

## Beginning and ending your R sessions

1. Login to the tealware site, choose the Mathematics and Statistics folder and start R.
2. Type `ls()` to see the data frames that you have in your directory. To start there are none...
3. Load the Carbon dioxide dataset from my website as follows:
  - a. Right-click on the "Modified Table..." link, "Copy Link Location" or "Copy Shortcut", and then return to R
  - b. At the `>` prompt, type the following:  
**`Carbon=read.csv(file="paste the link you just copied here", header=TRUE)`**
  - c. Now type `ls()` to see the new data frame **Carbon** present in your directory
4. Attach the data frame **Carbon** by typing `attach(Carbon)`; when you're finished, type `detach(Carbon)`

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#Here are some R commands to do lots of the analysis in Ch. 1
attach(Carbon) ; str(Carbon) #gives the structure of the frame
#We'll work on the co2 variable
co2
mean(co2) ; median(co2)
hist(co2); rug(co2) #rug puts the data under the rectangles
#you can change the bins using the "breaks" option
hist(co2,breaks=c(0,2,4,6,8,10,12,14,16,18,20)); rug(co2)
#or just say how many breaks you want
hist(co2,breaks=12) ; rug(co2)
#add a title within the histogram using "main="
hist(co2, breaks=12, main="CO2 Worldwide") ; rug(co2)
#smooth the data with the density function and plot it
plot(density(co2))
#add the rug and compare with the histogram by splitting
#the output window into two rows and one column
par(mfrow=c(2,1))
plot(density(co2)) ; rug(co2); hist(co2); rug(co2)
#change back to one plot per page
par(mfrow=c(1,1))
#how about boxplots?
boxplot(co2)
#you can also make a boxplot for each level of a corresponding
#categorical variable (like Region in our case...)
boxplot(co2 ~ Region) # "~" is the tilde mark, to left of "1"
```

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#now some statistics...
min(co2); max(co2) ; range(co2)
quantile(co2) #gives the 5-number summary
IQR(co2)
#you can get whatever quantiles you want
quantile(co2,probs=c(0,.05,.25,.5,.75,.95,1))
#you can see the third one for example
quantile(co2,probs=c(0,.05,.25,.5,.75,.95,1))[3]
var(co2) #variance
sd(co2) #square root of the variance
#actually do the formula
v=sum((co2-mean(co2))^2)/(length(co2)-1) ; v
#now take the square root
sqrt(v)
#summary combines the 5-number summary with the mean
summary(co2)
#look at the Region vector (variable) - it's categorical
#count the number of countries in each level
table(Region)
#get the percentages in each level
prop.table(table(Region))
#get a bar graph of these percentages
barplot(prop.table(table(Region)))
#
#now let's save all the work we've been doing here...

```

5. Under File, choose Save Workspace. You should see a window saying "Save Image in": choose My Computer and Pick your Timmie drive and save the workspace there with a name using the date, like: **jan25.Rdata**.

6. Under File, choose Save History. Do as in #5 above and save it on your Timmie drive like **jan25.Rhistory**.

7. Now type **q()** to quit R and you're done for the day. The next time you start R, reverse the steps you made in #5 and #6 above to **Load Workspace** and **Load History**, tracing your way back to your Timmie drive to find the files you just saved. Then your new R session will be exactly as you left it when you last signed out...