

ADS506 Assignment 1.2

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Assignment: Propose a Time Series Dataset for Your Final Project

```
#library(<PACKAGE_DEPENDENCIES>)
```

```
library(tidyverse)
library(dplyr)
```

Data Source

The S&P 500 stock price dataset was acquired from Yahoo Finance database and was neatly compiled as a time series exercise in Kaggle. The link is provided below. The daily time line spans from 23Nov2015 to 20Nov2020 with index prices given at high, low, open, close, and adjusted close values. The total trading activity is also provided as under volume.

Link: <https://www.kaggle.com/datasets/arashnic/time-series-forecasting-with-yahoo-stock-price>

Importing the Data

```
# import the data:
spy = read.csv('yahoo_stock.csv', stringsAsFactors = FALSE)
head(spy)
```

```
##      Date      High      Low      Open      Close      Volume Adj.Close
## 1 2015-11-23 2095.61 2081.39 2089.41 2086.59 3587980000 2086.59
## 2 2015-11-24 2094.12 2070.29 2084.42 2089.14 3884930000 2089.14
## 3 2015-11-25 2093.00 2086.30 2089.30 2088.87 2852940000 2088.87
## 4 2015-11-26 2093.00 2086.30 2089.30 2088.87 2852940000 2088.87
## 5 2015-11-27 2093.29 2084.13 2088.82 2090.11 1466840000 2090.11
## 6 2015-11-28 2093.29 2084.13 2088.82 2090.11 1466840000 2090.11
```

```
str(spy)
```

```
## 'data.frame': 1825 obs. of 7 variables:
## $ Date      : chr "2015-11-23" "2015-11-24" "2015-11-25" "2015-11-26" ...
## $ High      : num 2096 2094 2093 2093 2093 ...
## $ Low       : num 2081 2070 2086 2086 2084 ...
## $ Open      : num 2089 2084 2089 2089 2089 ...
## $ Close     : num 2087 2089 2089 2089 2090 ...
## $ Volume    : num 3.59e+09 3.88e+09 2.85e+09 2.85e+09 1.47e+09 ...
## $ Adj.Close : num 2087 2089 2089 2089 2090 ...
```

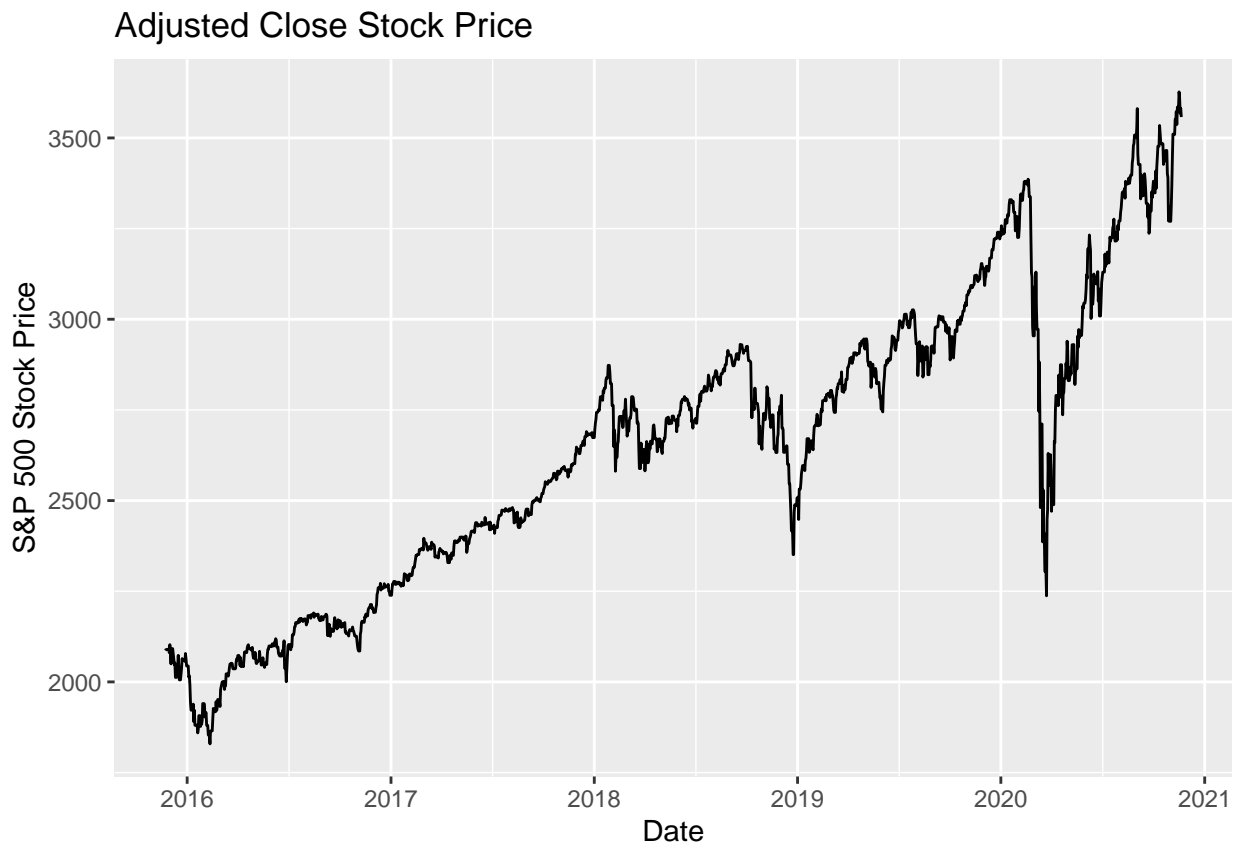
```
# transform if necessary:
spy$Date <- as.Date(spy$Date)
summary(spy)
```

##	Date	High	Low	Open
##	Min. :2015-11-23	Min. :1847	Min. :1810	Min. :1833
##	1st Qu.:2017-02-21	1st Qu.:2348	1st Qu.:2322	1st Qu.:2342
##	Median :2018-05-23	Median :2696	Median :2668	Median :2685
##	Mean :2018-05-23	Mean :2661	Mean :2633	Mean :2648
##	3rd Qu.:2019-08-22	3rd Qu.:2931	3rd Qu.:2901	3rd Qu.:2914
##	Max. :2020-11-20	Max. :3646	Max. :3600	Max. :3612

##	Close	Volume	Adj.Close
##	Min. :1829	Min. :1.297e+09	Min. :1829
##	1st Qu.:2329	1st Qu.:3.258e+09	1st Qu.:2329
##	Median :2683	Median :3.610e+09	Median :2683
##	Mean :2648	Mean :3.870e+09	Mean :2648
##	3rd Qu.:2918	3rd Qu.:4.143e+09	3rd Qu.:2918
##	Max. :3627	Max. :9.045e+09	Max. :3627

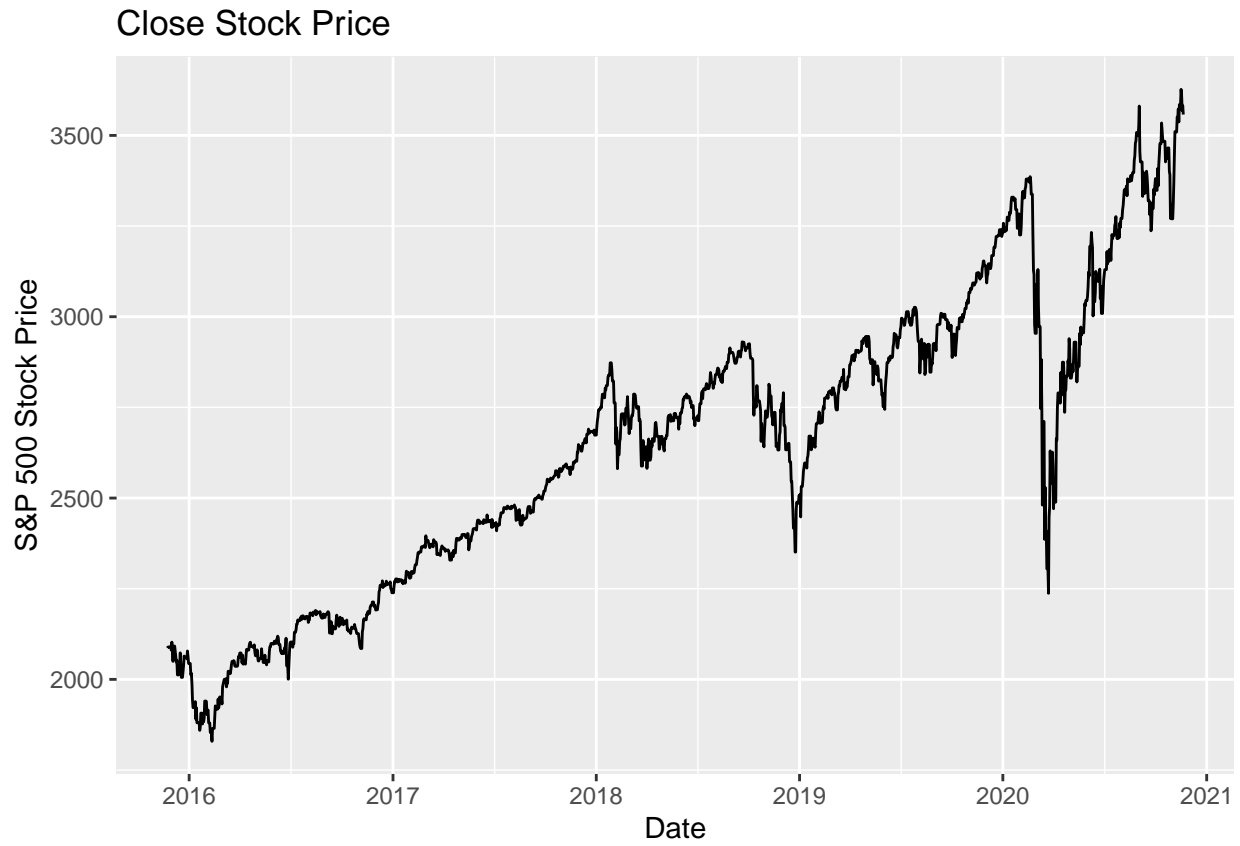
Time Series Plot

```
ggplot(spy, aes(Date, Adj.Close)) +
  xlab('Date') + ylab('S&P 500 Stock Price') +
  scale_x_date(date_breaks = "1 year", date_labels = "%Y") +
  geom_line()+
  ggtitle('Adjusted Close Stock Price')
```

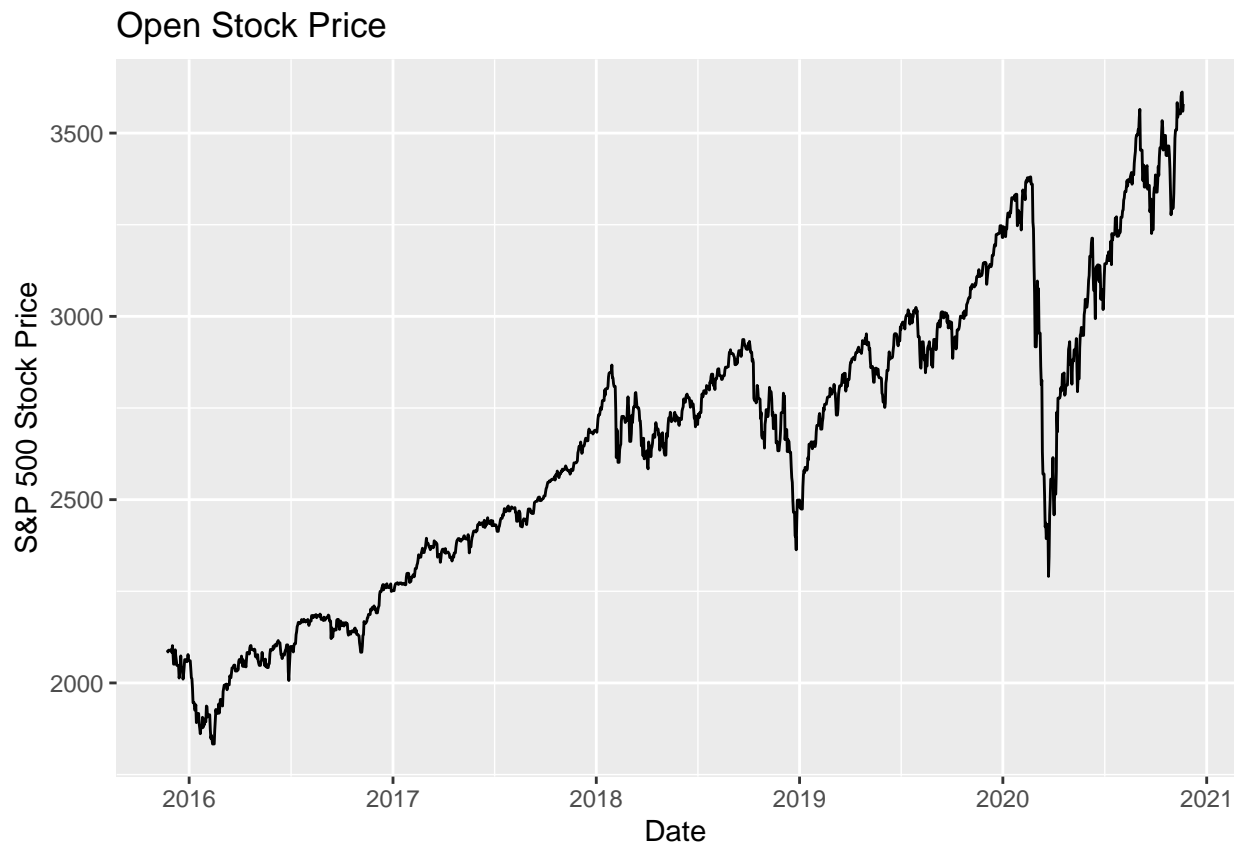


```
ggplot(spy, aes(Date, Close)) +
  xlab('Date') + ylab('S&P 500 Stock Price') +
  scale_x_date(date_breaks = "1 year", date_labels = "%Y") +
  geom_line()+
```

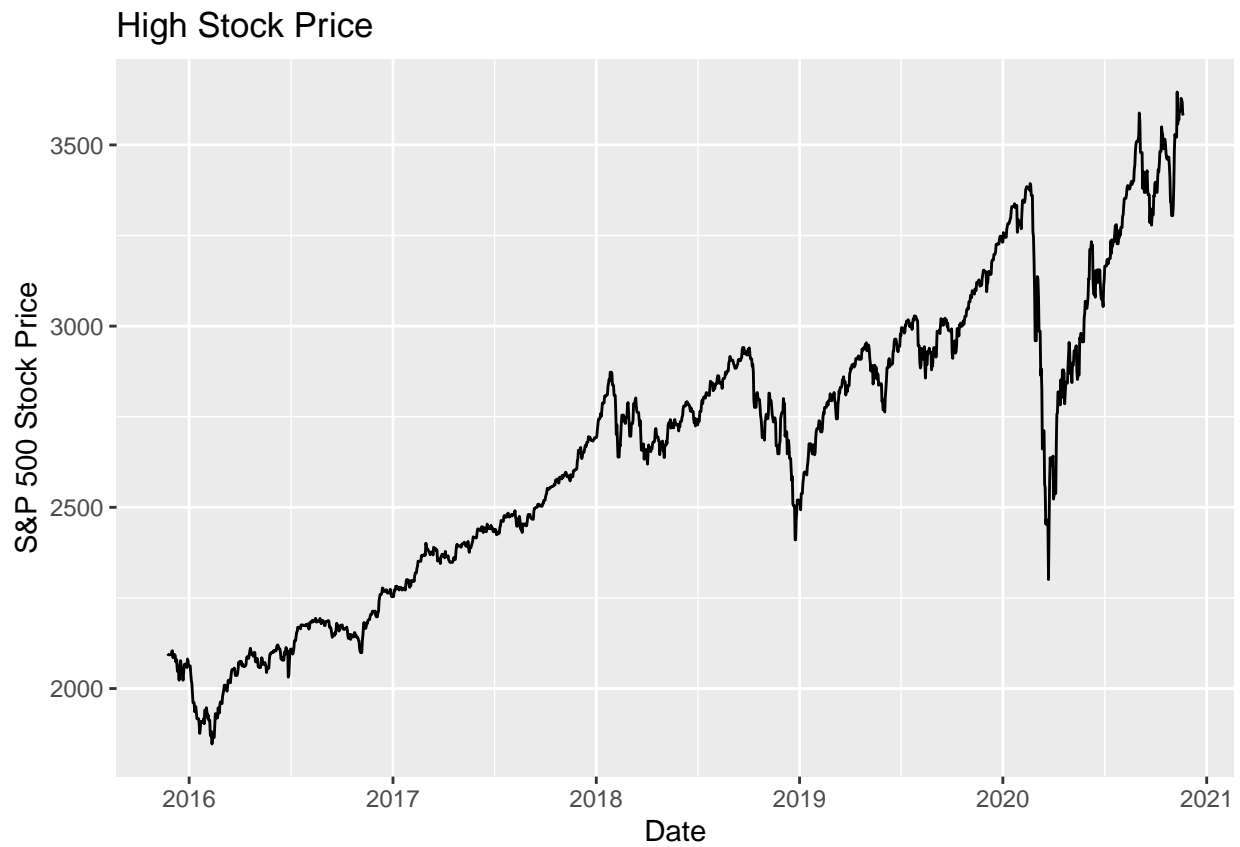
```
ggtitle('Close Stock Price')
```



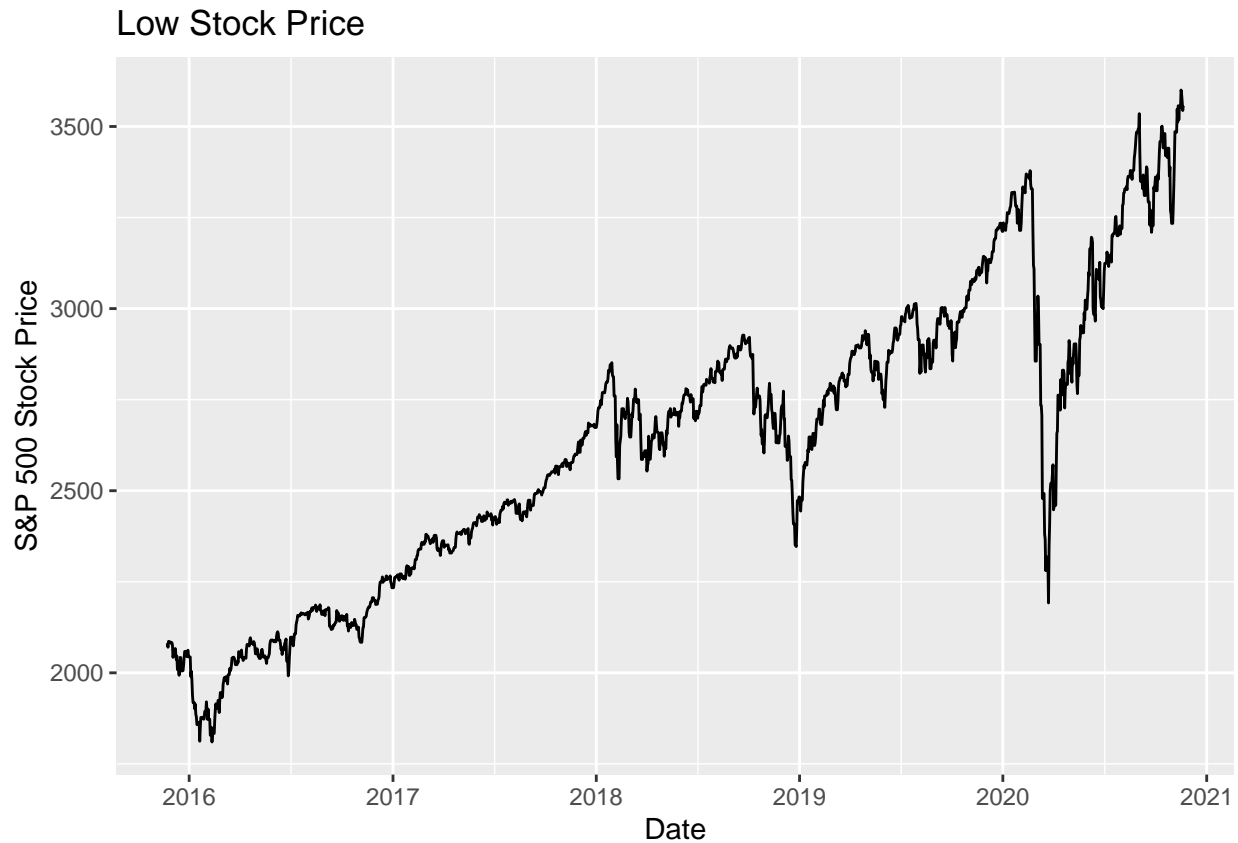
```
ggplot(spy, aes(Date, Open)) +  
  xlab('Date') + ylab('S&P 500 Stock Price') +  
  scale_x_date(date_breaks = "1 year", date_labels = "%Y") +  
  geom_line() +  
  ggtitle('Open Stock Price')
```



```
ggplot(spy, aes(Date, High)) +  
  xlab('Date') + ylab('S&P 500 Stock Price') +  
  scale_x_date(date_breaks = "1 year", date_labels = "%Y") +  
  geom_line() +  
  ggtitle('High Stock Price')
```



```
ggplot(spy, aes(Date, Low)) +  
  xlab('Date') + ylab('S&P 500 Stock Price') +  
  scale_x_date(date_breaks = "1 year", date_labels = "%Y") +  
  geom_line() +  
  ggtitle('Low Stock Price')
```



Discussion

For preliminary observation, there is an overall upward trend with some inconsistent seasonal groves. There are also drastic dips around 2016's low oil value incidence and 2019 as well as 2020 Covid era. There's not much difference between the high, low, open, and close prices. I think it would be really beneficial to explore the S&P 500 stock price dataset not only for this course but also for personal exposure to the stock market trend. After all, developing tools for forecasting the stock market prices has always been enticing and lucrative. I think having a hands on experience in analyzing stock market prices over time is going to be worth it for personal life and professional skills.

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