

## Stat261 – Lab 1

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Topics: R, RStudio, R Markdown, DataCamp (& alternatives)

Hand in: Nothing for Lab 1

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It is assumed that, prior to this lab, you have successfully:

1. Installed **R** on your machine. (<https://cran.r-project.org/>)
2. Installed **RStudio** on your machine. Note,
  - a. If you are using a tablet, you can access RStudio in the cloud at <https://rstudio.cloud>. Set up your cloud account before the lab. Note that the free cloud accounts have usage-time and capacity restrictions and you may require a paid account to complete the course.
  - b. Otherwise, RStudio can be downloaded from this link: <https://www.rstudio.com/products/rstudio>.
3. Create your **DataCamp** account using the invitation link below and your **netlink email id**.

*DataCamp is an online learning site for R and other Data Science courses. As a student in this course, you will be given a FREE account on DataCamp for use during the lab portion of the course. Use the link below with **your UVic netlink email id** to set up your free DataCamp account for the term. Since the email address domain is set as uvic.ca. **Other email accounts will NOT work!***

[https://www.datacamp.com/groups/shared\\_links/36669dd63b0158cbe7c5c5a5379d0b4603bf60898cdc4259c40c417c2eb7a5be](https://www.datacamp.com/groups/shared_links/36669dd63b0158cbe7c5c5a5379d0b4603bf60898cdc4259c40c417c2eb7a5be)

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### Lab overview

1. Start up RStudio on your computer. There are four main panels in the RStudio interface. The top left panel is the source panel, and the bottom left is the console. Other useful tabs and information are in the two right-hand panels.
2. Create a new script (File/New File/R Script) and save the file as *Lab1.R*. To utilize packages, they must first be installed and then loaded. Type the following code into your script to install and load the R Markdown package:

```
install.packages("rmarkdown")  
library(rmarkdown)
```

Run the two lines of code from the script file. See the Run button on the top right of the source panel.

IF you do NOT have a version of LaTeX on your computer, include and run the following:

```
install.packages("tinytex")  
tinytex::install_tinytex()  
# tinytex allows you to create pdf files from your Rmarkdown scripts
```

3. The packages can also be installed using the GUI: click on Packages tab (bottom right panel) and then Install.

4. The 'rmarkdown' package we just installed is used to create notebook documents that format text and code together in a neat and convenient manner. Create a new R Markdown file. Title it Lab 1, put your name as the author, and set the default output format to PDF. Knit the file.
  - a. Examine the code and the output pdf file.
  - b. You may find this [cheatsheet](#) useful for R Markdown formatting. More information about R Markdown is available [here](#).
5. Log onto the DataCamp website, then the link <https://learn.datacamp.com/courses> and click on the Course, Introduction to R. Work through the first three chapters: Intro to basics; Vectors; Matrices. A summary of what you'll learn is included at the end of this document.

6. *If your DataCamp account is not working during the lab*, run the following code

```
install.packages("swirl")
library(swirl)
swirl()
```

to start learning R using the package called **swirl**. Complete the **R programming** course 'The basics of programming in R'. You are prompted through the course. Complete sections **1. Basic Building Blocks** through to **4. Vectors**.

7. *If you have already completed the Intro to R series*, perhaps in a previous course, you are welcome to work through [Software Carpentry](#)'s free course on programming with R, available [here](#). This course aims to teach useful R programming by walking you through the common tasks of data analysis. Some lessons in this course may go beyond the level of R programming that is expected of you in this course, but the course itself is well-written and the material is useful if you are planning on pursuing a career in statistics/data science.
  - a. If you instead prefer more Datacamp series to work through, these are recommended:
    - [Intermediate R](#), [Intermediate R practice](#)
    - [Data Visualization in R](#)
    - [Introduction to Writing Functions in R](#)
    - [Introduction to Data in R](#)
    - [Foundations of Inference in R](#)*Take advantage of the Datacamp access while you have it!*

8. Optional: Read Coding styles for R: <http://adv-r.had.co.nz/Style.html>

9. Optional: Advanced for Latex users

Test latex code in Rmarkdown: enter this in a text area in the file Lab1.Rmd and knit the file again.

```
$$\beta_{1} = \frac{\sum_{i=1}^n (x_{i} - \bar{x})(y_{i} - \bar{y})}{\sum_{i=1}^n (x_{i} - \bar{x})^2}
$$
```

# Summary of R learned in DataCamp, Introduction to R lessons 1-3

## 1. Basics

Addition: +

Subtraction: -

Multiplication: \*

Division: /

Exponentiation: ^

Modulo: %% returns the remainder of the division

<- assignment

Data types: numerics, integers, logical, characters

class()

## 2. Vectors

c()

names()

sum()

vector selection []

sequence operator :

mean()

Logical operators: <, >, <=, >=, ==, !=

## Matrices

matrix()

rownames()

colnames()

rowSums(), colSums()

cbind()

rbind()