8.6 Exercise: Time Series for a single variable – *R version*

In this exercise we will use **iNZightTS** package to create a Time Series plot and get the Additive and Multiplicative Decomposition for it.

We will use the **week8_AverageVisitorsQuarterly** dataset from the **FutureLearnData** package.

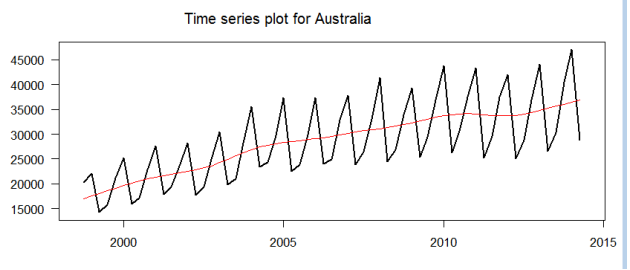
The skills addressed are to use the iNZightTS package to:

1. Generate a Time Series plot and a Seasonal plot for a single numeric variable.
2. Get an Additive and Multiplicative Decomposition.
3. Make a forecast.

Generate a Time Series plot and a Seasonplot for a single numeric variable

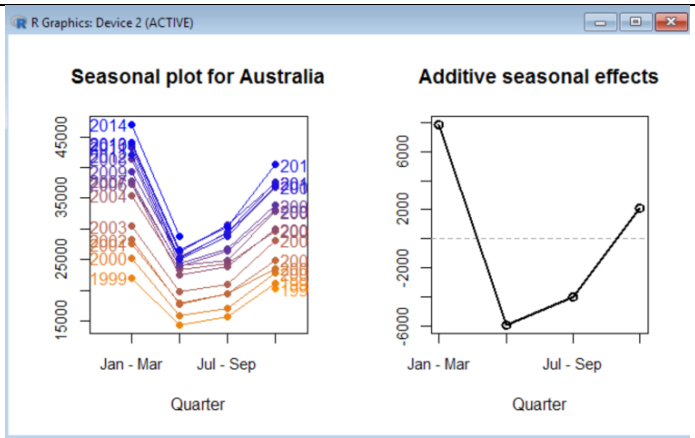
The data we are using shows us the number of visitors from different countries who are currently staying in New Zealand. We will investigate the changes in the number of Australian visitors over time.

8.6 Time Series for a single variable

# R Code	Output and/or Commentary
# Install the iNZightTS package install.packages(c('iNZightTS'), dependencies = TRUE, repos = c('http://r.docker.stat.auckland.ac.nz/R', 'https://cran.rstudio.com')) ***# Load the Time Series Library*** **library(iNZightTS)** library(FutureLearnData) ***# List the course datasets and select dataset*** data(package="FutureLearnData") **data(week8_AverageVisitorsQuarterly)** **head(week8_AverageVisitorsQuarterly)**	**Commentary** ***This installation only has to be done once*** ***Load packages in every new R session in which you want to use them*** ***Look at summary of the data sets to ensure you have the name exactly correct*** ***Load the data set*** *(which is in the FutureLearnData package)* ***List the top few rows*** `> head( week8_AverageVisitorsQuarterly)` `  Time Australia China.PR Japan Rep.Korea Germany UK Canada USA` `1 1998Q4 20288 1089 5938 1357 4376 13831 2196 7465` `2 1999Q1 22047 1492 6925 2189 6591 23271 3846 10969` `3 1999Q2 14362 1450 4353 1287 1787 9756 1285 5498` `4 1999Q3 15775 1551 6855 1767 1169 7899 1210 4811` `5 1999Q4 21209 2020 6216 2339 4998 15778 2748 9568` `6 2000Q1 25261 2364 7061 4075 7740 25362 4147 13700` `>`
Australia = iNZightTS(week8_AverageVisitorsQuarterly, **var=2)** ***# Plot the data -- t controls smoothing*** **rawplot(Australia , t=25)** ***# Now experiment*** *with different values of* ***t*** *# If you are on Windows and using R alone (not RStudio) try …* **rawplot(Australia , t=25,animate=TRUE)**	**Commentary** ***Create Time Series object for the Australian series*** *Australia is the 2nd variable in the dataset* *t controls the smoothing* ***(t must be betw. 0 and 100)*** 

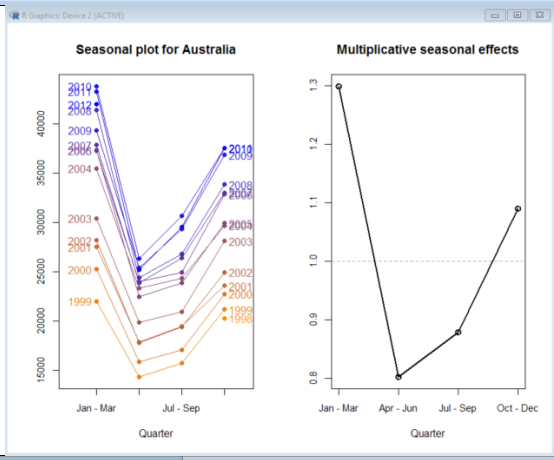
Seasonal plot – additive

seasonplot(Australia)



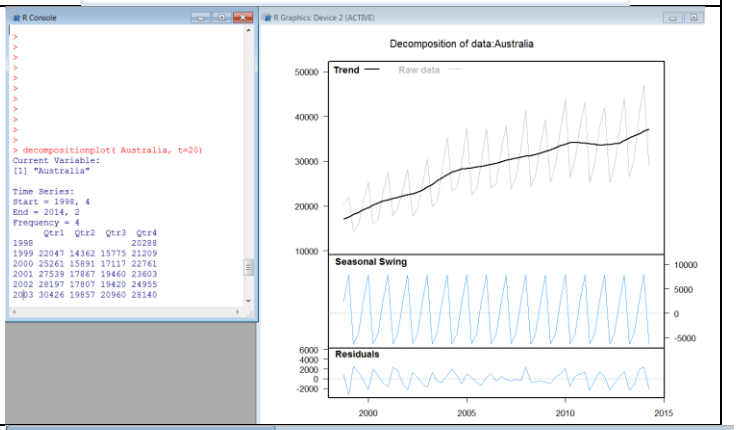
Seasonal plot – multiplicative

seasonplot(Australia , multiplicative=TRUE)



Decomposition plot

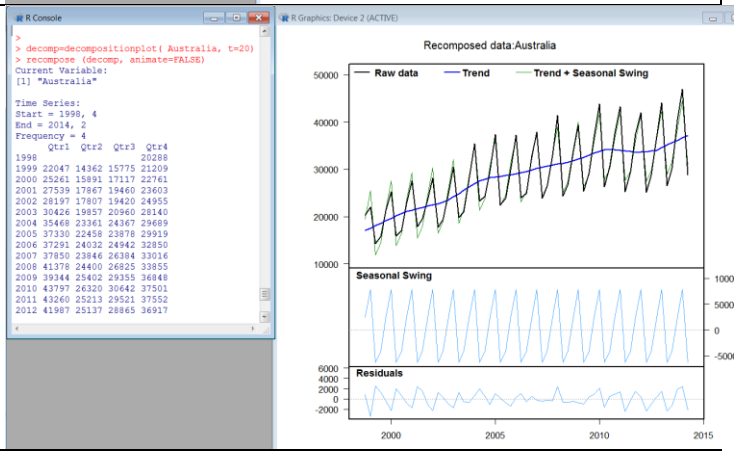
decompositionplot(Australia, t=20**)**

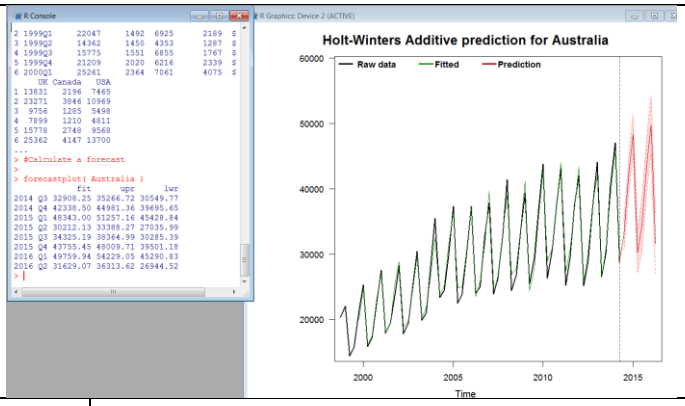


Recomposed plot

decomp=decompositionplot(Australia, t=20**)**
recompose(decomp, animate=FALSE)

If you are on Windows and using R alone (not RStudio) try …
recompose(decomp, animate=TRUE)



# Calculate a forecast **forecastplot(Australia)**	
# Let's establish this pattern for another country **China = iNZightTS (**week8_AverageVisitorsQuarterly, **var=3)** **rawplot(*China* , t=20)** **decompositionplot(*China*, t=20)** ***# etc …***	**Commentary** ***Create Time Series object for the China series. China is the 3rd variable** in the dataset **week8_AverageVisitorsQuarterly*** ***Now you can start plotting …***

- **Repeat what we have done above for any other country that interests you and try to interpret the patterns you see as has been done in the video**
    - Skim-read the **iNZight version** for the **commentary that is missing here.** (This document just concentrates on how the code works)

[*In the next Exercise we will start comparing series from different countries*.]