# R Seasonal Package Quick Guide

### Install/load the seasonal package

To download the seasonal package ensure you have an internet connection, open R, and type

**install.packages(“seasonal”)**

This downloads the package and the X-13A-S executable. You only need to do this one time.

If the seasonal package has been downloaded, you can use the package in R by typing

**library(seasonal)**

### Time series data

The seasonal package uses time series objects as its input data. If your data is in text files that X-13A-S can read, you can use the **import.ts** function to read them into R.

**myData <- import.ts(“c:\\x13\\data\\MySeries.dat”, format=”datevalue”)**

**myData <- import.ts(“c:\\x13\\data\\MySeries.a1”, format=”x13save”)**

**myData <- import.ts(“c:\\x13\\data\\MySeries.dat”, format=”free”, start = c(2000,1), frequency=12)**

### Running X-13A-S with seas()

With the seasonal package, spec files are replaced with the **seas()** function.

**m <- seas(myData)**

will (invisibly, in the background) write a spec file, run it with X-13ARIMA-SEATS, read in the output, and create an object (of class ‘seas’) named m to store the adjustment information.

The default settings will test for a log transformation, test for (flow) trading day and Easter, automatically select an ARIMA model, look for AO and LS outliers, forecast one (X-11 adjustments) or three (SEATS adjustments) years of data, and adjust the series with SEATS.

To change adjustment settings, use *spec.argument = value* arguments in the seas function. These correspond directly to the spec and argument names in X-13 spec files. For example, add:

* **arima.model = “(0 1 1)(0 1 1)”** to set the ARIMA model to the airline model
* **regression.variables = c(“AO2008.Jul”,”td1coef”,”Easter[1]”)** to set regression variables
* **forecast.maxlead = 60** to set the number of forecasts to 60
* **series.modelspan = “2005.1, “** to set the model span to start in 2005.1
* **x11=””** to run a default X-11 adjustment instead of SEATS

### Accessing output

Assuming m is the name of the seas object created, you can view output using:

* **out(m)** – opens the HTML output file for the run
* **summary(m)** – prints some summary regression and diagnostic information to the console
* **m$est** – prints regression and ARIMA estimates and standard errors to the console
* **final(m)** – extracts the seasonally adjusted series
* **original(m)** – extracts the original series
* **trend(m)** – extracts the trend
* **irregular(m)** – extracts the irregular
* **residuals(m)** – extracts the residuals
* **series(m, “table name”)** – extracts the named table. If the requested table has not already been listed in a save argument when running **seas()**, seas will be re-run to create the requested table. Tables have a long name (*spec.table*) and a short abbreviation. See the X-13 manual (Appendix B) for a complete list of tables that can be saved. Examples: **series(m,”forecast.forecasts”)** will save the forecasts, as will **series(m,”fct”)**. **series(m,”x11.irrwt”)** or **series(m,”c17”)** will save the final irregular weights.
* **udg(m,”udg key name”)** – extracts the requested information from the udg file.
* **static(m)** – creates a call (itself a seas object) of m with auto-choices hard-coded. Include **x11.filter=TRUE** to hard-code the x-11 filter. Evaluate the call with **eval(*static seas object*)**

### Graphing output

Some functions you can use to plot elements of the series include:

* **plot(m,outliers=TRUE,trend=TRUE,main=”Original Series, Seasonal Adjustment, and Trend”,xlab=”Date”,ylab=””)**
* **plot(m,outliers=TRUE,trend=TRUE,main=”Month to Month Percent Change of Original Series, Seasonal Adjustment, and Trend”,xlab=”Date”,ylab=””,transform=”PC”)**
* **monthplot(m,choice=”seasonal”,main=”Seasonal Factors and SI Ratios”)**
* **monthplot(m,choice=”irregular”,main=”Irregular Component”)**
* **residplot(m,outliers=TRUE,main=”RegARIMA Residuals”)**
* **acf(resid(m),main=”ACF of Residuals”)**
* **pacf(resid(m),main=”PACF of Residuals”)**