2020/12/18(五), 109 學年第一學期 資料科學應用 R 作業(6)

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(請依照規定)貼上執行程式碼及執行結果。
詳見: R 程式作業繳交方式
http://www.hmwu.idv.tw/web/teaching/doc/R-how-homework.pdf

```
> # 2020/12/25 HW
> # ex2.30(a)
> my.data <- read.table("answer.txt",header = TRUE)
> head(my.data, 5)
   Student V1 V2 V3 V4 V5 V6 V7 V8 V9 V10
1       s1  C  D  D  A  D  A  B  C  C   B
2       s2  B  D  B  D  D  A  C  D  B   B
3       s3  B  A  A  B  D  A  C  B  C   B
4       s4  B  D  B  A  B  C  C  D  C   B
5       s5  B  D  D  D  A  C  C  D  A   B
> # ex2.30(b)
> ans <- c("B", "D", "B", "D", "D", "A", "C", "D", "C", "B")
> s <- c("A", "D", "B", "D", "B", "A", "B", "D", "C", "B")
> correct.item <- which(s == ans)
> n.correct <- length(correct.item) * 10
> correct.item
[1]  2  3  4  6  8  9 10
> n.correct
[1] 70
> # ex2.30(c)
> options(max.print=999999)
> my.data1 <- t(my.data)
> answer <- data.frame(matrix(0,1,192))
> ans1 <- t(ans)
> ans2 <- t(ans1)
> for (i in 1:10){
+     for(j in 1:192){
+         correct.item1 <- which(my.data1[2:(i+1), j] == ans2[1:i,])
+         SS <- length(correct.item1) * 10
```

```
+         answer[,j] <- SS
+     }
+ }
> answer <- t(answer)
> my.data2 <- cbind(my.data , answer)
> score.table <- my.data2[,12]
> table(score.table)
score.table
  0  10  20  30  40  50  60  70  80  90 100
  3  10   9  11  19  23  28  40  30  12   7
> # ex2.30(d)
> P <- order(my.data2$answer, decreasing = TRUE)
> topID <- which(my.data2$answer >= 75)
> lowID <- which(my.data2$answer <= 25)
> n.topID <- length(topID)
> n.lowID <- length(lowID)
> Ta <- rownames(answer)[topID]
> La <- rownames(answer)[lowID]
> rownames(answer)[topID]
 [1] "X2"   "X12"  "X16"  "X19"  "X20"  "X21"  "X24"  "X25"  "X27"  "X31"
"X41"  "X43"  "X44"  "X47"  "X50"
[16] "X52"  "X54"  "X55"  "X66"  "X69"  "X73"  "X79"  "X80"  "X81"  "X86"
"X95"  "X96"  "X108" "X110" "X112"
[31] "X123" "X125" "X128" "X129" "X131" "X135" "X136" "X139" "X143" "X146"
"X152" "X157" "X159" "X165" "X171"
[46] "X187" "X189" "X190" "X192"
> rownames(answer)[lowID]
 [1] "X17"  "X32"  "X65"  "X71"  "X74"  "X82"  "X87"  "X90"  "X97"
"X105" "X107" "X120" "X132" "X142" "X160"
[16] "X161" "X163" "X168" "X169" "X174" "X177" "X178"
> n.topID
[1] 49
> n.lowID
[1] 22
> # ex2.30(e)★★★★★
> Tav <- data.frame(matrix(0,1,10))
> for (i in 1:10){
+     tav <- 0
```

```
+      for(j in Ta[1:49]){
+         while(my.data2[j, 2:(i+1)] == ans2[i,]){
+            tav = tav + 1
+         }
+
+         }
+      Tav[1,i] <- length(tav)
+ }


> Tav
   X1 X2 X3 X4 X5 X6 X7 X8 X9 X10
1   0   0   0   0   0   0   0   0   0      0
> PH <- round(,2)
Error in round(, 2) : non-numeric argument to mathematical function
> PL <- round(,2)
Error in round(, 2) : non-numeric argument to mathematical function
> # ex2.51(a)
> h <- c("A","A","A","B","B","B","C","C","C","C")
> A1 <- length(grep("A", h))
> B1 <- length(grep("B", h))
> C1 <- length(grep("C", h))
> paste0(A1,"A", B1,"B", C1,"C")
[1] "3A3B4C"
> # ex2.51(b)
> h1 <- c("3A3B4C")
> a1 <- substr(h1,2,2)
> b1 <- substr(h1,4,4)
> c1 <- substr(h1,6,6)
> a2 <- rep(a1,3)
> b2 <- rep(b1,3)
> c2 <- rep(c1,4)
> cat(a2,b2,c2)
A A A B B B C C C C
> # ex2.52
> #pkgs <- c("magrittr", "dplyr")
> #install.packages(pkgs)
> #library(magrittr)
```

```
> library(dplyr)
> #require(dplyr)
> compress <- function(){
+     cat("輸入為 ABC 三個字母組成之字串：")
+     n <- scan(what = "LETTERS", quiet = T, nmax = 1)
+     n1 <- strsplit(n,split="") %>% unlist(.,recursive = F)
+     n2 <- as.character(n1)
+     A1 <- length(grep("A", n2))
+     B1 <- length(grep("B", n2))
+     C1 <- length(grep("C", n2))
+     Zz <- paste0(A1,"A", B1,"B", C1,"C")
+     cat(Zz)
+ }
> compress()
輸入為 ABC 三個字母組成之字串：
1: ABAABBAABCCCAC
6A4B4C
> # ex5.2(a)
> set.seed(123456)
> La <- sample(c("白球","白球","白球","白球","白球","白球", "紅球", "紅球", "紅球
", "紅球"),3)
> W <- 0
> R <- 0
> for (i in 1:3){
+     if (La[i] == "白球"){
+         W = W + 1
+     }
+     else{
+         R = R + 1
+     }
+ }
> Pp <- (choose(6,length(W)) * choose(4,length(R))) / choose(10,3)
> cat("實驗一次的結果：", Pp)
實驗一次的結果： 0.2
```

```
> cat("印出白球各出現之個數：", W)
印出白球各出現之個數： 2
> cat("印出紅球各出現之個數：", R)
印出紅球各出現之個數： 1
> #ex.5.2(b)
> DrawResult <- data.frame(matrix(0,10,2))
> for (j in 1:10){
+     La <- sample(c("白球","白球","白球","白球","白球","白球", "紅球", "紅球", "紅
球", "紅球"),3)
+     W <- 0
+     R <- 0
+     for (i in 1:3){
+         if (La[i] == "白球"){
+             W = W + 1
+         }
+         else{
+             R = R + 1
+         }
+     }
+     DrawResult[j,1] <- W
+     DrawResult[j,2] <- R
+ }
> DrawResult
   X1 X2
1   2  1
2   2  1
3   1  2
4   2  1
5   2  1
6   1  2
7   2  1
8   2  1
9   1  2
10  2  1
> #ex5.2(c)
> Tt <- 0
> for (j in 1:100){
+     La <- sample(c("白球","白球","白球","白球","白球","白球", "紅球", "紅球", "紅
```

```
球", "紅球"),3)
+     W <- 0
+     R <- 0
+     for (i in 1:3){
+         if (La[i] == "白球"){
+             W = W + 1
+         }
+         else{
+             R = R + 1
+         }
+     }
+     if (W == 2    && R == 1){
+         Tt    = Tt +1
+     }
+ }
> Tt
[1] 50
> Tt/100
[1] 0.5
>
```