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

```
> #2.9(a)  用 for 找出 number 第 100 個偶數
> set.seed(12345)
> number <- sample(0:100, 1000, replace=T)
> number_for <- function(x){
+     t <- 0
+     result <- 0
+     for(i in number){
+         if(i %% 2 == 0){
+             result <- result+1
+             t <- t+1
+         }
+         if(t>x)break
+         ans <- i
+         }
+     ans
+   }
> number_for(100)
[1] 62
>
> #2.9(b)  用 repeat 找出 number 第 100 個偶數
> set.seed(12345)
> number <- sample(0:100, 1000, replace=T)
> number_repeat <- function(x){
+     t <- 1
+     result <- 0
+     repeat{
+         if(t > x)break
+         result <- result +1
+         t <- t+1
```

```
+     }
+     num.while <- which(number%% 2 == 0)
+     return(number[num.while[result]])
+ }
> number_repeat(100)
[1] 62
>
> #2.9(c) 用 while 找出 number 第 100 個偶數
> set.seed(12345)
> number <- sample(0:100, 1000, replace=T)
> number_while <- function(x){
+     t <- 1
+     result <- 0
+     while(t<x+1){
+         result <- result +1
+         t <- t+1
+     }
+     #return(result)
+     num.while <- which(number%% 2 == 0)
+     return(number[num.while[result]])
+ }
> number_while(100)
[1] 62
>
>
> #2.53
> str(mtcars)
'data.frame':   32 obs. of   11 variables:
 $ mpg : num   21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
 $ cyl : num   6 6 4 6 8 6 8 4 4 6 ...
 $ disp: num   160 160 108 258 360 ...
 $ hp   : num   110 110 93 110 175 105 245 62 95 123 ...
 $ drat: num   3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
 $ wt   : num   2.62 2.88 2.32 3.21 3.44 ...
 $ qsec: num   16.5 17 18.6 19.4 17 ...
 $ vs   : num   0 0 1 1 0 1 0 1 1 1 ...
 $ am   : num   1 1 1 0 0 0 0 0 0 0 ...
 $ gear: num   4 4 4 3 3 3 3 4 4 4 ...
```

```
 $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
> mtcars.data <-data.frame(mtcars$disp, mtcars$hp, mtcars$drat, mtcars$wt,
mtcars$qsec)
> mtcars.data.1 <- apply(mtcars.data, 2, mean)
> mtcars.data.1
mtcars.disp      mtcars.hp mtcars.drat      mtcars.wt mtcars.qsec
 230.721875    146.687500       3.596563       3.217250      17.848750
>
> tdisp <- tapply(mtcars$cyl, mtcars$disp, mean)
> tdisp
  71.1   75.7   78.7     79   95.1    108 120.1 120.3    121 140.8    145 146.7
     4      4      4      4      4      4      4      4      4      4      6
4
  160 167.6    225    258 275.8    301    304    318    350    351    360
400
     6      6      6      6      8      8      8      8      8      8      8
8
  440    460    472
     8      8      8
> thp <- tapply(mtcars$cyl, mtcars$hp, mean)
> thp
       52        62        65        66        91        93        95
97
4.000000 4.000000 4.000000 4.000000 4.000000 4.000000 4.000000 4.000000
      105       109       110       113       123       150       175
180
6.000000 4.000000 6.000000 4.000000 6.000000 8.000000 7.333333 8.000000
      205       215       230       245       264       335
8.000000 8.000000 8.000000 8.000000 8.000000 8.000000
> tdrat <-tapply(mtcars$cyl, mtcars$drat, mean)
> tdrat
     2.76      2.93         3      3.07      3.08      3.15      3.21      3.23
7.000000 8.000000 8.000000 8.000000 7.000000 8.000000 8.000000 8.000000
     3.54      3.62      3.69       3.7      3.73      3.77      3.85       3.9
8.000000 6.000000 4.000000 4.000000 8.000000 4.000000 4.000000 6.000000
     3.92      4.08      4.11      4.22      4.43      4.93
5.333333 4.000000 4.000000 6.000000 4.000000 4.000000
> twt <-tapply(mtcars$cyl, mtcars$wt, mean)
```

```
> twt
    1.513       1.615       1.835       1.935        2.14         2.2        2.32       2.465
4.000000 4.000000 4.000000 4.000000 4.000000 4.000000 4.000000 4.000000
     2.62        2.77        2.78       2.875        3.15        3.17        3.19       3.215
6.000000 6.000000 4.000000 6.000000 4.000000 8.000000 4.000000 6.000000
    3.435        3.44        3.46        3.52        3.57        3.73        3.78        3.84
8.000000 6.666667 6.000000 8.000000 8.000000 8.000000 8.000000 8.000000
    3.845        4.07        5.25       5.345       5.424
8.000000 8.000000 8.000000 8.000000 8.000000
> tqsec <-tapply(mtcars$cyl, mtcars$qsec, mean)
> tqsec
 14.5   14.6 15.41   15.5 15.84 16.46   16.7 16.87   16.9 17.02 17.05   17.3
    8      8      8      6      8      6      4      8      4      7      8
8
 17.4 17.42   17.6 17.82 17.98      18   18.3 18.52   18.6 18.61   18.9 19.44
    8      8      8      8      8      8      6      4      4      4      5
6
19.47   19.9      20 20.01 20.22   22.9
    4      4      4      4      6      4
> #2.62(a)
> computer.s <- function(x){
+     i <- sample(1:3, 1, replace = T)
+     if(i == 1){
+         cat("剪刀")
+     }else if(i == 2){
+         cat("石頭")
+     }else if(i == 3){
+         cat("布")
+     }
+ }
> computer.s()
石頭
> #2.62(b)
> player <- function(x){
+     j <- readline("請輸入你要出的拳頭(a:  剪刀, b:  石頭, c:  布, d:  不玩了):")
+     switch(j,
+                 a = cat("玩家出:剪刀"),
+                 b = cat("玩家出:石頭"),
```

```
+                 c = cat("玩家出:布"),
+                 d = cat("玩家:不玩了")
+     )
+ }
> player()
請輸入你要出的拳頭(a:  剪刀, b:  石頭, c:  布, d:  不玩了):a
玩家出:剪刀
> #2.62(c)
> set.seed(12345)
> game <- function(x){
+     #玩家出的結果
+     repeat{
+         player <- readline("請輸入你要出的拳頭(a:  剪刀, b:  石頭, c:  布, d:  不玩
了):")
+         if(player == "d")break
+         output.1 <- switch(player,
+                            a = c("剪刀"),
+                            b = c("石頭"),
+                            c = c("布"),
+                            d = c("玩家:不玩了")
+         )
+
+         #電腦出的結果
+         #set.seed(12345)
+         computer <- sample(1:3, 1, replace = T)
+         output.2 <- if(computer == 1){
+             c("剪刀")
+             }else if(computer == 2){
+             c("石頭")
+             }else if(computer == 3){
+             c("布")
+             }
+
+         #判斷勝負
+         scissors <- c("平手", "輸", "贏")
+         stone <- c("贏", "平手", "輸")
+         five <- c("輸", "贏", "平手")
+         win.lose <- data.frame(scissors, stone, five)
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```
+         rownames(win.lose) <- c("scissors","stone", "five")
+         colnames(win.lose) <- c("a","b", "c")
+         #win.lose
+
+         output.3 <- if((player == "a") & (computer == 1)){
+            win.lose[1,1]
+            }else if ((player == "a") & (computer == 2)){
+            win.lose[2,1]
+            }else if ((player == "a") & (computer == 3)){
+            win.lose[3,1]
+            }else if ((player == "b") & (computer == 1)){
+            win.lose[1,2]
+            }else if ((player == "b") & (computer == 2)){
+            win.lose[2,2]
+            }else if ((player == "b") & (computer == 3)){
+            win.lose[3,2]
+            }else if ((player == "c") & (computer == 1)){
+            win.lose[1,3]
+            }else if ((player == "c") & (computer == 2)){
+            win.lose[2,3]
+            }else if ((player == "c") & (computer == 3)){
+            win.lose[3,3]
+            }
+         #cat(output.3)
+         cat("電腦出[", output.2, "]", "你出[", output.1, "]", "你[", output.3, "]了")
+     }
+     cat("謝謝再會!")
+ }
> game()
請輸入你要出的拳頭(a: 剪刀, b: 石頭, c: 布, d: 不玩了):a
電腦出[ 石頭 ] 你出[ 剪刀 ] 你[ 輸 ]了
請輸入你要出的拳頭(a: 剪刀, b: 石頭, c: 布, d: 不玩了):b
電腦出[ 布 ] 你出[ 石頭 ] 你[ 輸 ]了
請輸入你要出的拳頭(a: 剪刀, b: 石頭, c: 布, d: 不玩了):c
電腦出[ 石頭 ] 你出[ 布 ] 你[ 贏 ]了
請輸入你要出的拳頭(a: 剪刀, b: 石頭, c: 布, d: 不玩了):d
謝謝再會!
>
```