2020/12/11(五), 109 學年第一學期 資料科學應用 R 期中考(1)

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> #exl1
> study <- function(x, y, t){
+     u <- sqrt(x)*sqrt(y)
+     tui <- 400*x + 600*y
+     fit <- ifelse(tui <= t, "*", "")
+     s <- data.frame(x, y, tui, u, fit)
+     names(s) <- c("Eng.hr", "Comp.hr", "Tuition", "U", "Fit")
+     print(s)
+ }
> eng <- rep(c(13:17), 5)
> comp <- rep(8:12, each = 5)
> study(eng, comp, 12000)
   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
```

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24         16          12      13600 13.85641
25         17          12      14000 14.28286
>
> #exl2(a)
> score109 <- read_excel("data/Score-109.xlsx", sheet = "score", na = "NA" ,skip = 1)
> head(score109)
# A tibble: 6 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
> tail(score109)
# A tibble: 6 x 3
   ID       Calculus English
   <chr>       <dbl>     <dbl>
1 No.70          95          14
2 No.71          69          96
3 No.72          51         100
4 No.73          37          50
5 No.74          33          92
6 No.75           4          37
>
> #exl2(b)
> score109[is.na(score109)] <- 0
> score109[(score109[,2] <= 60) & (score109[,3] <= 60),]
# A tibble: 24 x 3
     ID       Calculus English
     <chr>       <dbl>     <dbl>
 1 No.5           46          15
 2 No.7           32          51
 3 No.8           51           0
 4 No.11           3           0
 5 No.15          39           6
 6 No.18          40           0
 7 No.19          18          60
 8 No.21          45          51
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  9 No.26          39          29
10 No.30          48          52
# … with 14 more rows
>
> #exl2(c)
> my.cor <- function(x, y){
+     x1 <- rank(x)
+     y1 <- rank(y)
+     xm <- mean(x)
+     ym <- mean(y)
+     a <- sum((x1-xm) * (y1-ym))
+     b <- sqrt(sum((x1-xm)^2)) * sqrt(sum((y1-ym)^2))
+     ans <- a/b
+     cat(ans)
+ }
> x <- score109$Calculus
> y <- score109$English
> my.cor(x, y)
0.2378331>

> #exl2(d)
> cor(x, y)
[1] -0.02334661
```