2020/11/06(五), 109學年第一學期 資料科學應用 R作業(2)

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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

> #2020/11/06 作業

>

> #ex1.13(a)

> lm.obj <- lm(airquality$Wind ~ airquality$Temp)

> lm.anova <- anova(lm.obj)

> lm.summary <- summary(lm.obj)

>

> lm.obj

Call:

lm(formula = airquality$Wind ~ airquality$Temp)

Coefficients:

(Intercept) airquality$Temp

23.2337 -0.1705

> lm.anova

Analysis of Variance Table

Response: airquality$Wind

Df Sum Sq Mean Sq F value Pr(>F)

airquality$Temp 1 395.71 395.71 40.08 2.642e-09 \*\*\*

Residuals 151 1490.84 9.87

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

> lm.summary

Call:

lm(formula = airquality$Wind ~ airquality$Temp)

Residuals:

Min 1Q Median 3Q Max

-8.5784 -2.4489 -0.2261 1.9853 9.7398

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 23.23369 2.11239 10.999 < 2e-16 \*\*\*

airquality$Temp -0.17046 0.02693 -6.331 2.64e-09 \*\*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 3.142 on 151 degrees of freedom

Multiple R-squared: 0.2098, Adjusted R-squared: 0.2045

F-statistic: 40.08 on 1 and 151 DF, p-value: 2.642e-09

>

> #用class去判斷物件類別

> class(lm.anova)

[1] "anova" "data.frame"

> #用str去判斷資料結構

> str(lm.anova)

Classes ‘anova’ and 'data.frame': 2 obs. of 5 variables:

$ Df : int 1 151

$ Sum Sq : num 396 1491

$ Mean Sq: num 395.71 9.87

$ F value: num 40.1 NA

$ Pr(>F) : num 2.64e-09 NA

- attr(\*, "heading")= chr [1:2] "Analysis of Variance Table\n" "Response: airquality$Wind"

>

> #ex1.13(b)

> #用attributes去判斷資料屬性

> attributes(lm.summary)

$names

[1] "call" "terms" "residuals" "coefficients"

[5] "aliased" "sigma" "df" "r.squared"

[9] "adj.r.squared" "fstatistic" "cov.unscaled"

$class

[1] "summary.lm"

> #加入$取出R2

> lm.summary$r.squared

[1] 0.2097529

>

>

> #ex1.20(a)

> #用table讀檔並用 "\t" 分隔

> data\_statlog\_vehicle\_846x18 <- read.table("data/statlog\_vehicle\_846x18.txt", sep="\t")

> data\_statlog\_vehicle\_846x18

V1 V2 V3 V4 V5 V6 V7

1 no class compactness circularity distance radiusratio pr.axis

2 1 0 96 55 103 201 65

3 2 0 101 56 100 215 69

4 3 0 93 35 66 154 59

5 4 0 101 48 107 222 68

6 5 0 87 38 85 177 61

7 6 0 95 48 104 214 67

8 7 0 98 55 101 228 70

9 8 0 107 53 103 221 66

10 9 0 103 50 98 212 63

11 10 0 77 38 63 135 59

12 11 0 89 41 75 143 56

13 12 0 98 55 101 219 69

14 13 0 96 55 98 161 54

15 14 0 97 59 108 227 70

16 15 0 92 39 91 191 62

17 16 0 73 37 53 111 54

18 17 0 101 53 103 203 63

19 18 0 79 40 80 133 55

20 19 0 80 37 57 116 55

21 20 0 94 38 84 158 55

22 21 0 97 50 108 211 65

23 22 0 95 46 105 219 68

24 23 0 99 46 105 209 64

25 24 0 85 39 77 151 59

26 25 0 77 38 75 144 59

27 26 0 88 35 50 121 58

28 27 0 100 45 100 209 65

29 28 0 102 54 100 163 53

30 29 0 106 49 107 194 57

31 30 0 95 45 80 186 62

32 31 0 103 54 107 218 64

33 32 0 93 35 72 172 62

34 33 0 85 36 78 149 55

35 34 0 91 45 75 154 57

36 35 0 82 38 53 125 59

37 36 0 107 52 101 218 64

38 37 0 98 54 104 186 59

39 38 0 103 54 91 179 57

40 39 0 108 51 103 197 60

41 40 0 84 39 90 180 60

42 41 0 78 36 60 116 56

43 42 0 98 45 76 166 60

44 43 0 101 51 105 212 68

45 44 0 90 36 78 179 64

46 45 0 97 48 94 198 63

47 46 0 111 54 103 171 50

48 47 0 103 55 100 194 62

49 48 0 92 46 79 176 64

50 49 0 101 56 100 168 55

V8 V9 V10 V11 V12 V13

1 max.length scatterratio elongatedness pr.axis max.length scaledvmi

2 9 204 32 23 166 227

3 10 208 32 24 169 227

4 6 142 46 18 128 162

5 10 208 32 24 154 232

6 8 164 40 20 129 186

7 9 205 32 23 151 227

8 9 210 31 24 168 236

9 11 209 32 24 163 222

10 9 193 34 22 161 214

11 5 130 52 18 130 145

12 7 146 46 19 137 170

13 11 225 30 25 178 231

14 10 215 31 24 175 226

15 11 224 30 25 186 225

16 8 176 37 21 137 196

17 6 126 55 18 128 135

18 9 195 34 22 162 210

19 7 147 47 19 135 172

20 6 125 54 18 125 142

21 9 169 39 20 130 196

22 10 214 31 24 156 232

23 9 201 33 23 148 223

24 11 197 34 23 152 212

25 8 150 45 19 134 176

26 6 147 46 19 132 167

27 5 114 59 17 122 132

28 8 201 32 23 147 231

29 10 213 31 24 173 219

30 11 214 31 24 161 224

31 7 164 40 20 145 188

32 12 222 30 25 174 221

33 7 149 44 19 124 169

34 7 147 45 19 128 168

35 6 150 44 19 146 170

36 5 133 51 18 128 152

37 11 202 33 23 164 219

38 10 213 32 24 172 223

39 11 220 31 25 170 220

40 11 211 31 24 160 222

41 7 177 37 21 131 209

42 6 123 55 17 124 141

43 7 157 42 20 148 184

44 10 209 32 24 162 222

45 8 157 42 19 126 182

46 9 181 36 21 155 200

47 11 221 30 25 172 227

48 11 212 31 24 175 217

49 8 162 41 20 149 183

50 11 214 31 24 175 219

V14 V15 V16 V17 V18 V19 V20

1 scaledvma scaledradius skewness skewness kurtosis kurtosis hollows

2 624 246 74 6 2 186 194

3 651 223 74 6 5 186 193

4 304 120 64 5 13 197 202

5 641 204 70 5 38 190 202

6 402 130 63 1 25 198 205

7 628 202 74 5 9 186 193

8 661 245 72 1 6 188 197

9 653 212 66 0 1 191 201

10 567 185 64 5 5 198 204

11 247 139 79 13 21 183 187

12 317 156 76 18 5 184 188

13 748 216 74 6 14 187 195

14 683 221 76 3 6 185 193

15 732 218 70 10 25 186 198

16 466 151 67 3 23 192 200

17 227 147 82 1 15 176 184

18 571 210 68 5 5 191 198

19 311 144 76 8 30 181 193

20 229 132 81 8 5 178 184

21 430 155 69 9 15 190 195

22 683 218 72 7 29 188 197

23 602 201 69 5 38 191 202

24 575 159 65 0 33 194 205

25 331 133 73 0 16 184 193

26 315 136 80 16 20 181 187

27 192 138 74 21 4 182 187

28 611 189 72 5 5 189 195

29 669 201 76 12 27 187 195

30 670 172 67 0 39 192 206

31 406 178 65 11 18 199 204

32 728 199 67 0 18 189 200

33 334 125 62 5 30 203 210

34 321 134 64 10 24 197 203

35 335 180 66 16 2 193 198

36 259 146 87 0 0 177 183

37 610 192 65 17 2 197 206

38 665 217 73 1 26 186 195

39 707 198 72 1 32 186 198

40 661 187 67 7 3 190 200

41 469 145 71 4 38 190 198

42 221 121 78 3 16 178 185

43 371 186 69 13 10 190 196

44 653 224 73 5 23 186 195

45 367 142 66 1 20 192 198

46 494 189 64 20 11 199 203

47 727 201 69 15 6 190 198

48 666 219 73 10 14 187 194

49 396 178 67 2 10 191 198

50 681 224 74 2 3 185 192

[ reached 'max' / getOption("max.print") -- omitted 797 rows ]

>

> #列出陣列維度

> dim(data\_statlog\_vehicle\_846x18)

[1] 847 20

>

> #列出前後五筆資料

> #前五筆

> head(data\_statlog\_vehicle\_846x18)

V1 V2 V3 V4 V5 V6 V7

1 no class compactness circularity distance radiusratio pr.axis

2 1 0 96 55 103 201 65

3 2 0 101 56 100 215 69

4 3 0 93 35 66 154 59

5 4 0 101 48 107 222 68

6 5 0 87 38 85 177 61

V8 V9 V10 V11 V12 V13

1 max.length scatterratio elongatedness pr.axis max.length scaledvmi

2 9 204 32 23 166 227

3 10 208 32 24 169 227

4 6 142 46 18 128 162

5 10 208 32 24 154 232

6 8 164 40 20 129 186

V14 V15 V16 V17 V18 V19 V20

1 scaledvma scaledradius skewness skewness kurtosis kurtosis hollows

2 624 246 74 6 2 186 194

3 651 223 74 6 5 186 193

4 304 120 64 5 13 197 202

5 641 204 70 5 38 190 202

6 402 130 63 1 25 198 205

> #後五筆

> tail(data\_statlog\_vehicle\_846x18)

V1 V2 V3 V4 V5 V6 V7 V8 V9 V10 V11 V12 V13 V14 V15 V16 V17 V18

842 841 3 95 49 82 139 56 11 159 43 20 162 173 365 185 75 7 10

843 842 3 87 45 66 139 58 8 140 47 18 148 168 294 175 73 3 12

844 843 3 95 43 76 142 57 10 151 44 19 149 173 339 159 71 2 23

845 844 3 90 44 72 157 64 8 137 48 18 144 159 283 171 65 9 4

846 845 3 89 46 84 163 66 11 159 43 20 159 173 368 176 72 1 20

847 846 3 85 36 66 123 55 5 120 56 17 128 140 212 131 73 1 18

V19 V20

842 182 191

843 188 196

844 187 200

845 196 203

846 186 197

847 186 190

>

> #看記憶體站比

> object.size(data\_statlog\_vehicle\_846x18)

267448 bytes

>

>

> #ex1.28(a)

> #讀檔 skip 第一列

> data\_stock\_data.txt <- read.table("data/stock-data.txt", header = TRUE, sep="\t", skip = 1)

> data\_stock\_data.txt

半導體公司 年度 月份 最高價 最低價 加權平均價 成交筆數

1 台積電 100 1 78.30 69.60 74.30 263,999

2 台積電 100 2 77.00 69.90 72.54 235,159

3 台積電 100 3 72.20 65.70 69.74 276,434

4 台積電 100 4 73.90 68.00 71.37 211,611

5 台積電 100 5 76.90 73.00 74.96 213,185

6 台積電 100 6 78.20 70.40 74.70 260,507

7 台積電 100 7 73.90 68.50 71.59 238,386

8 台積電 100 8 72.80 62.20 66.61 305,409

9 台積電 100 9 72.10 65.90 69.11 266,720

10 台積電 100 10 74.00 68.10 70.70 181,361

11 台積電 100 11 76.00 71.30 74.03 197,579

12 台積電 100 12 76.80 72.00 75.00 179,107

13 威盛 100 1 33.40 29.30 30.97 55,107

14 威盛 100 2 32.65 28.35 30.54 26,901

15 威盛 100 3 35.45 28.50 32.01 55,802

16 威盛 100 4 32.80 27.55 30.35 27,568

17 威盛 100 5 32.60 25.95 29.40 37,516

18 威盛 100 6 37.25 31.20 34.68 89,247

19 威盛 100 7 38.15 32.45 35.47 67,463

20 威盛 100 8 35.40 26.60 30.13 45,393

21 威盛 100 9 29.00 23.10 26.17 24,781

22 威盛 100 10 25.15 20.40 23.39 25,791

23 威盛 100 11 25.70 18.70 22.74 29,099

24 威盛 100 12 20.20 14.80 16.96 21,092

25 聯發科 100 1 424.00 378.00 403.55 106,530

26 聯發科 100 2 380.00 325.50 348.98 97,339

27 聯發科 100 3 355.00 312.50 339.96 117,960

28 聯發科 100 4 354.00 301.00 328.65 87,638

29 聯發科 100 5 362.50 305.50 335.42 128,717

30 聯發科 100 6 331.00 295.00 311.57 110,521

31 聯發科 100 7 316.50 244.00 274.39 161,471

32 聯發科 100 8 298.00 221.00 262.09 249,066

33 聯發科 100 9 348.00 268.00 309.66 240,792

34 聯發科 100 10 345.00 310.50 329.66 185,407

35 聯發科 100 11 326.00 268.00 302.52 160,330

36 聯發科 100 12 292.00 243.00 268.01 135,509

37 聯電 100 1 18.20 15.50 17.19 258,572

38 聯電 100 2 18.30 15.30 16.38 150,872

39 聯電 100 3 16.10 13.90 14.92 209,011

40 聯電 100 4 15.65 14.55 15.21 125,663

41 聯電 100 5 15.30 14.25 14.76 116,087

42 聯電 100 6 15.15 13.85 14.51 125,348

43 聯電 100 7 14.50 12.95 13.89 122,812

44 聯電 100 8 13.15 10.15 11.13 169,781

45 聯電 100 9 12.05 10.65 11.25 127,617

46 聯電 100 10 13.70 11.05 12.39 113,378

47 聯電 100 11 13.30 11.60 12.68 107,400

48 聯電 100 12 13.60 11.70 12.51 99,760

49 旺宏 100 1 23.75 20.20 22.19 241,726

50 旺宏 100 2 22.95 20.30 21.49 113,440

51 旺宏 100 3 22.40 17.65 19.48 208,006

52 旺宏 100 4 19.65 18.05 18.88 107,292

53 旺宏 100 5 18.90 17.40 18.25 103,567

54 旺宏 100 6 18.15 16.90 17.60 72,617

55 旺宏 100 7 18.50 14.40 17.09 125,851

56 旺宏 100 8 14.50 10.25 11.84 152,177

57 旺宏 100 9 12.65 10.40 11.55 108,879

58 旺宏 100 10 12.00 10.25 11.31 68,571

59 旺宏 100 11 13.65 10.85 12.54 167,018

60 旺宏 100 12 12.85 11.15 12.17 115,192

成交金額 成交股數 週轉率百分比

1 100,578,274,926 1,353,616,348 5.22

2 74,985,055,548 1,033,654,452 3.98

3 88,459,924,495 1,268,289,393 4.89

4 70,177,023,098 983,177,475 3.79

5 74,005,599,560 987,256,484 3.80

6 96,761,306,205 1,295,262,736 4.99

7 73,569,965,426 1,027,567,656 3.96

8 84,617,942,159 1,270,302,342 4.90

9 74,225,030,814 1,073,997,108 4.14

10 59,947,670,693 847,821,278 3.27

11 65,432,526,407 883,753,804 3.41

12 53,687,756,290 715,808,271 2.76

13 4,580,913,795 147,912,893 21.54

14 2,060,809,696 67,459,942 9.82

15 4,355,434,679 136,059,651 19.81

16 1,815,454,798 59,799,382 8.70

17 2,758,375,085 93,810,158 13.66

18 7,828,188,732 225,687,324 32.86

19 5,968,464,729 168,228,930 24.50

20 3,364,616,892 111,649,410 16.26

21 1,477,865,479 56,460,496 8.22

22 1,528,259,415 65,336,840 9.51

23 1,687,413,881 74,175,097 10.80

24 856,362,397 50,464,211 7.34

25 57,621,649,341 142,786,216 12.98

26 46,409,931,806 132,985,689 12.08

27 52,887,228,668 155,567,203 14.14

28 39,442,097,346 120,011,172 10.91

29 60,665,847,316 180,862,384 16.44

30 50,190,673,665 161,084,547 14.64

31 67,807,228,929 247,119,699 22.46

32 99,279,007,797 378,794,148 34.43

33 110,850,615,666 357,971,048 30.97

34 86,245,899,331 261,616,653 22.64

35 66,694,256,195 220,461,694 19.21

36 50,261,172,442 187,529,947 16.34

37 31,112,735,815 1,809,650,075 13.93

38 14,737,456,282 899,524,191 6.92

39 19,678,194,951 1,318,563,860 10.15

40 11,339,720,871 745,385,215 5.73

41 10,613,932,085 718,857,838 5.53

42 11,651,143,825 802,571,097 6.17

43 11,900,583,208 856,247,283 6.55

44 13,165,667,283 1,182,650,262 9.04

45 9,214,851,731 818,390,302 6.25

46 7,702,645,861 621,343,297 4.74

47 7,641,319,053 602,169,179 4.60

48 6,317,139,669 504,611,921 3.85

49 24,488,010,731 1,103,457,390 32.81

50 10,237,820,122 476,337,345 14.13

51 16,814,336,067 863,074,087 25.58

52 7,081,789,345 374,989,300 11.10

53 7,221,174,001 395,658,986 11.70

54 4,294,383,140 243,965,636 7.22

55 8,571,233,298 501,422,845 14.82

56 8,137,500,167 687,167,610 20.31

57 5,542,998,380 479,779,350 14.18

58 3,041,525,834 268,710,697 7.94

59 9,538,526,797 760,264,306 22.47

60 5,070,210,532 416,455,073 12.31

> #印出前五筆資料

> head(data\_stock\_data.txt)

半導體公司 年度 月份 最高價 最低價 加權平均價 成交筆數

1 台積電 100 1 78.3 69.6 74.30 263,999

2 台積電 100 2 77.0 69.9 72.54 235,159

3 台積電 100 3 72.2 65.7 69.74 276,434

4 台積電 100 4 73.9 68.0 71.37 211,611

5 台積電 100 5 76.9 73.0 74.96 213,185

6 台積電 100 6 78.2 70.4 74.70 260,507

成交金額 成交股數 週轉率百分比

1 100,578,274,926 1,353,616,348 5.22

2 74,985,055,548 1,033,654,452 3.98

3 88,459,924,495 1,268,289,393 4.89

4 70,177,023,098 983,177,475 3.79

5 74,005,599,560 987,256,484 3.80

6 96,761,306,205 1,295,262,736 4.99

> #印出後五筆資料

> tail(data\_stock\_data.txt)

半導體公司 年度 月份 最高價 最低價 加權平均價 成交筆數 成交金額

55 旺宏 100 7 18.50 14.40 17.09 125,851 8,571,233,298

56 旺宏 100 8 14.50 10.25 11.84 152,177 8,137,500,167

57 旺宏 100 9 12.65 10.40 11.55 108,879 5,542,998,380

58 旺宏 100 10 12.00 10.25 11.31 68,571 3,041,525,834

59 旺宏 100 11 13.65 10.85 12.54 167,018 9,538,526,797

60 旺宏 100 12 12.85 11.15 12.17 115,192 5,070,210,532

成交股數 週轉率百分比

55 501,422,845 14.82

56 687,167,610 20.31

57 479,779,350 14.18

58 268,710,697 7.94

59 760,264,306 22.47

60 416,455,073 12.31

> #檢查資料類別物件

> class(data\_stock\_data.txt)

[1] "data.frame"

> str(data\_stock\_data.txt)

'data.frame': 60 obs. of 10 variables:

$ 半導體公司 : chr "台積電" "台積電" "台積電" "台積電" ...

$ 年度 : int 100 100 100 100 100 100 100 100 100 100 ...

$ 月份 : int 1 2 3 4 5 6 7 8 9 10 ...

$ 最高價 : num 78.3 77 72.2 73.9 76.9 78.2 73.9 72.8 72.1 74 ...

$ 最低價 : num 69.6 69.9 65.7 68 73 70.4 68.5 62.2 65.9 68.1 ...

$ 加權平均價 : num 74.3 72.5 69.7 71.4 75 ...

$ 成交筆數 : chr "263,999" "235,159" "276,434" "211,611" ...

$ 成交金額 : chr "100,578,274,926" "74,985,055,548" "88,459,924,495" "70,177,023,098" ...

$ 成交股數 : chr "1,353,616,348" "1,033,654,452" "1,268,289,393" "983,177,475" ...

$ 週轉率百分比: num 5.22 3.98 4.89 3.79 3.8 4.99 3.96 4.9 4.14 3.27 ...

> attributes(data\_stock\_data.txt)

$names

[1] "半導體公司" "年度" "月份" "最高價"

[5] "最低價" "加權平均價" "成交筆數" "成交金額"

[9] "成交股數" "週轉率百分比"

$class

[1] "data.frame"

$row.names

[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

[23] 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

[45] 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

> #轉換 成交筆數 成交金額 成交股數 為數字

> lapply(data\_stock\_data.txt, class)

$半導體公司

[1] "character"

$年度

[1] "integer"

$月份

[1] "integer"

$最高價

[1] "numeric"

$最低價

[1] "numeric"

$加權平均價

[1] "numeric"

$成交筆數

[1] "character"

$成交金額

[1] "character"

$成交股數

[1] "character"

$週轉率百分比

[1] "numeric"

> data\_stock\_data.txt$成交筆數 <- as.numeric(data\_stock\_data.txt$成交筆數)

Warning message:

強制變更過程中產生了 NA

> data\_stock\_data.txt$成交金額 <- as.numeric(data\_stock\_data.txt$成交金額)

Warning message:

強制變更過程中產生了 NA

> data\_stock\_data.txt$成交股數 <- as.numeric(data\_stock\_data.txt$成交股數)

Warning message:

強制變更過程中產生了 NA

> #確認轉換過去的資料型態

> lapply(data\_stock\_data.txt, class)

$半導體公司

[1] "character"

$年度

[1] "integer"

$月份

[1] "integer"

$最高價

[1] "numeric"

$最低價

[1] "numeric"

$加權平均價

[1] "numeric"

$成交筆數

[1] "numeric"

$成交金額

[1] "numeric"

$成交股數

[1] "numeric"

$週轉率百分比

[1] "numeric"

>

>

> #ex1.33(a)

> Dates <- c("0924", "1112", "1231", "1105", "0604", "0219", "0416", "0611", "0813", "1029")

> Time <- c("01:00", "04:00", "16:00", "23:00", "08:00", "09:00", "07:00", "17:00", "03:00", "14:00")

> Items <- c("shirt", "shirt", "pants", "jacket", "jacket", "shirt", "jacket", "jacket", "shoes", "shirt")

> Volume <- c(7951, 159, 1958, 6848, 3762, 3678, 8696, 9045, 6208, 1425)

> DateTime <- paste(Dates, Time)

> DateTime

[1] "0924 01:00" "1112 04:00" "1231 16:00" "1105 23:00" "0604 08:00"

[6] "0219 09:00" "0416 07:00" "0611 17:00" "0813 03:00" "1029 14:00"

> mySale <- data.frame(DateTime, Items, Volume)

> mySale

DateTime Items Volume

1 0924 01:00 shirt 7951

2 1112 04:00 shirt 159

3 1231 16:00 pants 1958

4 1105 23:00 jacket 6848

5 0604 08:00 jacket 3762

6 0219 09:00 shirt 3678

7 0416 07:00 jacket 8696

8 0611 17:00 jacket 9045

9 0813 03:00 shoes 6208

10 1029 14:00 shirt 1425

> str(mySale)

'data.frame': 10 obs. of 3 variables:

$ DateTime: chr "0924 01:00" "1112 04:00" "1231 16:00" "1105 23:00" ...

$ Items : chr "shirt" "shirt" "pants" "jacket" ...

$ Volume : num 7951 159 1958 6848 3762 ...

>

> #lapply 列出類別

> lapply(mySale,class)

$DateTime

[1] "character"

$Items

[1] "character"

$Volume

[1] "numeric"

> #用strptime()更改

> mySale$DateTime <- strptime(mySale$DateTime,"%m%d %H:%M")

> #檢查是否轉換成功

> class(mySale$DateTime)

[1] "POSIXlt" "POSIXt"

> #轉換以下類別

> mySale$DateTime <- as.POSIXct(mySale$DateTime)

> mySale$Items <- as.factor(mySale$Items)

> mySale$Volume <- as.numeric(mySale$Volume)

> #用lapply()去確認所有類別

> lapply(mySale,class)

$DateTime

[1] "POSIXct" "POSIXt"

$Items

[1] "factor"

$Volume

[1] "numeric"

> str(mySale)

'data.frame': 10 obs. of 3 variables:

$ DateTime: POSIXct, format: "2020-09-24 01:00:00" ...

$ Items : Factor w/ 4 levels "jacket","pants",..: 3 3 2 1 1 3 1 1 4 3

$ Volume : num 7951 159 1958 6848 3762 ...

>

> #ex1.33(b)

> #用mySale$Items擷取出mySale中Items的DateTime >="0700 00:00"商品 並存成after\_july

> after\_july <- mySale$Items[DateTime >="0700 00:00"]

> after\_july

[1] shirt shirt pants jacket shoes shirt

Levels: jacket pants shirt shoes

> #用mySale$Volume擷取出mySale中Volume的DateTime >="0700 00:00"銷售量 並計算mean存成after\_july\_meanVolume

> after\_july\_meanVolume <- mean(mySale$Volume[DateTime >="0700 00:00"])

> after\_july\_meanVolume

[1] 4091.5

>