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# Introduction of R

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**Apr, 2016**



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# Outline

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



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# Introduction

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



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# Introduction

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- ❖ Contact

- ❖ [jasonyaopku@gmail.com](mailto: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

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



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# The R Environment

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



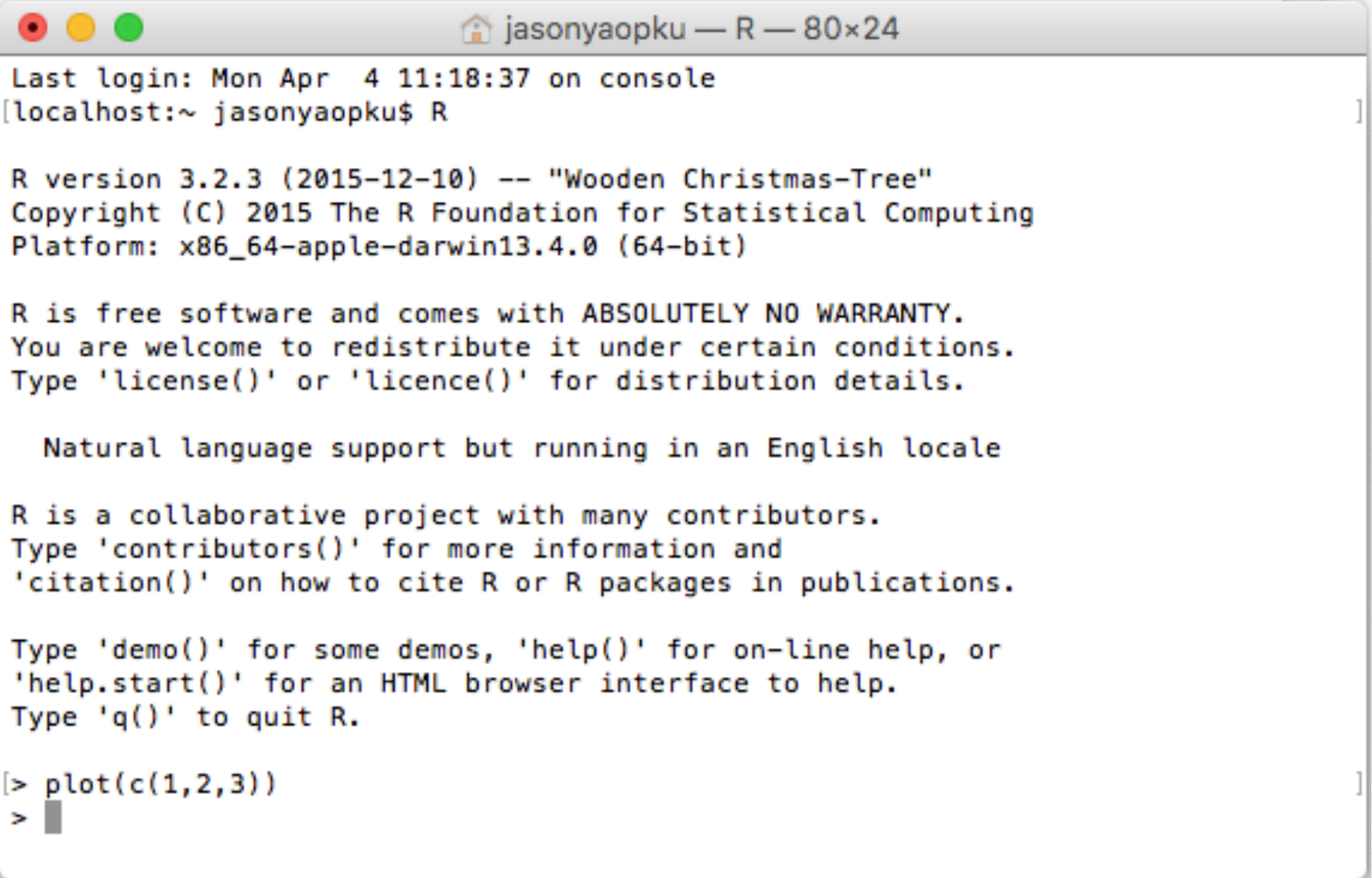
# The R Environment

- ❖ Where to program?

- ❖ Terminal

- ❖ R software

- ❖ RStudio



```
jasonyaopku — R — 80x24
Last login: Mon Apr  4 11:18:37 on console
[localhost:~ jasonyaopku$ R

R version 3.2.3 (2015-12-10) -- "Wooden Christmas-Tree"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin13.4.0 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[> plot(c(1,2,3))
>
```



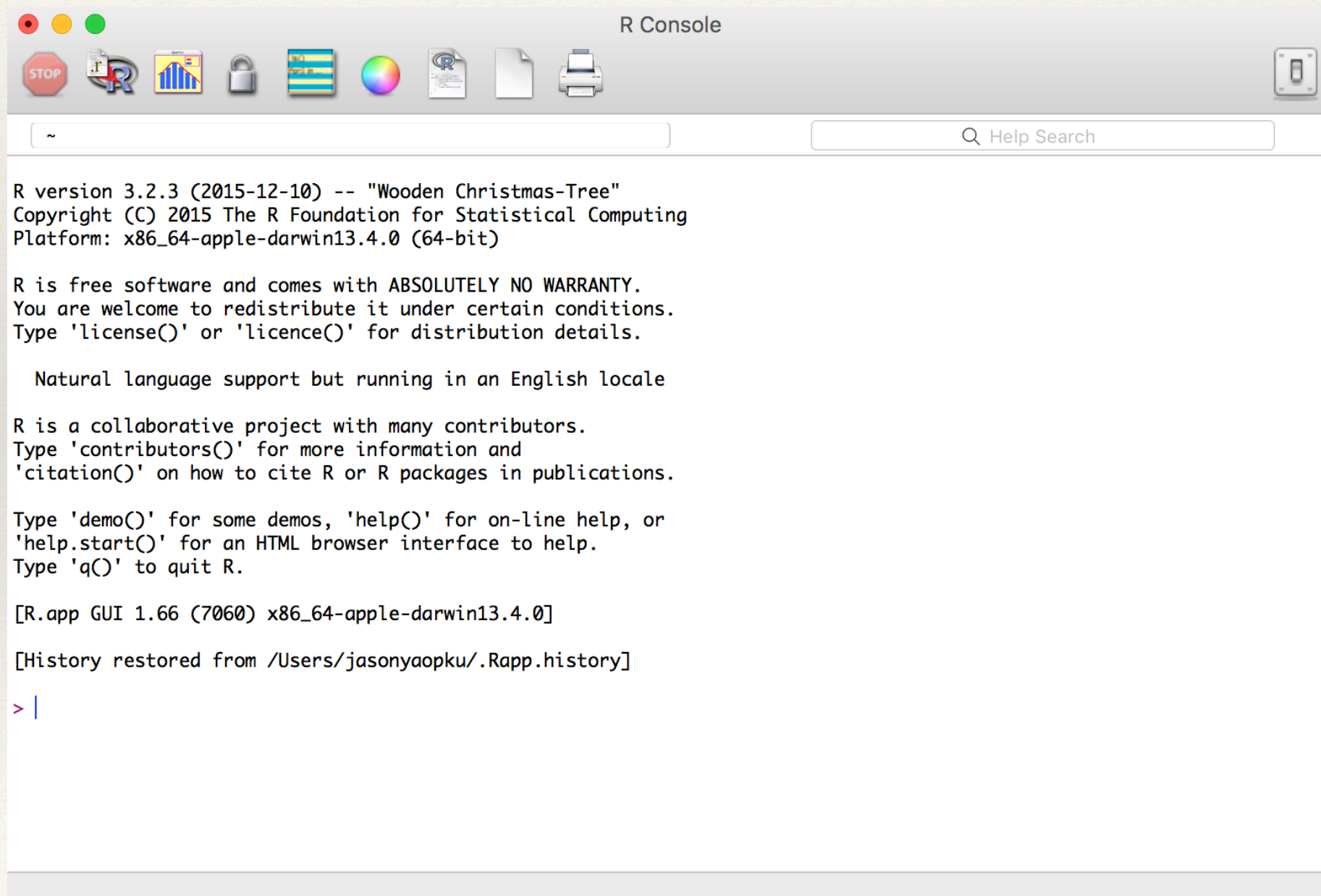
# The R Environment

## ❖ Where to program?

❖ Terminal

❖ R software

❖ RStudio



```
R Console

~ Help Search

R version 3.2.3 (2015-12-10) -- "Wooden Christmas-Tree"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin13.4.0 (64-bit)

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.66 (7060) x86_64-apple-darwin13.4.0]

[History restored from /Users/jasonyaopku/.Rapp.history]

> |
```



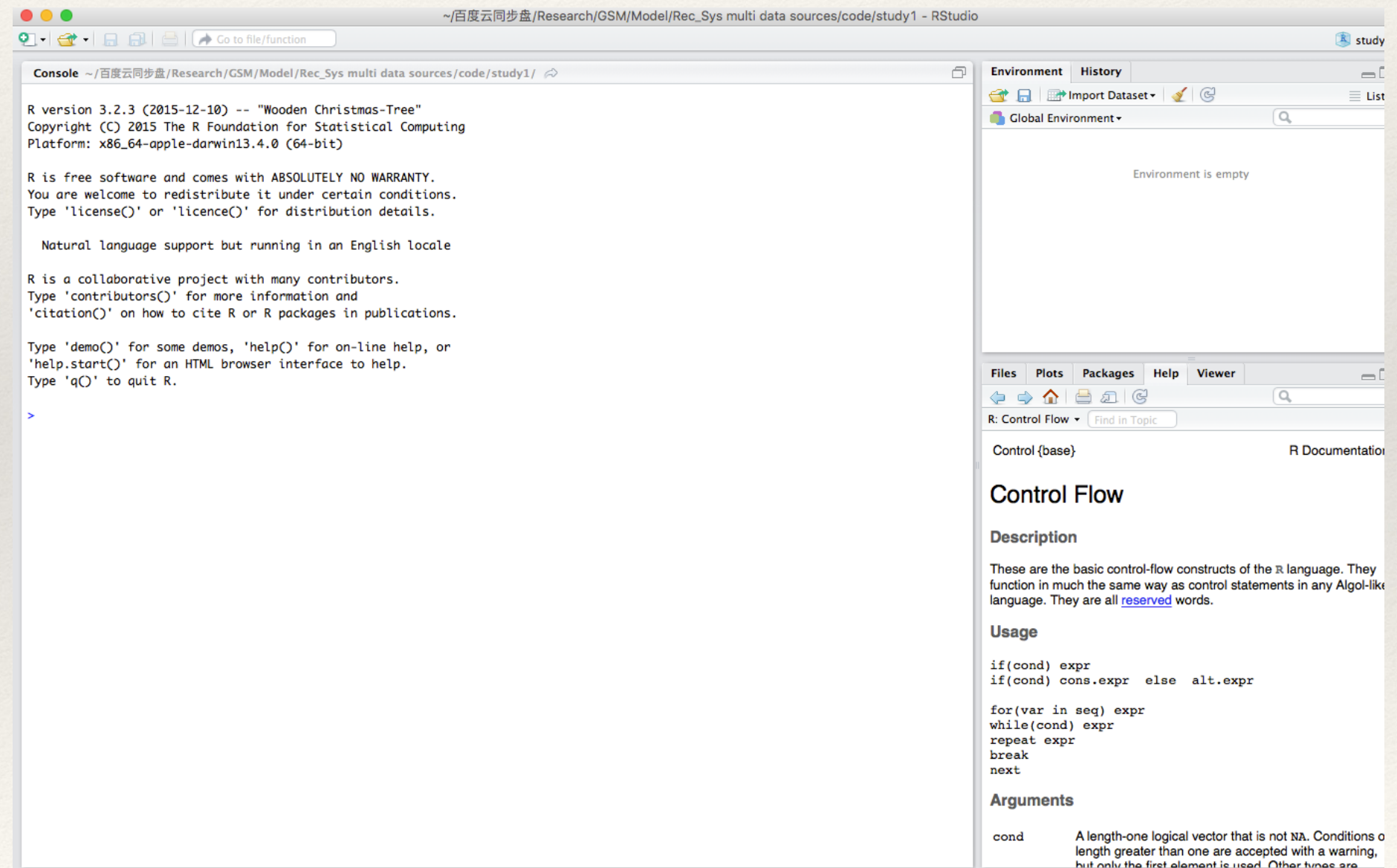
# The R Environment

❖ Where to program?

❖ Terminal

❖ R software

❖ RStudio





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# The R Environment

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- ❖ 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

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- ❖ R is OO (object-oriented) language
- ❖ Everything in R can be considered as an object
- ❖ Example!



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# Common Data Structures

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



---

# Common Data Structures

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



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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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# Outline

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- ❖ **Assignment**
- ❖ Basic Functions
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# Operators

---

❖ +

❖ -

❖ \*

❖ /

❖ %\*%



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# Assignment

---

❖ `->`

❖ `5->n`

❖ `<-`

❖ `n<-5`

❖ `=`

❖ `n=5`



---

# Indexing

---

❖ +

❖ -

❖ \*

❖ /

❖ %\*%



---

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- ❖ **Basic Functions**
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- ❖ Conclusion



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# Basic Functions

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



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# Conditional Execution

---

❖ if (condition)

{

}

else

{

}



---

# Loop

---

❖ for (variable in vector)

{

}

❖ while (condition)

{

...

break

}



---

# Conclusion

---

- ❖ Introduction
  - ❖ requirements
- ❖ The R Environment
  - ❖ WWW
- ❖ Common Data Structures
  - ❖  $3(\text{NCL})+4(\text{VDFM})$



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# Conclusion

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



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# Homework 1

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