Nama : Ibnu Fajar Setiawan **NIM :** 065002000006	 UNIVERSITAS TRISAKTI **Praktikum Data Analitik**	**Modul 9** **Nama Dosen: Syandra Sari, S.Kom, M.Kom**
Hari/Tanggal : Kamis, 1 Desember 2022		**Nama Aslab :** **1. Azzahra Nuranisa (065001900044)** 2. **Ida Jubaidah (065001900037)**

Praktikum 9 – Data Analitik
METODE DEKOMPOSISI DAN HOLT WINTER

DESKRIPSI MODUL : Melihat hubungan antara variabel Katagorik dengan Variabel Numerik.

No	Elemen Kompetensi	Indikator Kinerja	Jml Jam	hlm
1	Mampu melakukan analisis timeseries dengan menggunakan metode holtwinter	Dapat melakukan analisis timeseries dengan menggunakan metode holtwinter	2	
2	Mampu melakukan analisis timeseries dengan menggunakan metode dekomposisi	Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi	2	
3	Mampu melakukan analisis timeseries dengan menggunakan metode dekomposisi dan holtwinter	Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi dan holtwinter dengan data masing-masing praktikan	2	

	dengan data masing-masing praktikan			

TEORI SINGKAT

Analisis deret waktu (*time series*) dapat menggunakan berbagai macam model yang populer seperti *metode dekomposisi*, model *winter's*, regresi deret waktu, dan model ARIMA. Model peramalan tersebut dapat digunakan untuk *peramalan* data yang mengandung pola musiman dan/atau tren. Data yang digunakan dalam praktikum berupa data sekunder deret waktu volume pasokan (ton) dan harga beras (rupiah) ke Pasar Induk Beras Cipinang (PIBC) per bulan. Karakteristik pasokan beras berikut peramalannya dari berbagai wilayah tersebut kiranya perlu dipahami oleh pengelola PIBC yang bertugas antara lain melakukan pemantauan data pasokan, distribusi dan harga beras. Data tersebut diolah menggunakan dua metode yaitu metode *Holt-Winter* serta metode Dekomposisi. Metode Winter menggunakan *seasonal length* sebesar 12 serta dua tipe metode yaitu *multiplicative* dan *additive*. Metode peramalan ini dipilih karena termasuk metode yang sesuai untuk kasus peramalan dengan pola *trend* dan *seasonal* (Fogarty *et al*, 1991; Minitab, 2000).

LAB SETUP

Untuk dapat menjalankan praktikum ini maka yang harus disiapkan adalah :

1. Aplikasi RStudio
2. Xampp

ELEMEN KOMPETENSI I

Deskripsi **:** Dapat melakukan analisis timeseries dengan menggunakan metode holtwinter

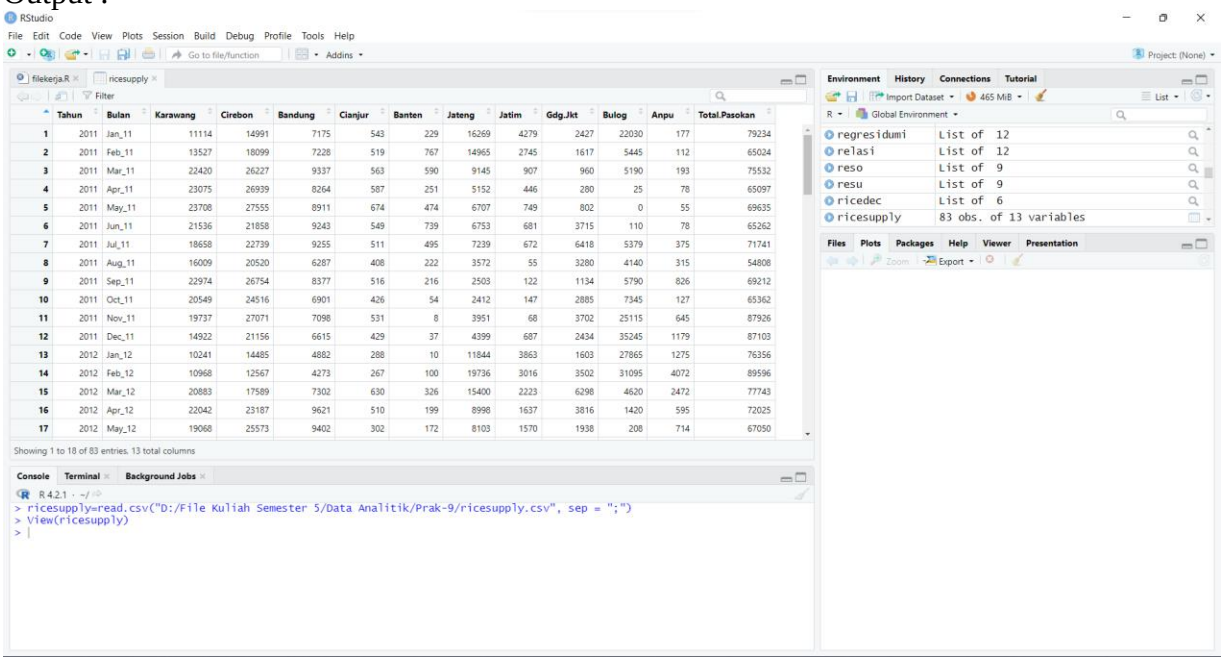
Kompetensi Dasar : Mampu melakukan analisis timeseries dengan menggunakan metode holtwinter

PRAKTIKUM

Dalam praktikum ini akan dipelajari dan dipraktekkan bagaimana melakukan analisis data terhadap data ricesupply dengan metode holtwinter

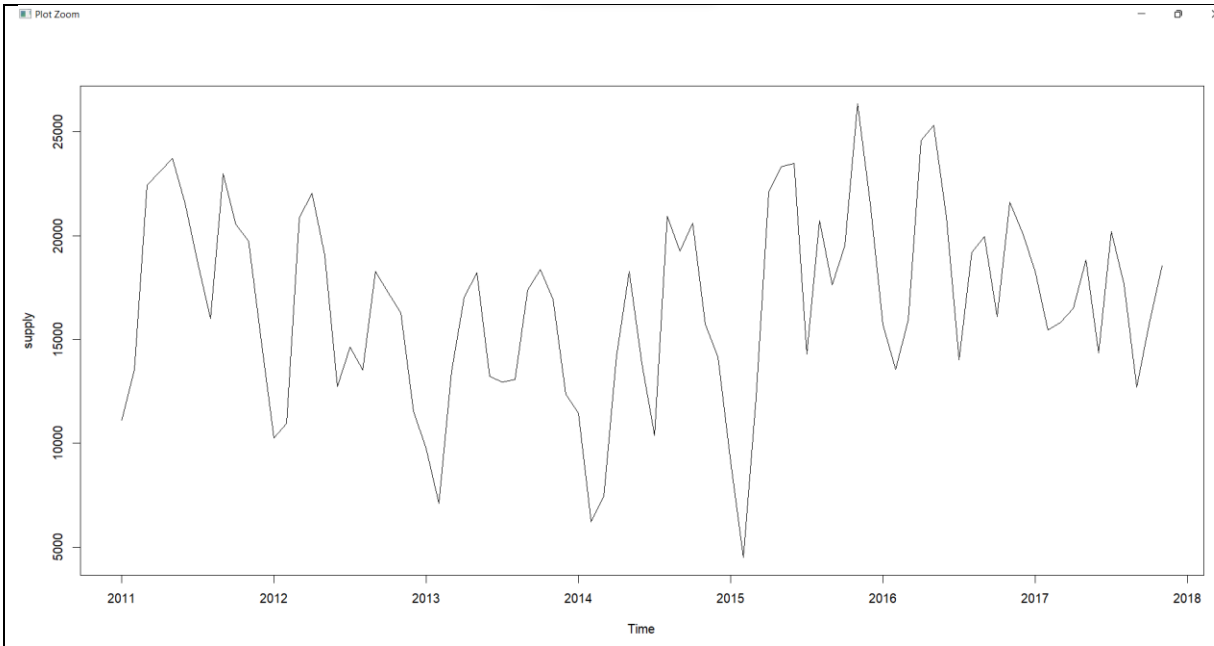
```
> library(RMySQL)
> con = dbConnect(MySQL(), user = 'root', password = '', dbname =
+                   'db_da', host = 'localhost')
> myQuery <- "select * from ricesupply;"
> ricesupply <- dbGetQuery(con, myQuery)
> View(ricesupply)
```

Output :




```
> supply <- ts(ricesupply$Karawang, start = c(2011, 1), frequency = 12)
> plot(supply)
```

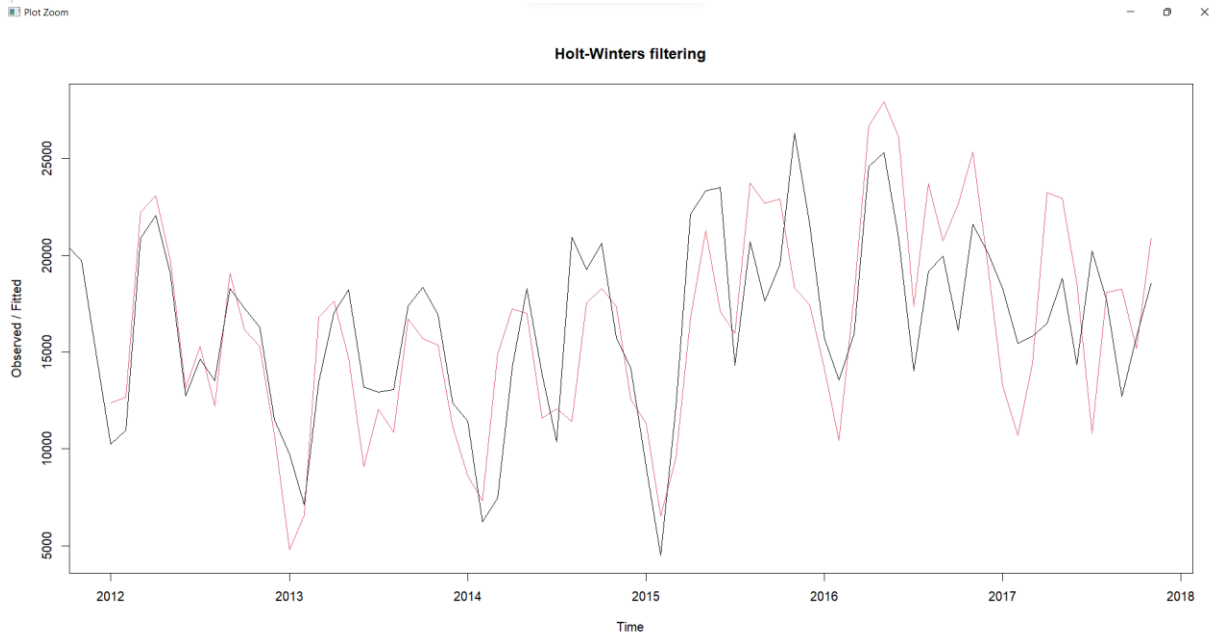
Output :




```
> library(forecast)
> fit <- HoltWinters(supply)
> accuracy(forecast(fit))
> f1 <- forecast(fit,h=12)
> print(f1)
> forecast(fit,12)
> plot(fit)
```

Output:

```
> library(forecast)
> fit <- HoltWinters(supply)
> accuracy(forecast(fit))
                    ME     RMSE      MAE       MPE     MAPE     MASE      ACF1
Training set 56.9985 3574.674 2854.331 -1.482961 18.67965 0.863118 0.2729595
> f1 <- forecast(fit,h=12)
> print(f1)
         Point Forecast     Lo 80    Hi 80     Lo 95    Hi 95
Dec 2017       18264.52 13651.373 22877.67 11209.319 25319.72
Jan 2018       14978.35 10293.680 19663.03  7813.763 22142.95
Feb 2018       11302.59  6529.157 16076.02  4002.255 18602.92
Mar 2018       11664.69  6784.129 16545.24  4200.518 19128.86
Apr 2018       14243.30  9236.398 19250.20  6585.904 21900.70
May 2018       16689.84 11536.817 21842.86  8808.973 24570.70
Jun 2018       12832.34  7513.145 18151.53  4697.336 20967.34
Jul 2018       15328.02  9822.582 20833.46  6908.178 23747.86
Aug 2018       14085.16  8373.581 19796.74  5350.053 22820.27
Sep 2018       10558.01  4620.762 16495.26  1477.772 19638.25
Oct 2018       12640.37  6458.418 18822.32  3185.892 22094.84
Nov 2018       16127.75  9682.668 22572.84  6270.845 25984.66
> forecast(fit,12)
         Point Forecast     Lo 80    Hi 80     Lo 95    Hi 95
Dec 2017       18264.52 13651.373 22877.67 11209.319 25319.72
Jan 2018       14978.35 10293.680 19663.03  7813.763 22142.95
Feb 2018       11302.59  6529.157 16076.02  4002.255 18602.92
Mar 2018       11664.69  6784.129 16545.24  4200.518 19128.86
Apr 2018       14243.30  9236.398 19250.20  6585.904 21900.70
May 2018       16689.84 11536.817 21842.86  8808.973 24570.70
Jun 2018       12832.34  7513.145 18151.53  4697.336 20967.34
Jul 2018       15328.02  9822.582 20833.46  6908.178 23747.86
Aug 2018       14085.16  8373.581 19796.74  5350.053 22820.27
Sep 2018       10558.01  4620.762 16495.26  1477.772 19638.25
Oct 2018       12640.37  6458.418 18822.32  3185.892 22094.84
Nov 2018       16127.75  9682.668 22572.84  6270.845 25984.66
> plot(fit)
>
```



ELEMEN KOMPETENSI II

Deskripsi **:** Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi

Kompetensi Dasar : Mampu melakukan analisis timeseries dengan menggunakan metode dekomposisi

PRAKTIKUM

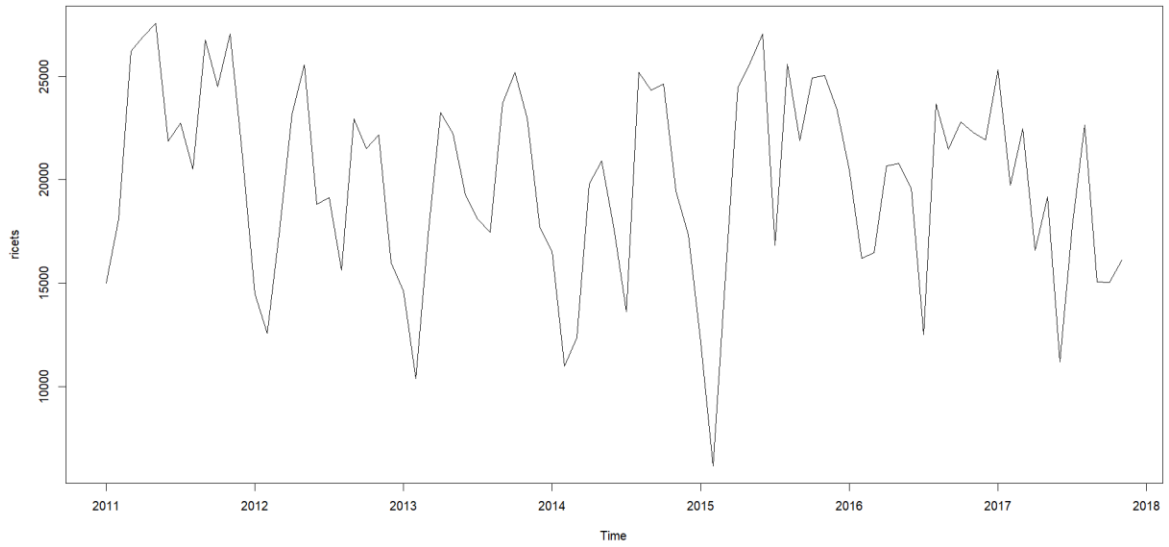
Dalam praktikum ini akan dipelajari dan dipraktekkan bagaimana melakukan analisis data terhadap data ricesupply dengan metode dekomposisi

Seasonal Decomposition

```
> ricets <- ts(ricesupply$Cirebon, frequency=12, start=c(2011,1))
> ricets
> plot.ts(ricets)
```

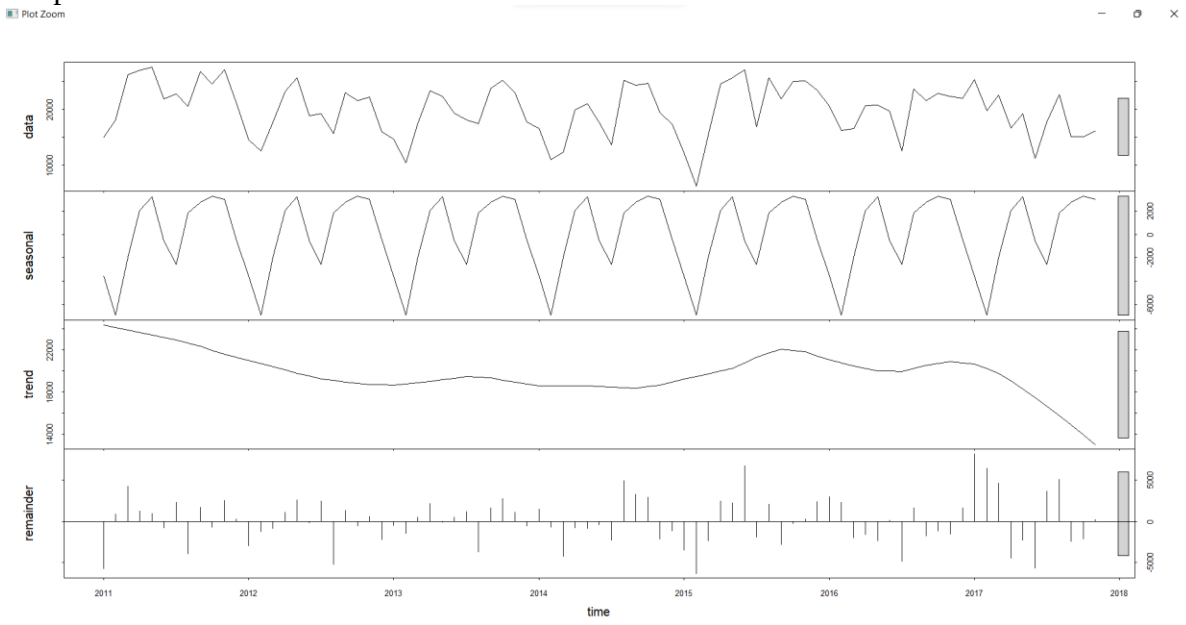
Output:

```
> ##ek 2
> ricets <- ts(ricesupply$Cirebon, frequency=12, start=c(2011,1))
> ricets
       Jan   Feb   Mar   Apr   May   Jun   Jul   Aug   Sep   Oct   Nov   Dec
2011 14991 18099 26227 26939 27555 21858 22739 20520 26754 24516 27071 21156
2012 14485 12567 17589 23187 25573 18805 19139 15642 22940 21524 22177 15986
2013 14606 10383 17416 23242 22237 19262 18092 17449 23699 25200 22962 17723
2014 16536 10978 12354 19812 20924 17611 13630 25190 24325 24643 19430 17335
2015 12163  6170 15342 24457 25672 27051 16846 25588 21895 24915 25046 23400
2016 20473 16189 16469 20661 20788 19579 12505 23674 21476 22797 22302 21943
2017 25310 19750 22475 16581 19186 11190 17765 22642 15060 15046 16116
> plot.ts(ricets)
>
```




```
> fit <- stl(ricets, s.window="periodic")
> plot(fit)
```

Output:




```
>  accuracy (forecast(fit))
>  fit <- forecast(ricets)
>  accuracy(fit)
```

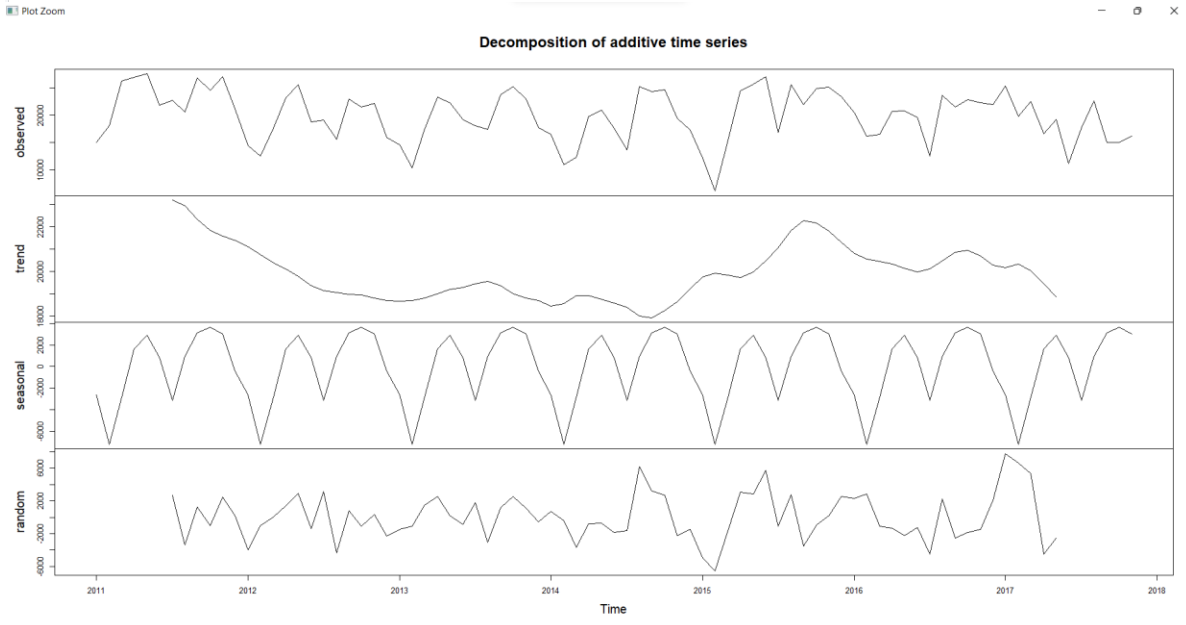
Output:

```
> plot(fit)
> accuracy (forecast(fit))
                     ME      RMSE       MAE        MPE      MAPE      MASE       ACF1
Training set -255.8127 3394.641 2629.446 -4.394285 14.78957 0.7498971 0.1017622
> fit <- forecast(ricets)
> accuracy(fit)
                     ME      RMSE       MAE        MPE      MAPE      MASE       ACF1
Training set -216.4238 3465.603 2688.879 -4.075693 15.00563 0.766847 0.1038552
> 
```

```
> ricedec <- decompose(ricets)
> ricedec$seasonal
```

Output:

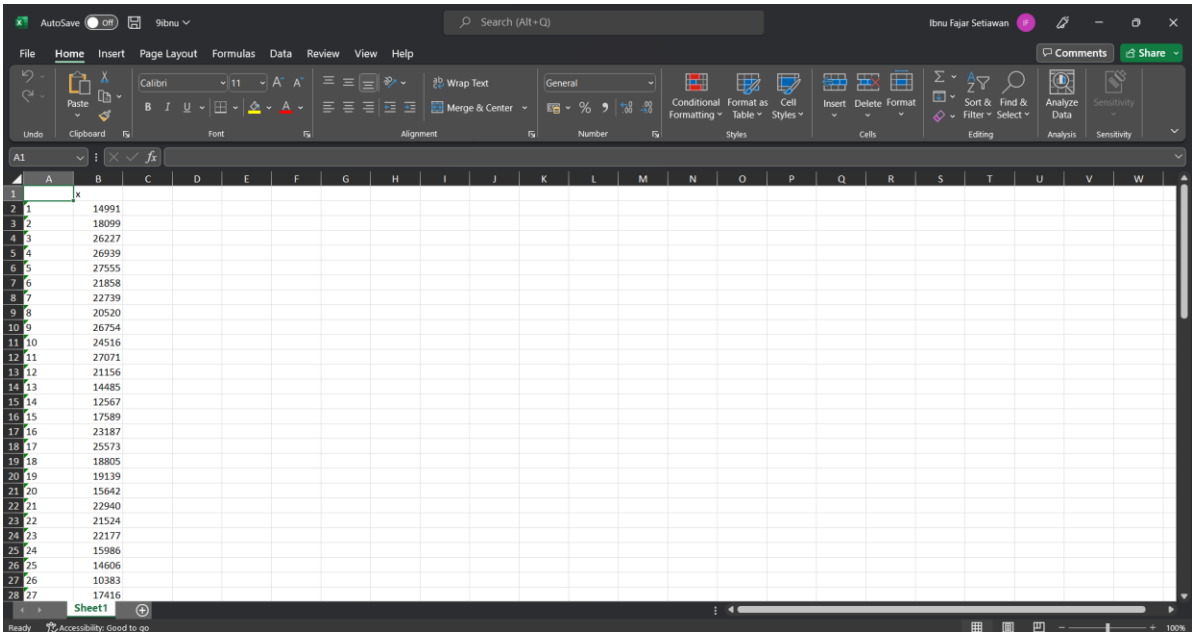
```
> ricedec <- decompose(ricets)
> ricedec$seasonal
           Jan        Feb        Mar       Apr       May       Jun       Jul       Aug       Sep       Oct
2011 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
2012 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
2013 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
2014 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
2015 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
2016 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
2017 -2628.9104 -7198.4382 -2863.9660 1665.5062 2880.6799 859.7229 -3132.9035 969.3049 3154.8951 3670.5479
           Nov        Dec
2011  3032.7632  -409.2021
2012  3032.7632  -409.2021
2013  3032.7632  -409.2021
2014  3032.7632  -409.2021
2015  3032.7632  -409.2021
2016  3032.7632  -409.2021
2017  3032.7632
> plot(ricedec)
> 
```




```
> View(ricets)
```

```
> library(xlsx)
> write.xlsx(ricets, "D:/Document/KULIAH/prak/data analitik/9ida.xlsx")
```

Output:



	x
1	14991
2	18099
3	26227
4	26939
5	27555
6	21858
7	22739
8	20520
9	26754
10	24516
11	27071
12	21156
13	14485
14	12567
15	17589
16	23187
17	25573
18	18805
19	19139
20	15642
21	22940
22	21524
23	22177
24	15986
25	14606
26	10383
27	17416

ELEMEN KOMPETENSI III

Deskripsi **:** Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi dan holtwinter dengan data masing-masing praktikan

Kompetensi Dasar : Mampu melakukan analisis timeseries dengan menggunakan metode dekomposisi dan holtwinter dengan data masing-masing praktikan

Dalam praktikum **Gunakan dua matriks data** (pasokan dan harga beras) serta ambil **data dari satu kota** (data pasokan / **ricesupply**) dan **satu jenis beras** (data harga / **hargaberas**). Lakukan perbandingan nilai akurasi dari kedua jenis metode peramalan untuk data musiman (seasonal). Manakah yang errornya lebih kecil. Setiap praktikan tidak boleh sama jenis beras atau kotanya.

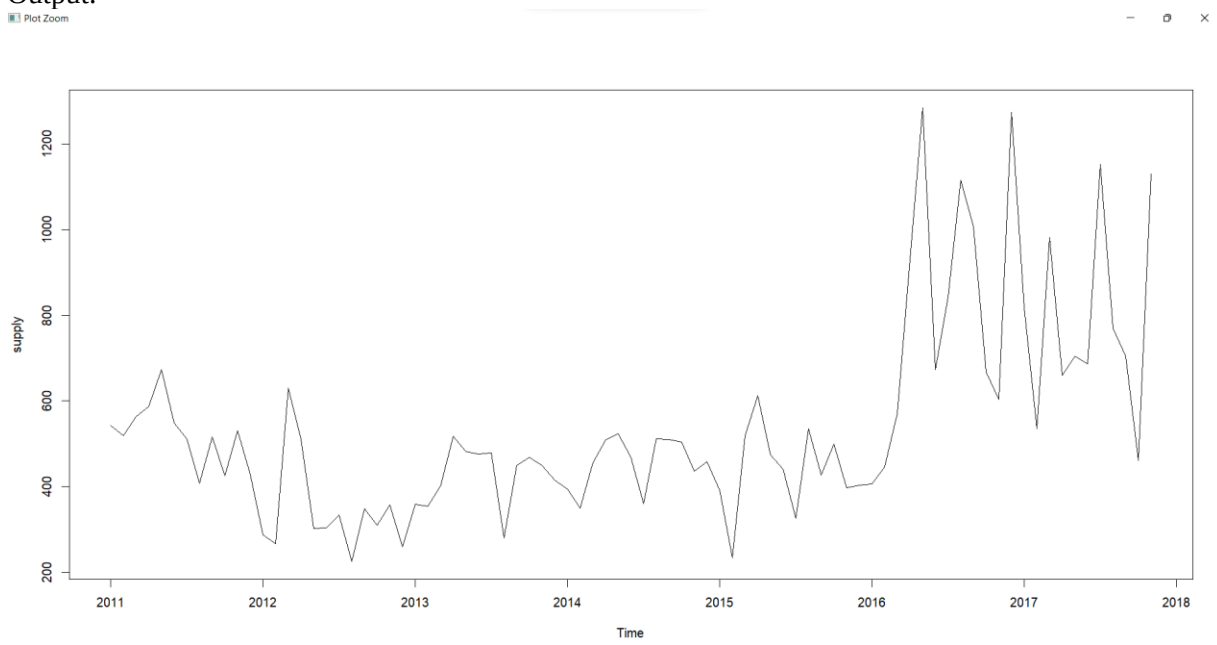
Data ricesupply : Data Cianjur

```
> library(RMySQL)
> con = dbConnect(MySQL(), user = 'root', password = '', dbname =
+                   'db_da', host = 'localhost')
> myQuery <- "select * from namadata;"
> ricesupply <- dbGetQuery(con, myQuery)
> View(ricesupply)
```

Output:

```
>  supply <- ts(ricesupply$Cianjur, start = c(2011, 1), frequency = 12)
>  plot(supply)
```

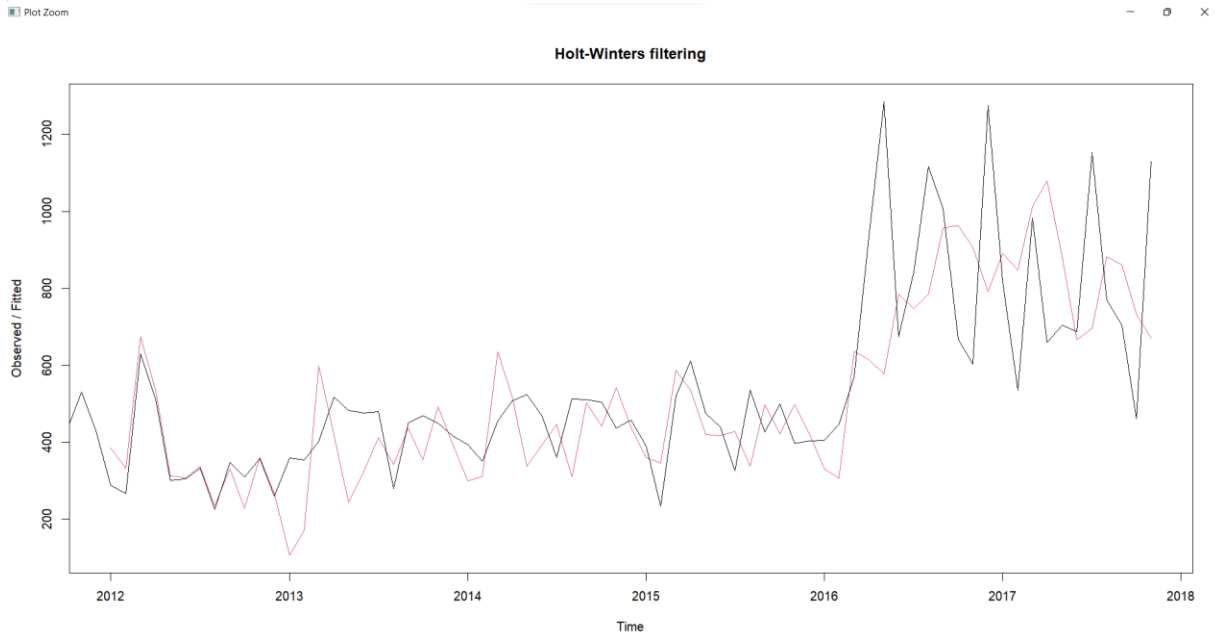
Output:




```
>  library(forecast)
>  fit <- HoltWinters(supply)
>  accuracy (forecast(fit))
>  f1 <- forecast(fit,h=12)
>  print(f1)
> forecast(fit,12)
> plot(fit)
```

Output:

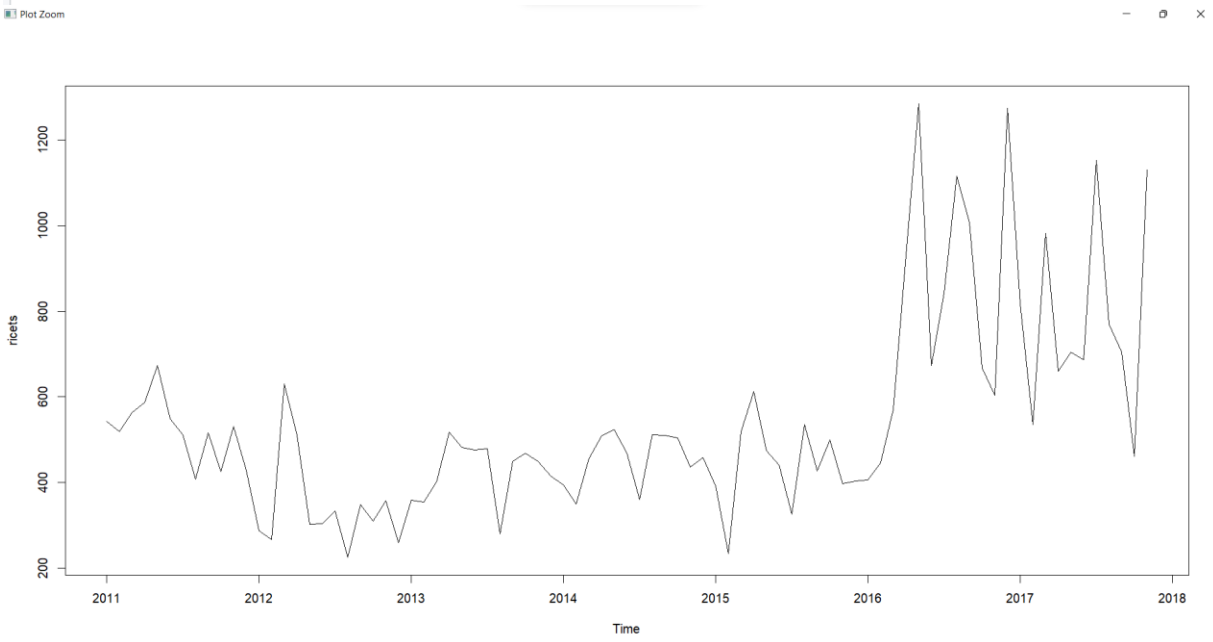
```
> accuracy (forecast(fit))
                    ME     RMSE      MAE      MPE     MAPE      MASE        ACF1
Training set 25.05589 189.0146 130.5452 1.00759 22.66015 0.7130874 0.01190773
> f1 <- forecast(fit,h=12)
> print(f1)
         Point Forecast    Lo 80     Hi 80    Lo 95    Hi 95
Dec 2017       924.9819 683.1789 1166.7850 555.1760 1294.788
Jan 2018       771.9474 517.9092 1025.9857 383.4294 1160.465
Feb 2018       703.2017 436.5822  969.8211 295.4424 1110.961
Mar 2018      1010.5572 731.0241 1290.0903 583.0483 1438.066
Apr 2018      1016.6204 723.8536 1309.3872 568.8723 1464.369
May 2018       993.0743 686.7648 1299.3837 524.6144 1461.534
Jun 2018       871.8647 551.7139 1192.0154 382.2364 1361.493
Jul 2018       974.6247 640.3433 1308.9061 463.3855 1485.864
Aug 2018       920.8177 572.1249 1269.5105 387.5381 1454.097
Sep 2018       926.2149 562.8378 1289.5921 370.4776 1481.952
Oct 2018       828.7669 450.4398 1207.0940 250.1655 1407.368
Nov 2018       982.5012 588.9652 1376.0372 380.6398 1584.363
> forecast(fit,12)
         Point Forecast    Lo 80     Hi 80    Lo 95    Hi 95
Dec 2017       924.9819 683.1789 1166.7850 555.1760 1294.788
Jan 2018       771.9474 517.9092 1025.9857 383.4294 1160.465
Feb 2018       703.2017 436.5822  969.8211 295.4424 1110.961
Mar 2018      1010.5572 731.0241 1290.0903 583.0483 1438.066
Apr 2018      1016.6204 723.8536 1309.3872 568.8723 1464.369
May 2018       993.0743 686.7648 1299.3837 524.6144 1461.534
Jun 2018       871.8647 551.7139 1192.0154 382.2364 1361.493
Jul 2018       974.6247 640.3433 1308.9061 463.3855 1485.864
Aug 2018       920.8177 572.1249 1269.5105 387.5381 1454.097
Sep 2018       926.2149 562.8378 1289.5921 370.4776 1481.952
Oct 2018       828.7669 450.4398 1207.0940 250.1655 1407.368
Nov 2018       982.5012 588.9652 1376.0372 380.6398 1584.363
> plot(fit)
>
```



```
> ricets <- ts(ricesupply$Cianjur, frequency=12, start=c(2011,1))
> ricets
> plot.ts(ricets)
```

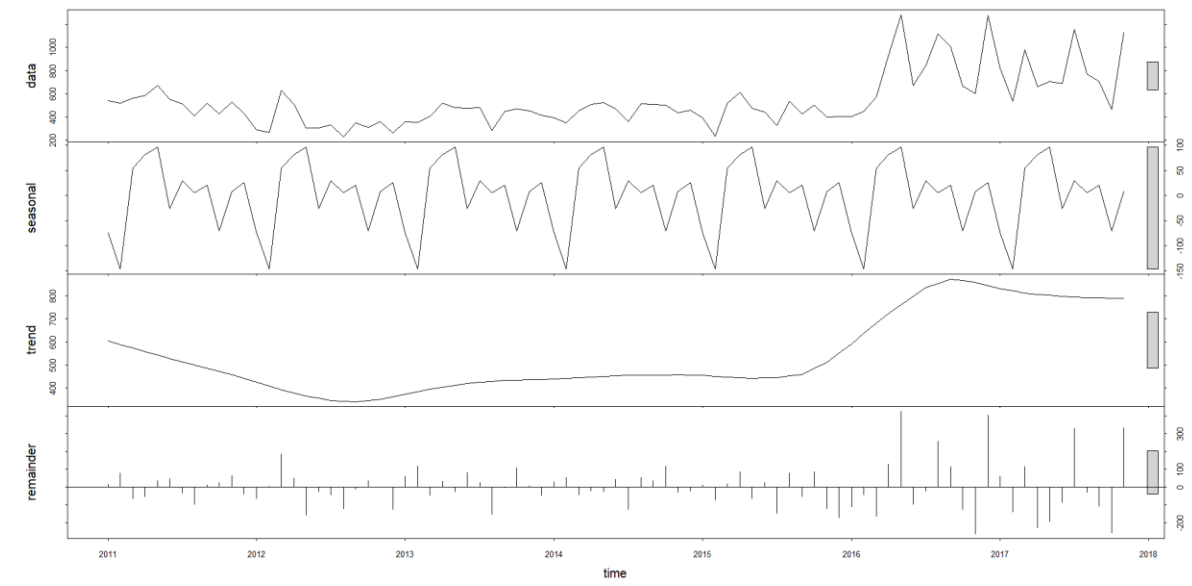
Output:

```
> ricets <- ts(ricesupply$Cianjur, frequency=12, start=c(2011,1))
> ricets
     Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec
2011 543  519  563  587  674  549  511  408  516  426  531  429
2012 288  267  630  510  302  304  333  226  348  310  357  260
2013 359  354  402  518  482  476  479  280  449  469  450  416
2014 394  350  455  508  524  468  360  512  510  504  436  458
2015 391  234  519  612  475  440  326  536  427  500  397  404
2016 406  446  571  931 1284  674  843 1116 1007  668  603 1274
2017 818  535  982  660  704  687 1153  770  704  461 1130
> plot.ts(ricets)
>
```




```
> fit <- stl(ricets, s.window="periodic")
> plot(fit)
```

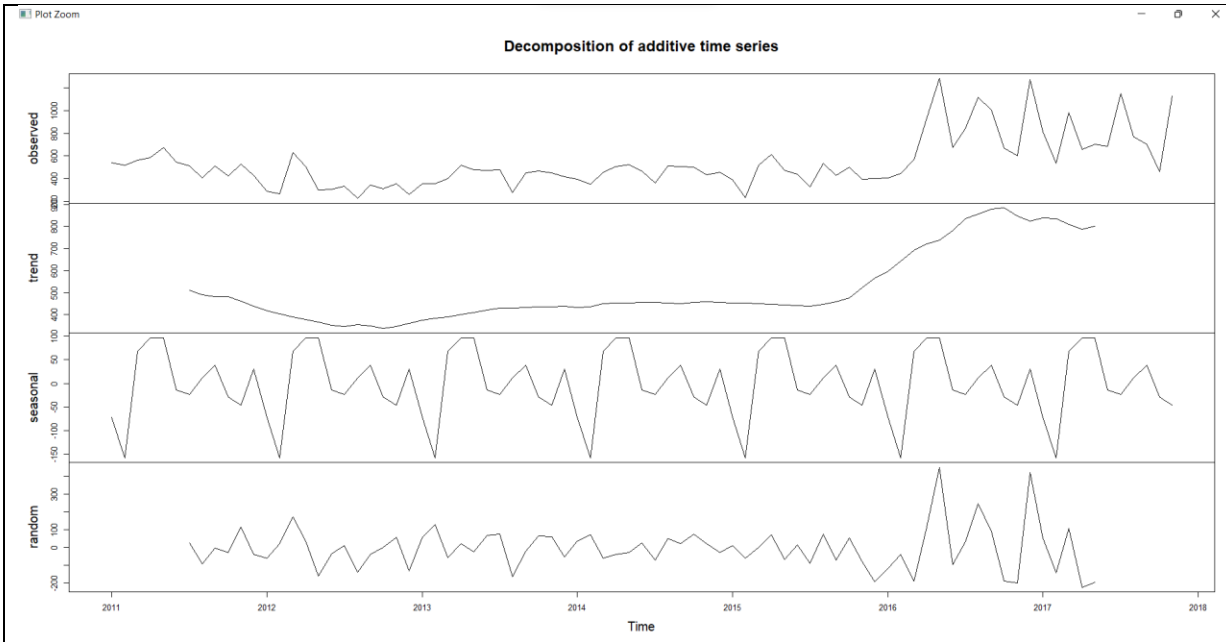
Output:




```
> fit <- forecast(ricets)
> accuracy(fit)
> ricedec <- decompose(ricets)
> ricedec$seasonal
> plot(ricedec)
```

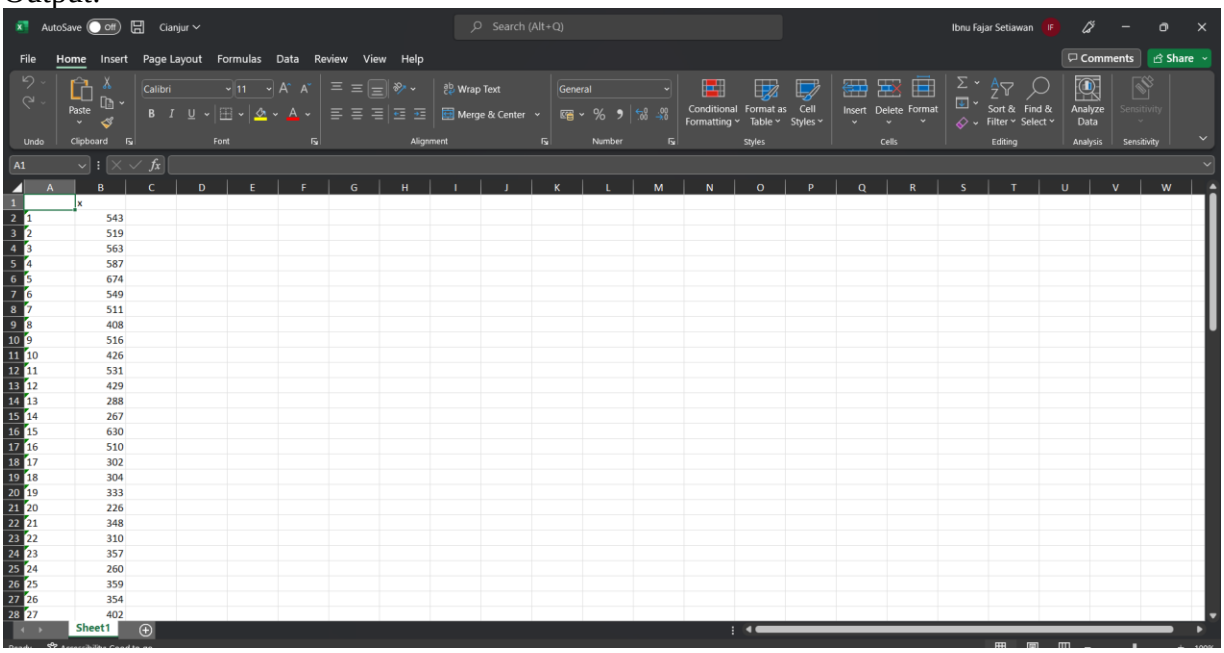
Output:

```
> fit <- forecast(ricets)
> accuracy(fit)
                    ME     RMSE      MAE       MPE     MAPE     MASE        ACF1
Training set 12.85821 172.7212 120.5184 -4.37119 22.15537 0.658317 0.002723744
> ricedec <- decompose(ricets)
> ricedec$seasonal
           Jan        Feb       Mar       Apr       May       Jun       Jul       Aug       Sep       Oct
2011 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
2012 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
2013 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
2014 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
2015 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
2016 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
2017 -72.23252 -157.53808  67.47581  95.92720  96.85775 -13.76863 -23.80891  11.83692  38.64942 -28.10058
           Nov       Dec
2011 -45.98252  30.68414
2012 -45.98252  30.68414
2013 -45.98252  30.68414
2014 -45.98252  30.68414
2015 -45.98252  30.68414
2016 -45.98252  30.68414
2017 -45.98252
> plot(ricedec)
>
```




```
>View(ricets)
>  library(xlsx)
>  write.xlsx(ricets, "D:/Cianjur.xlsx")
```

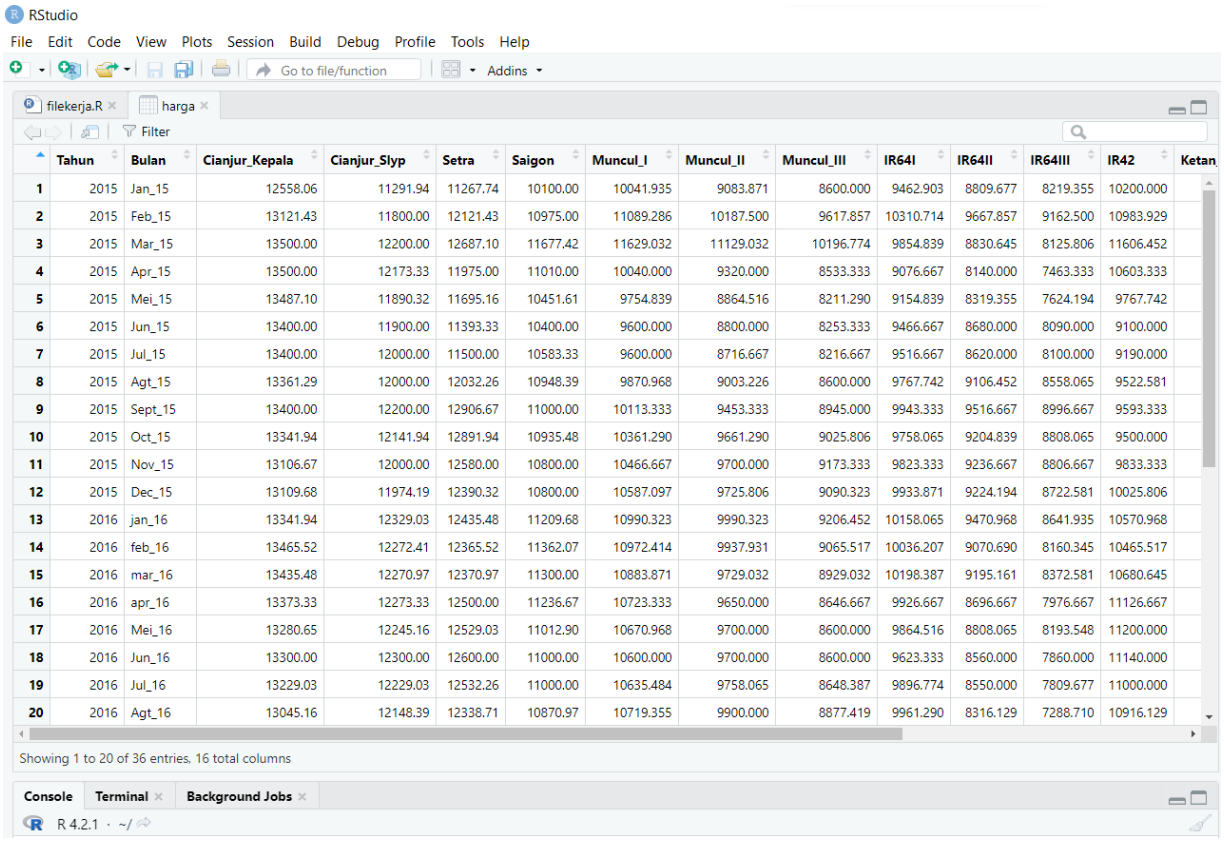
Output:



Data HargaBeras

```
> library(RMySQL)
> con = dbConnect(MySQL(), user = 'root', password = '', dbname =
+                   'db_da', host = 'localhost')
> myQuery <- "select * from namadata;"
> harga <- dbGetQuery(con, myQuery)
> View(harga)
```

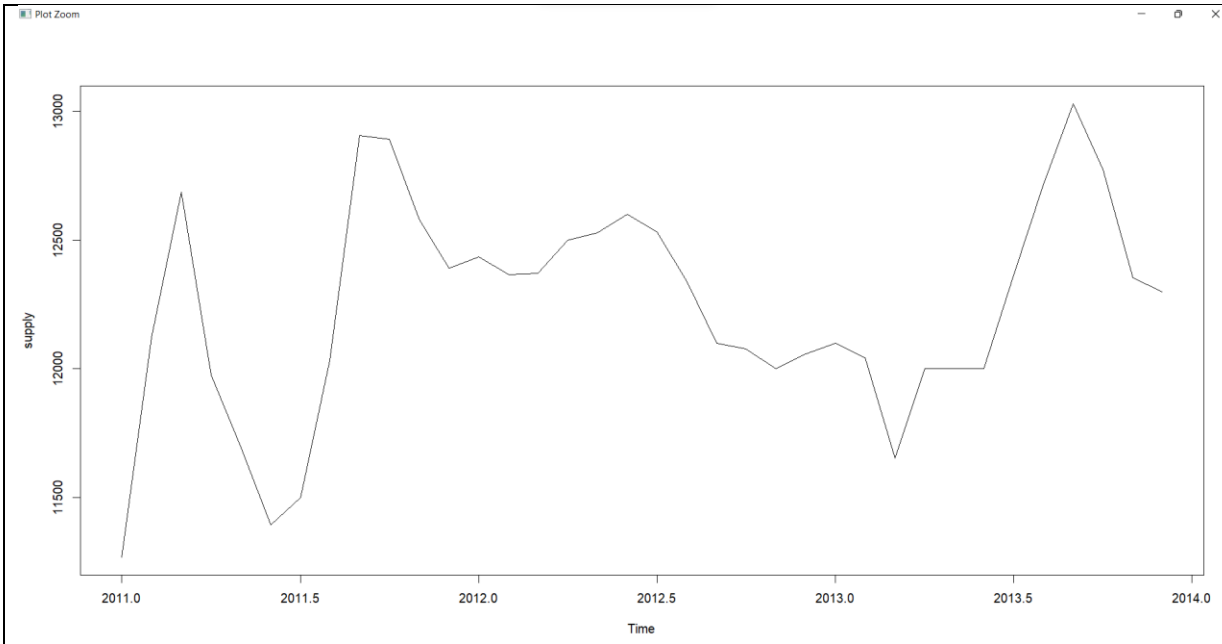
Output:



	Tahun	Bulan	Cianjur_Kepala	Cianjur_Slyp	Setra	Saigon	Muncul_I	Muncul_II	Muncul_III	IR64I	IR64II	IR64III	IR42	Ketan
1	2015	Jan_15	12558.06	11291.94	11267.74	10100.00	10041.935	9083.871	8600.000	9462.903	8809.677	8219.355	10200.000	
2	2015	Feb_15	13121.43	11800.00	12121.43	10975.00	11089.286	10187.500	9617.857	10310.714	9667.857	9162.500	10983.929	
3	2015	Mar_15	13500.00	12200.00	12687.10	11677.42	11629.032	11129.032	10196.774	9854.839	8830.645	8125.806	11606.452	
4	2015	Apr_15	13500.00	12173.33	11975.00	11010.00	10040.000	9320.000	8533.333	9076.667	8140.000	7463.333	10603.333	
5	2015	Mei_15	13487.10	11890.32	11695.16	10451.61	9754.839	8864.516	8211.290	9154.839	8319.355	7624.194	9767.742	
6	2015	Jun_15	13400.00	11900.00	11393.33	10400.00	9600.000	8800.000	8253.333	9466.667	8680.000	8090.000	9100.000	
7	2015	Jul_15	13400.00	12000.00	11500.00	10583.33	9600.000	8716.667	8216.667	9516.667	8620.000	8100.000	9190.000	
8	2015	Agt_15	13361.29	12000.00	12032.26	10948.39	9870.968	9003.226	8600.000	9767.742	9106.452	8558.065	9522.581	
9	2015	Sept_15	13400.00	12200.00	12906.67	11000.00	10113.333	9453.333	8945.000	9943.333	9516.667	8996.667	9593.333	
10	2015	Oct_15	13341.94	12141.94	12891.94	10935.48	10361.290	9661.290	9025.806	9758.065	9204.839	8808.065	9500.000	
11	2015	Nov_15	13106.67	12000.00	12580.00	10800.00	10466.667	9700.000	9173.333	9823.333	9236.667	8806.667	9833.333	
12	2015	Dec_15	13109.68	11974.19	12390.32	10800.00	10587.097	9725.806	9090.323	9933.871	9224.194	8722.581	10025.806	
13	2016	jan_16	13341.94	12329.03	12435.48	11209.68	10990.323	9990.323	9206.452	10158.065	9470.968	8641.935	10570.968	
14	2016	feb_16	13465.52	12272.41	12365.52	11362.07	10972.414	9937.931	9065.517	10036.207	9070.690	8160.345	10465.517	
15	2016	mar_16	13435.48	12270.97	12370.97	11300.00	10883.871	9729.032	8929.032	10198.387	9195.161	8372.581	10680.645	
16	2016	apr_16	13373.33	12273.33	12500.00	11236.67	10723.333	9650.000	8646.667	9926.667	8696.667	7976.667	11126.667	
17	2016	Mei_16	13280.65	12245.16	12529.03	11012.90	10670.968	9700.000	8600.000	9864.516	8808.065	8193.548	11200.000	
18	2016	Jun_16	13300.00	12300.00	12600.00	11000.00	10600.000	9700.000	8600.000	9623.333	8560.000	7860.000	11140.000	
19	2016	Jul_16	13229.03	12229.03	12532.26	11000.00	10635.484	9758.065	8648.387	9896.774	8550.000	7809.677	11000.000	
20	2016	Agt_16	13045.16	12148.39	12338.71	10870.97	10719.355	9900.000	8877.419	9961.290	8316.129	7288.710	10916.129	


```
>  supply <- ts(harga$Setra, start = c(2011, 1), frequency = 12)
>  plot(supply)
```

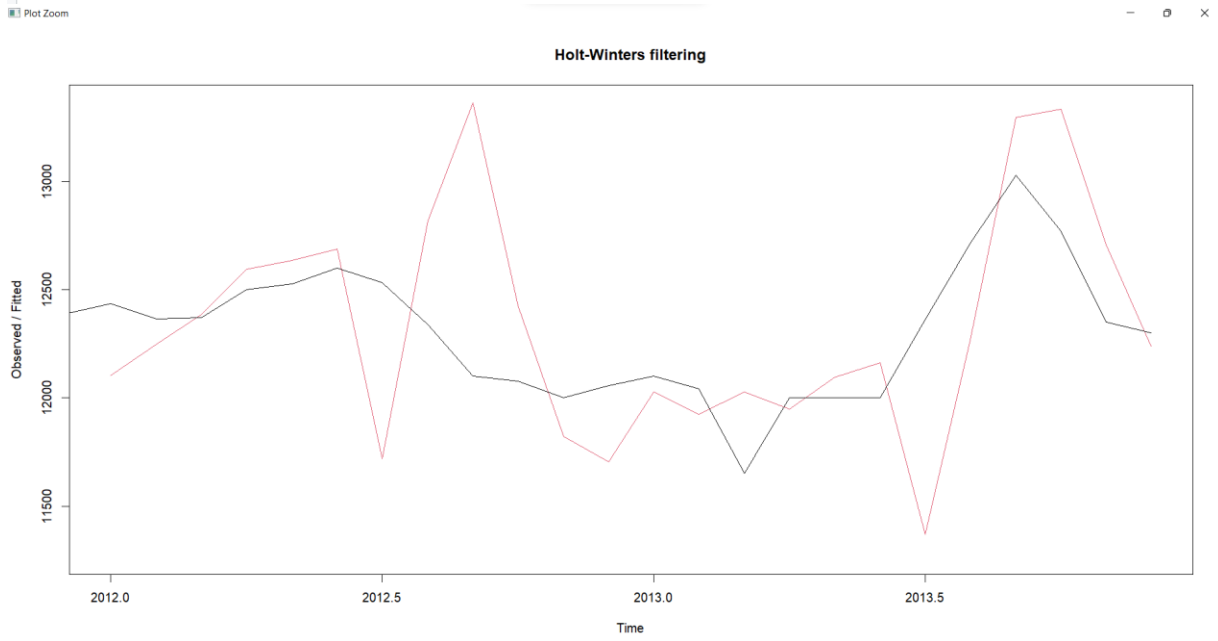
Output:




```
>  library(forecast)
>  fit <- HoltWinters(supply)
>  accuracy (forecast(fit))
>  f1 <- forecast(fit,h=12)
>  print(f1)
> forecast(fit,12)
> plot(fit)
```

Output:

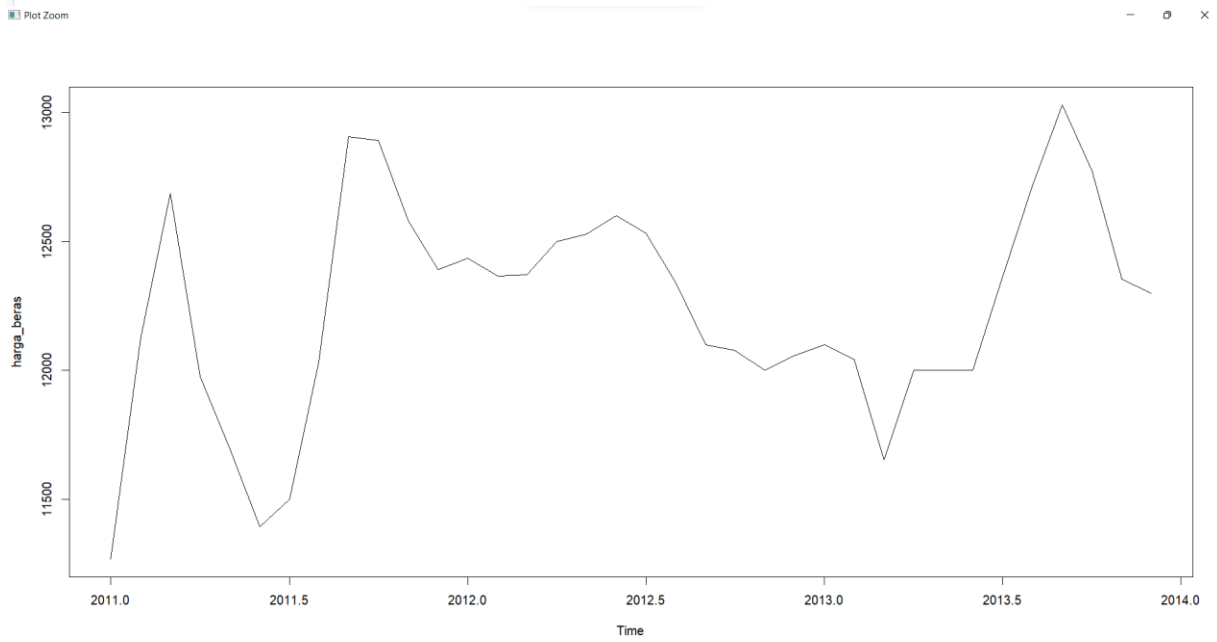
```
> library(forecast)
> fit <- HoltWinters(supply)
> accuracy (forecast(fit))
                    ME     RMSE      MAE         MPE     MAPE      MASE      ACF1
Training set -28.70975 448.5596 323.2938 -0.2444304 2.624221 0.5567333 0.2260333
> f1 <- forecast(fit,h=12)
> print(f1)
         Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
Jan 2014       12272.83 11686.82 12858.84 11376.60 13169.06
Feb 2014       12127.83 11398.29 12857.37 11012.09 13243.57
Mar 2014       12015.99 11166.84 12865.14 10717.33 13314.65
Apr 2014       12326.31 11372.44 13280.18 10867.48 13785.14
May 2014       12396.65 11348.46 13444.84 10793.58 13999.72
Jun 2014       12516.69 11382.00 13651.38 10781.33 14252.04
Jul 2014       12143.56 10928.51 13358.60 10285.30 14001.81
Aug 2014       12164.90 10874.49 13455.32 10191.39 14138.42
Sep 2014       12678.58 11316.97 14040.20 10596.18 14760.99
Oct 2014       12839.59 11410.33 14268.86 10653.72 15025.47
Nov 2014       12684.36 11190.50 14178.23 10399.69 14969.03
Dec 2014       12587.38 11031.60 14143.16 10208.02 14966.75
> forecast(fit,12)
         Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
Jan 2014       12272.83 11686.82 12858.84 11376.60 13169.06
Feb 2014       12127.83 11398.29 12857.37 11012.09 13243.57
Mar 2014       12015.99 11166.84 12865.14 10717.33 13314.65
Apr 2014       12326.31 11372.44 13280.18 10867.48 13785.14
May 2014       12396.65 11348.46 13444.84 10793.58 13999.72
Jun 2014       12516.69 11382.00 13651.38 10781.33 14252.04
Jul 2014       12143.56 10928.51 13358.60 10285.30 14001.81
Aug 2014       12164.90 10874.49 13455.32 10191.39 14138.42
Sep 2014       12678.58 11316.97 14040.20 10596.18 14760.99
Oct 2014       12839.59 11410.33 14268.86 10653.72 15025.47
Nov 2014       12684.36 11190.50 14178.23 10399.69 14969.03
Dec 2014       12587.38 11031.60 14143.16 10208.02 14966.75
> plot(fit)
>
```




```
> harga_beras <- ts(harga$Setra, frequency=12, start=c(2011,1))
> harga_beras
> plot.ts(harga_beras)
```

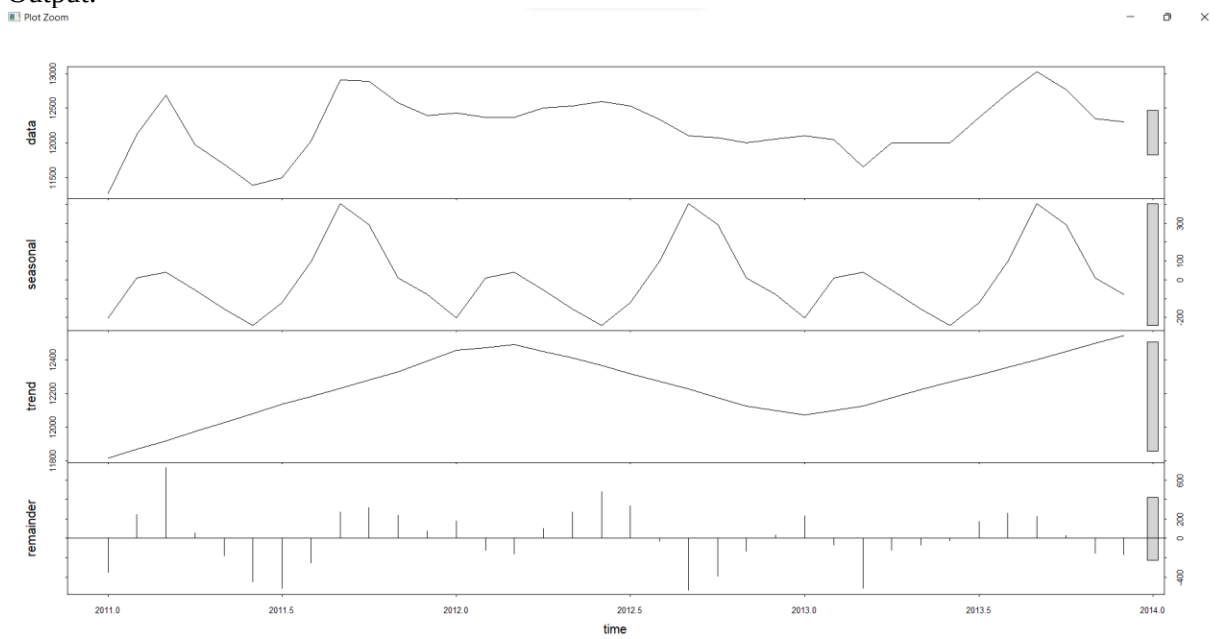
Output:

```
> harga_beras <- ts(harga$Setra, frequency=12, start=c(2011,1))
> harga_beras
         Jan      Feb      Mar      Apr      May      Jun      Jul      Aug      Sep      Oct      Nov      Dec
2011 11267.74 12121.43 12687.10 11975.00 11695.16 11393.33 11500.00 12032.26 12906.67 12891.94 12580.00 12390.32
2012 12435.48 12365.52 12370.97 12500.00 12529.03 12600.00 12532.26 12338.71 12100.00 12077.42 12000.00 12058.06
2013 12100.00 12042.86 11651.61 12000.00 12000.00 12000.00 12363.23 12715.48 13029.17 12772.58 12352.50 12300.00
> plot.ts(harga_beras)
>
```




```
> fit <- stl(harga_beras, s.window="periodic")
> plot(fit)
```

Output:

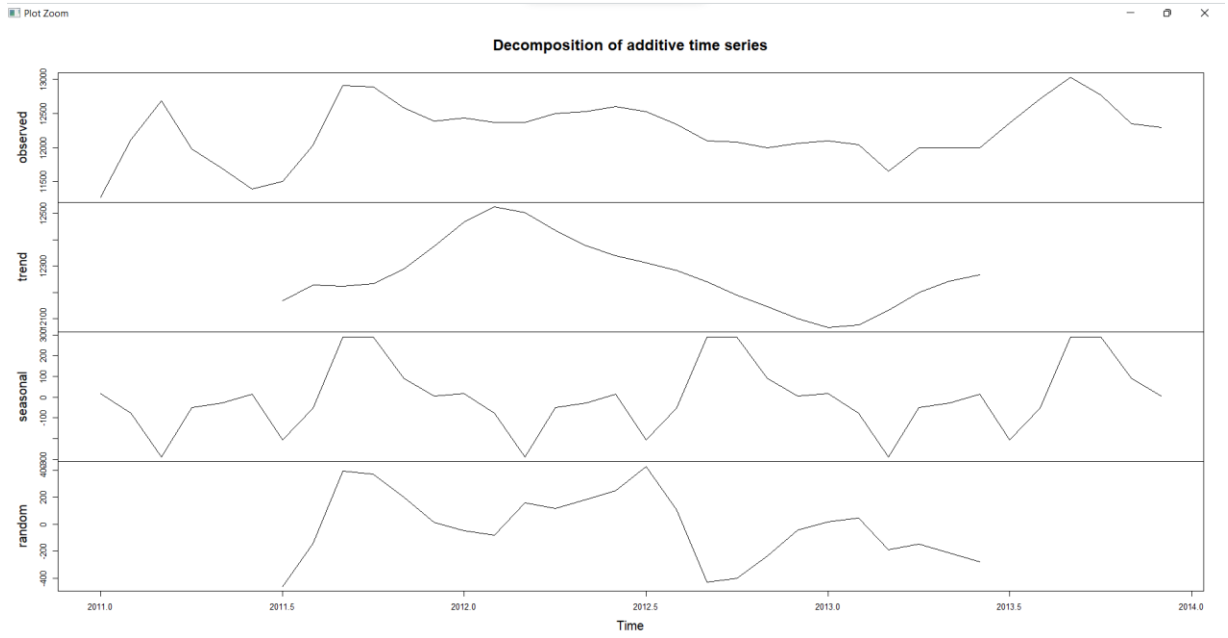



```
>  fit <- forecast(harga_beras)
>  accuracy(fit)
> hargadec <- decompose(harga_beras)
>  hargadec $seasonal
```

> plot(hargadec)

Output:

```
> fit <- forecast(harga_beras)
> accuracy(fit)
                    ME     RMSE      MAE       MPE     MAPE      MASE      ACF1
Training set 28.6685 330.6387 231.8905 0.2068072 1.88821 0.3993306 0.2811701
> hargadec <- decompose(harga_beras)
> hargadec $seasonal
             Jan         Feb         Mar         Apr         May         Jun         Jul         Aug         Sep
2011   17.200564  -78.571923 -288.254747  -49.610592  -27.868319   14.236854 -206.487674  -52.834638  288.224312
2012   17.200564  -78.571923 -288.254747  -49.610592  -27.868319   14.236854 -206.487674  -52.834638  288.224312
2013   17.200564  -78.571923 -288.254747  -49.610592  -27.868319   14.236854 -206.487674  -52.834638  288.224312
             Oct         Nov         Dec
2011  290.620139   89.071085    4.274939
2012  290.620139   89.071085    4.274939
2013  290.620139   89.071085    4.274939
> plot(hargadec)
>
```

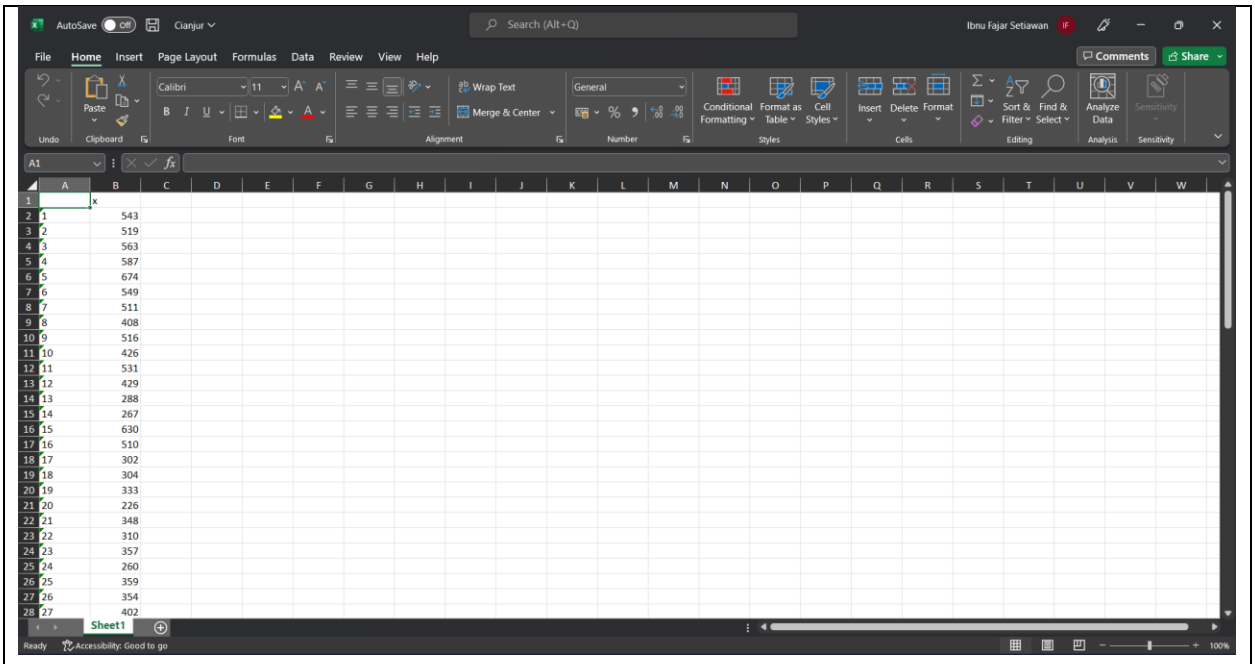


>View(hargadec)

> library(xlsx)

> write.xlsx(ricets, "D:/Cianjur.xlsx")

Output:



1	543
2	519
3	563
4	587
5	674
6	549
7	511
8	408
9	516
10	426
11	531
12	429
13	288
14	267
15	630
16	510
17	302
18	304
19	333
20	226
21	348
22	310
23	357
24	260
25	359
26	354
27	402

Output:

1. **Cek List**

No	Elemen Kompetensi	Penyelesaian	
		Selesai	Tidak
1	**Elemen Kompetensi I** Dapat melakukan analisis timeseries dengan menggunakan metode holtwinter	✓	
2	**Elemen Kompetensi II** Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi	✓	
	Elemen Kompetensi III	✓	

	Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi dan holtwinter dengan data masing-masing praktikan		

2. Form Umpan Balik

Elemen Kompetensi	Waktu Pengerjaan	Kriteria
Elemen Kompetensi I Dapat melakukan analisis timeseries dengan menggunakan metode holtwinter	15	1
Elemen Kompetensi II Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi	15	1
Elemen Kompetensi II Dapat melakukan analisis timeseries dengan menggunakan metode dekomposisi dan holtwinter dengan data masing-masing praktikan	15	1

Kriteria

1.Sangat Menarik

2.Cukup Menarik

3.Kurang Menarik

4.Sangat Kurang Menarik