```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import yfinance as yf
import datetime
```

```
%matplotlib inline
```

```
tickers = ['AAPL', 'MSFT', 'GOOGL', 'AMZN', 'JPM', 'BAC', 'WFC', 'C']
```

```
# 2 years of data
start = datetime.datetime(2016, 1, 1)
end = datetime.datetime(2017, 12, 31)
stock_data = yf.download(tickers, start=start, end=end)
```

```
[*********************100%***********************]  8 of 8 completed
```

```
stock_data.shape
```

```
(504, 48)
```

```
# 2 years of data
start = datetime.datetime(2016, 1, 1)
end = datetime.datetime(2017, 12, 31)
stock_data = yf.download('AAPL', start=start, end=end)
```

```
[*********************100%***********************]  1 of 1 completed
```

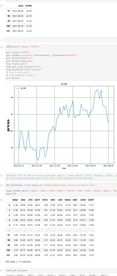
```
stock_data.shape
```

```
(504, 6)
```

```
stock_data.tail()
```

	Open	High	Low	Close	Adj Close	Volume
Date						
2017-12-22	171.537	174.54	171.396	174.350	169.804	16480987
2017-12-26	170.160	172.300	169.026	170.570	166.127	21498213
2017-12-27	170.620	170.786	169.885	170.475	166.034	16480314
2017-12-28	171.030	171.775	170.781	171.085	166.630	12655951
2017-12-29	170.805	171.466	169.539	169.848	165.413	18844984

```
# Plot the closing price of AAPL
stock_data['Close'].plot(figsize=(10, 7))
plt.title("Stock Price", fontsize=17)
plt.ylabel('Price', fontsize=14)
plt.xlabel('Time', fontsize=14)
plt.grid(which='major', linewidth=0.5, color='k')
plt.minor_ticks_on()
plt.grid(which='minor', linewidth=0.5, color='k')
plt.legend(['AAPL'])
plt.show()
```




```
# Plot Open and the adjusted Closed Apple stock data, color, legend, linewidth, grid
stock_data[['Open', 'Adj Close']].plot(figsize=(10, 7), linewidth=1.5, grid=True)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fb8d0d0d0d0>
```

```
# Set parameters for a new plot
plt.rcParams['figure.figure.edgecolor'] = 'red'
stock_data[['Open', 'Adj Close']].plot(figsize=(10, 7), linewidth=1.5, grid=True)
plt.show()
```

```
# Create a copy of stock_df variable
stock_df = stock_data.copy()
stock_df.head()
```

	Open	High	Low	Close	Adj Close	Volume
Date						
2016-01-04	105.370	105.850	102.410	105.350	102.410	67649400
2016-01-05	102.610	105.923	100.671	102.710	99.824	55790000
2016-01-06	100.700	102.363	96.796	99.960	97.164	79951200
2016-01-07	96.545	99.062	94.372	96.430	93.742	98192800
2016-01-08	98.610	99.980	96.266	98.379	95.635	62630400

```
# Create a new column for the 10 day moving average
stock_df['10_MA'] = stock_df['Close'].rolling(10).mean()
stock_df.head(20)
```

	Open	High	Low	Close	Adj Close	Volume	10_MA
Date							
2016-01-04	105.370	105.850	102.410	105.350	102.410	67649400	NaN
2016-01-05	102.610	105.923	100.671	102.710	99.824	55790000	NaN
2016-01-06	100.700	102.363	96.796	99.960	97.164	79951200	NaN
2016-01-07	96.545	99.062	94.372	96.430	93.742	98192800	NaN
2016-01-08	98.610	99.980	96.266	98.379	95.635	62630400	NaN
2016-01-11	98.800	99.470	96.543	97.099	94.387	63170400	NaN
2016-01-12	99.940	101.689	98.837	101.063	98.247	79687800	NaN
2016-01-13	99.350	100.543	96.043	97.339	94.621	87381400	NaN
2016-01-14	100.076	100.810	97.500	98.230	95.487	70790800	NaN
2016-01-15	97.390	98.515	94.709	96.364	93.674	83087200	NaN
2016-01-19	97.810	99.699	97.060	98.671	95.913	60655800	NaN
2016-01-20	96.270	97.633	93.817	94.372	91.731	106721200	NaN
2016-01-21	94.790	97.370	94.372	96.958	94.258	75424800	96.958
2016-01-22	97.633	98.990	96.267	98.431	95.686	65799200	97.497
2016-01-23	98.370	99.558	97.930	98.500	95.753	62790800	97.992
2016-01-24	98.037	98.249	95.004	95.172	92.516	90070400	97.626
2016-01-25	95.797	96.239	93.930	94.418	91.776	94543600	97.180

20 rows × 7 columns

```
# Create a new column for the 50 day moving average
stock_df['50_MA'] = stock_df['Close'].rolling(50).mean()
stock_df.head(60)
```

	Open	High	Low	Close	Adj Close	Volume	10_MA	50_MA
Date								
2016-01-04	105.370	105.850	102.410	105.350	102.410	67649400	NaN	NaN
2016-01-05	102.610	105.923	100.671	102.710	99.824	55790000	NaN	NaN
2016-01-06	100.700	102.363	96.796	99.960	97.164	79951200	NaN	NaN
2016-01-07	96.545	99.062	94.372	96.430	93.742	98192800	NaN	NaN
2016-01-08	98.610	99.980	96.266	98.379	95.635	62630400	NaN	NaN
2016-01-11	98.800	99.470	96.543	97.099	94.387	63170400	NaN	NaN
2016-01-12	99.940	101.689	98.837	101.063	98.247	79687800	NaN	NaN
2016-01-13	99.350	100.543	96.043	97.339	94.621	87381400	NaN	NaN
2016-01-14	100.076	100.810	97.500	98.230	95.487	70790800	NaN	NaN
2016-01-15	97.390	98.515	94.709	96.364	93.674	83087200	NaN	NaN
2016-01-19	97.810	99.699	97.060	98.671	95.913	60655800	NaN	NaN
2016-01-20	96.270	97.633	93.817	94.372	91.731	106721200	NaN	NaN
2016-01-21	94.790	97.370	94.372	96.958	94.258	75424800	96.958	NaN
2016-01-22	97.633	98.990	96.267	98.431	95.686	65799200	97.497	NaN
2016-01-23	98.370	99.558	97.930	98.500	95.753	62790800	97.992	NaN
2016-01-24	98.037	98.249	95.004	95.172	92.516	90070400	97.626	NaN
2016-01-25	95.797	96.239	93.930	94.418	91.776	94543600	97.180	NaN
2016-01-26	96.267	97.430	95.344	96.430	93.742	74846800	96.430	NaN
2016-01-27	96.960	97.300	95.090	95.690	93.024	78544000	95.690	NaN
2016-01-28	96.690	97.877	95.690	97.430	94.712	67168800	96.430	NaN
2016-01-29	97.430	97.877	96.430	97.430	94.712	65420000	96.430	NaN
2016-01-30	96.430	96.430	93.800	94.820	92.172	90418400	95.820	NaN
2016-01-31	94.820	95.040	92.348	93.750	91.146	108772800	95.250	NaN
2016-02-01	93.800	94.880	93.408	94.372	91.731	73475200	94.372	NaN
2016-02-02	94.372	94.559	91.797	92.930	90.339	90444800	93.930	NaN
2016-02-03	93.250	94.807	92.828	93.880	91.268	94994200	93.880	NaN
2016-02-04	94.807	95.099	93.797	94.480	91.853	62824800	94.180	NaN
2016-02-05	94.480	94.823	92.930	93.348	90.753	63274400	94.048	NaN
2016-02-06	93.348	94.480	92.930	94.190	91.571	79687200	94.190	NaN
2016-02-07	94.190	96.043	93.547	95.940	93.274	98314400	94.940	NaN
2016-02-08	95.940	96.267	94.637	94.910	92.273	62796800	94.910	NaN
2016-02-09	95.000	95.370	94.320	94.930	92.292	56305600	94.930	NaN
2016-02-10	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-11	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-12	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-13	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-14	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-15	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-16	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-17	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-18	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-19	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-20	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-21	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-22	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-23	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-24	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-25	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-26	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-27	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-02-28	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-02-29	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-01	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-02	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-03	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-04	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-05	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-06	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-07	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-08	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-09	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-10	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-11	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-12	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-13	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-14	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-15	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-16	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-17	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-18	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-19	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-20	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-21	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-22	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-23	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-24	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-25	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-26	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-27	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-28	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-29	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-03-30	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-03-31	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-01	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-02	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-03	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-04	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-05	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-06	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-07	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-08	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-09	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-10	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-11	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-12	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-13	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-14	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-15	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-16	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-17	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-18	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-19	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-20	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-21	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-22	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-23	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-24	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-25	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-26	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-27	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-28	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-04-29	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-04-30	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
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2016-05-02	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-03	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-04	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-05	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-06	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-07	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-08	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-09	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-10	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-11	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-12	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-13	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-14	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-15	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-16	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-17	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-18	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-19	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-20	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-21	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-22	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-23	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-24	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-25	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-26	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-27	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-28	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-29	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-05-30	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-05-31	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-01	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-02	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-03	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-04	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-05	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-06	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-07	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-08	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-09	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-10	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-11	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-12	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-13	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-14	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-15	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-16	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-17	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-18	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-19	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-20	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-21	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-22	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-23	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-24	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-25	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-26	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-27	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-28	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-06-29	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-06-30	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-01	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-02	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-03	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-04	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-05	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-06	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-07	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-08	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-09	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-10	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-11	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-12	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-13	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-14	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-15	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-16	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-17	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-18	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-19	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-20	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-21	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-22	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-23	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-24	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-25	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-26	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-27	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-28	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-29	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-07-30	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-07-31	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-01	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-02	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-03	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-04	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-05	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-06	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-07	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-08	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-09	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-10	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-11	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-12	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-13	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-14	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-15	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-16	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-17	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-18	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-19	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-20	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-21	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-22	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-23	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-24	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-25	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-26	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-27	94.640	95.099	93.797	94.930	92.292	56305600	94.930	NaN
2016-08-28	94.930	95.500	93.930	94.640	92.010	62028800	94.640	NaN
2016-08-29	94.640	95.099	93.797	94.930	92.292	56305600	94.930	Na

0m0s0s

	title	price
198	Mercedes-Benz Sprinter	1000000
200	Volkswagen Transporter Panel Van	1000000
199	Kia Carnival	1000000
201	Toyota Land Cruiser 200 Wide	1000000
196	Toyota Hiace VIP Minibus	1000000

0m0s0s

```
dataset[dataset['price'].isnull() & (dataset['year'] ...
```

0m0s0s

```
Unknown Unknown count:
0
```

0m0s0s

	title	category	region	power-train	condition	year	mileage	engine	transmission	drive	interior	exterior	cylinders	body type	fuel	drive-unit
198	Mercedes-Benz Sprinter	Trucks & Buses	Russia	Hydraulic	Used	Used	Unknown	2996 cm³, 211 hp	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Diesel	Unknown
200	Volkswagen Transporter Panel Van	Trucks & Buses	Russia	Mechanical	Used	Used	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Diesel	Unknown
199	Kia Carnival	Trucks & Buses	Russia	Unknown	Used	Used	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
201	Toyota Land Cruiser 200 Wide	Trucks & Buses	Russia	Mechanical	Used	Used	Unknown	4461 cm³, 235 hp	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Diesel	Unknown
196	Toyota Hiace VIP Minibus	Trucks & Buses	Russia	Unknown	Used	Used	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

0m0s0s

```
dataset[dataset['year'].isnull() & (dataset['year'] ...
```

0m0s0s

```
Unknown Unknown count:
0
```

0m0s0s

	title	price
198	Mercedes-Benz Sprinter	1000000
200	Volkswagen Transporter Panel Van	1000000
199	Kia Carnival	1000000
201	Toyota Land Cruiser 200 Wide	1000000
196	Toyota Hiace VIP Minibus	1000000

0m0s0s

```
dataset[dataset['price'] > 1000000].sort_values(...
```

0m0s0s

	title	price
198	Mercedes-Benz Sprinter	1000000
200	Volkswagen Transporter Panel Van	1000000
199	Kia Carnival	1000000
201	Toyota Land Cruiser 200 Wide	1000000
196	Toyota Hiace VIP Minibus	1000000

0m0s0s

```
dataset['brand'] = dataset.apply(lambda row: ...
```

0m0s0s

```
title          0
price          0
year           0
mileage        0
engine         0
transmission   0
drive          0
interior       0
exterior       0
cylinders      0
body type      0
fuel           0
drive-unit     0
brand          0
dtype: int64, (8,)
```

0m0s0s

```
# Top 10 vehicle brands
top_brands = dataset['brand'].value_counts().head(10)
plt.figure(figsize=(12,6))
sns.barplot(x=top_brands.index, y=top_brands.values, palette="viridis")
plt.xlabel("Name of brand")
plt.ylabel("Number of vehicles")
plt.title("Top 10 vehicle brands")
plt.xticks(rotation=45)
plt.show()
```

0m0s0s

```
top_brands.shape
```

0m0s0s

```
(10,)
```

0m0s0s

0m0s0s

```
```

0m0s0s

```
```