

# 第一次作业答案

赵越

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# 1 第一题

## 1.1 a

```
#help(read.table)  
rain.df <- read.table("rnf6080.dat")
```

## 1.2 b

```
dim(rain.df)
```

```
## [1] 5070 27
```

## 1.3 c

```
colnames(rain.df)
```

```
## [1] "V1" "V2" "V3" "V4" "V5" "V6" "V7" "V8" "V9" "V10" "V11" "V12"  
## [13] "V13" "V14" "V15" "V16" "V17" "V18" "V19" "V20" "V21" "V22" "V23" "V24"  
## [25] "V25" "V26" "V27"
```

## 1.4 d

```
rain.df[5, 7]
```

```
## [1] 0
```

## 1.5 e

```
rain.df[2, ]
```

```
## V1 V2 V3 V4 V5 V6 V7 V8 V9 V10 V11 V12 V13 V14 V15 V16 V17 V18 V19 V20 V21  
## 2 60 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  
## V22 V23 V24 V25 V26 V27  
## 2 0 0 0 0 0 0
```

## 1.6 f

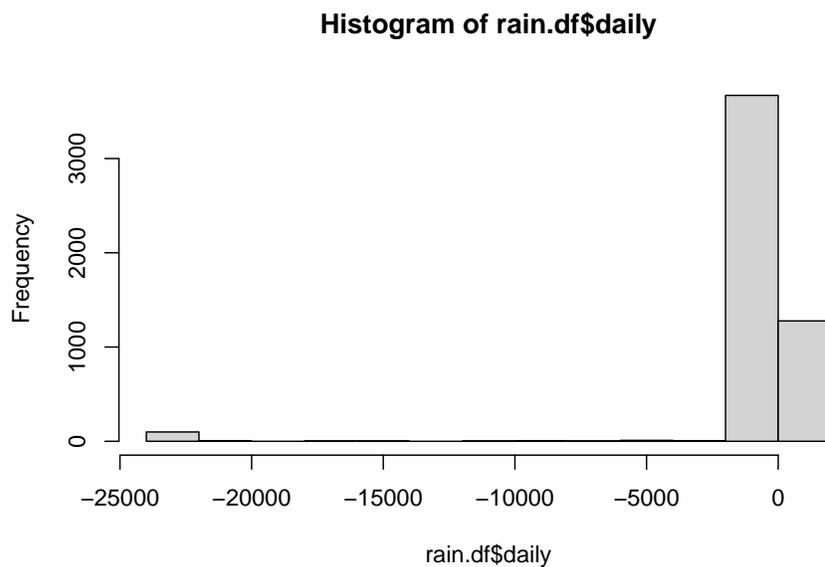
```
names(rain.df) <- c("year","month","day",seq(0,23))
head(rain.df)
```

```
##   year month day 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
## 1   60     4   1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## 2   60     4   2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## 3   60     4   3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## 4   60     4   4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## 5   60     4   5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## 6   60     4   6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

rename the columns

## 1.7 g

```
rain.df$daily <- rowSums(rain.df[, 4:27])
hist(rain.df$daily)
```

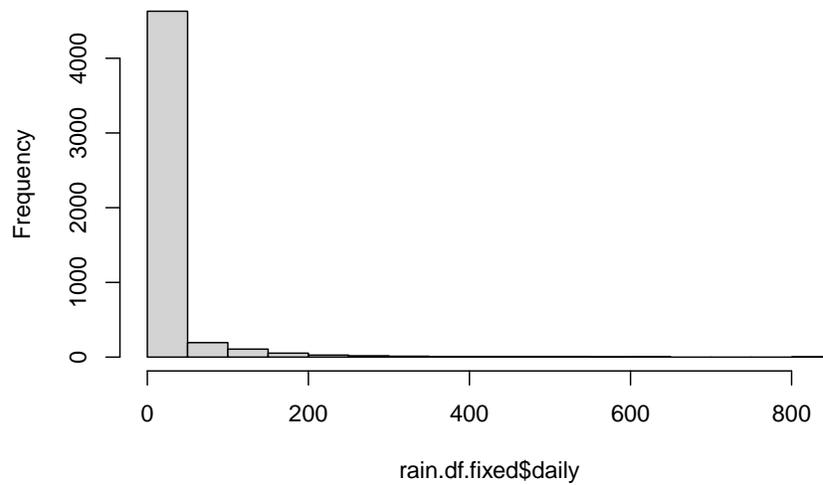


negative values

## 1.8 h

```
rain.df.fixed <- rain.df[, -28]
rain.df.fixed[, 4:27][rain.df.fixed[, 4:27] < 0] <- NA
rain.df.fixed$daily <- rowSums(rain.df.fixed[, 4:27], na.rm = T)
hist(rain.df.fixed$daily)
```

Histogram of rain.df.fixed\$daily



## 2 第二题

## 2.1 a

```
vector1 <- c("5", "12", "7", "32")
max(vector1)
```

```
## [1] "7"
```

“7” has the biggest ASCII

```
sort(vector1)
```

```
## [1] "12" "32" "5" "7"
```

“1” < “3” < “5” < “7”

```
sum(vector1)
```

wrong because of “character” type in `sum` function

## 2.2 b

```
vector2 <- c("5",7,12)
```

```
vector2[2] + vector2[3]
```

wrong because of the last two elements have been turned into “character” type

```
dataframe3 <- data.frame(z1="5",z2=7,z3=12)
```

```
dataframe3[1,2] + dataframe3[1,3]
```

```
## [1] 19
```

data.frame is a list, which can store different types of elements

```
list4 <- list(z1="6", z2=42, z3="49", z4=126)
```

```
list4[[2]]+list4[[4]]
```

```
## [1] 168
```

[[ returns the value

```
list4[2]+list4[4]
```

wrong because [ returns a sublist

### 3 第三题

#### 3.1 a

```
##?seq
```

```
seq(1, 10000, 372)
```

```
## [1] 1 373 745 1117 1489 1861 2233 2605 2977 3349 3721 4093 4465 4837 5209
```

```
## [16] 5581 5953 6325 6697 7069 7441 7813 8185 8557 8929 9301 9673
```

```
seq(1, 10000, length.out = 50)
```

```
## [1] 1.0000 205.0612 409.1224 613.1837 817.2449 1021.3061
```

```
## [7] 1225.3673 1429.4286 1633.4898 1837.5510 2041.6122 2245.6735
```

```
## [13] 2449.7347 2653.7959 2857.8571 3061.9184 3265.9796 3470.0408
```

```
## [19] 3674.1020 3878.1633 4082.2245 4286.2857 4490.3469 4694.4082
```

```
## [25] 4898.4694 5102.5306 5306.5918 5510.6531 5714.7143 5918.7755
```

```
## [31] 6122.8367 6326.8980 6530.9592 6735.0204 6939.0816 7143.1429
```

```
## [37] 7347.2041 7551.2653 7755.3265 7959.3878 8163.4490 8367.5102
```

```
## [43] 8571.5714 8775.6327 8979.6939 9183.7551 9387.8163 9591.8776
```

```
## [49] 9795.9388 10000.0000
```

#### 3.2 b

```
rep(1:3, times = 3)
```

```
## [1] 1 2 3 1 2 3 1 2 3
```

```
rep(1:3, each = 3)
```

```
## [1] 1 1 1 2 2 2 3 3 3
```

`rep(1:3, times = 3)` replicates the whole vector 3 times, while `rep(1:3, each = 3)` replicates each element of the vector 3 times

## 4 第四题

```
library(MASS)
data(Cars93)
#View(Cars93)
```

### 4.1 a

```
summary(Cars93)
```

```
##      Manufacturer      Model      Type      Min.Price      Price
## Chevrolet: 8      100      : 1      Compact:16      Min.      : 6.70      Min.      : 7.40
## Ford      : 8      190E      : 1      Large :11      1st Qu.:10.80      1st Qu.:12.20
## Dodge     : 6      240      : 1      Midsize:22      Median :14.70      Median :17.70
## Mazda     : 5      300E      : 1      Small  :21      Mean   :17.13      Mean   :19.51
## Pontiac   : 5      323      : 1      Sporty :14      3rd Qu.:20.30      3rd Qu.:23.30
## Buick     : 4      535i      : 1      Van    : 9      Max.   :45.40      Max.   :61.90
## (Other)  :57      (Other):87
##      Max.Price      MPG.city      MPG.highway      AirBags
## Min.      : 7.9      Min.      :15.00      Min.      :20.00      Driver & Passenger:16
## 1st Qu.:14.7      1st Qu.:18.00      1st Qu.:26.00      Driver only       :43
## Median :19.6      Median :21.00      Median :28.00      None              :34
## Mean   :21.9      Mean   :22.37      Mean   :29.09
## 3rd Qu.:25.3      3rd Qu.:25.00      3rd Qu.:31.00
## Max.   :80.0      Max.   :46.00      Max.   :50.00
##
```

```

## DriveTrain Cylinders EngineSize Horsepower RPM
## 4WD :10 3 : 3 Min. :1.000 Min. : 55.0 Min. :3800
## Front:67 4 :49 1st Qu.:1.800 1st Qu.:103.0 1st Qu.:4800
## Rear :16 5 : 2 Median :2.400 Median :140.0 Median :5200
##      6 :31 Mean :2.668 Mean :143.8 Mean :5281
##      8 : 7 3rd Qu.:3.300 3rd Qu.:170.0 3rd Qu.:5750
##      rotary: 1 Max. :5.700 Max. :300.0 Max. :6500
##
## Rev.per.mile Man.trans.avail Fuel.tank.capacity Passengers
## Min. :1320 No :32 Min. : 9.20 Min. :2.000
## 1st Qu.:1985 Yes:61 1st Qu.:14.50 1st Qu.:4.000
## Median :2340 Median :16.40 Median :5.000
## Mean :2332 Mean :16.66 Mean :5.086
## 3rd Qu.:2565 3rd Qu.:18.80 3rd Qu.:6.000
## Max. :3755 Max. :27.00 Max. :8.000
##
## Length Wheelbase Width Turn.circle
## Min. :141.0 Min. : 90.0 Min. :60.00 Min. :32.00
## 1st Qu.:174.0 1st Qu.: 98.0 1st Qu.:67.00 1st Qu.:37.00
## Median :183.0 Median :103.0 Median :69.00 Median :39.00
## Mean :183.2 Mean :103.9 Mean :69.38 Mean :38.96
## 3rd Qu.:192.0 3rd Qu.:110.0 3rd Qu.:72.00 3rd Qu.:41.00
## Max. :219.0 Max. :119.0 Max. :78.00 Max. :45.00
##
## Rear.seat.room Luggage.room Weight Origin Make
## Min. :19.00 Min. : 6.00 Min. :1695 USA :48 Acura Integra: 1
## 1st Qu.:26.00 1st Qu.:12.00 1st Qu.:2620 non-USA:45 Acura Legend : 1
## Median :27.50 Median :14.00 Median :3040 Audi 100 : 1
## Mean :27.83 Mean :13.89 Mean :3073 Audi 90 : 1
## 3rd Qu.:30.00 3rd Qu.:15.00 3rd Qu.:3525 BMW 535i : 1
## Max. :36.00 Max. :22.00 Max. :4105 Buick Century: 1
## NA's :2 NA's :11 (Other) :87

```

From the counts of factors variables we can count the rows are 93

## 4.2 b

```
attach(Cars93)
mean(Price[DriveTrain == "Rear"])

## [1] 28.95
```

## 4.3 c

```
min(Horsepower[Passengers == 7])

## [1] 109
```

```
min(Horsepower[Passengers == 6])

## [1] 100
```

## 4.4 d

```
Dis.Highway <- MPG.highway * Fuel.tank.capacity
as.character(Model[Dis.Highway == max(Dis.Highway)])

## [1] "535i"
```

```
as.character(Model[Dis.Highway == min(Dis.Highway)])

## [1] "Capri"
```

```
as.character(Model[Dis.Highway == median(Dis.Highway)])

## [1] "MPV"
```

```
detach(Cars93)
```