

1 Converting between NumPy and Pandas

Conversion between NumPy and Pandas is simple.

Let's start with importing NumPy and Pandas, and then make a Pandas dataframe.

```
import numpy as np
import pandas as pd

df = pd.DataFrame()

names = ['Gandolf', 'Gimli', 'Frodo', 'Legolas', 'Bilbo']
types = ['Wizard', 'Dwarf', 'Hobbit', 'Elf', 'Hobbit']
magic = [10, 1, 4, 6, 4]
aggression = [7, 10, 2, 5, 1]
stealth = [8, 2, 5, 10, 5]

df['names'] = names
df['type'] = types
df['magic_power'] = magic
df['aggression'] = aggression
df['stealth'] = stealth

print (df)
```

OUT:

	names	type	magic_power	aggression	stealth
0	Gandolf	Wizard	10	7	8
1	Gimli	Dwarf	1	10	2
2	Frodo	Hobbit	4	2	5
3	Legolas	Elf	6	5	10
4	Bilbo	Hobbit	4	1	5

1.1 Converting from Pandas to NumPy

We will use the values method to convert from Pandas to NumPy. Notice that we loose our column headers when converting to a NumPy array, and the index filed (name) simply becomes the first column.

```
my_array = df.values

print (my_array)
```

OUT:

```
[['Gandolf' 'Wizard' 10 7 8]
 ['Gimli' 'Dwarf' 1 10 2]
 ['Frodo' 'Hobbit' 4 2 5]
 ['Legolas' 'Elf' 6 5 10]
 ['Bilbo' 'Hobbit' 4 1 5]]
```

1.2 Converting from NumPy to Pandas

We will use the dataframe method to convert from a NumPy array to a Pandas dataframe. A new index has been created, and columns have been given numerical headers.

```
my_new_df = pd.DataFrame(my_array)
```

```
print (my_new_df)
```

OUT:

	0	1	2	3	4
0	Gandolf	Wizard	10	7	8
1	Gimli	Dwarf	1	10	2
2	Frodo	Hobbit	4	2	5
3	Legolas	Elf	6	5	10
4	Bilbo	Hobbit	4	1	5

If we have column names, we can supply those to the dataframe during the conversion proces. We pass a list to the dataframe method:

```
names = ['name','type','magic_power','agression','strength']
```

```
my_new_df = pd.DataFrame(my_array, columns=names)
```

```
print(my_new_df)
```

OUT:

	name	type	magic_power	agression	strength
0	Gandolf	Wizard	10	7	8
1	Gimli	Dwarf	1	10	2
2	Frodo	Hobbit	4	2	5
3	Legolas	Elf	6	5	10
4	Bilbo	Hobbit	4	1	5

And, as we have seen previously, we can set the index to a particular column:

```
my_new_df.set_index('name', inplace=True)
```

```
print (my_new_df)
```

OUT:

	type	magic_power	agression	strength
name				
Gandolf	Wizard	10	7	8
Gimli	Dwarf	1	10	2
Frodo	Hobbit	4	2	5
Legolas	Elf	6	5	10
Bilbo	Hobbit	4	1	5