

# Lesson19\_Assignment

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**Create a sample DataFrame with time series data.**

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

```
In [2]: date_rng = pd.date_range(start='2023-01-01', end='2023-01-31', freq='D')
data = np.random.rand(len(date_rng)) # Random data for demonstration
df = pd.DataFrame({'Date': date_rng, 'Value': data})
df.set_index('Date', inplace=True)
```

```
In [3]: df.head()
```

Out[3]:

	Value
Date	
2023-01-01	0.831165
2023-01-02	0.117792
2023-01-03	0.325506
2023-01-04	0.791047
2023-01-05	0.577671

**1) Calculate the mean value of the 'Value' column for the month of January 2023.**

```
In [4]: df['Value'].mean()
```

Out[4]: 0.500838903714002

**2) Extract and display data for the week of January 15, 2023, to January 21, 2023.**

```
In [5]: df['2023-01-15':'2023-01-21']
```

Out[5]:

	Value
Date	
2023-01-15	0.052611
2023-01-16	0.153827
2023-01-17	0.858016
2023-01-18	0.991093
2023-01-19	0.117649
2023-01-20	0.497901
2023-01-21	0.599053

***3) Calculate the rolling 7-day average of the 'Value' column and create a new DataFrame with the original data and the rolling average.***

```
In [6]: df2 = df.copy()
```

```
In [7]: df2['7D Rolling AVG'] = df2.rolling(window=7, center=True).mean()  
df2
```

Out[7]:

	Value	7D Rolling AVG
Date		
2023-01-01	0.831165	NaN
2023-01-02	0.117792	NaN
2023-01-03	0.325506	NaN
2023-01-04	0.791047	0.498212
2023-01-05	0.577671	0.462276
2023-01-06	0.339733	0.454660
2023-01-07	0.504573	0.447512
2023-01-08	0.579615	0.357730
2023-01-09	0.064475	0.387172
2023-01-10	0.275470	0.469696
2023-01-11	0.162574	0.539949
2023-01-12	0.783767	0.464663
2023-01-13	0.917394	0.477428
2023-01-14	0.996350	0.560649
2023-01-15	0.052611	0.679008
2023-01-16	0.153827	0.583849
2023-01-17	0.858016	0.523921
2023-01-18	0.991093	0.467164
2023-01-19	0.117649	0.553390
2023-01-20	0.497901	0.660639
2023-01-21	0.599053	0.551025
2023-01-22	0.656188	0.466731
2023-01-23	0.904571	0.533023
2023-01-24	0.090718	0.505253
2023-01-25	0.401034	0.556201
2023-01-26	0.581692	0.474656
2023-01-27	0.303512	0.428438
2023-01-28	0.955694	0.476750
2023-01-29	0.085370	NaN
2023-01-30	0.581043	NaN
2023-01-31	0.428903	NaN

**4) Create a line plot to visualize the 'Value' column and the rolling 7-day average together.**

```
In [8]: df2.plot.line(y=['Value', '7D Rolling AVG'], color=['g','r'],  
                    title='Line Plot of DF2')
```

```
Out[8]: <AxesSubplot:title={'center':'Line Plot of DF2'}, xlabel='Date'>
```

