Introduction of R

Kai Yao

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Outline

- Introduction
- The R Environment
- Common Data Structures
- Mode and Attributes
- Assignment
- Basic Functions
- Conditional Execution and Loops
- Conclusion

Introduction

- Objective of this course
  - Fundamental methods for data process
  - Learn the way for DIY
- Requirements
  - Be Interactive
  - No plagiarism
  - No Absence

Introduction

- Contact
  - jasonyaopku@gmail.com
- Materials
  - https://github.com/jasonyaopku/Data-Processing-in-R.git
  - https://cran.r-project.org

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The R Environment

- Why do we choose R ?
  - Free
  - Cross platform
  - Rich resource
- What do we use?
  - R software
  - RStudio

The R Environment

- Where to program?
  - Terminal
  - R software
  - RStudio

The R Environment

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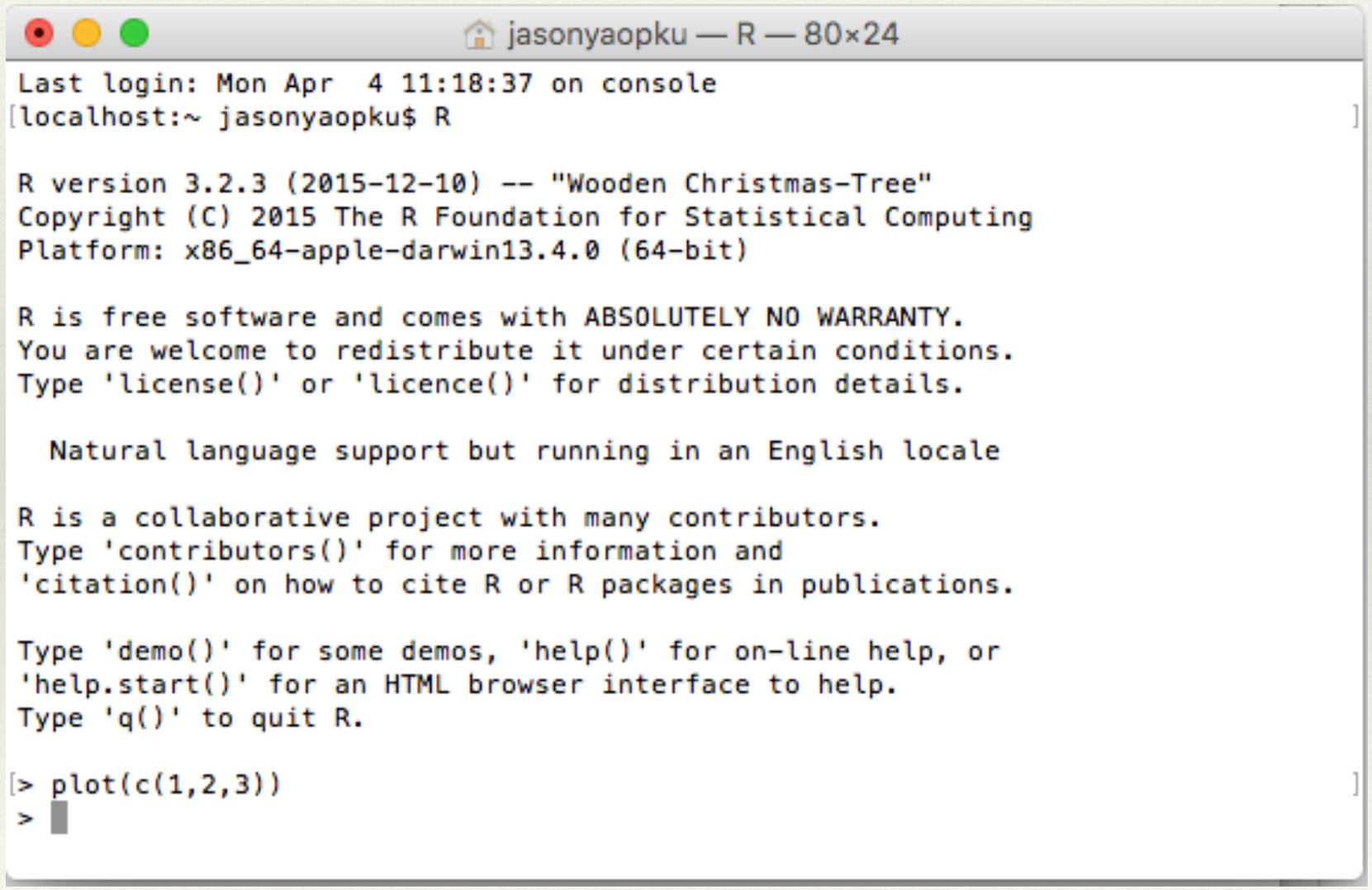
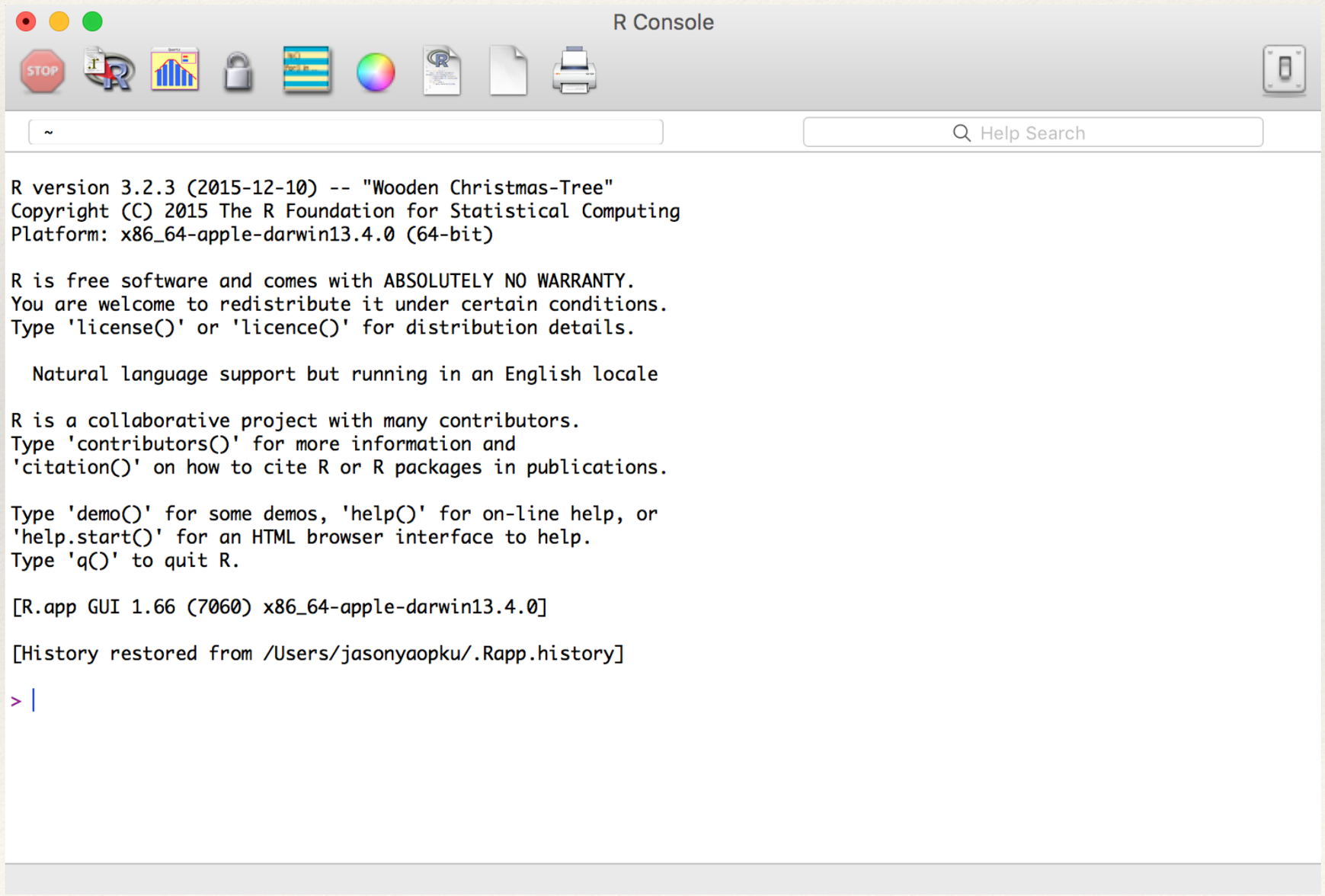


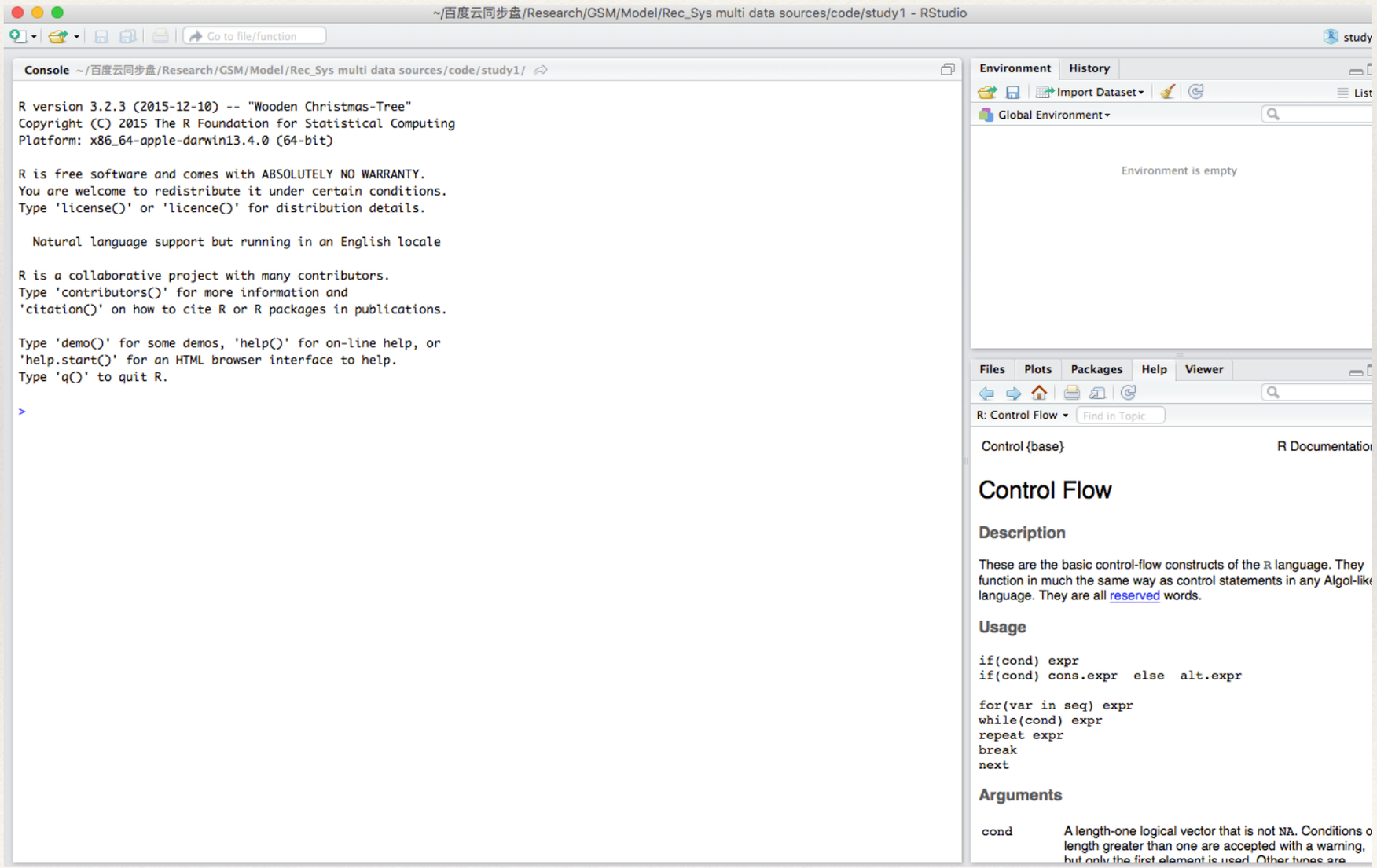
The R Environment

- Where to program?
  - Terminal
  - R software
  - RStudio



The R Environment

- Where to program?
  - Terminal
  - R software
  - RStudio



The R Environment

- Where to program?
  - Terminal
  - R software
    - RStudio
- Learn how to use help and search information is the most important thing!!!

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Common Data Structures

- R is OO (object-oriented) language
- Everything in R can be considered as an object
- Example!
  - Car
- How to define variables in R?

Common Data Structures

- Basic DS
  - numeric
  - character
  - logical
- Special DS: NA, Inf, -Inf

Common Data Structures

- Complex DS
  - Vector
  - Factor
  - Dataframe
  - Matrix
- Optional
  - Array
  - List

Common Data Structures

Object	Type	Multi Type?
Vector	num, char, logical	NO
Factor	num, char	NO
Matrix	num, char, logical	NO
Dataframe	num, char, logical	YES
Array	num, char, logical	NO
List	All	YES

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Mode and Attribute

- Mode
  - type of the object
- Attribute
  - type
  - length
  - dimension
  - …
- we can change the attributes of object

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Operators

- +
- -
- *
- /
- %*%

Assignment

- ->
  - 5->n
- <-
  - n<-5
- =
  - n=5

Indexing

- Start from 1 to n
  - Vector
  - Dataframe
  - Matrix
  - Array
  - List

Lifetime of Variables

- Assignment
  - replace the original variable
  - new value can be any type
- Revise
  - just change the value of elements
  - new value must be the same type as the original one

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Basic Functions

- ls.str()
- rm()
- print()
- message()
- seq()
- rep()

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Conditional Execution

- >, <, ==, >=, <=, !=
- functions which return TRUE or FALSE
- if (condition)

{

……..

}else

{

……..

}

Loop

- for (variable in vector)

  {

  }

- while (condition)

  {

  …

  break

  }

Conclusion

- Introduction
  - Requirements
- The R Environment
  - WWW
- Common Data Structures
  - NCL: (numeric, character, logical)
  - VDFM: (vector, factor, dataframe, matrix)

Conclusion

- Mode and Attributes
  - Every object has its attributes
  - We can change its attributes
- Assignment
  - Operators, Indexing for different data structures
- Basic Functions
  - Very useful during programming
- Conditional Execution and Loops
  - If, for, while

Homework 1

- Download the document of Homework from https://github.com/jasonyaopku/Data-Processing-in-R.git

Next Class

- In class test
- Read and write data files
- Brief description analysis
- Advanced statistic functions
- How to write own function