SRT411_ASSIGNMENT_0

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INTRODUCTION:

“R is a powerful language and environment for statistical computing and graphics. It is a public domain (a so called”GNU“) project which is similar to the commercial S language and environment which was developed at Bell Laboratories (for-merly AT&T, now Lucent Technologies) by John Chambers and colleagues. R can be considered as a different implementation of S, and is much used in as an educational language and research tool. It is quite similar to other programming packages such as MatLab (not freeware), but moreuser-friendly than programming languages such asC++ or Fortran. In this assignment we have to complete the ToDo list from the document in this link and will be reading and understanding content from this web file. After completing these ToDo in R markdown we have to convert this .Rmd file into the PDF using Knit. Further, we wil be making an account in the GitHub and make a repository that includes the .Rmd file and PDF file of the R code and output and one read me file which will explain the assignment”

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.

```
((2018-2014)/(2014-1999))*100
```

```
## [1] 26.66667
```

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.

```
years_university = 2018-2014
years_life = 2014-1999
university_to_life = (years_university/years_life)*100
university_to_life
```

```
## [1] 26.66667
```

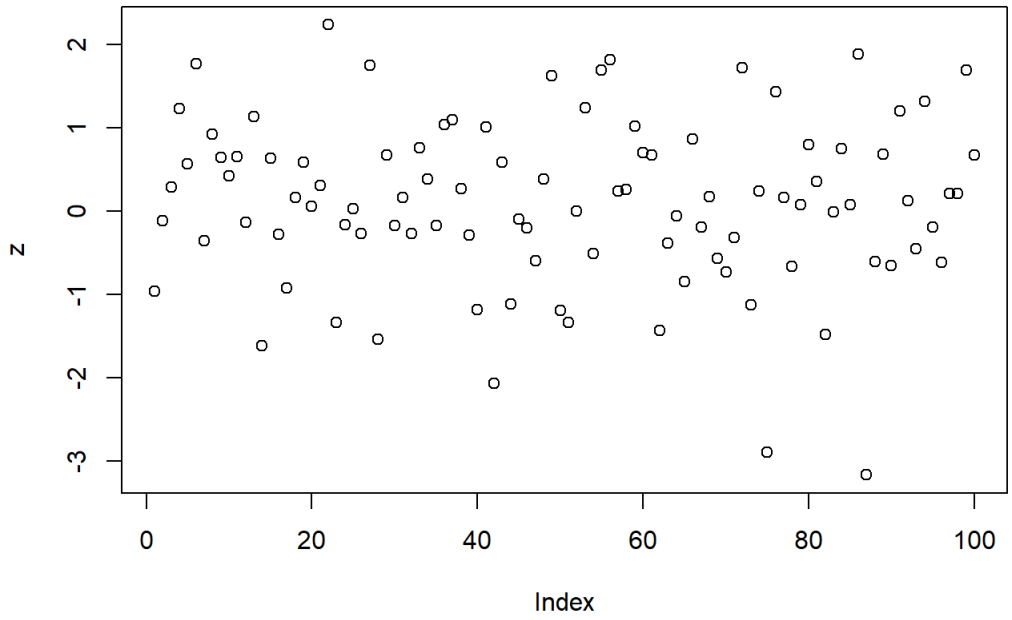
3. Compute the sum of 4, 5, 8 and 11 by first combining them into a vector and then using the function sum.

```
b=c(4,5,8,11)
sum(b)
```

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

4. Plot 100 normal random numbers.

```
z=rnorm(100)
plot(z)
```



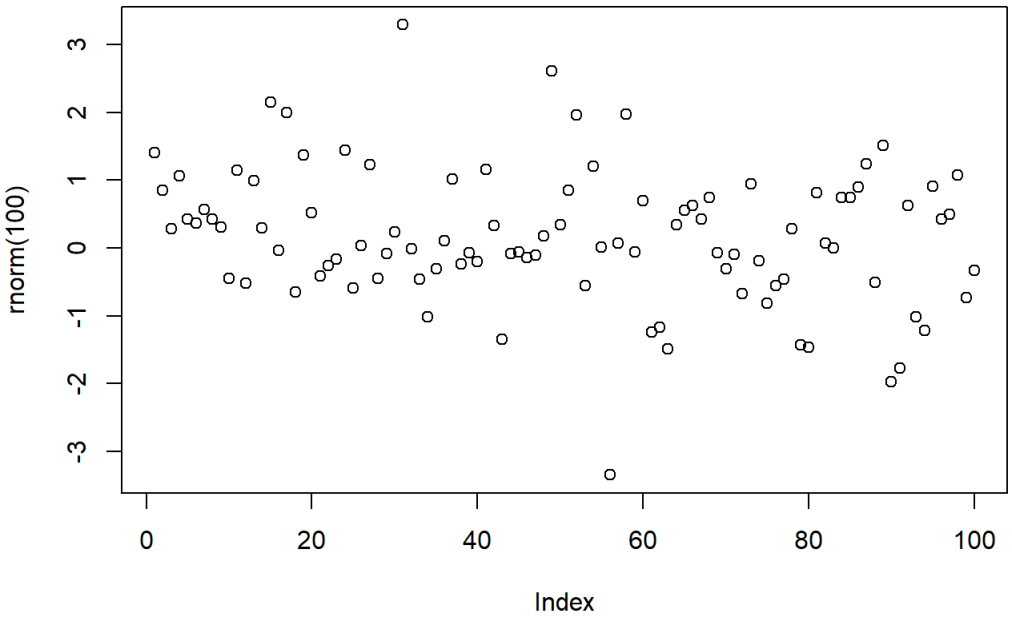
5. Find help for the sqrt function.

```
help("sqrt")
```

```
## starting httpd help server ... done
```

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

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



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
```

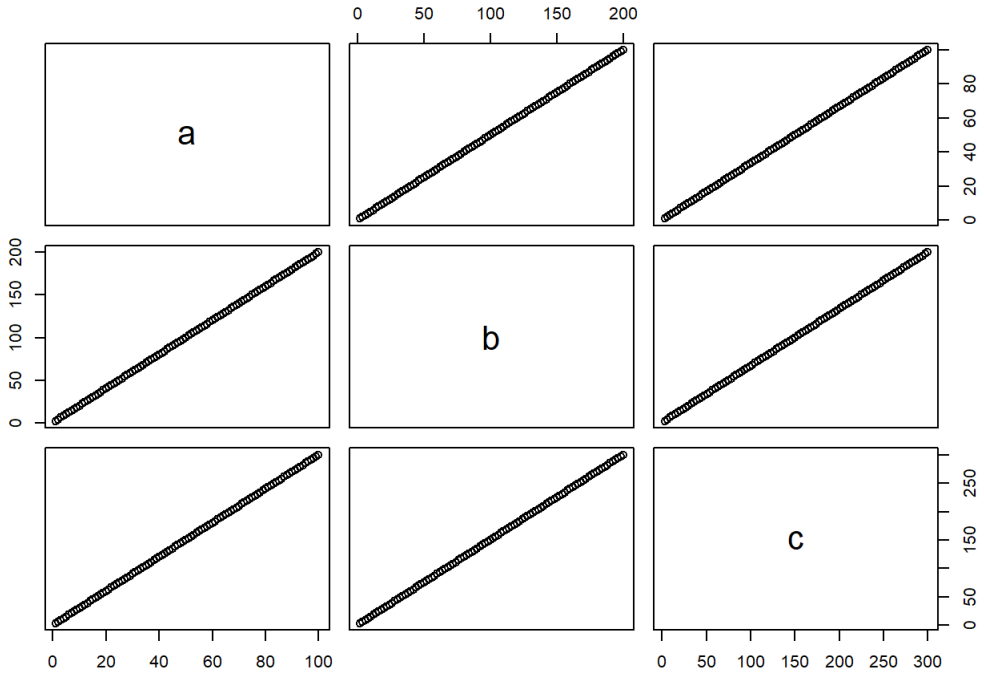
```
##  [1] 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
## [24] 54 55 56 57 58 59 60
```

```
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
```

8. Make a script file which constructs three random normal vectors of length 100. Call these vectors x1, x2 and x3. Make a data frame called t with three columns (called a,b and c) containing respectively x1, x1+x2 and x1+x2+x3.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 = seq(1:100)
x2 = seq(1:100)
x3 = seq(1:100)
t= data.frame(a=x1, b=x1+x2, c=x1+x2+x3)
plot(t)
```



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.

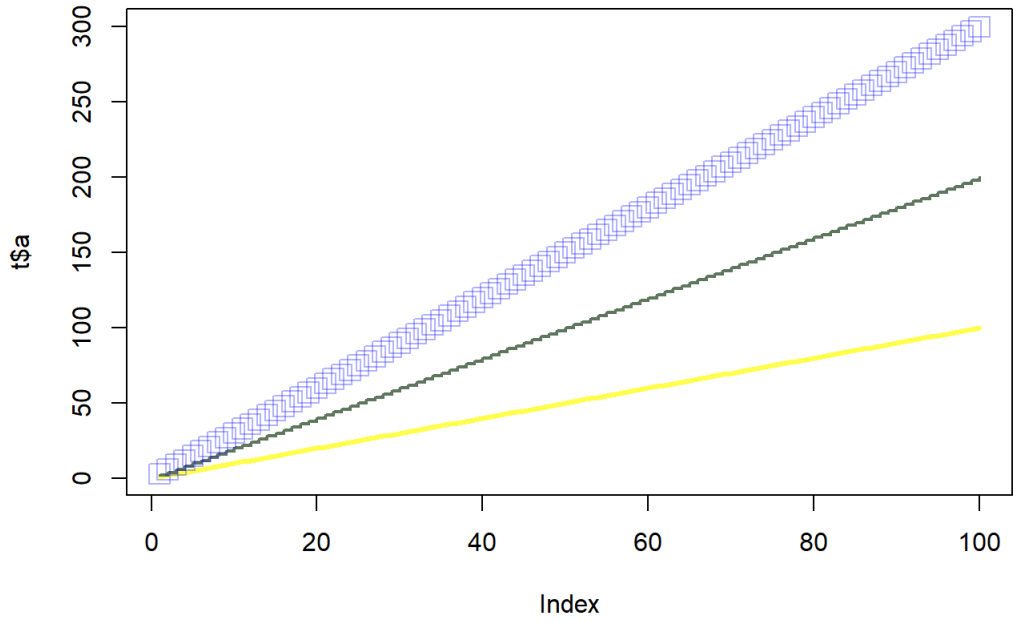
> Rgb Generates colour

> lwd = line width

> Pch= plotting ‘character’, i.e., symbol to use. This can either be a single character or an integer code for one of a set of graphics symbols. The full set of S symbols is available with pch = 0:18.

> Cex: For other text symbols, cex = 1 corresponds to the default fontsize of the device, often specified by an argument pointsize. For pch in 0:25 the default size is about 75% of the character height (see par("cin"))

```
plot(t$a, type="l", ylim=range(t),lwd=3, col=rgb(1,1,0,0.7))
lines(t$b, type="s", lwd=2,col=rgb(0.3,0.4,0.3,0.9))
points(t$c, pch=22, cex=2,col=rgb(0,0,1,0.3))
```



10. 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(a=c(1,2,4,8,16,32),g=c(2,4,8,16,32,64),x=c(3,6,12,24,48,96))
write.table(d,file="tst1.txt",row.names=FALSE)
t = read.table("tst1.txt",header = TRUE)
t2=data.frame(a=t$a, g=t$g*5, x=t$x)
write.table(t2,file="tst2.txt",row.names=FALSE)
```

11. Compute the mean of the square root of a vector of 100 random numbers. What happens?

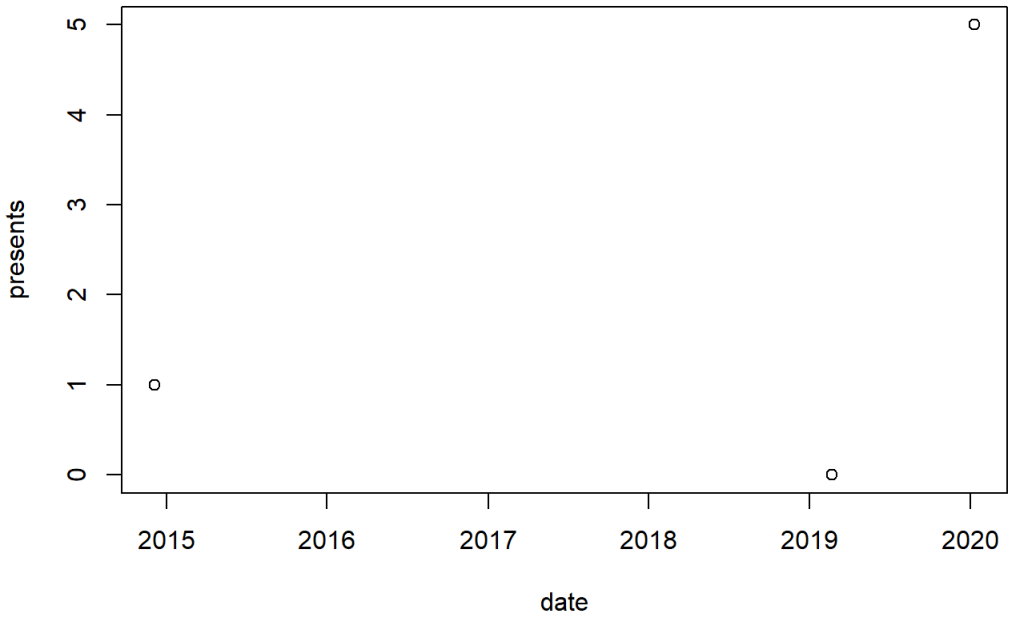
```
mean(sqrt(rnorm(100)+10))
```

```
## [1] 3.168614
```

"mean(sqrt(rnorm(100)))" gives an error message as rnorm give negative random numbers too.

12. Make a graph with on the x-axis: today, Sinterklaas 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.

```
date=strptime(c("20190220","20141205","20200110"),format = "%Y%m%d")
presents=c(0,1,5)
plot(date,presents)
```



13. 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.

```
vector=seq(1:100)
s=c()
for(i in 1:100)
 {
     if(vector[i]<5)

         { s[i]=vector[i]*5 }

     else if(vector[i]>90)

         { s[i]=vector[i]*10; }

     else

         { s[i]=vector[i]*0.1; }
  }
 s
```

```
##   [1]    5.0   10.0   15.0   20.0    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
```

14. 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.a)

```
z=1:100
fun = function(arg1)
 {
     l = length(arg1)
     for(i in 1:l)
     {

         if (arg1[i] < 5)

             { arg1[i] = arg1[i] * 5 }

         else if (arg1[i] > 90)

             { arg1[i] = arg1[i] * 10}

         else

             { arg1[i] = arg1[i] * 0.1 }

     }
 return (arg1)
 }
 fun(z)
```

```
##   [1]    5.0   10.0   15.0   20.0    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
```