

Praktikum KomStat D - 28/8/2023

INTRODUCTION TO R

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COVERED TODAY

A brief outline

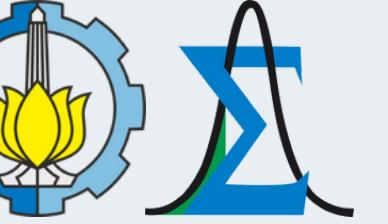
Introduction

Packages in R

Basic R Operations

Data Frame & Data Import

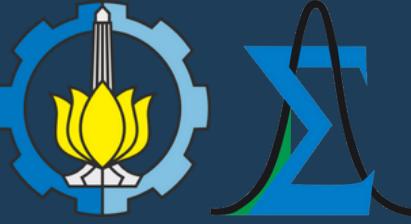




INTRODUCTION

RStudio





INTERFACE

The screenshot shows the RStudio interface with the following components:

- Environment pane:** Shows the global environment with objects like `A`, `above_40`, `anova`, and `Anova`.
- Output pane:** Displays the R startup message and license information.
- Console pane:** Shows the command `t.test {stats}` and its documentation for "Student's t-Test".

Write the Script

Output

Output

```
R version 4.0.4 (2021-02-15) -- "Lost Library Book"
Copyright (C) 2021 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

  Natural language support but running in an English locale

R is a collaborative project with many contributors.
```

Student's t-Test

Description

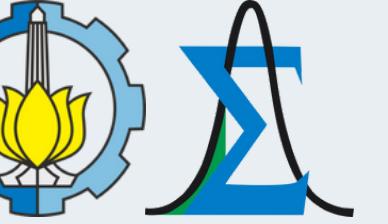
Performs one and two sample t-tests on vectors of data.

Usage

```
t.test(x, ...)
```

Default S3 method:
t.test(x, y = NULL,
 alternative = c("two.sided", "less", "greater")
 mu = 0, paired = Your device needs to restart to install
 conf.level = 0.95
 equal = FALSE,
 ...)

S3 method for class Select a time to
... restart.



Packages in R





PACKAGES

Install Packages

```
install.packages('nama package')
```

```
install.packages('ggplot2')
```

Load Packages

```
library('nama package')
```

```
library('ggplot2')
```

HELP FUNCTION

```
?nama function/package()
```

```
?rep()
```

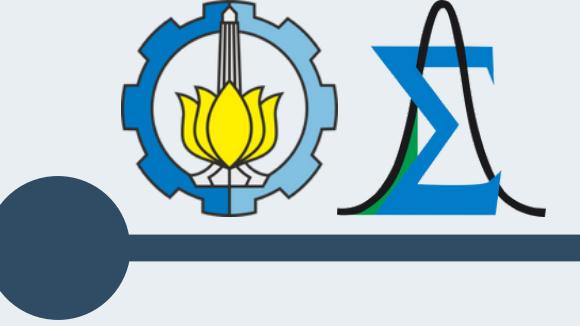
```
?ggplot2()
```

```
help(nama function)
```

```
help(ggplot2)
```

```
browseVignettes("nama function")
```

```
browseVignettes("ggplot2")
```



Basic R Operations





Basic R Syntax

```
> a <- 1  
> a  
[1] 1  
> class(a)  
[1] "numeric"  
> a <- c(1,2,3)  
> a  
[1] 1 2 3  
> class(a)  
[1] "numeric"  
> length(a)  
[1] 3  
> a[1]  
[1] 1  
> a[-1]  
[1] 2 3
```



Array

```
> array(1,4)  
[1] 1 1 1 1
```



Sequences

```
> seq(10)
[1] 1 2 3 4 5 6 7 8 9 10
> seq(3,10)
[1] 3 4 5 6 7 8 9 10
> seq(2,6, length.out=4)
[1] 2.000000 3.333333 4.666667
[4] 6.000000
> seq(2,6, along.with = 1:4)
[1] 2.000000 3.333333 4.666667
[4] 6.000000
> seq(1,10, by=0.5)
[1] 1.0 1.5 2.0 2.5 3.0 3.5
[7] 4.0 4.5 5.0 5.5 6.0 6.5
[13] 7.0 7.5 8.0 8.5 9.0 9.5
[19] 10.0
```

Repetition

```
> rep(a, times = 10)
[1] 1 2 3 1 2 3 1 2 3 1 2 3 1
[17] 2 3 1 2 3 1 2 3 1 2 3 1 2 3
> rep(a, each = 3)
[1] 1 1 1 2 2 2 3 3 3
> rep(a, len = 5)
[1] 1 2 3 1 2
```

MATHEMATICAL OPERATIONS

Math Notation	R	Example
Plus/Add	+	35 + 19
Minus/Subtract	-	98 - 67.9961
Multiply	*	6 * 5
Divide	/	90 / 18
Square Root	sqrt()	sqrt(144)
Power	x^n	19^2
Modulo	x %% y	6 %% 2
	x %/% y	5 %/% 2

Vector Operations

```
> vec1 <- as.vector(seq(1:5))  
> vec1  
[1] 1 2 3 4 5  
> class(vec1)  
[1] "integer"  
> vec2 <- as.vector(rep(6:10))  
> vec2  
[1] 6 7 8 9 10  
> class(vec2)  
[1] "integer"  
  
> vec3 = vec1 + vec2  
> vec3  
[1] 7 9 11 13 15  
> vec4 = vec1 + 20  
> vec4  
[1] 21 22 23 24 25  
> vec5 = vec2 - 3  
> vec5  
[1] 3 4 5 6 7
```



ROUNDING OF NUMBERS

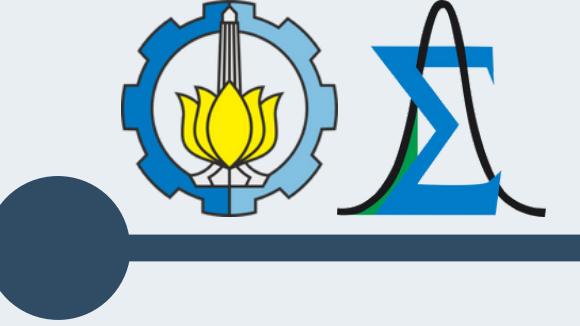
Input	1.1	1.9
round()	1	2
ceiling()	2	2
floor()	1	1
trunc()	1	1

MATRIX OPERATORS

R	Definition
+	Addition of each matrix element
-	Subtraction of each matrix element
*	Multiply each element of matrix
%*%	Matrix multiplication
solve()	inverse of matrix
t	Transpose
det	Determinant
diag	Diagonal
crossprod	cross product of a matrix

LOGICAL FUNCTION

R	Definition
<	Smaller than
<=	smaller or equal than
>	larger
>=	larger or equal than
!=	unequal
==	logical equal
!	logical NOT (unary)
&	logical AND (vector)
	logical OR (vector)
&&	logical AND (no vector)
	logical OR (no vector)



Data Frame & Data Import



Data Frame

```
> a=c(10,20,15,43,76,41)
> a
[1] 10 20 15 43 76 41
> b=factor(c("m","f","m","f","m","f"))
> b
[1] m f m f m f
Levels: f m
> c=c(2,5,8,3,6,1)
> c
[1] 2 5 8 3 6 1
```

```
> myframe=data.frame(a,b,c)
> myframe
   a b c
1 10 m 2
2 20 f 5
3 15 m 8
4 43 f 3
5 76 m 6
6 41 f 1
> colnames(myframe)=c("Age","Sex","Siblings")
> myframe
  Age Sex Siblings
1 10  m 2
2 20  f 5
3 15  m 8
4 43  f 3
5 76  m 6
6 41  f 1
```

Data Frame

```
> myframe[1]  
[1] 10 20 15 43 76 41  
  
> myframe["Age"]  
Age  
1 10  
2 20  
3 15  
4 43  
5 76  
6 41  
  
> myframe$Age  
[1] 10 20 15 43 76 41
```

```
> myframe[3,3]=2  
  
> myframe  
   Age Sex Siblings  
1 10  m    2  
2 20  f    5  
3 15  m    2  
4 43  f    3  
5 76  m    6  
6 41  f    1  
  
> myframe[,-2]  
   Age Siblings  
1 10    2  
2 20    5  
3 15    2  
4 43    3  
5 76    6  
6 41    1
```



IMPORT DATA

```
setwd("lokasi file")
setwd("C:/Users/Mahasiswa/Downloads/Data")
getwd()
```

TYPE	SYNTAX
excel (.csv)	<code>nama data = read.csv("lokasi file", header = TRUE, sep = ";" atau ",")</code>
excel (.xlsx)	<code>library(readxl)</code> <code>nama data = read_excel("Data.xlsx")</code>
Notepad (.txt)	<code>nama data = read.table("lokasi file", header = TRUE)</code>
spss (.sav)	<code>library(foreign)</code> <code>nama data = read.spss("data.sav", use.value.labels=TRUE,</code> <code>to.data.frame=TRUE)</code>



EXPORT DATA

TYPE	SYNTAX
excel (.csv)	<code>write.csv(nama data, "lokasi file/nama data.csv")</code>
excel (.xlsx)	<code>library(writexl)</code> <code>write_xlsx(nama data, "lokasi file/nama data.xlsx")</code>
Notepad (.txt)	<code>write.table(nama data, "lokasi file/nama data.txt")</code>
spss (.sav)	<code>library(haven)</code> <code>write_sav(nama data, "lokasi file/nama data.sav")</code>

THANK YOU



<https://its.id/m/KomstatD23>