Data 624 Homework 1

Steven Gonzalez

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Load Packages

```
library(fpp3)
```

Exercise 1

Explore the following four time series: `Bricks` from `aus_production`, `Lynx` from `pelt`, `Close` from `gafa_stock`, `Demand` from `vic_elec`.

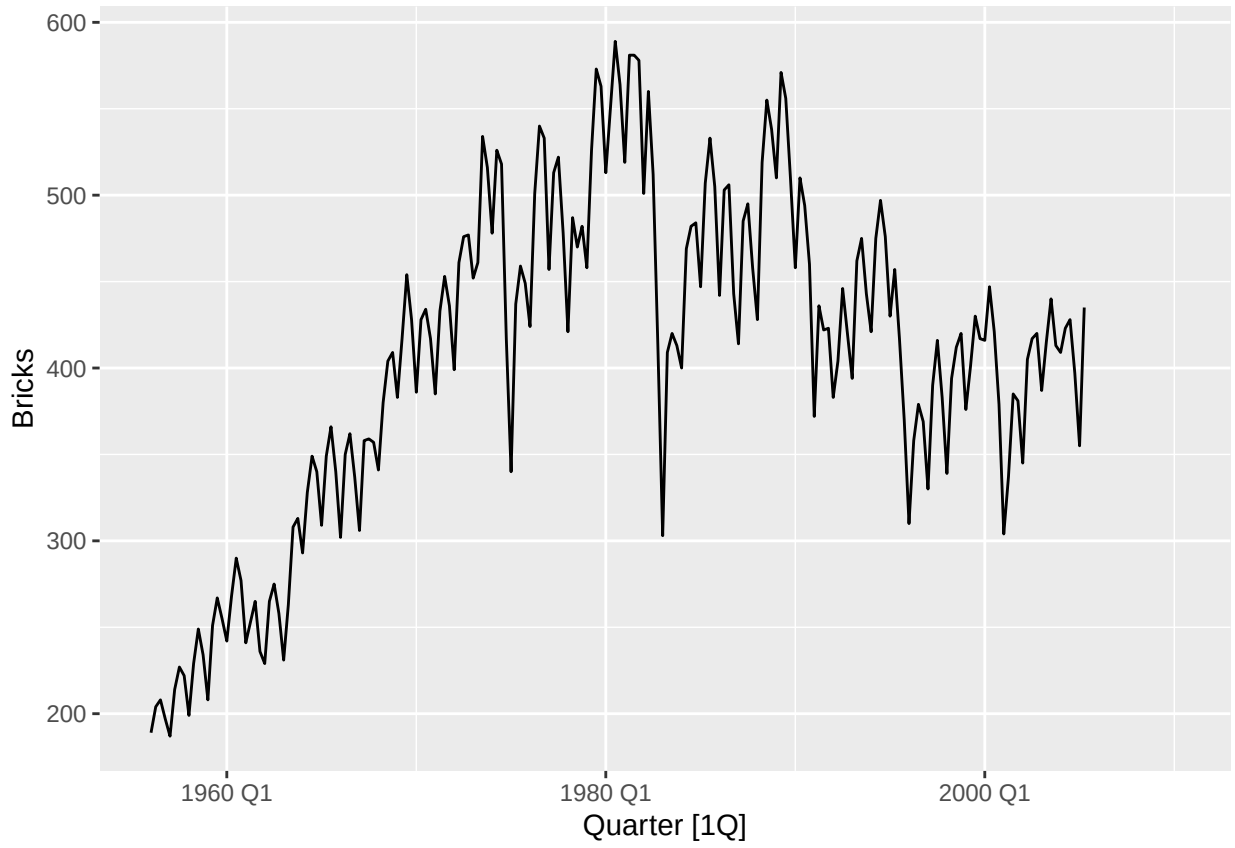
Use `?` (or `help()`) to find out about the data in each series. What is the time interval of each series? Use `autoplot()` to produce a time plot of each series. For the last plot, modify the axis labels and title.

```
?aus_production
aus_production #used to get further familiarized with the data
```

```
## # A tsibble: 218 x 7 [1Q]
##    Quarter  Beer Tobacco Bricks Cement Electricity   Gas
##      <qtr> <dbl>   <dbl>  <dbl>  <dbl>       <dbl> <dbl>
##  1 1956 Q1   284    5225    189    465        3923     5
##  2 1956 Q2   213    5178    204    532        4436     6
##  3 1956 Q3   227    5297    208    561        4806     7
##  4 1956 Q4   308    5681    197    570        4418     6
##  5 1957 Q1   262    5577    187    529        4339     5
##  6 1957 Q2   228    5651    214    604        4811     7
##  7 1957 Q3   236    5317    227    603        5259     7
##  8 1957 Q4   320    6152    222    582        4735     6
##  9 1958 Q1   272    5758    199    554        4608     5
## 10 1958 Q2   233    5641    229    620        5196     7
## # i 208 more rows
```

As can be seen from the results above, the `Bricks` time series from `aus_production` has a quarterly time interval. Below is the time plot illustrating this using `autoplot()`.

```
autoplot(aus_production, Bricks)
```

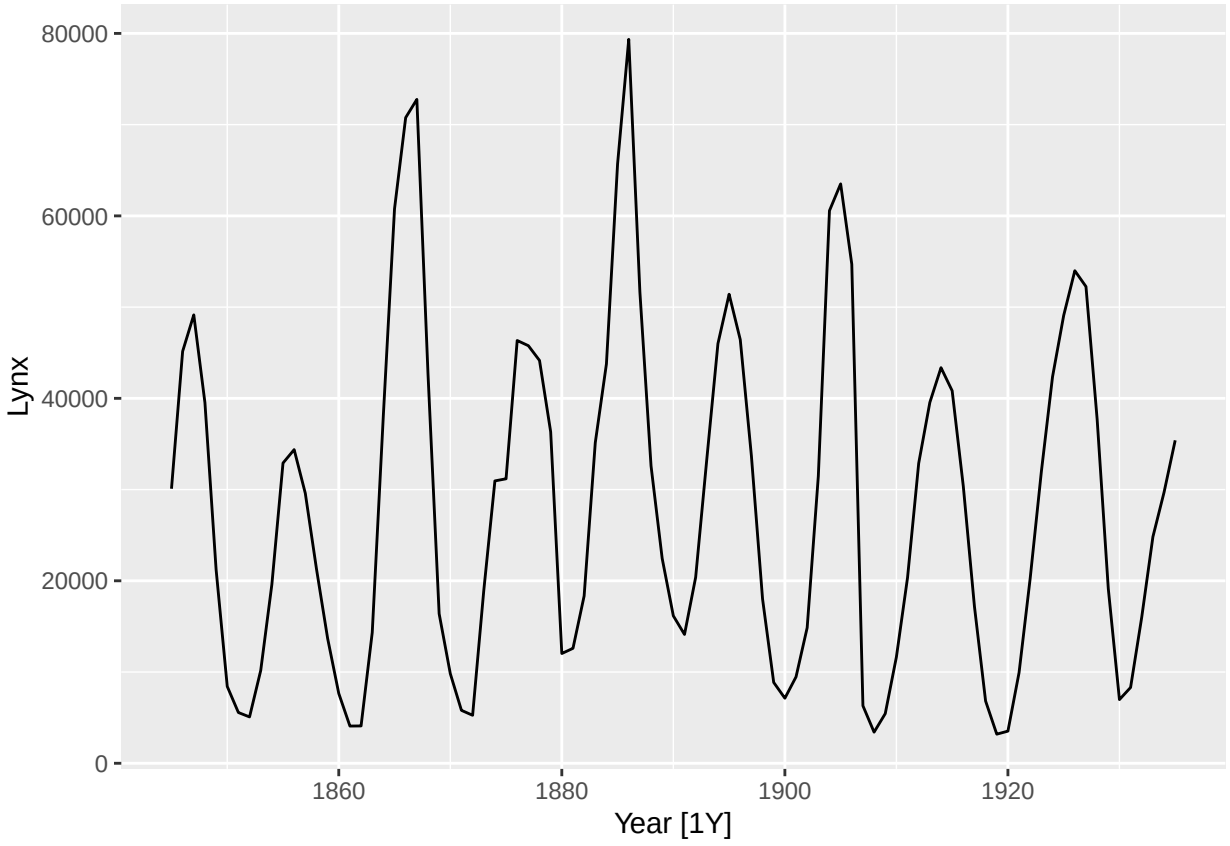



```
?pelt
pelt #used to get further familiarized with the data
```

```
## # A tsibble: 91 x 3 [1Y]
##     Year  Hare  Lynx
##    <dbl> <dbl> <dbl>
##  1  1845 19580 30090
##  2  1846 19600 45150
##  3  1847 19610 49150
##  4  1848 11990 39520
##  5  1849 28040 21230
##  6  1850 58000  8420
##  7  1851 74600  5560
##  8  1852 75090  5080
##  9  1853 88480 10170
## 10  1854 61280 19600
## # i 81 more rows
```

As can be seen from the results above, the `Lynx` time series from `pelt` has an annual time interval. Below is the time plot illustrating this using `autoplot()`.

```
autoplot(pelt, Lynx)
```

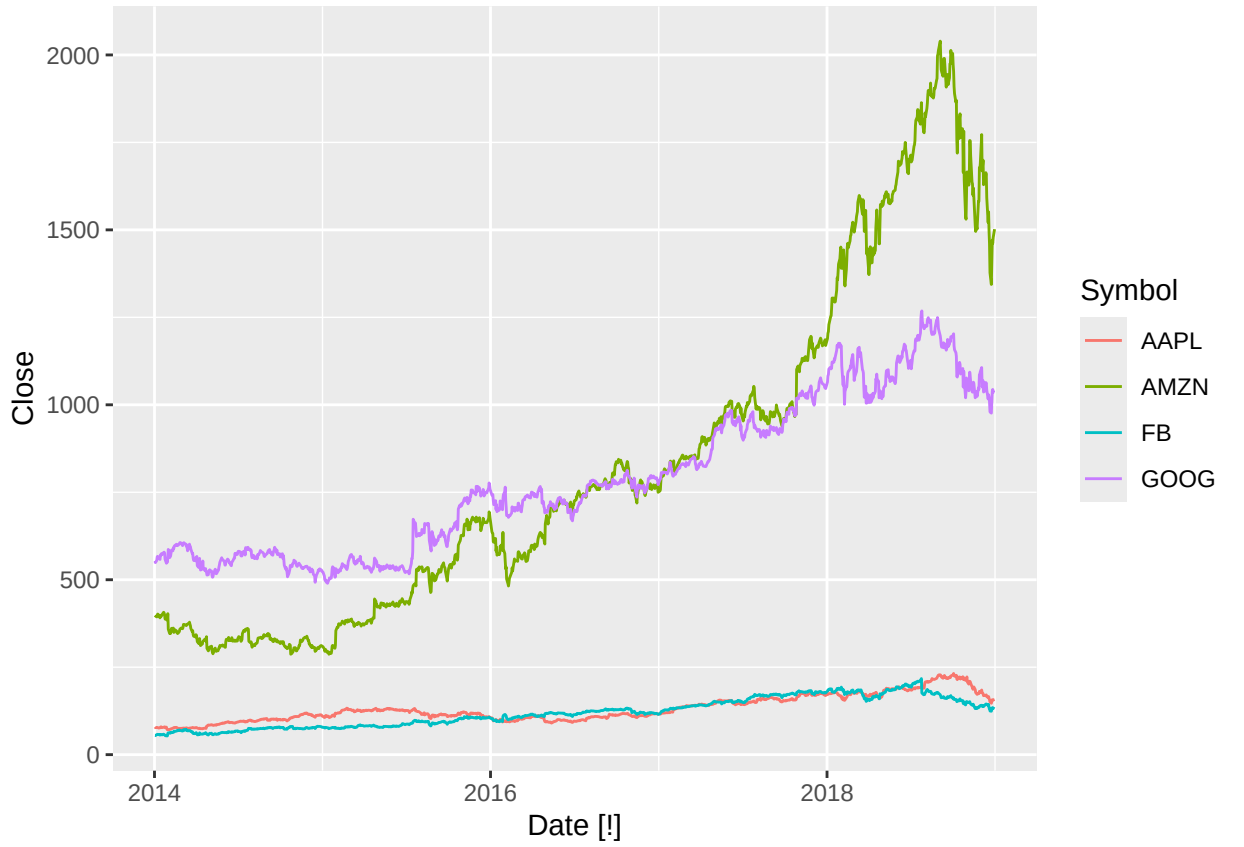



```
?gafa_stock
gafa_stock #used to get further familiarized with the data
```

```
## # A tsibble: 5,032 x 8 [!]
## # Key:       Symbol [4]
##    Symbol Date        Open  High   Low Close Adj_Close    Volume
##    <chr>  <date>     <dbl> <dbl> <dbl> <dbl>     <dbl>     <dbl>
##  1 AAPL   2014-01-02  79.4  79.6  78.9  79.0      67.0  58671200
##  2 AAPL   2014-01-03  79.0  79.1  77.2  77.3      65.5  98116900
##  3 AAPL   2014-01-06  76.8  78.1  76.2  77.7      65.9 103152700
##  4 AAPL   2014-01-07  77.8  78.0  76.8  77.1      65.4  79302300
##  5 AAPL   2014-01-08  77.0  77.9  77.0  77.6      65.8  64632400
##  6 AAPL   2014-01-09  78.1  78.1  76.5  76.6      65.0  69787200
##  7 AAPL   2014-01-10  77.1  77.3  75.9  76.1      64.5  76244000
##  8 AAPL   2014-01-13  75.7  77.5  75.7  76.5      64.9  94623200
##  9 AAPL   2014-01-14  76.9  78.1  76.8  78.1      66.1  83140400
## 10 AAPL   2014-01-15  79.1  80.0  78.8  79.6      67.5  97909700
## # i 5,022 more rows
```

As can be seen from the results above, the `Close` time series from `gafa_stock` has a time interval with specific dates that seem to be business days, which would make sense given that it is a data set on stock prices. Below is the time plot illustrating this using `autoplot()`.

```
autoplot(gafa_stock, Close)
```

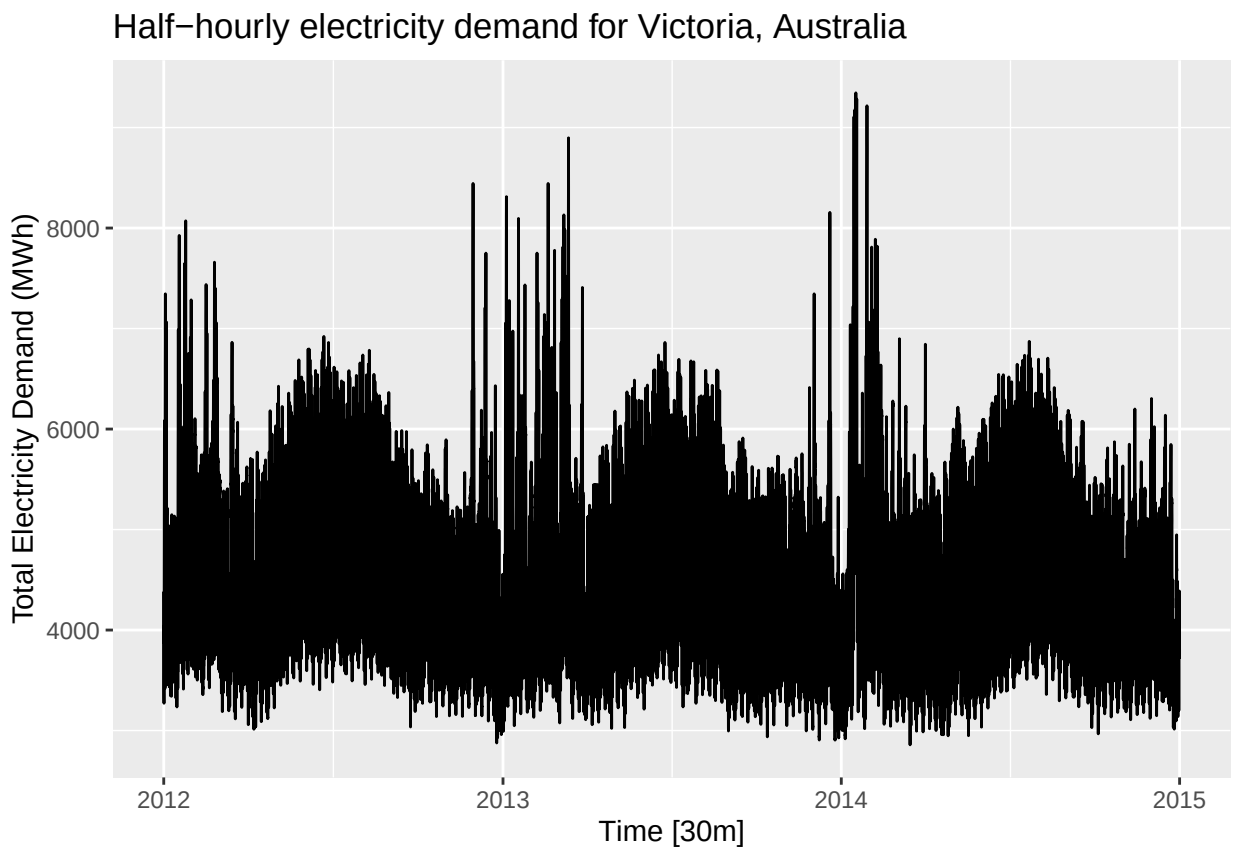



```
?vic_elec
vic_elec #used to get further familiarized with the data
```

```
## # A tsibble: 52,608 x 5 [30m] <Australia/Melbourne>
##    Time                Demand Temperature Date       Holiday
##    <dttm>               <dbl>       <dbl> <date>     <lgl>
##  1 2012-01-01 00:00:00  4383.        21.4 2012-01-01 TRUE
##  2 2012-01-01 00:30:00  4263.        21.0 2012-01-01 TRUE
##  3 2012-01-01 01:00:00  4049.        20.7 2012-01-01 TRUE
##  4 2012-01-01 01:30:00  3878.        20.6 2012-01-01 TRUE
##  5 2012-01-01 02:00:00  4036.        20.4 2012-01-01 TRUE
##  6 2012-01-01 02:30:00  3866.        20.2 2012-01-01 TRUE
##  7 2012-01-01 03:00:00  3694.        20.1 2012-01-01 TRUE
##  8 2012-01-01 03:30:00  3562.        19.6 2012-01-01 TRUE
##  9 2012-01-01 04:00:00  3433.        19.1 2012-01-01 TRUE
## 10 2012-01-01 04:30:00  3359.        19.0 2012-01-01 TRUE
## # i 52,598 more rows
```

As can be seen from the results above, the `Demand` time series from `vic_elec` has a half-hourly time interval. Below is the time plot illustrating this using `autoplot()` with modified title and axis labels.

```
autoplot(vic_elec, Demand) +
  labs(title = "Half-hourly electricity demand for Victoria, Australia",
       y = "Total Electricity Demand (MWh)")
```



Exercise 2

Use `filter()` to find what days corresponded to the peak closing price for each of the four stocks in `gafa_stock`.

```
aapl_peak <- gafa_stock %>%
  filter(Symbol == "AAPL") %>%
  select(Symbol, Date, Close) %>%
  slice_max(Close, n = 1)
aapl_peak
```

```
## # A tsibble: 1 x 3 [!]
## # Key:       Symbol [1]
##   Symbol Date       Close
##   <chr>  <date>     <dbl>
## 1 AAPL   2018-10-03  232.
```

```
amzn_peak <- gafa_stock %>%
  filter(Symbol == "AMZN") %>%
```

```
  select(Symbol, Date, Close) %>%
  slice_max(Close, n = 1)
amzn_peak
```

```
## # A tsibble: 1 x 3 [!]
## # Key:       Symbol [1]
##   Symbol Date       Close
##   <chr>  <date>     <dbl>
## 1 AMZN   2018-09-04 2040.
```

```
fb_peak <- gafa_stock %>%
  filter(Symbol == "FB") %>%
  select(Symbol, Date, Close) %>%
  slice_max(Close, n = 1)
fb_peak
```

```
## # A tsibble: 1 x 3 [!]
## # Key:       Symbol [1]
##   Symbol Date       Close
##   <chr>  <date>     <dbl>
## 1 FB     2018-07-25  218.
```

```
goog_peak <- gafa_stock %>%
  filter(Symbol == "GOOG") %>%
  select(Symbol, Date, Close) %>%
  slice_max(Close, n = 1)
goog_peak
```

```
## # A tsibble: 1 x 3 [!]
## # Key:       Symbol [1]
##   Symbol Date       Close
##   <chr>  <date>     <dbl>
## 1 GOOG   2018-07-26 1268.
```

Exercise 3