setwd("C:/Users/Matrix/Desktop/project csv")

> filenameo <- "heart.csv"

> heartds <- read.csv(filenameo, header=TRUE)

> dim(heartds)

[1] 289 14

> sapply(heartds, class)

age sex cp trtbps chol fbs restecg

"integer" "integer" "integer" "integer" "integer" "integer" "integer"

thalachh exng oldpeak slp caa thall output

"integer" "integer" "numeric" "integer" "integer" "integer" "integer"

> head(heartds)

age sex cp trtbps chol fbs restecg thalachh exng oldpeak slp caa

1 60 1 3 145 233 1 0 150 0 2.3 0 0

2 35 1 2 130 250 0 1 187 0 3.5 0 0

3 41 0 1 130 204 0 0 172 0 1.4 2 0

4 55 1 1 120 236 0 1 178 0 0.8 2 0

5 56 0 0 120 354 0 1 163 1 0.6 2 0

6 55 1 0 140 192 0 1 148 0 0.4 1 0

thall output

1 1 1

2 2 1

3 2 1

4 2 1

5 2 1

6 1 1

> summary(heartds)

age sex cp trtbps chol

Min. :29.00 Min. :0.0000 Min. :0.000 Min. : 94.0 Min. :126

1st Qu.:47.00 1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:120.0 1st Qu.:212

Median :54.00 Median :1.0000 Median :1.000 Median :130.0 Median :243

Mean :54.01 Mean :0.6782 Mean :1.021 Mean :131.4 Mean :248

3rd Qu.:60.00 3rd Qu.:1.0000 3rd Qu.:2.000 3rd Qu.:140.0 3rd Qu.:276

Max. :77.00 Max. :1.0000 Max. :3.000 Max. :200.0 Max. :564

fbs restecg thalachh exng oldpeak

Min. :0.0000 Min. :0.0000 Min. : 71.0 Min. :0.0000 Min. :0.000

1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:136.0 1st Qu.:0.0000 1st Qu.:0.000

Median :0.0000 Median :1.0000 Median :154.0 Median :0.0000 Median :0.600

Mean :0.1453 Mean :0.5156 Mean :150.2 Mean :0.3183 Mean :1.008

3rd Qu.:0.0000 3rd Qu.:1.0000 3rd Qu.:168.0 3rd Qu.:1.0000 3rd Qu.:1.600

Max. :1.0000 Max. :2.0000 Max. :202.0 Max. :1.0000 Max. :6.200

slp caa thall output

Min. :0.000 Min. :0.0000 Min. :0.000 Min. :0.0000

1st Qu.:1.000 1st Qu.:0.0000 1st Qu.:2.000 1st Qu.:0.0000

Median :1.000 Median :0.0000 Median :2.000 Median :1.0000

Mean :1.419 Mean :0.7128 Mean :2.315 Mean :0.5709

3rd Qu.:2.000 3rd Qu.:1.0000 3rd Qu.:3.000 3rd Qu.:1.0000

Max. :2.000 Max. :4.0000 Max. :3.000 Max. :1.0000

> library(psych)

> install.packages("GGally")

WARNING: Rtools is required to build R packages but is not currently installed. Please download and install the appropriate version of Rtools before proceeding:

https://cran.rstudio.com/bin/windows/Rtools/

Installing package into ‘C:/Users/Matrix/AppData/Local/R/win-library/4.2’

(as ‘lib’ is unspecified)

also installing the dependencies ‘hms’, ‘prettyunits’, ‘crayon’, ‘forcats’, ‘progress’, ‘reshape’

trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.2/hms\_1.1.2.zip'

Content type 'application/zip' length 103644 bytes (101 KB)

downloaded 101 KB

trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.2/prettyunits\_1.1.1.zip'

Content type 'application/zip' length 37845 bytes (36 KB)

downloaded 36 KB

trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.2/crayon\_1.5.2.zip'

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downloaded 158 KB

trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.2/forcats\_1.0.0.zip'

Content type 'application/zip' length 429155 bytes (419 KB)

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trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.2/progress\_1.2.2.zip'

Content type 'application/zip' length 85987 bytes (83 KB)

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trying URL 'https://cran.rstudio.com/bin/windows/contrib/4.2/GGally\_2.1.2.zip'

Content type 'application/zip' length 1636346 bytes (1.6 MB)

downloaded 1.6 MB

package ‘hms’ successfully unpacked and MD5 sums checked

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package ‘reshape’ successfully unpacked and MD5 sums checked

package ‘GGally’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in

C:\Users\Matrix\AppData\Local\Temp\RtmpWCrhs0\downloaded\_packages

> describe(heartds)

vars n mean sd median trimmed mad min max range skew kurtosis

age 1 289 54.01 9.13 54.0 54.12 8.90 29 77.0 48.0 -0.14 -0.56

sex 2 289 0.68 0.47 1.0 0.72 0.00 0 1.0 1.0 -0.76 -1.43

cp 3 289 1.02 1.03 1.0 0.93 1.48 0 3.0 3.0 0.40 -1.23

trtbps 4 289 131.38 17.52 130.0 130.20 14.83 94 200.0 106.0 0.73 0.97

chol 5 289 247.96 51.60 243.0 245.17 47.44 126 564.0 438.0 1.17 4.55

fbs 6 289 0.15 0.35 0.0 0.06 0.00 0 1.0 1.0 2.00 2.02

restecg 7 289 0.52 0.51 1.0 0.51 0.00 0 2.0 2.0 0.09 -1.63

thalachh 8 289 150.23 22.90 154.0 151.60 22.24 71 202.0 131.0 -0.56 -0.10

exng 9 289 0.32 0.47 0.0 0.27 0.00 0 1.0 1.0 0.78 -1.40

oldpeak 10 289 1.01 1.13 0.6 0.83 0.89 0 6.2 6.2 1.30 1.79

slp 11 289 1.42 0.61 1.0 1.48 1.48 0 2.0 2.0 -0.54 -0.63

caa 12 289 0.71 1.02 0.0 0.52 0.00 0 4.0 4.0 1.35 0.93

thall 13 289 2.31 0.60 2.0 2.35 0.00 0 3.0 3.0 -0.44 0.42

output 14 289 0.57 0.50 1.0 0.59 0.00 0 1.0 1.0 -0.29 -1.93

se

age 0.54

sex 0.03

cp 0.06

trtbps 1.03

chol 3.04

fbs 0.02

restecg 0.03

thalachh 1.35

exng 0.03

oldpeak 0.07

slp 0.04

caa 0.06

thall 0.04

output 0.03

3 2 1

4 2 1

5 2 1

6 1 1

> summary(heartds)

age sex cp trtbps chol

Min. :29.00 Min. :0.0000 Min. :0.000 Min. : 94.0 Min. :126

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fbs restecg thalachh exng oldpeak

Min. :0.0000 Min. :0.0000 Min. : 71.0 Min. :0.0000 Min. :0.000

1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:136.0 1st Qu.:0.0000 1st Qu.:0.000

Median :0.0000 Median :1.0000 Median :154.0 Median :0.0000 Median :0.600

ggpairs(heartds)

Mean :0.1453 Mean :0.5156 Mean :150.2 Mean :0.3183 Mean :1.008

3rd Qu.:0.0000 3rd Qu.:1.0000 3rd Qu.:168.0 3rd Qu.:1.0000 3rd Qu.:1.600

Max. :1.0000 Max. :2.0000 Max. :202.0 Max. :1.0000 Max. :6.200

slp caa thall output

Min. :0.000 Min. :0.0000 Min. :0.000 Min. :0.0000

1st Qu.:1.000 1st Qu.:0.0000 1st Qu.:2.000 1st Qu.:0.0000

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sex 2 289 0.68 0.47 1.0 0.72 0.00 0 1.0 1.0 -0.76 -1.43

cp 3 289 1.02 1.03 1.0 0.93 1.48 0 3.0 3.0 0.40 -1.23

trtbps 4 289 131.38 17.52 130.0 130.20 14.83 94 200.0 106.0 0.73 0.97

chol 5 289 247.96 51.60 243.0 245.17 47.44 126 564.0 438.0 1.17 4.55

fbs 6 289 0.15 0.35 0.0 0.06 0.00 0 1.0 1.0 2.00 2.02

restecg 7 289 0.52 0.51 1.0 0.51 0.00 0 2.0 2.0 0.09 -1.63

thalachh 8 289 150.23 22.90 154.0 151.60 22.24 71 202.0 131.0 -0.56 -0.10

exng 9 289 0.32 0.47 0.0 0.27 0.00 0 1.0 1.0 0.78 -1.40

oldpeak 10 289 1.01 1.13 0.6 0.83 0.89 0 6.2 6.2 1.30 1.79

slp 11 289 1.42 0.61 1.0 1.48 1.48 0 2.0 2.0 -0.54 -0.63

caa 12 289 0.71 1.02 0.0 0.52 0.00 0 4.0 4.0 1.35 0.93

thall 13 289 2.31 0.60 2.0 2.35 0.00 0 3.0 3.0 -0.44 0.42

output 14 289 0.57 0.50 1.0 0.59 0.00 0 1.0 1.0 -0.29 -1.93

se

age 0.54

sex 0.03

cp 0.06

trtbps 1.03

chol 3.04

fbs 0.02

restecg 0.03

thalachh 1.35

exng 0.03

oldpeak 0.07

slp 0.04

caa 0.06

thall 0.04

output 0.03

>ggpairs(heartds)