000e+01
```

- savetxt: 데이터를 Text 형식으로 저장하는 기능
 - 구분자 지정 저장 (delimiter)

```
np.savetxt('array2.csv', d, delimiter='|') # delimiter 구분자 지정
np.loadtxt('array2.csv', delimiter='|')
                                                                                         🗂 jupyter
array([[ 1., 2., 3., 4., 5.],
          [6., 7., 8., 9., 10.],
                                                                                                 Running
                                                                                                          Clusters
          [11., 12., 13., 14., 15.],
                                                                                         Select items to perform actions on them.
          [16., 17., 18., 19., 20.],
                                                                                           □ 0 ▼ I workspace
          [21., 22., 23., 24., 25.]])
                                                                                             10 01 numpy ndarray.ipynb
                                                                                           ■ 10 02 numpy create function.ipynb
                                                                                           10 03_numpy_operation_function.ipynb
                                                                                           ■ 10 04 numpy array operation.ipynb
                                                                                           ■ 10 05 numpy comparison.ipynb
                                                                                           ■ 10_06_numpy_data_io.ipynb

☐ Jupyter array2.csv

Last Saturday at 12:28 PM

                                                                                           □ □ array1.csv
                                                                                Logout
                                                                                           array2.csv
           1 1.000000000000000000e+0012.00000000000000e+0013.000000000000000e+0014.00000000000000e+00
           2 | 6.000000000000000000e+00|7.000000000000000e+00|8.0000000000000000e+00|9.000000000000000e+00|
             1.00000000000000000000e+01
           3 | 1.1000000000000000000e+01 | 1.20000000000000000e+01 | 1.300000000000000000000e+01 | 1.400000000000000e+01
             11.50000000000000000000e+01
           5 2.1000000000000000000e+01 [2.2000000000000000e+01 [2.30000000000000000000000000e+01 ]2.4000000000000000e+01
             12.5000000000000000000e+01
```

- savetxt: 데이터를 Text 형식으로 저장하는 기능
 - 데이터 형식 지정 저장 (fmt)

```
np.savetxt('array3.csv', d, delimiter='\t', fmt='%i') # type 지정
np.loadtxt('array3.csv', dtype=np.str)
                                                                                        🗂 jupyter
array([['1', '2', '3', '4', '5'],
          ['6', '7', '8', '9', '10'],
                                                                                                        Clusters
          ['11', '12', '13', '14', '15'],
                                                                                        Select items to perform actions on them.
         ['16', '17', '18', '19', '20'],
['21', '22', '23', '24', '25']], dtype='<U2')
                                                                                         □ 0 	■ / workspace
                                                                                            ■ ■ 10 01 numpy ndarray.ipynb
                                                                                          ■ 10_02_numpy_create_function.ipynb
                                                                                          ■ 10 03 numpy operation function.ipynb
                                                                                          ■ 10 04 numpy array operation.ipynb
                                                                                          ■ 10_05_numpy_comparison.ipynb
                                                                                          ■ 10_06_numpy_data_io.ipynb
          jupyter array3.csv✓ Last Saturday at 12:36 PM
                                                                               Logout
                                                                                          □ □ array1.csv
                                                                                          array2.csv
          File Edit View Language
                                                                                          array3.csv
           4 16-17-18-19-20
          5 21-*22-*23-*24-*25
```

- numpy object npy
 - save / load : Binary 형태로 저장

```
np.save('npy_data', arr=d)
np.load(file='npy_data.npy')
                                                                                         🗂 jupyter
array([[ 1, 2, 3, 4, 5],
          [6, 7, 8, 9, 10],
                                                                                                Running
                                                                                                         Clusters
          [11, 12, 13, 14, 15],
                                                                                        Select items to perform actions on them.
          [16, 17, 18, 19, 20],
                                                                                          □ 0 - workspace
          [21, 22, 23, 24, 25]])
                                                                                             <u></u>
                                                                                          ■ 1 10 01 numpy ndarray.ipynb
                                                                                          ■ 10 02 numpy create function.ipynb
                                                                                          ■ 10 03 numpy operation function.ipynb
                                                                                          ■ 10_04_numpy_array_operation.ipynb
                                                                                          ■ 10 05 numpy comparison.ipynb
                                                                                          ■ 10 06 numpy data io.ipynb
          🗂 jupyter
                                                                                          arrav1.csv
                                                                               Logout
                                                                                          arrav2.csv
                                                                                          array3.csv
          1 Error! C:#Users#GGoReb#workspace#npy data.npy is not UTF-8 encoded
                                                                                          mabang1.txt
          2 Saving disabled.
          3 See Console for more details.
                                                                                          mabang2.txt
                                                                                          npy_data.npy
```