rworksheet4a

2023-11-07

```
#1
Shoe_size<-c(6.5,9.0,8.5,8.5,10.5,7.0,9.5,9.0,13.0,7.5,10.5,8.5,12.0,10.5,13.0,11.5,8.5,5.0,10.0,6.5,7.5
Shoe_size
```

```
##  [1]  6.5  9.0  8.5  8.5 10.5  7.0  9.5  9.0 13.0  7.5 10.5  8.5 12.0 10.5 13.0
## [16] 11.5  8.5  5.0 10.0  6.5  7.5  8.5 10.5  8.5 10.5 11.0  9.0 13.0
```

```
Height<-c(66.0,68.0,64.5,65.0,70.0,64.0,70.0,71.0,72.0,64.0,74.5,67.0,67.0,71.0,77.0,72.0,59.0,62.0,72.0
Height
```

```
##  [1] 66.0 68.0 64.5 65.0 70.0 64.0 70.0 71.0 72.0 64.0 74.5 67.0 67.0 71.0 77.0
## [16] 72.0 59.0 62.0 72.0 66.0 64.0 67.0 73.0 69.0 72.0 70.0 69.0 70.0
```

```
StatData<-data.frame(Shoe_size,Height)
StatData
```

```
##    Shoe_size Height
## 1        6.5   66.0
## 2        9.0   68.0
## 3        8.5   64.5
## 4        8.5   65.0
## 5       10.5   70.0
## 6        7.0   64.0
## 7        9.5   70.0
## 8        9.0   71.0
## 9       13.0   72.0
## 10       7.5   64.0
## 11      10.5   74.5
## 12       8.5   67.0
## 13      12.0   67.0
## 14      10.5   71.0
## 15      13.0   77.0
## 16      11.5   72.0
## 17       8.5   59.0
## 18       5.0   62.0
## 19      10.0   72.0
## 20       6.5   66.0
## 21       7.5   64.0
## 22       8.5   67.0
## 23      10.5   73.0
## 24       8.5   69.0
## 25      10.5   72.0
## 26      11.0   70.0
## 27       9.0   69.0
## 28      13.0   70.0
```

```
Gender<-c("F","F","F","F","M","F","F","F","M","F","M","F","M","M","M","M","F","F","M","F","F","M","M","
Gender
```

```
##  [1] "F" "F" "F" "F" "M" "F" "F" "F" "M" "F" "M" "F" "M" "M" "M" "M" "F" "F" "M"
## [20] "F" "F" "M" "M" "F" "M" "M" "M" "M"
```

```
length(Gender)
```

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

```
StatDataNew<-cbind(StatData,Gender)
StatDataNew
```

```
##    Shoe_size Height Gender
## 1        6.5   66.0      F
## 2        9.0   68.0      F
## 3        8.5   64.5      F
## 4        8.5   65.0      F
## 5       10.5   70.0      M
## 6        7.0   64.0      F
## 7        9.5   70.0      F
## 8        9.0   71.0      F
## 9       13.0   72.0      M
## 10       7.5   64.0      F
## 11      10.5   74.5      M
## 12       8.5   67.0      F
## 13      12.0   67.0      M
## 14      10.5   71.0      M
## 15      13.0   77.0      M
## 16      11.5   72.0      M
## 17       8.5   59.0      F
## 18       5.0   62.0      F
## 19      10.0   72.0      M
## 20       6.5   66.0      F
## 21       7.5   64.0      F
## 22       8.5   67.0      M
## 23      10.5   73.0      M
## 24       8.5   69.0      F
## 25      10.5   72.0      M
## 26      11.0   70.0      M
## 27       9.0   69.0      M
## 28      13.0   70.0      M
```

```
#b
males<-subset(StatDataNew,Gender=="M")
males
```

```
##    Shoe_size Height Gender
## 5       10.5   70.0      M
## 9       13.0   72.0      M
## 11      10.5   74.5      M
## 13      12.0   67.0      M
## 14      10.5   71.0      M
## 15      13.0   77.0      M
## 16      11.5   72.0      M
## 19      10.0   72.0      M
```

```
## 22       8.5   67.0      M
## 23      10.5   73.0      M
## 25      10.5   72.0      M
## 26      11.0   70.0      M
## 27       9.0   69.0      M
## 28      13.0   70.0      M
```

```
females<-subset(StatDataNew,Gender=="F")
females
```

```
##    Shoe_size Height Gender
## 1        6.5   66.0      F
## 2        9.0   68.0      F
## 3        8.5   64.5      F
## 4        8.5   65.0      F
## 6        7.0   64.0      F
## 7        9.5   70.0      F
## 8        9.0   71.0      F
## 10       7.5   64.0      F
## 12       8.5   67.0      F
## 17       8.5   59.0      F
## 18       5.0   62.0      F
## 20       6.5   66.0      F
## 21       7.5   64.0      F
## 24       8.5   69.0      F
```

```
#What its result? Show the R scripts.
#Shoe_size Height Gender
#1        6.5   66.0      F
#2        9.0   68.0      F
#3        8.5   64.5      F
#4        8.5   65.0      F
#5       10.5   70.0      M
#6        7.0   64.0      F
#7        9.5   70.0      F
#8        9.0   71.0      F
#9       13.0   72.0      M
#10       7.5   64.0      F
#11      10.5   74.5      M
#12       8.5   67.0      F
#13      12.0   71.0      M
#14      10.5   71.0      M
#15      13.0   77.0      M
#16      11.5   72.0      M
#17       8.5   59.0      F
#18       5.0   62.0      F
#19      10.0   72.0      M
#20       6.5   66.0      F
#21       7.5   64.0      F
#22       8.5   67.0      M
#23      10.5   73.0      M
#24       8.5   69.0      F
#25      10.5   72.0      M
#26      11.0   70.0      M
#27       9.0   69.0      M
```

```
#28      13.0   70.0      M

#c
mShoe<-mean(Shoe_size)
mShoe
```

```
## [1] 9.410714
```

```
mHeight<-mean(Height)
mHeight
```

```
## [1] 68.42857
```

```
#Write the R scripts and its result.
#> msize<-mean(Shoe_size)
#> msize
#[1] 9.410714
#> mheight<-mean(Height)
#> mheight
#[1] 68.42857



#d. Is there a relationship between shoe size and height? Why?
#The data suggests a potential relationship between shoe size and height, but further statistical analy


#2.
months_vector<-c("March","April","January","November","January","September","October","September","Nover
months_vector
```

```
##  [1] "March"     "April"     "January"   "November"  "January"   "September"
##  [7] "October"   "September" "November"  "August"    "January"   "November"
## [13] "November"  "February"  "May"       "August"    "July"      "December"
## [19] "August"    "August"    "September" "November"  "February"  "April"
```

```
#3.
factor_months_vector<-factor(months_vector)
factor_months_vector
```

```
##  [1] March     April     January   November  January   September October
##  [8] September November  August    January   November  November  February
## [15] May       August    July      December  August    August    September
## [22] November  February  April
## 11 Levels: April August December February January July March May ... September
```

```
summary(factor_months_vector)
```

```
##     April    August  December  February   January      July     March       May
##         2         4         1         2         3         1         1         1
##  November   October September
##         5         1         3
```

```
#4.
direction<-c("East","West","North")
direction
```

```
## [1] "East"  "West"  "North"
```

```r
frequency<-c(1,4,3)
frequency
```

```
## [1] 1 4 3
```

```r
factor_direction<-factor(direction,levels=c("East","West","North"))
print(factor_direction)
```

```
## [1] East  West  North
## Levels: East West North
```

```r
factor_frequency<-factor(frequency,levels=c(1,4,3))
print(factor_frequency)
```

```
## [1] 1 4 3
## Levels: 1 4 3
```

```r
#5.
library(readr)
import_march<-read.csv(file="import1_march.csv")
import_march
```

```
##   Students Strategy.1 Strategy.2 Strategy.3
## 1     Male          8         10          8
## 2                   4          8          6
## 3                   0          6          4
## 4   Female         14          4         15
## 5                  10          2         12
## 6                   6          0          9
```

```r
#6.
num<-readline(prompt="Choose a number from 1 to 50:")
```

```
## Choose a number from 1 to 50:
```

```r
if (num>1 && num<=50){
  cat("The input number is", num)

}else if (num==20){
  print('TRUE')
}else{
  print('The number selected is beyond the range of 1 to 50')
}
```

```
## [1] "The number selected is beyond the range of 1 to 50"
```

```r
#7.
#a.
calc_min_bills<-function(){
 price<-as.integer(readline(prompt="Price of snack(a random number divisible by 50):"))

 if (is.na(price)|| price %% 50 !=0){
  cat("Invalid.\n")
return()
}
  num_bills<-0
  bill_denominations<-c(1000,500,200,100,50)
```

```
  for(bill in bill_denominations){
    num_bills<-num_bills + (price %/% bill)
    price<-price %% bill
  }

cat("Minimum number of bills needed:", num_bills,"\n")
}
calc_min_bills()
```

```
## Price of snack(a random number divisible by 50):
## Invalid.
```

```
## NULL
```

```
#8.
#a.
Name<-c("Annie","Thea","Steve","Hanna")
Grade1<-c(85,65,75,95)
Grade2<-c(65,75,55,75)
Grade3<-c(85,90,80,100)
Grade4<-c(100,90,85,90)
cardDf<-data.frame(Name, Grade1, Grade2, Grade3, Grade4)
cardDf
```

```
##    Name Grade1 Grade2 Grade3 Grade4
## 1 Annie     85     65     85    100
## 2  Thea     65     75     90     90
## 3 Steve     75     55     80     85
## 4 Hanna     95     75    100     90
```

```
#b.
student_above_90<-FALSE
for(j in 1:length(Name)){
  average_score<-c((Grade1)[j]+(Grade2)[j]+(Grade3)[j]+(Grade4)[j])/4
if (average_score>90){
    cat(paste(Name[j], "'s average grade this semester is", round(average_score,2),"\n"))
student_above_90<-TRUE
  }
}
if(!student_above_90){
  print("No student have an average of over 90 in the math during the semester")
}
```

```
## [1] "No student have an average of over 90 in the math during the semester"
```

```
#c.
for (test_num in 1:4){
  total_score<-Grade1 + Grade2 + Grade3 + Grade4
  average_score<-total_score/4
  if (average_score[test_num]<80){
    cat("The", test_num, "test was difficult.\n")
  }
}
```

```
## The 3 test was difficult.
```

```
#d.
for (j in 1:length(Name)){
```

```
  highest_grade<-Grade1[j]

  if (Grade2[j]>highest_grade){
    highest_grade<-Grade2[j]
  }
  if (Grade3[j]>highest_grade){
    highest_grade<-Grade3[j]
  }
  if (Grade4[j]>highest_grade){
    highest_grade<-Grade4[j]
  }

  if (highest_grade>90){
    cat(paste(Name[j], "'s highest grade this semester is", highest_grade,".\n"))
  }
}
```

```
## Annie 's highest grade this semester is 100 .
## Hanna 's highest grade this semester is 100 .
```