Module 5 Exercises - Time Series ¶

Exercise 1:

Create a numPy datetime variable with today's date. Then create 7 consecutive days (1 week) starting from the variable with today's date.

In [20]:

```
import pandas as pd
import numpy as np
import seaborn; seaborn.set()
import matplotlib.pyplot as plt

from datetime import datetime   #daytime type 584 year back and futer

%matplotlib inline
```

In [21]:

```
date = np.array('2018-04-04', dtype=np.datetime64)
```

In [22]:

```
date
```

Out[22]:

```
array('2018-04-04', dtype='datetime64[D]')
```

In [23]:

```
date + np.arange(7)
```

Out[23]:

```
array(['2018-04-04', '2018-04-05', '2018-04-06', '2018-04-07',
       '2018-04-08', '2018-04-09', '2018-04-10'], dtype='datetime64[D]')
```

In [24]:

```
date
```

Out[24]:

```
array('2018-04-04', dtype='datetime64[D]')
```

Exercise 2:

Create a pandas datetime index with the dates 2016-02-11, 2016-07-01, 2016-07-09, 2016-10-08, 2017-02-18, 2017-02-25, 2017-05-02, 2017-08-26, 2017-12-15, and 2018-02-11. Then create a pandas Series with the values 0,1,2,3,4,5,6,7,8, and 9 in a list, with the dates as the index. Get the rows from the year 2017.

In [29]:

```
index = pd.DatetimeIndex(['2018-04-04', '2018-04-05', '2018-04-06', '2018-04-07'
       '2018-04-08', '2018-04-09', '2018-04-10'])
data = pd.Series([0,1,2,3,4,5,6], index=index)  #= to make single column
```

```
In [31]: data['2018']
```

```
Out[31]: 2018-04-04    0
         2018-04-05    1
         2018-04-06    2
         2018-04-07    3
         2018-04-08    4
         2018-04-09    5
         2018-04-10    6
         dtype: int64
```

Exercise 3:

Convert the following date formats into pandas datetime:

- datetime(2017, 12, 15)
- 8th of October 2016
- 20180211
- 2017-02-25
- 2019-Jan-16

```
In [14]: dates = pd.to_datetime([datetime(2017,12,15), "8th of October 2016", "20180211",
```

```
In [15]: dates
```

```
Out[15]: DatetimeIndex(['2017-12-15', '2016-10-08', '2018-02-11', '2017-02-25',
                        '2019-01-16'],
                       dtype='datetime64[ns]', freq=None)
```

Exercise 4:

Using the pandas library, make a time delta range that has five periods with a 1 hour 45 minute interval.

```
In [6]: Times = pd.timedelta_range(0, freq='1H45T', periods=5)
        Times
```

```
Out[6]: TimedeltaIndex(['00:00:00', '01:45:00', '03:30:00', '05:15:00', '07:00:00'], dt
        ype='timedelta64[ns]', freq='105T')
```

Exercise 5:

Using the pandas library, create a date range with 20 business days starting from today's date.

In [7]:

```
from pandas.tseries.offsets import BDay #.tseries.offsets

bizdays = pd.date_range('2019-04-04', periods=20, freq=BDay()) # BUSINESS DAY
bizdays
```

Out[7]:

```
DatetimeIndex(['2019-04-04', '2019-04-05', '2019-04-08', '2019-04-09',
               '2019-04-10', '2019-04-11', '2019-04-12', '2019-04-15',
               '2019-04-16', '2019-04-17', '2019-04-18', '2019-04-19',
               '2019-04-22', '2019-04-23', '2019-04-24', '2019-04-25',
               '2019-04-26', '2019-04-29', '2019-04-30', '2019-05-01'],
              dtype='datetime64[ns]', freq='B')
```

Exercise 6:

From this link (https://notebooks.azure.com/priesterkc/projects/DABmaterial/tree/Lv1%20Data%20Analytics/datase download the "smalltravel.csv" file and upload it to your datasets folder. Import the traveltime_s.csv file into a dataframe. Resample the average speed column by week using the mean, and plot the graph.

Tip: You do not need to add the line style in the plot code.

In [8]:

```
#df['col'] = pd.to_datetime(df['col'])
```

In [9]:

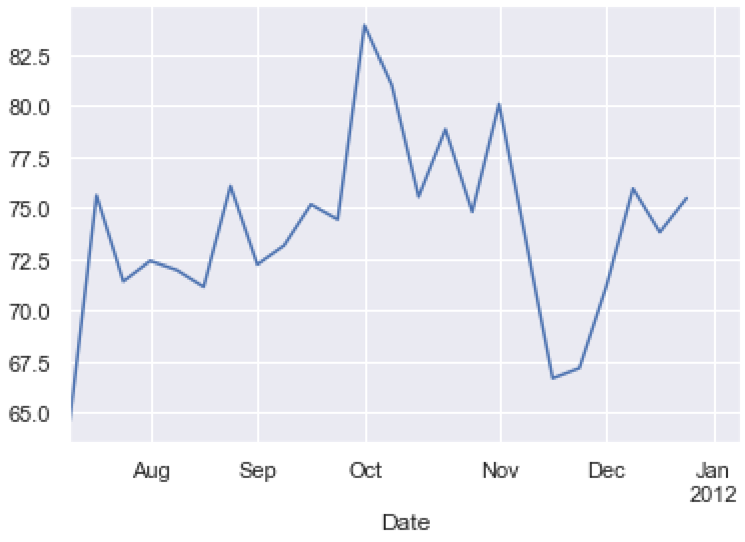
```
traveldf = pd.read_csv("datasets/smalltravel.csv", index_col='Date', parse_dates
traveldf.head()
```

Out[9]:

	GoingTo	AvgSpeed	MovingTime
Date			
2012-01-06	Home	78.3	36.3
2012-01-06	GSK	81.8	34.9
2012-01-04	Home	82.0	35.9
2012-01-04	GSK	74.2	35.6
2012-01-03	Home	83.4	34.8

In [10]:
```
weekly = traveldf['AvgSpeed'].resample('W').mean()
weekly.plot()
```

Out[10]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2742b9dae80>
```



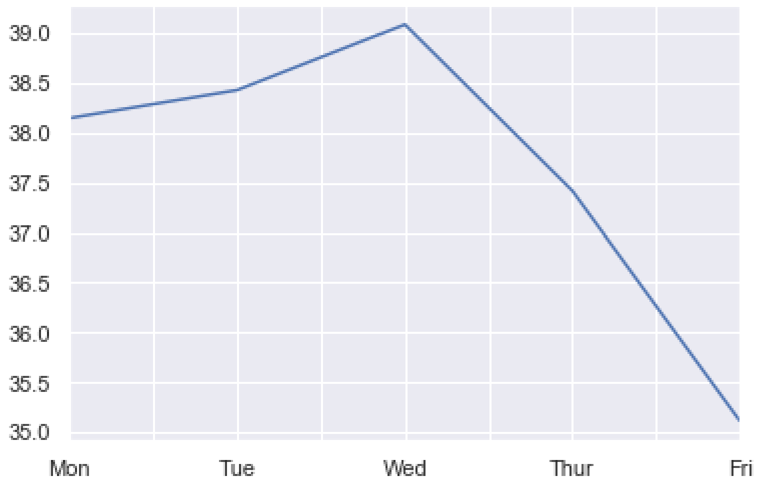
Exercise 7:

Using the dataframe from the previous exercise, write code to group the moving time column by day of the week, then plot the graph.

Tip: The index list only needs to contain the weekdays. You do not need to add the line style in the plot code.

In [11]:
```
by_weekday = traveldf['MovingTime'].groupby(traveldf.index.dayofweek).mean()
by_weekday.index = ['Mon', 'Tue', 'Wed', 'Thur', 'Fri']
by_weekday.plot()
```

Out[11]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2742c174e48>
```



In [ ]:

In [ ]: