# 2020/12/11(五), 109學年第一學期 資料科學應用 R期中考

#

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> #ex.1

> study <- function(x, y){

+ #x <- 13

+ #y <- 8

+ #預算限制式

+ Eng.hr <- x

+ #Eng.hr

+ Comp.hr <- y

+ #Comp.hr

+ Tuition <- ((400\*x) + (600\*y) )

+ #Tuition

+ ifelse((limt <= 12000), limt, 0)

+ #limt

+ #效用函數

+ U <- sqrt(x)\*sqrt(y)

+ #U

+ Fit <- ifelse(Tuition <=12000, "\*"," ")

+

+ study.table <- data.frame(Eng.hr, Comp.hr, Tuition, U, Fit)

+ study.table

+ }

>

> x <- rep(13:17, 5)

> y <- rep(8:12, each=5)

> study(x, y)

Eng.hr Comp.hr Tuition U Fit

1 13 8 10000 10.19804 \*

2 14 8 10400 10.58301 \*

3 15 8 10800 10.95445 \*

4 16 8 11200 11.31371 \*

5 17 8 11600 11.66190 \*

6 13 9 10600 10.81665 \*

7 14 9 11000 11.22497 \*

8 15 9 11400 11.61895 \*

9 16 9 11800 12.00000 \*

10 17 9 12200 12.36932

11 13 10 11200 11.40175 \*

12 14 10 11600 11.83216 \*

13 15 10 12000 12.24745 \*

14 16 10 12400 12.64911

15 17 10 12800 13.03840

16 13 11 11800 11.95826 \*

17 14 11 12200 12.40967

18 15 11 12600 12.84523

19 16 11 13000 13.26650

20 17 11 13400 13.67479

21 13 12 12400 12.49000

22 14 12 12800 12.96148

23 15 12 13200 13.41641

24 16 12 13600 13.85641

25 17 12 14000 14.28286

>

>

> #ex.2(a)

> library(readxl)

> student\_test <- read\_excel("data/Score-109.xlsx", na = "NA", skip=1)

> student\_test

# A tibble: 75 x 3

ID Calculus English

<chr> <dbl> <dbl>

1 No.1 72 62

2 No.2 88 97

3 No.3 76 66

4 No.4 89 51

5 No.5 46 15

6 No.6 16 87

7 No.7 32 51

8 No.8 51 0

9 No.9 73 1

10 No.10 99 14

# ... with 65 more rows

> #印出前後五筆資料

> head(student\_test, 5)

# A tibble: 5 x 3

ID Calculus English

<chr> <dbl> <dbl>

1 No.1 72 62

2 No.2 88 97

3 No.3 76 66

4 No.4 89 51

5 No.5 46 15

> tail(student\_test, 5)

# A tibble: 5 x 3

ID Calculus English

<chr> <dbl> <dbl>

1 No.71 69 96

2 No.72 51 100

3 No.73 37 50

4 No.74 33 92

5 No.75 4 37

>

>

> #ex.2(b) 印出"請問有哪些同學兩科成績同時不及格

> #將遺失值填入0

> student\_test[is.na(student\_test)] <- 0

> student\_test

# A tibble: 75 x 3

ID Calculus English

<chr> <dbl> <dbl>

1 No.1 72 62

2 No.2 88 97

3 No.3 76 66

4 No.4 89 51

5 No.5 46 15

6 No.6 16 87

7 No.7 32 51

8 No.8 51 0

9 No.9 73 1

10 No.10 99 14

# ... with 65 more rows

> id <- which((student\_test$Calculus+ student\_test$English) < 60)

> student\_test[id, ]

# A tibble: 15 x 3

ID Calculus English

<chr> <dbl> <dbl>

1 No.8 51 0

2 No.11 3 0

3 No.15 39 6

4 No.18 40 0

5 No.33 18 0

6 No.35 37 21

7 No.39 0 38

8 No.45 26 32

9 No.47 6 52

10 No.48 4 9

11 No.53 31 18

12 No.54 21 28

13 No.56 50 3

14 No.68 15 21

15 No.75 4 37

>

> #ex.2(c) 寫相關係數函數

> x1 <- student\_test$Calculus

> x2 <- student\_test$English

>

> my.cor <- function(x1, x2){

+

+ # x1 <- 5

+ # x2 <- 10

+ x1.bar <- mean(x1)

+ x2.bar <- mean(x2)

+

+ a <- sum((x1- x1.bar)\*(x2 - x2.bar))

+ b <- sqrt(sum((x1- x1.bar)^2)) \* sqrt(sum((x2 - x2.bar)^2))

+ ans <- a/b

+ ans

+ }

>

> x1 <- student\_test$Calculus

> x2 <- student\_test$English

> my.cor(x1, x2)

[1] -0.02334661

>

> #ex.2(d) 計算微積分及英文兩成績之相關係數

> x1 <- student\_test$Calculus

> x2 <- student\_test$English

> my.cor(x1, x2)

[1] -0.02334661

>

> cor(x1, x2)

[1] -0.02334661

>

>

> #ex.3(a)

> my\_dnorm <- function(x, u = 0, z = 1){

+ #x <- 1

+ #u <- 0

+ #z <- 1

+ e <- 2.718282

+ density <- (1/(sqrt(2\*pi)\*z))\*e^(-(x-u)^2/2\*z)

+ density

+

+ }

> my\_dnorm(2.5, 3, 2)

[1] 0.1553483

>

> #ex.3(b)

> x <- rep(-3:3)

> dnorm <- my\_dnorm(x, 3, 2)

> my.dnorm <- my\_dnorm(x, 3, 2)

> my.dnorm.table <-data.frame(x, dnorm, my.dnorm)

> my.dnorm.table

x dnorm my.dnorm

1 -3 4.626768e-17 4.626768e-17

2 -2 2.770240e-12 2.770240e-12

3 -1 2.244750e-08 2.244750e-08

4 0 2.461668e-05 2.461668e-05

5 1 3.653440e-03 3.653440e-03

6 2 7.338133e-02 7.338133e-02

7 3 1.994711e-01 1.994711e-01

>