

SRT411A0.Rmd

Yakov Kadashevitch

February 19, 2018

Assignment Description

The following assignment is a demonstration using the text from <https://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf> (<https://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf>) to read, understand, and demonstrate different actions and results using the power of R.

Sources Used

The following sources were used in the process of creating this document:

<http://rmarkdown.rstudio.com/> (<http://rmarkdown.rstudio.com/>) <http://nicercode.github.io/guides/reports/> (<http://nicercode.github.io/guides/reports/>) http://kbroman.org/knitr_knutshell/pages/markdown.html (http://kbroman.org/knitr_knutshell/pages/markdown.html) <https://www.rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf> (<https://www.rstudio.com/wp-content/uploads/2015/02/rmarkdown-cheatsheet.pdf>)

Used to change the working directory.

```
setwd("/home/yak/Desktop")
```

Todo 1

Compute the difference between 2014 and the year you started at this university and divide this by the difference between 2014 and the year you were born. Multiply this with 100 to get the percentage of your life you have spent at this university. Use brackets if you need them.

```
((2015-2014)/(2014-1995))*100
```

```
## [1] 5.263158
```

Todo 2

Repeat the previous ToDo, but with several steps in between. You can give the variables any name you want, but the name has to start with a letter.

```
A= ((2015-2014)/(2014-1995))*100  
A
```

```
## [1] 5.263158
```

Todo 3

Compute the sum of 4, 5, 8 and 11 by first combining them into a vector and then using the function `sum`.

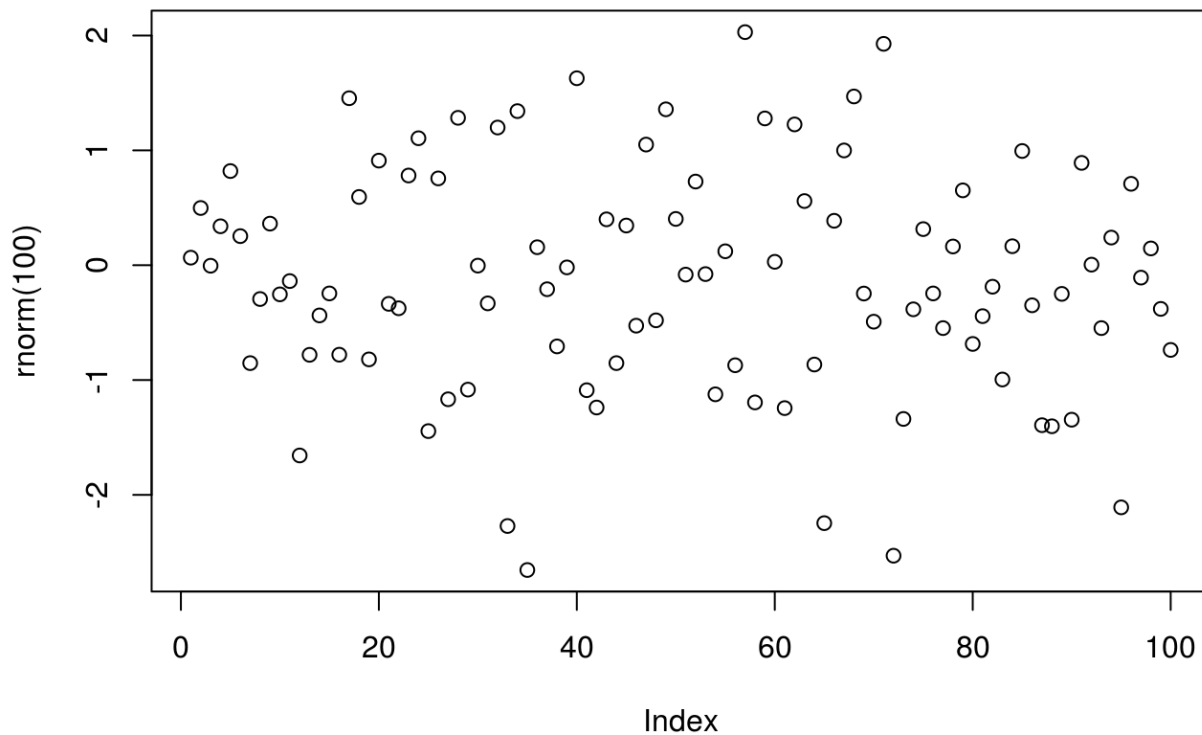
```
sum(4,5,8,11)
```

```
## [1] 28
```

Todo 4

Plot 100 normal random numbers.

```
plot(rnorm(100))
```



Todo 5

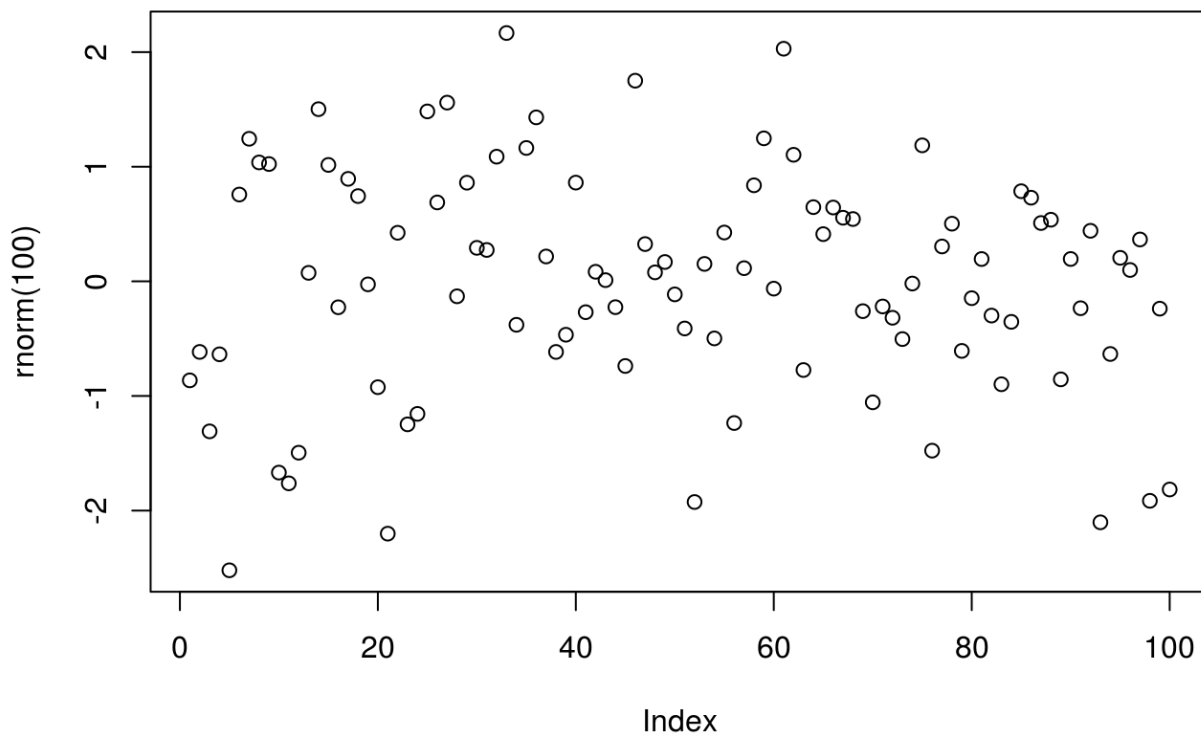
Find help for the sqrt function.

```
help(sqrt)
```

Todo 6

Make a file called firstscript.R containing R- code that generates 100 random numbers and plots them, and run this script several times.

```
source("firstscript.R")
```



Todo 7

Put the numbers 31 to 60 in a vector named P and in a matrix with 6 rows and 5 columns named Q. Tip: use the function seq. Look at the different ways scalars, vectors and matrices are denoted in the workspace window.

```
P= seq(from=31, to=60, by=1)
Q= matrix(P,ncol= 5, nrow= 6)
P
```

```
## [1] 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
## [24] 54 55 56 57 58 59 60
```

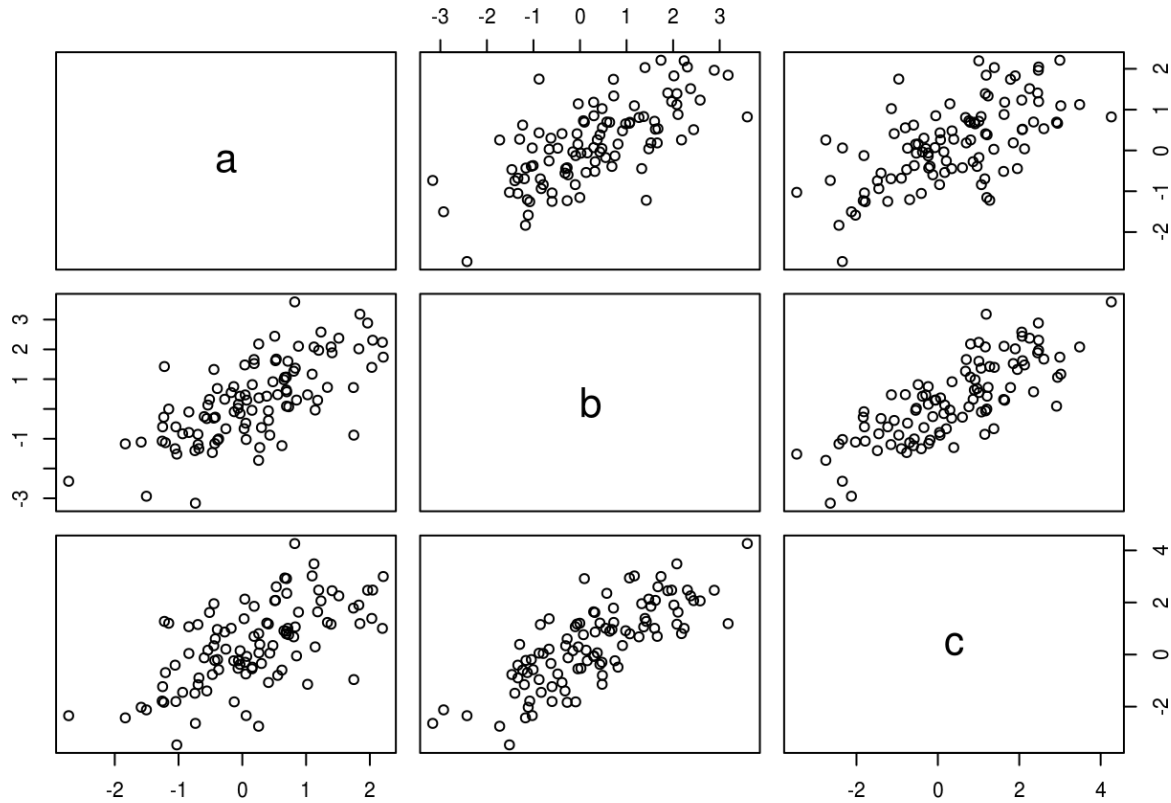
```
Q
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]   31   37   43   49   55
## [2,]   32   38   44   50   56
## [3,]   33   39   45   51   57
## [4,]   34   40   46   52   58
## [5,]   35   41   47   53   59
## [6,]   36   42   48   54   60
```

Todo 8

Make a script file which constructs three random normal vectors of length 100. Call these vectors x_1 , x_2 and x_3 . Make a data frame called t with three columns (called a , b and c) containing respectively x_1 , x_1+x_2 and $x_1+x_2+x_3$. Call the following functions for this data frame: `plot(t)` and `sd(t)`. Can you understand the results? Rerun this script a few times.

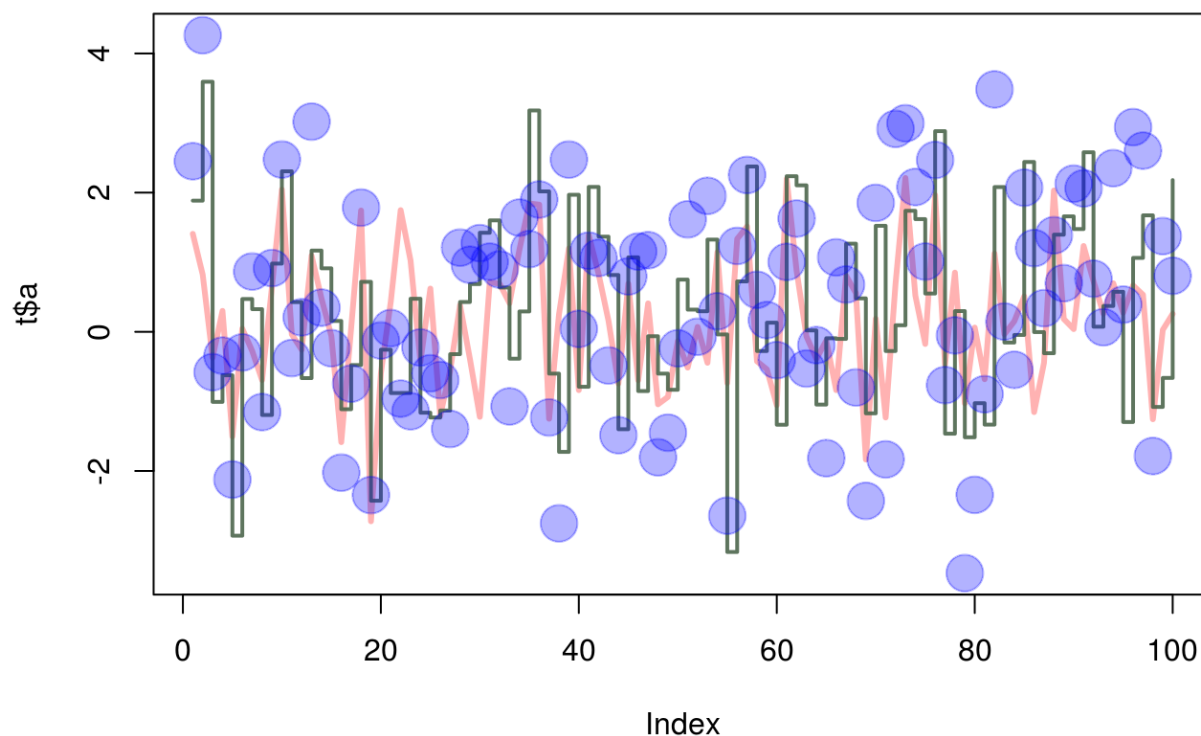
```
x1=rnorm(100)
x2=rnorm(100)
x3=rnorm(100)
t=data.frame(a=x1,b=x1+x2,c=x1+x2+x3)
plot(t)
```



Todo 9

Add these lines to the script file of the previous section. Try to find out, either by experimenting or by using the help, what the meaning is of `rgb`, the last argument of `rgb`, `lwd`, `pch`, `cex`.

```
plot(t$a, type="l", ylim=range(t), lwd=3, col=rgb(1,0,0,0.3))
lines (t$b, type="s", lwd=2, col=rgb (0.3,0.4,0.3,0.9))
points (t$c, pch=20, cex=4, col=rgb(0,0,1,0.3))
```



Todo10

Make a file called `tst1.txt` in Notepad from the example in Figure 4 and store it in your working directory. Write a script to read it, to multiply the column called `g` by 5 and to store it as `tst2.txt`.

```
d = data.frame (g = c (3,4,5), y = c(12,43,54))
write.table(d, file="tst1.txt", row.names=FALSE)
d2 = read.table(file="tst1.txt", header=TRUE)
d2$g*5
```

```
## [1] 15 20 25
```

Todo11

Compute the mean of the square root of a vector of 100 random numbers. What happens? Make a vector from 1 to 100. Make a for-loop which runs through the whole vector. Multiply the elements which are smaller than 5 and larger than 90 with 10 and the other elements with 0.1.

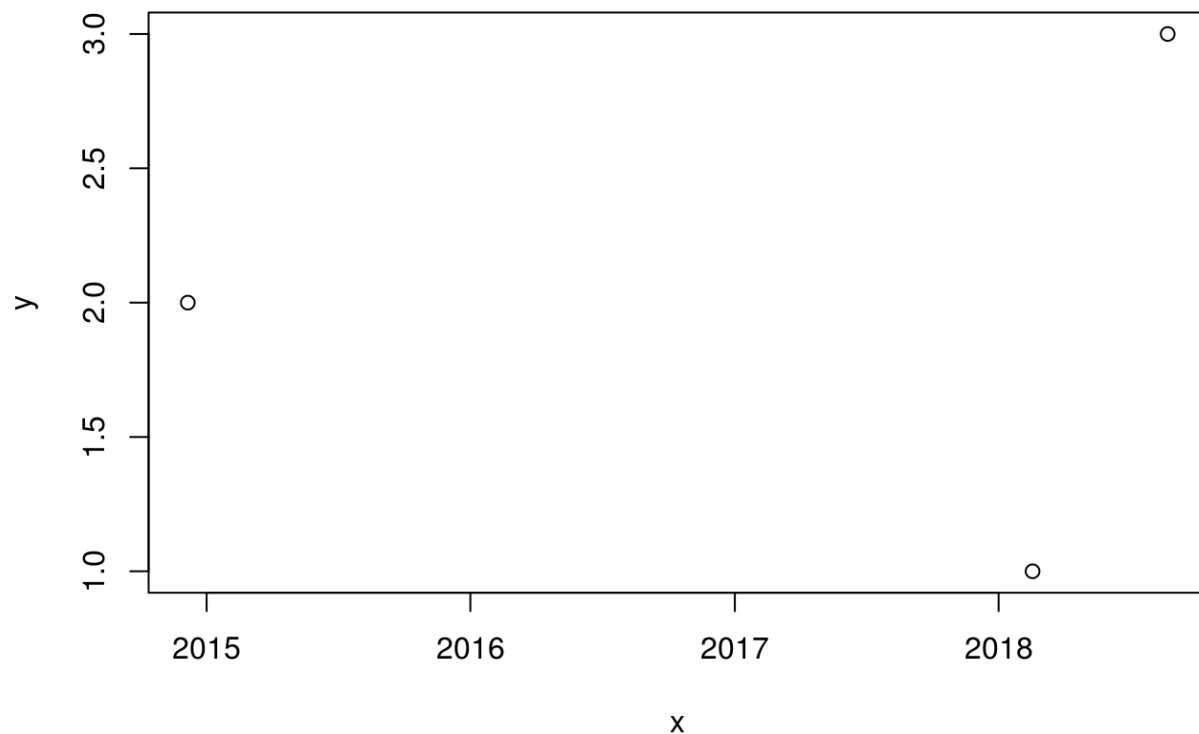
```
sqrt (mean(rnorm(100)))
```

```
## [1] 0.2822812
```

Todo12

Make a graph with on the x-axis: today, Sin- terklaas 2014 and your next birthday and on the y-axis the number of presents you expect on each of these days. Tip: make two vectors first.

```
x=strptime(c("2018-02-17", "2014-12-6", "2018-08-23"), "%Y-%m-%d")
y= c(1,2,3)
plot(x,y)
```



Todo13

Make a vector from 1 to 100. Make a for-loop which runs through the whole vector. Multiply the elements which are smaller than 5 and larger than 90 with 10 and the other elements with 0.1.

```

0=seq(from= 1, to= 100, by= 1)
s = c()
for(i in 1:100)
{
  if(0[i]<5)
  {
    s[i]=0[i]*10;
  }
  else if(0[i]>90)
  {
    s[i]=0[i]*10;
  }
  else
  {
    s[i]=0[i]*0.1;
  }
}
s

```

```

## [1] 10.0 20.0 30.0 40.0 0.5 0.6 0.7 0.8 0.9 1.
0
## [11] 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.
0
## [21] 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.
0
## [31] 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.
0
## [41] 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 5.
0
## [51] 5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 6.
0
## [61] 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7.
0
## [71] 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9 8.
0
## [81] 8.1 8.2 8.3 8.4 8.5 8.6 8.7 8.8 8.9 9.
0
## [91] 910.0 920.0 930.0 940.0 950.0 960.0 970.0 980.0 990.0 1000.
0

```

Todo14

Write a function for the previous ToDo, so that you can feed it any vector you like (as argument). Use a for-loop in the function to do the computation with each element. Use the standard R function length in the specification of the counter.


```
fun1 = function(0){  
  
  s = c()  
  L = length(0)  
  L  
  for(i in 1:L)  
  {  
    if(0[i]<5)  
    {  
      s[i]=0[i]*10;  
    }  
    else if(0[i]>90)  
    {  
      s[i]=0[i]*10;  
    }  
    else  
    {  
      s[i]=0[i]*0.1;  
    }  
  }  
  s  
  
}  
  
fun1(c(1,2,3,91,92,93,45,46,47))
```

```
## [1] 10.0 20.0 30.0 910.0 920.0 930.0 4.5 4.6 4.7
```