

ISE 3293/5013 Laboratory 1

Introduction to R

In this lab you will learn the basics of R. This program is free and you are encouraged to obtain a copy for your Mac, PC or Linux machine. Install it and then download and install R studio (this is a nice front end to R and is also free). If you do not have your own computer then you can use the machines on this level of the PHYSC building to do homework, assignments and projects.

Objectives

In this lab you will learn how to:

1. Read data into R.
2. Create data in R.
3. Manipulate data frames.
4. Create vectors.
5. Create matrices.
6. Create tables.
7. Create barplots.
8. Create pie charts.
9. Create boxplots.
10. Create scatter plots.

Tasks

There are two front-ends to R that we will look at. Tinn-R and Rstudio.

We will use Rstudio for most of the course

All output made please copy and paste into this word file. Save and place in the dropbox when completed.

- Task 1
 - Download from D2L the zipped data files, “Dataxls”
 - Unzip the contents into a directory on your desktop (call it LAB1)
 - Download the file “lab1.r”
 - Place this file with the others in LAB1.
 - Start Rstudio
 - Open “lab1.r” from within Rstudio.
 - Go to the “session” menu within Rstudio and “set working directory” to where the source files are located.
 - Copy and paste the working directory by issuing the command `getwd()` :
"F:/Google Drive - Saied/Courses/02 OU/11 Fundamentals of Engineering Statistical Analysis/02 Labs/01 Lab 1"
 -
- Task 2
 - Find the file “DDT.xls” inside LAB1
 - Open it in Excel
 - Save As type CSV(comma delimited) “*.csv”

- Use `read.table()` to read the data into R, this function will already be available within the script `lab1.r` which you have opened in Rstudio.
- Copy and paste the first six lines of the data using “`head()`” (use “courier new” font):

```
RIVER MILE SPECIES LENGTH WEIGHT DDT
1 FCM 5 CCATFISH 42.5 732 10
2 FCM 5 CCATFISH 44.0 795 16
3 FCM 5 CCATFISH 41.5 547 23
4 FCM 5 CCATFISH 39.0 465 21
5 FCM 5 CCATFISH 50.5 1252 50
6 FCM 5 CCATFISH 52.0 1255 150
```

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- Task 3
 - We read the data into an object called “`ddt`”. This object contains all of the data. What are the qualitative variables in “`ddt`”?

```
"RIVER" "SPECIES"
```

- What are the quantitative variables in “`ddt`”?

```
"MILE" "LENGTH" "WEIGHT" "DDT"
```

- How many SPECIES are in the `ddt` data set?

```
3: CCATFISH, LMBASS, SMBUFFALO
```

- Subset the `ddt` data set so that we see only the observations with SPECIES, LMBASS and WEIGHT bigger than 800gms

```
RIVER MILE SPECIES LENGTH WEIGHT DDT
141 TRM 345 LMBASS 30 856 2.2
144 TRM 345 LMBASS 36 1433 1.9
```

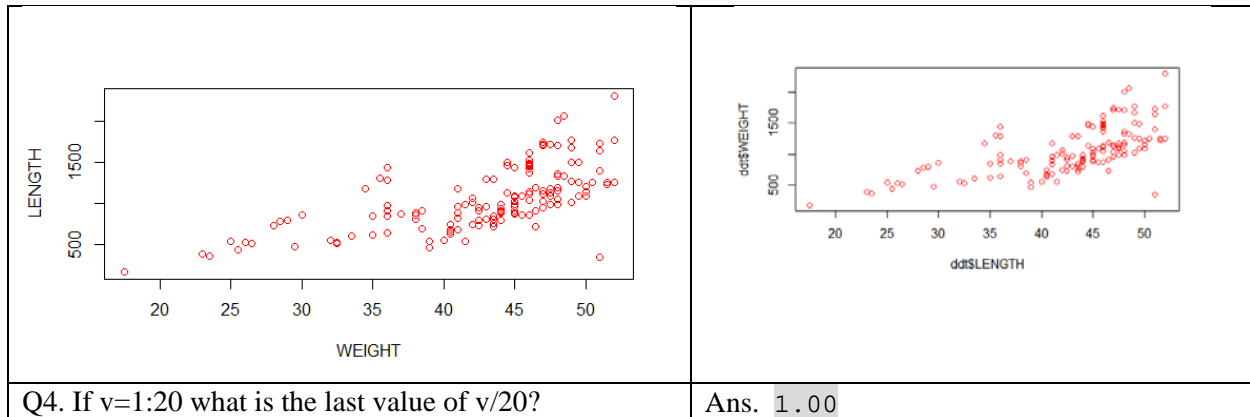
- Subset the `ddt` data set so that we see only those observations where the RIVER is SCM and DDT bigger than 4.0

```
RIVER MILE SPECIES LENGTH WEIGHT DDT
16 SCM 1 CCATFISH 45 984 9.1
17 SCM 1 CCATFISH 43 965 7.8
18 SCM 1 CCATFISH 45 1084 4.1
```

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- CLICKER QUESTIONS



Q.1 Find the mean length of fish in the <code>ddt</code> data frame!	Ans. 42.8125
Q.2 What is the standard deviation of the weight of fish in the <code>ddt</code> data frame?	Ans. 376.5461
Q3. Is this the plot of LENGTH vs WEIGHT from the <code>ddt</code> data frame?	Ans. 1=Yes, 0=No It is WEIGHT vs. LENGTH

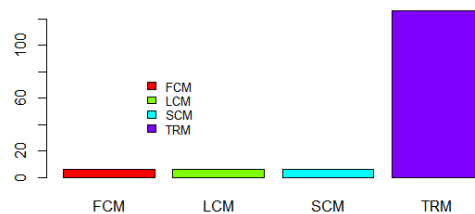


• Task 4

- Make a table of the rivers.

RIVER			
FCM	LCM	SCM	TRM
6	6	6	126

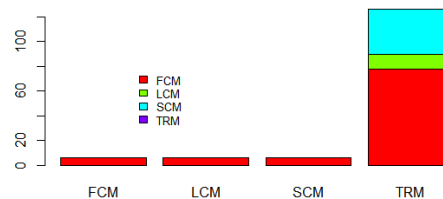
- Make a color coded barplot of the rivers.



- Make a table of the rivers crossed with the species of fish.

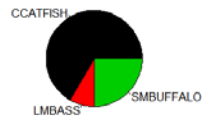
RIVER				
SPECIES	FCM	LCM	SCM	TRM
CCATFISH	6	6	6	78
LMBASS	0	0	0	12
SMBUFFALO	0	0	0	36

- Make a barplot of the rivers crossed with the species of fish.

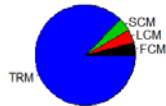


• Task 5

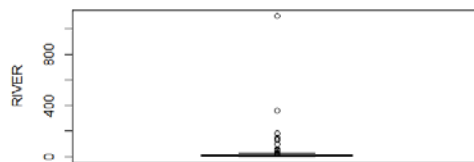
- Make a pie chart of Fish SPECIES



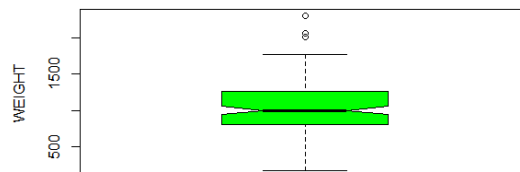
- Make a pie chart of RIVERS



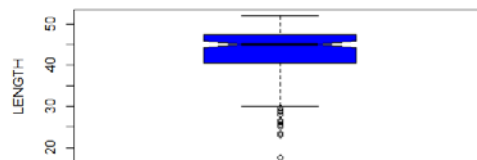
- Task 6
 - Make a boxplot of the variable DDT



- Make a boxplot of the variable WEIGHT

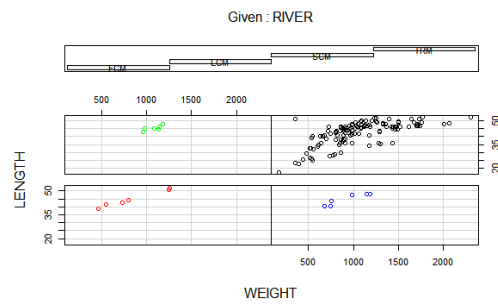


- Make a boxplot of the variable LENGTH



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- Task 7
 - Make a coplot of LENGTH Vs WEIGHT given RIVER



- Make a coplot of DDT Vs WEIGHT given SPECIES

