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 process. We pass a list to the dataframe method:

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

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

print(my_new_df)

OUT:

      name    type magic_power aggression 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 aggression 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
```