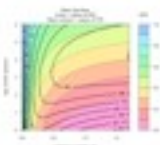


Introduction to R

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What is R?

"A free programming language and software environment for statistical computing and graphics"

- Manipulate data
- Statistical analysis
- Mathematical modeling, simulation
- Plot figures, animations
- Write scripts and functions for own analysis

Installing R and R-studio



Go to: <http://mirrors.dotsrc.org/cran/>

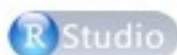


MS Windows - select "base" and "Download R 3.0.1 for Windows". This downloads the installer "R-3.0.1-win.exe". Run this to install the program.



Apple OSX 10.6 and later - Download the installer package "R-3.0.1.pkg" and double click it to install the program.

Installing R and R-studio



Go to: <http://www.rstudio.com/ide/download>

Click on: 

Click to download the recommended version.


Follow the instructions!

R Studio



R Studio



- Data entry in Excel
- Explore data in R to find errors
- Do analysis and exploration in R, not Excel 
- Be lazy and use scripts (don't just type everything into the console!)
- Scripts: programs allowing you to repeat, edit, correct your work

The R language

Object oriented programming language

- Objects - numbers, variables
- Functions - manipulations of objects

The R language

Basic operations

- Arithmetic (+, -, *, /, ^, sqrt)
- Matrix maths (t, +, %*%)
- Assignment (=, <-)

Getting help (e.g. for the "lm" function).

- ?lm, ??lm
- help("lm"), help.search("lm")

"Classes" in R

- "Class" defines the type of object and can influence what functions do.
- Common classes

```
data.frame  
list  
matrix  
integer  
numeric  
factor  
character
```

Model objects: `lm`, `glm`, `aov` etc.

Importing data from Excel

- Create a folder/directory for analysis and set it to be R's working directory

```
setwd("PATH")
```

- Save Excel file out as a *.csv file
- Import using the `read.csv` function

```
A <- read.csv("PATH", header = TRUE)
```

Manipulating dataframes

- Subsetting data using logical operators (`==`, `<`, `>`, `<=`, `>=`)
- By row/column

```
x[1:5, ], x[, 6:10]
```

- `subset` function

```
> head  
      Name Distance Quantity Price  
1  Volvo 400000      3      12  
2  Volvo 400000      4      13  
3  Volvo 400000     20      21  
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```

Export data from R

- Export using the `write.csv` function

```
write.csv(myData, file = "myData.csv", header  
= TRUE, row.names = FALSE)
```

- This file can be opened in Excel
- Save the entire workspace

```
save.image("myWorkspace.RData")
```

- Save the parts of the workspace

```
save(A, B, C, myWorkspace.RData)
```

Objects you want to save

Graphics in R

