

# 1.1 - Series

April 11, 2017

```
In [1]: import pandas as pd
```

```
In [2]: l = list(range(0, 60, 3))
```

```
In [3]: s = pd.Series(l)
```

```
In [4]: l
```

```
Out[4]: [0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57]
```

```
In [5]: s
```

```
0      0
1      3
2      6
3      9
4     12
5     15
6     18
7     21
8     24
9     27
10    30
11    33
12    36
13    39
14    42
15    45
16    48
17    51
18    54
19    57
```

```
dtype: int64
```

```
In [6]: %timeit -n 1 -r 1 sum(l)
```

```
1 loop, best of 1: 2.05  $\mu$ s per loop
```

```

In [7]: %timeit -n 1 -r 1 s.sum()
1 loop, best of 1: 3.85 ms per loop

In [8]: l = list(range(0, 10**6, 3))
In [9]: s = pd.Series(l)
In [10]: l[:15]
Out[10]: [0, 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42]
In [11]: s[:15]

0      0
1      3
2      6
3      9
4     12
5     15
6     18
7     21
8     24
9     27
10    30
11    33
12    36
13    39
14    42
dtype: int64

In [12]: %timeit -n 1 -r 1 sum(l)
1 loop, best of 1: 3.6 ms per loop

In [13]: %timeit -n 1 -r 1 s.sum()
1 loop, best of 1: 461  $\mu$ s per loop

In [14]: %timeit -n 1 -r 1 sum(s)
1 loop, best of 1: 34.1 ms per loop

In [15]: s.values
Out[15]: array([      0,       3,       6, ..., 999993, 999996, 999999])

```

## 0.1 Sfruttiamo l'indice

```
In [16]: l[121], s[121]
```

```
Out[16]: (363, 363)
```

```
In [17]: my_l = l[97:120]  
        my_s = s[97:120]
```

```
In [18]: my_l
```

```
Out[18]: [291,  
          294,  
          297,  
          300,  
          303,  
          306,  
          309,  
          312,  
          315,  
          318,  
          321,  
          324,  
          327,  
          330,  
          333,  
          336,  
          339,  
          342,  
          345,  
          348,  
          351,  
          354,  
          357]
```

```
In [19]: my_s
```

```
97    291  
98    294  
99    297  
100   300  
101   303  
102   306  
103   309  
104   312  
105   315  
106   318  
107   321
```

```
108    324
109    327
110    330
111    333
112    336
113    339
114    342
115    345
116    348
117    351
118    354
119    357
dtype: int64
```

```
In [20]: my_l[0]
```

```
Out[20]: 291
```

```
In [21]: my_s[110]
```

```
Out[21]: 330
```

```
In [22]: my_s.iloc[-1]
```

```
Out[22]: 357
```

```
In [23]: my_s.loc[119]
```

```
Out[23]: 357
```

```
In [24]: my_s.values[15] == my_s.iloc[15]
```

```
Out[24]: True
```

## 0.2 Com'è fatto l'indice

```
In [25]: my_s.index
```

```
Out[25]: RangeIndex(start=97, stop=120, step=1)
```

```
In [26]: re_my_s = pd.Series(my_s.values)
```

```
In [27]: re_my_s == my_l
```

```
0    True
1    True
2    True
3    True
```

```
4     True
5     True
6     True
7     True
8     True
9     True
10    True
11    True
12    True
13    True
14    True
15    True
16    True
17    True
18    True
19    True
20    True
21    True
22    True
dtype: bool
```

```
In [28]: re_my_s.index = range(97, 120)
        # Perché gli index sono immutabili!
```

```
In [29]: re_my_s2 = pd.Series(range(291, 358, 3),
                             index=range(97, 120))
```

```
In [30]: (re_my_s2 == my_s).all()
```

```
Out[30]: True
```

```
In [31]: indice = ['el_{}'.format(i) for i in range(97, 120)]
```

```
In [32]: re_my_s2.index = indice
```

```
In [33]: re_my_s2
```

```
el_97    291
el_98    294
el_99    297
el_100   300
el_101   303
el_102   306
el_103   309
el_104   312
el_105   315
el_106   318
```

```
el_107      321
el_108      324
el_109      327
el_110      330
el_111      333
el_112      336
el_113      339
el_114      342
el_115      345
el_116      348
el_117      351
el_118      354
el_119      357
dtype: int64
```

```
In [34]: re_my_s2.index
```

```
Out[34]: Index(['el_97', 'el_98', 'el_99', 'el_100', 'el_101', 'el_102', 'el_103',
               'el_104', 'el_105', 'el_106', 'el_107', 'el_108', 'el_109', 'el_110',
               'el_111', 'el_112', 'el_113', 'el_114', 'el_115', 'el_116', 'el_117',
               'el_118', 'el_119'],
              dtype='object')
```

```
In [35]: indice[14] = 'il mio multiplo di 111 preferito'
```

```
In [36]: indice[15] = -1
```

```
In [37]: re_my_s2.index = indice
```

```
In [38]: re_my_s2
```

```
el_97          291
el_98          294
el_99          297
el_100         300
el_101         303
el_102         306
el_103         309
el_104         312
el_105         315
el_106         318
el_107         321
el_108         324
el_109         327
el_110         330
il mio multiplo di 111 preferito  333
-1             336
```

```
el_113      339
el_114      342
el_115      345
el_116      348
el_117      351
el_118      354
el_119      357
dtype: int64
```

```
In [39]: re_my_s2.index
```

```
Out[39]: Index([
    'el_97',
    'el_99',
    'el_101',
    'el_103',
    'el_105',
    'el_107',
    'el_109',
    'il mio multiplo di 111 preferito',
    'el_113',
    'el_115',
    'el_117',
    'el_119'],
             dtype='object')
```

```
In [40]: re_my_s2.index[14] = 'ho cambiato idea'
```

```
-----
TypeError                                 Traceback (most recent call last)

<ipython-input-40-75585b433b8c> in <module>()
----> 1 re_my_s2.index[14] = 'ho cambiato idea'

/home/pietro/nobackup/repo/pandas/pandas/indexes/base.py in __setitem__(self, key, value)
1564
1565     def __setitem__(self, key, value):
-> 1566         raise TypeError("Index does not support mutable operations")
1567
1568     def __getitem__(self, key):
```

```
TypeError: Index does not support mutable operations
```