Chapter 2: The Use of R Package

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Why Using R

- R is one of most popular data manipulation tools freely available
- Every month, a number of new components added
- Every month, a number of updated components added to this tool
- Many build-in components
- R is a platform that can integrate these different components to reach some goals
- Easy to program
- Various experimental and treatment designs can be generalized

What you should learn

- Install R platform and Rstudio
- Install R package
- How to use basic R programming
- Read a data file
- Save results to a file

Install R and RStudio

- Please use the following youtube for extra help
  - https://www.youtube.com/watch?v=MFfRQuQKGYg

Install R Platform

- Using R for data analysis will need a R platform being installed in your PC: windows or Mac version
- Install R platform by your own: search “down load R for windows” or similar words, you will learn how to install this by yourself.

Install R Studio

- Rstudio is a higher level R platform, which will make R programming and other tasks much easier and more attractive
- RStudio will need an installed regular R platform to run different R analyses
- You can download Rstudio from the website http://www.rstudio.com/ and then install it
- Now you complete the first objective

Install R and R Studio

- https://www.youtube.com/watch?v=MFfRQuQKGYg

Install an R Package

- R provides many built-in R functions, sometimes you will need to some specific R functions from specific R packages, then you will need to install these new R packages
- Follow the instruction on the youtube for help at the website:
  - https://www.youtube.com/watch?v=u1r5XTqrCTQ

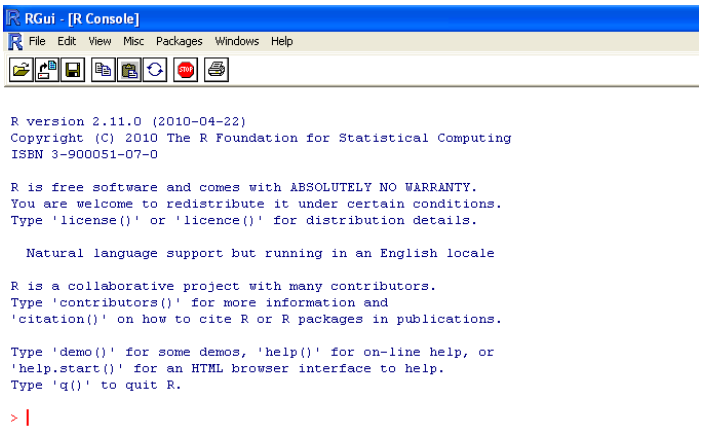
Install an R Package

- Install three R packages by yourself
  - agridat
  - agricolae
  - minque
  - qgtools
- Now you know how to install an R package which is available online
- Later we will learn how to install an R package from a local hard drive

How to Use

- Click RStudio if it is on desktop screen
- If not, go to **All Programs** and find it and click it
- You may find some help from internet from the following websites
  - https://www.youtube.com/watch?v=7cGwYMhPDUY
  - https://www.youtube.com/watch?v=1jl9OKnjQHs

How to Use R



How to Use R

- You can type a code in the window **R Console** after > then hit return key
- x<-10
- > x
- [1] 10
- y<-2
- > x*y
- [1] 20
- However, any code will not be saved for the future use, so we normally will not use this window to develop codes

How to Use R

- If you have some R codes developed, you can open a file by click open icon and edit or modify it
- You can initiate a new R program by clicking “File” and then “New script”

How To Use R

- Use various R packages/functions available directly
- Integrate different functions from the other R packages
- Develop your own functions and possibly your own packages

How to Use R

- x<-10
- y<-2
- z<-x*y
- Z
- Execute R code
  - Highlight the R code to be executed
  - Click execution icon
- If we execute the above codes, the following lines will appear under R console window
- x<-10
- > y<-2
- > z<-x*y
- > z By highlighting clicking a variable, you can check the values of this variable (it could be a single value, vector, matrix, or even a data set
- [1] 20 this is the value of Z

Several Websites

- http://cran.r-project.org/doc/manuals/R-intro.html#R-and-statistics
- http://www.maths.anu.edu.au/~johnm/r-book/2edn/scripts/: R codes downloadable from "The R Book" from this website
- Data files can be download from this website: http://www.bio.ic.ac.uk/research/mjcraw/therbook/

Read an External File

- Two basic formats of files can be read externally
  - read.table()
  - Read.csv()
- Please download two files into the folder PS756 in your hard drive from **data sets** in D2L: cotyldreg.txt and snphead.csv

Read an External File

- Read a text file
  - read.table("c:\\ps756\\cotyldreg.txt",header=TRUE)
- Read a csv file
  - read.csv("\c:\\ps756\\snphead.csv",header=TRUE)

Read an External Files

- You may also read an external file from a website, for example:
- cedegren=read.table("http://nlp.stanford.edu/~manning/courses/ling289/cedegren.txt",header=T)

- Please download the file from D2L (data sets)
- Read a data set from a harddrive:
  cot=read.table("c\\r\\data\\cotyldreg.txt",header=T)
- Obtain a data set from a R package (build-in data set)
- install.packages("agricolae")
- library(agricolae)
- Data1=data(plrv)

Read an External File from a built-in Package

- install.packages("agricolae") # you need install this R package if not install yet
- library(agricolae) # you need load this R package before you can use data files or R functions that are installed in the package
- data(corn) # load a data file from the package agricolae
- corn #list the data for the data file corn

Load Variables

- Once you have a data file available in your R system, you can use some variables/columns from this data file. For example
- attach(head) #using attach to make all variable in the data head globle
- head$SNP # extract the variable SNP in this data file
- head[,(1:2)] # list the data from the first two columns

Save Results into File

- For example we want to save the data file corn that is from the R package agricolae
- You want to save this file into the folder ps756
- There are two basic ways to save this file into your hard drive
  - write.table(corn,"c:\\ps756\\corn.txt")
  - write.csv(corn,"c:\\ps756\\corn.csv")

Take-home Message

- How to install R and RStudio
- How to install a specific R package
- How to use basic R
- How to read an external file
- How to save results into your hard drive