**V1: What is RStudio and why should you download it?**

**・Rstudio is more user-freiendly thus time-saving!**

**・Use “=” or “<-“ to assign values to an object**

**・Create a vector**

**x=1:5**

**y=6:10**

**z=11:15**

**・draw a plot of x and y**

**plot(x,y)**

**>> a plot**

**・to ask what’s in R’s memory (the LS command)**

**ls()**

**>>”x” “y”**

**・save the plot in R studio**

**Click [export] on the menu bar （右下區域）**

**・import dataset by clicking [Import Dataset] on the menu bar（右上）**

**・create manuscript in R**

**Click [File]>>[New File]>>[New R Script] on the menu bar on top**

**・add up numeric objects**

**sum(x,y,z)**

**・remember to save R script so that you can use it next time!**

**・R markdown allows you to embed R code & R output directly into documents, pdf,, HTML, Word, etc…**

**・create a project**

**Click [File]>>[New Project]**

**A project allows you to manage all your files and output related to a project in one spot!**

**V2: Download and install R and RStudio**

**・one must download R before downloading RStudio, and you can go to CRAN to find R to install! (remember to select the location that you’re in) and follow through the installing process!**

**RStudio can be downloaded on** [**www.rstudio.com**](http://www.rstudio.com)

**V3: Getting started with R: Basic Arithmetic and coding in R**

**・Use “=” or “<-“ to assign values to an element**

**・ask R what value does the object store**

**print(x) or**

**Simply type x**

**・but R is case sensitive: it matters a lot if the objects are in upper case or not!!**

**・to input a different value to an object you can simply just use “=” or “<-“ to assign it again! The original value would be overwritten!**

**・remove an object from R’s workspace memory**

**rm(y) >> y will be removed**

**・object names in R may include numbers, periods**

**Ex: x.1 xx**

**But number can’t appear as the first character (an error would appear)**

**・we can assign different types of things to an object, when assigning words we should use “”**

**・calculate by typing the formula directly**

**11+4**

**7\*9**

**R 可以四則運算、平方、開根號、取log、exponent、絕對值…都可！**

**・+ sign at the beginning of the line means previous incomplete command**

**・press [upper key] on kb to get to the last entered command**

**press [lower key] on kb to get to the next entered command**

**・R ignores “#” so we can just type anything we want after it!**

**V4: Create and work with vectors and matrices in R**

**・create vectors by “c” or the concatenate command**

**x1=c(1,3,5,7,9)**

**(it’ll appear as numeric[5] in the workspace memory)**

**Gender=c(“male”,”female”)**

**(it’ll appear as character[2] in the workspace memory)**

**・create sequence by using “:” in between**

**2:7 >> 2 3 4 5 6 7**

**・create sequence with a start, an end and different increments**

**seq(from=1, to=4, by=1/2) >> 1 1.5 2 2.5 3 3.5 4**

**・create vectors with repeating numbers**

**rep(1, times=10) >> 1 1 1 1 1 1 1 1 1 1**

**rep(“marin”, times=5) >> marin marin marin marin marin**

**rep(1:3, times=3)>> 1 2 3 1 2 3 1 2 3**

**・if we type x=1:5 >> 1 2 3 4 5, it’ll appear as integer[5] in the workspace memory!**

**・if 2 vectors are of the same length, we may +-\*/ the corresponding elements (same thing happens to a matrix)**

**・x +-\*/ a number >> each element in object x would be affected!**

**・extract specific element in a vector by []**

**Recall y= 1 3 5 7 9**

**y[3]>> 5**

**y[-3] >> 1 3 7 9 (“-“ in [] means every element except that one)**

**・set up matrix**

**matrix(c(1,2,3,4,5,6,7,8,9), nrow=3, byrow= TRUE)>>**

**1 4 7**

**2 5 8**

**3 6 9**

**nrow >> 3 columns & 3 rows**

**byrow=TRUE>> enter elements row-wise**

**・extract the element in the 1st row & 2nd column**

**mat[1,2] >> 2**

**(we had assign the previous matrix to “mat”)**

**mat[c(1,3), 2] >> 2 8**

**[2, ] the blank>> all elements in row 2**

**[ ,1] the blank>> all elements in column 1**

**V5: import data from excel**

**・data file:**

**.csv (comma separated value)**

**.txt (tab delimited tec)xt file)**

**・import .csv**

**data1= read.csv(file.choose() , header=TRUE)**

**a menu would pop up for u to choose the file from**

**the first row is the variable name or headers**

**data2= read.table(file.choose() , header=TRUE, sep”,”)**

**the values are comma separated!**

**・import .txt**

**data3= read.delim(file.choose() , header=TRUE)**

**data4= read.delim(file.choose() , header=TRUE, sep”/t”)**

**the values are separated by tabs**

**V6: import excel with readxl/ built-in package & menu**

**・readxl (already in R!) can import both .xlsx and .xls**

**Click [file]>>[import dataset]>>[from excel]**

**Or on the environment （右上）**

**V7: export data from R**