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> # 2020/12/11(五), 109學年第一學期 資料科學應用 R期中考
> #
> # 學號:A106260105 姓名:黃念慈
> #
> # 本檔案為各題之程式碼檔，無執行結果
>
>
> # ex 1
> study <- function(X, Y, B){
+   colname <- c("Eng.hr", "Comp.hr", "Tuition", "U", "Fit")
+   U <- (X^(1/2)*(Y^(1/2)))
+   UFunction <- matrix(0, 1, 5, dimnames = list(1, colname))
+
+   if(UFunction$Tuition < 12000){
+     UFunction$Tuition[UFunction$Tuition] <- "*"
+   }
+   UFunction$Eng.hr[UFunction$Eng.hr] <- X
+   UFunction$Comp.hr[UFunction$Comp.hr] <- Y
+   UFunction$Tuition[UFunction$Tuition] <- B
+   list(UFunction)
+ }
>
> # ex 2(a)
> score <- read.csv("data/Score-109.csv", header = T, skip=1)
> names(score) <- c("ID", "Calculus", "English")
> head(score, 5)
    ID Calculus English
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(score, 5)
     ID Calculus English
71 No.71       69      96
72 No.72       51     100
73 No.73       37      50
74 No.74       33      92
```

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75 No.75       4     37
> # ex 2(b)
> score[is.na(score)] <- 0
> subset(score, (score$Calculus < 60) & (score$English < 60))
     ID Calculus English
5   No.5       46      15
7   No.7       32      51
8   No.8       51       0
11 No.11        3       0
15 No.15       39       6
18 No.18       40       0
21 No.21       45      51
26 No.26       39      29
30 No.30       48      52
33 No.33       18       0
35 No.35       37      21
39 No.39        0      38
45 No.45       26      32
46 No.46       32      56
47 No.47        6      52
48 No.48        4       9
53 No.53       31      18
54 No.54       21      28
56 No.56       50       3
66 No.66       22      52
68 No.68       15      21
73 No.73       37      50
75 No.75        4      37
> # ex 2(c)
> my.cor <- function(x, y) {
+   x.bar <- mean(x)
+   y.bar <- mean(y)
+   a <- sum((x-x.bar)*(y-y.bar))
+   b <- sqrt(sum((x-x.bar)^2))
+   c <- sqrt(sum((y-y.bar)^2))
+   r.cor <- a/(b*c)
+   list(r_value = r.cor)
+ }
```

```
> # ex 2(d)
> my.cor(score$Calculus, score$English)
$r_value
[1] -0.02334661

> cor(score$Calculus, score$English)
[1] -0.02334661
>
> # ex 3(a)
> my.dnorm <- function(x, μ, σ) {
+   μ <- mean(x)
+   A <-(sqrt(2*pi))*σ
+   B <-(x - μ)^2
+   C <- (2*σ)^2
+   e <- exp(1)
+   f <- (1/A)*((e)^(-(B/C)))
+   f
+ }
> # ex 3(b)
> list(x=(-3:3), dnorm(-3:3) ,my.dnorm(-3:3, 0, 1))
$x
[1] -3 -2 -1  0  1  2  3

[[2]]
[1] 0.004431848 0.053990967 0.241970725 0.398942280 0.241970725 0.0539
90967 0.004431848

[[3]]
[1] 0.04204821 0.14676266 0.31069656 0.39894228 0.31069656 0.14676266
0.04204821
```