```
import pandas as pd
import numpy as np
import matplotlib as mp
import matplotlib.pyplot as plt
%matplotlib inline
from statsmodels import *
from statsmodels.tsa.seasonal import seasonal_decompose
from pandas import Series, DataFrame
%load_ext rpy2.ipynb
```

```
%%R
library(ggplot2)
library(forecast)
library(tseries)
```

```
%%R
data(AirPassengers)
AirPassengers
```

```
%%R
class(AirPassengers)
```

```
%%R
start(AirPassengers)
end(AirPassengers)
frequency(AirPassengers)
summary(AirPassengers)
```

```
%%R
plot(AirPassengers)
abline(reg=lm(AirPassengers~time(AirPassengers)))
cycle(AirPassengers)
plot(aggregate(AirPassengers,FUN=mean))
boxplot(AirPassengers~cycle(AirPassengers))
```

```
%%R
plot.ts(AirPassengers)
AirPassengers.HW = HoltWinters(AirPassengers, seasonal = "multiplicative")
AirPassengers.HW.forecast = forecast(AirPassengers.HW, h=48)
plot(AirPassengers.HW.forecast)
```

```
%%R
AirPassengers.HW.forecast$fitted
```

```
%%R
AirPassengers.HW.forecast$upper
AirPassengers.HW.forecast$lower
```

```
%%R
AirPassengers.HW.forecast$mean
```

```
%%R
AirPassengers.HW.forecast$residuals
```

```
%%R
AirPassengers.HW.forecast$model
```

```
%%R
AirPassengers.HW.forecast$level
```

```
%%R
AirPassengers.HW.forecast$x
```

```
%%R
AirPassengers.HW.forecast$method
```

```
%%R
AirPassengers.HW.forecast$series
```