2020/11/13(五), 109 學年第一學期 資料科學應用 R 作業(3)

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>

>

> #ex1.25(a)

> library(readxl)

> my.data <- read_excel("data/R-score.xlsx")

New names:

* `` -> ...2

* `` -> ...3

* `` -> ...4

> head(my.data, 6)

A tibble: 6 x 10

`115-2-R 程式設計`~ ...2 ...3 ...4 `小考(1)`

<chr></chr>	<chr> <chr> <chr> <dbl></dbl></chr></chr></chr>	
1 No	系級 學號 姓名	0.1
21	統計系 1~3257~ 周小如~	55
3 2	統計系 1~3257~ 周抒如~	30
4 3	會計系 1~3257~ 林育安~	10
5 4	會計系 1~ 3257~ 林育辰~	10
6 5	會計系 1~ 3257~ 黃季晴~	5

... with 5 more variables: `小考(2)` <dbl>,

`小考(3)` <dbl>, 作業 <dbl>, 期末考 <dbl>,

點名 <chr>

> #ex1.25(b)

> str(my.data)

tibble [14 x 10] (S3: tbl_df/tbl/data.frame)

\$115-2-R 程式設計: chr [1:14] "No" "1" "2" "3" ...

\$...2 : chr [1:14] "系級" "統計系 1" "統計系 1" "會計系 1" ...

\$...3: chr [1:14] "學號" "32578012" "32578014" "32578016" ...

\$...4 : chr [1:14] "姓名" "周小如" "周抒如" "林育安" ...

\$ 小考(1) : num [1:14] 0.1 55 30 10 10 5 10 25 55 10 ...

\$ 小考(2) : num [1:14] 0.15 95 65 5 20 15 35 50 45 15 ...

\$ 小考(3) : num [1:14] 0.15 100 70 25 45 20 60 40 75 55 ...

\$ 作業: num [1:14] 0.2 100 100 10 40 25 0 60 100 55 ...

\$ 期末考: num [1:14] 0.4 86 94 77 87 86 77 87 79 87 ...

\$ 點名 : chr [1:14] "10 分" "10" "10" "10" ...

> mean(my.data\$"小考(1)"[2:14])

[1] 25

> mean(my.data\$"小考(2)"[2:14])

[1] 36.15385

> mean(my.data\$"小考(3)"[2:14])

[1] 51.15385

> mean(my.data\$"作業"[2:14])

[1] 51.15385

> mean(my.data\$"期末考"[2:14])

```
[1] 77.23077
> sd(my.data$"小考(1)"[2:14])
[1] 18.37117
> sd(my.data$"小考(2)"[2:14])
[1] 33.05008
> sd(my.data$"小考(3)"[2:14])
[1] 26.7047
> sd(my.data$"作業"[2:14])
[1] 38.57643
> sd(my.data$"期末考"[2:14])
[1] 23.89963
> #ex1.25(c)
> my.data$total <- c(as.matrix(my.data[, 5:9])%*% as.vector(c(0.1, 0.15, 0.15, 0.2,
0.4)))
>
>
> #ex1.29(a)
> data1 <- read excel("data/R-score.xlsx", na="NA")
New names:
* `` -> ...2
* `` -> ...3
* `` -> ...4
> data1
# A tibble: 14 x 10
   `115-2-R 程式設計`~ ...2 ...3 ...4 `小考(1)`
   <chr>
                      <chr> <chr> <chr>
                                            <dbl>
                      系級 學號 姓名
 1 No
                                                 0.1
                      統計系 1~3257~ 周小如~
 2 1
                                                      55
```

3 2	統計系 1~ 3257~ 周抒如~	30
4 3	會計系 1~3257~ 林育安~	10
5 4	會計系 1~ 3257~ 林育辰~	10
6 5	會計系 1~ 3257~ 黃季晴~	5
7 6	統計系 1~3257~ 詹宜瑄~	10
8 7	會計系 1~3257~ 劉岱蓉~	25
9 8	統計系 1~ 3257~ 蔡旻憫~	55
10 9	統計系 1~ 3257~ 黎奕璇~	10
11 10	會計系 1~3247~ 蕭偲賢~	15
12 11	會計系 1~3247~ 謝涵融~	35
13 12	會計系 1~ 3257~ 羅順霓~	50
14 13	統計系 1~3257~ 顧瀚薇~	15

... with 5 more variables: `小考(2)` <dbl>,

`小考(3)` <dbl>, 作業 <dbl>, 期末考 <dbl>,

點名 <chr>

> str(data1)

tibble [14 x 10] (S3: tbl_df/tbl/data.frame)

\$ 115-2-R 程式設計: chr [1:14] "No" "1" "2" "3" ...

\$...2 : chr [1:14] "系級" "統計系 1" "統計系 1" "會計系 1" ...

\$...3: chr [1:14] "學號" "32578012" "32578014" "32578016" ...

```
$ 小考(1)
                    : num [1:14] 0.1 55 30 10 10 5 10 25 55 10 ...
 $ 小考(2)
                    : num [1:14] 0.15 95 65 5 20 15 35 50 45 15 ...
 $ 小考(3)
                    : num [1:14] 0.15 100 70 25 45 20 60 40 75 55 ...
 $ 作業
                     : num [1:14] 0.2 100 100 10 40 25 0 60 100 55 ...
 $期末考
                     : num [1:14] 0.4 86 94 77 87 86 77 87 79 87 ...
 $點名
                     : chr [1:14] "10 分" "10" "10" "10" ...
> colnames(data1) <- c("no", "grade", "id", "name",
                            "quiz1", "quiz2", "quiz3", "hw", "final", "attend")
> data1$id <- as.factor(data1$id)
> str(data1)
tibble [14 x 10] (S3: tbl_df/tbl/data.frame)
          : chr [1:14] "No" "1" "2" "3" ...
 $ no
 $ grade : chr [1:14] "系級" "統計系 1" "統計系 1" "會計系 1" ...
 $ id
         : Factor w/ 14 levels "32474226", "32475032", ..: 14 5 6 7 8 9 10 11 12 13 ...
 $ name : chr [1:14] "姓名" "周小如" "周抒如" "林育安" ...
 $ quiz1 : num [1:14] 0.1 55 30 10 10 5 10 25 55 10 ...
 $ quiz2 : num [1:14] 0.15 95 65 5 20 15 35 50 45 15 ...
 $ quiz3 : num [1:14] 0.15 100 70 25 45 20 60 40 75 55 ...
 $ hw
          : num [1:14] 0.2 100 100 10 40 25 0 60 100 55 ...
 $ final: num [1:14] 0.4 86 94 77 87 86 77 87 79 87 ...
 $ attend: chr [1:14] "10 分" "10" "10" "10" ...
> data2 <- read.table("data/20140714-weather.txt", header=TRUE, sep="\t")
> data2
   locationName
                       lat
                                Ion stationId TEMP ELEV
             基隆 25.1348 121.7321
1
                                         466940 29.1
                                                         27
             淡水 25.1656 121.4400
2
                                         466900 28.5
                                                         19
```

: chr [1:14] "姓名" "周小如" "周抒如" "林育安" ...

\$...4

3	板橋	24.9993 121.4338	466880 29.0	10
4	竹子湖	25.1650 121.5363	466930 25.2	607
5	新竹	24.8300 121.0061	467571 29.8	34
6	臺中	24.1475 120.6759	467490 29.4	84
7	梧棲	24.2587 120.5151	467770 29.2	7
8	澎湖	23.5672 119.5552	467350 27.8	11
9	日月潭	23.8830 120.8999	467650 22.8 10	015
10	阿里山	23.5104 120.8051	467530 14.4 24	413
11	玉山	23.4893 120.9517	467550 7.3 3	845
12	嘉義	23.4977 120.4245	467480 29.3	27
13	高雄	22.5679 120.3080	467440 30.3	2
14	恆春	22.0054 120.7381	467590 29.7	22
15	宜蘭	24.7656 121.7479	467080 28.5	7
16	蘇澳	24.6017 121.8644	467060 29.9	25
17	花蓮	23.9770 121.6050	466990 29.4	16
18	成功	23.0992 121.3654	467610 29.1	34
19	臺東	22.7540 121.1465	467660 30.3	9
20	大武	22.3576 120.8957	467540 28.3	8
21	蘭嶼	22.0387 121.5506	467620 26.7	324

22	彭佳嶼	25.6294 122.0713	466950 27.9	102
23	東吉島	23.2590 119.6596	467300 29.5	43
24	新店	24.9608 121.5165	A0A9M0 26.8	24
25	臺北	25.0396 121.5067	466920 30.4	5
26	臺南	22.9952 120.1970	467410 30.0	41
27	金門	24.4074 118.2893	467110 28.4	48
28	馬祖	26.1694 119.9232	467990 28.0	98
29	新屋	25.0067 121.0475	467050 29.3	21

> str(data2)

'data.frame': 29 obs. of 6 variables:

\$ locationName: chr "基隆""淡水""板橋""竹子湖" ...

\$ lat : num 25.1 25.2 25 25.2 24.8 ... \$ lon : num 122 121 121 122 121 ...

\$ stationId : chr "466940" "466900" "466880" "466930" ...

\$ TEMP : num 29.1 28.5 29 25.2 29.8 29.4 29.2 27.8 22.8 14.4 ...

\$ ELEV : int 27 19 10 607 34 84 7 11 1015 2413 ...

> data3 <- read.csv("data/weather delays14.csv", header=TRUE, sep=",")

> data3

year month day dep_time arr_time carrier tailnum

1	2014	1	1	1733	2024	AA	N3HPAA
2	2014	1	1	1718	1840	В6	N324JB
3	2014	1	1	624	946	DL	N3751B
4	2014	1	1	910	1203	DL	N910DL
5	2014	1	1	1850	2052	MQ	N1EAMQ
6	2014	1	2	2049	45	AA	N319AA
7	2014	1	2	738	1124	AA	N335AA
8	2014	1	2	5	339	AA	N335AA
9	2014	1	2	1618	1958	AA	N339AA
10	2014	1	2	1657	2050	AA	N5FAAA

11 2014	1	2	1939	2351	AA	N336AA
12 2014	1	2	1445	1620	AA	N3KDAA
13 2014	1	2	1841	2013	AA	N3AEAA
14 2014	1	2	1837	2108	AA	N3FDAA
15 2014	1	2	1625	2020	AA	N3DDAA
16 2014	1	2	1920	2316	AA	N3BCAA
17 2014	1	2	615	819	AA	N3GKAA
18 2014	1	2	653	855	AA	N3BSAA
19 2014	1	2	838	1042	AA	N3DYAA
20 2014	1	2	925	1126	AA	N560AA
21 2014	1	2	959	1309	AA	N3EAAA
22 2014	1	2	1231	1445	AA	N4WSAA
23 2014	1	2	1405	1723	AA	N3JTAA
24 2014	1	2	1944	2117	AA	N547AA
25 2014	1	2	1903	2100	AA	N434AA
26 2014	1	2	758	1345	AA	N5FHAA
27 2014	1	2	2139	332	AA	N5CKAA
28 2014	1	2	1404	1748	AA	N3CTAA
29 2014	1	2	1720	2106	AA	N3DTAA
30 2014	1	2	1905	2234	AA	N3ESAA
31 2014	1	2	631	1007	AA	N3LBAA
32 2014	1	2	715	1026	AA	N3KAAA
33 2014	1	2	808	1131	AA	N3DTAA
34 2014	1	2	908	1301	AA	N3FMAA
35 2014	1	2	1052	1428	AA	N3KUAA
36 2014	1	2	1956	2320	AA	N3CMAA
37 2014	1	2	1306	1646	AA	N3BBAA
38 2014	1	2	1512	1826	AA	N3HVAA
39 2014	1	2	1514	1846	AA	N3DPAA
40 2014	1	2	1603	1940	AA	N3KAAA
41 2014	1	2	1550	1901	AA	N3LBAA
42 2014	1	2	844	1346	AA	N5FGAA
43 2014	1	2	1657	2040	AA	N3AUAA
44 2014	1	2	1124	1512	AA	N3GPAA
45 2014	1	2	1954	2358	AA	N3FMAA
46 2014	1	2	910	1241	AA	N3AUAA
47 2014	1	2	730	1049	AA	N3DPAA
48 2014	1	2	1519	1847	AA	N5CCAA

49 20:	1 /	1	2	10	221	2200	۸۸	NIDEONA
50 20		1	2		331 744	2209 2112	AA AA	N369AA N3JMAA
51 20:		1	2		000	7	AA	N3BSAA
52 20:		1	2		322	2133	AA	N633AA
53 20:		1	2	10	3	452	В6	N806JB
54 20:		1	2	15	557	1748	В6	N183JB
55 20		1	2		329	2130	В6	N238JB
56 20:		1	2)40	6	В6	N247JB
57 20:		1	2		.13	2338	В6	N281JB
58 20:		1	2		857	1102	В6	N324JB
59 20:	14	1	2	22	215	145	В6	N507JB
60 20	14	1	2	19	952	2316	В6	N516JB
61 20	14	1	2	19	949	25	В6	N524JB
62 20	14	1	2	18	38	2205	В6	N562JB
63 20	14	1	2	20	37	114	В6	N571JB
64 20	14	1	2	23	36	416	В6	N587JB
65 20	14	1	2	1	.56	852	В6	N588JB
66 20	14	1	2	23	321	321	В6	N589JB
67 20	14	1	2	19	920	2256	В6	N629JB
68 20	14	1	2	20)27	104	В6	N630JB
69 20	14	1	2	20)58	242	В6	N641JB
70 20	14	1	2	19	915	2250	В6	N644JB
71 20	14	1	2	23	34	337	В6	N649JB
fli	ght orig	in de	est	carrier_c	delay	weather_	delay	
1	199	JI	K	ORD		0		7
2	1734	JI	K	BTV		0		18
3	479	JI	K	ATL		0		9
4	1174	L	GΑ	PBI		0		52
5	2839	L	GΑ	STL		0		35
6	21	JI	-K	LAX		0		87
7	33	JI	K	LAX		0		8
8	185	JI	-K	LAX		0		53
9	133	JI	-K	LAX		0		32
10	145	JI	-K	MIA		0		6
11	177	JI	-K	SFO		0		114
12	178	JI	-K	BOS		0		1
13	256	JI	-K	BOS		0		63
14	199	JI	-K	ORD		0		33

15	211	JFK	IAH	0	10
16	291	JFK	AUS	0	74
17	301	LGA	ORD	0	15
18	303	LGA	ORD	0	23
19	307	LGA	ORD	0	58
20	313	LGA	ORD	0	35
21	317	LGA	ORD	0	14
22	327	LGA	ORD	0	4
23	331	LGA	ORD	0	10
24	343	LGA	ORD	0	45
25	345	LGA	ORD	0	10
26	936	JFK	STT	0	8
27	1029	JFK	SJU	0	159
28	1073	LGA	MIA	0	4
29	1171	LGA	DFW	0	8
30	1185	LGA	DFW	0	42
31	1103	LGA	DFW	0	31
32	1107	LGA	DFW	0	30
33	1111	LGA	DFW	0	23
34	1121	LGA	DFW	0	8
35	1131	LGA	DFW	0	27
36	1193	LGA	DFW	0	46
37	1145	LGA	DFW	0	11
38	1151	LGA	DFW	0	14
39	1155	LGA	DFW	0	8
40	1156	LGA	DFW	0	3
41	1327	LGA	PBI	0	14
42	1357	JFK	SJU	0	39
43	1410	LGA	MIA	0	11
44	1599	LGA	MIA	0	18
45	1611	LGA	MIA	0	74
46	2267	LGA	MIA	0	70
47	2279	LGA	MIA	0	20
48	2285	JFK	MCO	0	20
49	2351	JFK	MIA	0	61
50	2297	LGA	MIA	0	50
51	2437	LGA	MIA	0	35
52	2448	JFK	EGE	0	52

53	329	JFK	RSW		0	150
54	118	JFK	BOS		0	14
55	1373	JFK	CHS		251	19
56	1119	JFK	CLT		0	17
57	2202	JFK	BUF		0	15
58	885	JFK	RDU		0	16
59	65	JFK	ABQ		0	67
60	711	JFK	LAS		6	43
61	161	JFK	SMF		0	17
62	183	JFK	MCO		0	8
63	201	JFK	FLL		99	28
64	2053	JFK	PBI		0	21
65	1503	JFK	SJU		0	50
66	1295	JFK	AUS		0	70
67	1801	JFK	FLL		0	41
68	263	JFK	SEA		69	31
69	803	JFK	SJU		0	79
70	669	JFK	SJC		0	26
71	1901	JFK	FLL		0	41
	nas_delay	aircraf	t_delay			
1	5	1		11		
2	(6		0		
3	4.	5		0		
4	(0		0		
5	1	2		0		
6	4	1		22		
7	2	6		0		
8	1	4		97		
9	!	5		1		
10	1	8		101		
11	3	2		0		
12	3.	5		114		
13	1	2		13		
14	3	1		49		
15	4.	5		0		
16	3	6		51		
17	1	9		0		

19	19	0
20	16	0
21	85	0
22	34	42
23	103	35
24	0	127
25	7	78
26	42	0
27	54	0
28	29	10
29	31	22
30	9	53
31	21	0
32	1	0
33	8	0
34	33	0
35	21	0
36	14	0
37	30	0
38	4	73
39	22	11
40	17	15
41	0	12
42	3	0
43	18	56
44	33	26
45	44	25
46	16	0
47	4	0
48	18	4
49	13	0
50	3	119
51	47	0
52	16	0
53	97	47
54	42	104
55	54	0
56	86	173

```
57
          53
                          141
          21
58
                           64
59
          27
                           67
60
          32
                            5
                            0
61
          63
62
          33
                            0
63
          89
                            0
64
         109
                           80
65
         135
                           67
66
          46
                           86
67
          18
                          163
                            0
68
          77
                            7
69
          48
70
           0
                           19
71
          62
                           63
[ reached 'max' / getOption("max.print") -- omitted 4588 rows ]
> str(data3)
'data.frame': 4659 obs. of 14 variables:
 $ year
                 $ month
                  : int 111111111...
 $ day
                 : int 1111122222...
                 : int 1733 1718 624 910 1850 2049 738 5 1618 1657 ...
 $ dep time
 $ arr time
                : int 2024 1840 946 1203 2052 45 1124 339 1958 2050 ...
 $ carrier
                : chr "AA" "B6" "DL" "DL" ...
                : chr "N3HPAA" "N324JB" "N3751B" "N910DL" ...
 $ tailnum
 $ flight
               : int 199 1734 479 1174 2839 21 33 185 133 145 ...
 $ origin
                : chr "JFK" "JFK" "JFK" "LGA" ...
 $ dest
                 : chr "ORD" "BTV" "ATL" "PBI" ...
 $ carrier delay: int 0000000000...
 $ weather delay: int 7 18 9 52 35 87 8 53 32 6 ...
 $ nas delay
                : int 51 6 45 0 12 41 26 14 5 18 ...
 $ aircraft delay: int 11 0 0 0 0 22 0 97 1 101 ...
>
> #ex2.10
> score <- sample(1:100, 50, replace = TRUE)
```

[1] "老師請同學吃飯"

> ifelse(any(score >= 95), "老師請同學吃飯", "老師很生氣")

- > #ex2.21(a)
- > score.data <- read.csv("data/score02.csv")
- > head(score.data, 7)

學號 期中考 期末考

1 410072106	80	60
2 410073023	50	73
3 410079062	45	35
4 410079090	77	54
5 410079118	62	54
6 410079120	67	45
7 410079121	72	78

>

- > #ex2.21(b)
- > str(score.data)

'data.frame': 94 obs. of 3 variables:

\$ 學號: int 410072106 410073023 410079062 410079090 410079118

410079120 410079121 410172016 410172027 410172103 ...

- \$ 期中考: int 80 50 45 77 62 67 72 62 82 92 ...
- \$ 期末考: int 60 73 35 54 54 45 78 75 95 66 ...

54

- > class(score.data)
- [1] "data.frame"
- > names(score.data) <- c("id", "mid", "final")
- > score.data

id mid final

- 1 410072106 80 60
- 2 410073023 50 73
- 3 410079062 45 35
- 4 410079090 77
- 5 410079118 62 54
- 6 410079120 67 45
- 7 410079121 72 78
- 8 410172016 62 75
- 9 410172027 82 95

10 410172103	92	66
11 410173029	42	11
12 410173072	55	73
13 410173101	82	64
14 410173134	92	78
15 410173135	100	55
16 410173136	80	88
17 410174210	50	63
18 410183004	95	90
19 410183012	67	35
20 410184012	75	16
21 410184015	52	45
22 410273002	100	25
23 410273004	99	56
24 410273005	60	55
25 410273007	100	76
26 410273010	72	40
27 410273011	55	45
28 410273014	45	57
29 410273016	62	100
29 410273016 30 410273018	_	100 25
	_	
30 410273018	100 70	25
30 410273018 31 410273019	100 70	25 67
30 410273018 31 410273019 32 410273020	100 70 95	25 67 55
30 410273018 31 410273019 32 410273020 33 410273024	100 70 95 75 85	25 67 55 55
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031	100 70 95 75 85 75	25 67 55 55 68
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032	100 70 95 75 85 75 70	25 67 55 55 68 64
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034	100 70 95 75 85 75 70 67	25 67 55 55 68 64 47
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040	100 70 95 75 85 75 70 67	25 67 55 55 68 64 47 56
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041	100 70 95 75 85 75 70 67 57	25 67 55 55 68 64 47 56 28
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041 39 410273042	100 70 95 75 85 75 70 67 57 70	25 67 55 58 68 64 47 56 28
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041 39 410273042 40 410273048	100 70 95 75 85 75 70 67 57 70 52 72	25 67 55 58 64 47 56 28 85 62
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041 39 410273042 40 410273048 41 410273049	100 70 95 75 85 75 70 67 57 70 52 72 57	25 67 55 55 68 64 47 56 28 85 62 40
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041 39 410273042 40 410273048 41 410273049 42 410273050	100 70 95 75 85 75 70 67 57 70 52 72 57 47	25 67 55 55 68 64 47 56 28 85 62 40 42
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041 39 410273042 40 410273048 41 410273049 42 410273050 43 410273051	100 70 95 75 85 75 70 67 57 70 52 72 57 47 80	25 67 55 58 64 47 56 28 85 62 40 42 6
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273032 36 410273034 37 410273040 38 410273041 39 410273042 40 410273048 41 410273049 42 410273050 43 410273051 44 410273057	100 70 95 75 85 75 70 67 57 70 52 72 57 47 80 50	25 67 55 58 64 47 56 28 85 62 40 42 6 70
30 410273018 31 410273019 32 410273020 33 410273024 34 410273031 35 410273034 37 410273040 38 410273041 39 410273042 40 410273048 41 410273049 42 410273050 43 410273057 45 410273060	100 70 95 75 85 75 70 67 57 70 52 72 57 47 80 50 60	25 67 55 55 68 64 47 56 28 85 62 40 42 6 70 40

48 410273067	70	86
49 410273069	82	65
50 410273070	100	72
51 410273073	75	88
52 410273075	87	40
53 410273076	47	75
54 410273081	90	31
55 410273094	100	8
56 410273095	90	64
57 410273096	87	70
58 410273102	100	100
59 410273105	85	52
60 410273106	80	71
61 410273108	90	94
62 410273109	90	80
63 410273110	87	87
64 410273116	82	100
65 410275001	61	9
66 410275005	92	73
67 410275015	52	43
68 410275016	55	60
69 410275017	57	47
70 410275020	95	81
71 410275029	79	93
72 410275032	85	33
73 410275033	60	29
74 410275034	85	81
75 410275036	72	26
76 410275040	70	57
77 410275051	35	90
78 410275055	85	53
79 410275058	100	100
80 410279001	100	48
81 410279006	32	14
82 410279018	47	55
83 410279021	42	32
84 410279039	90	41
85 410279049	47	60

```
86 410279054
               32
                     54
87 410279063 72
                     82
88 410279075
               38
                     90
89 410279080 90
                     36
90 49973086 82
                      76
91 49979003
                      25
               85
92 49979046
               82
                      55
93 49981006
               82
                      55
94 49981011 95
                      98
>
> #ex2.21(c)
> score.data$id[score.data$final > score.data$mid]
 [1] 410073023 410079121 410172016 410172027
 [5] 410173072 410173136 410174210 410273014
 [9] 410273016 410273042 410273048 410273062
[13] 410273067 410273073 410273076 410273108
[17] 410273116 410275016 410275029 410275051
[21] 410279018 410279049 410279054 410279063
[25] 410279075 49981011
>
> #ex2.21(d)
> score.data1 <- table(score.data$mid >= 60, score.data$final >= 60)
> dimnames(score.data1) <- list(mid=c("fail", "pass"), final=c("fail", "pass"))
> score.data1
      final
mid
       fail pass
               9
  fail
        15
  pass
         32
               38
>
> #ex2.21(e)
> average <- (score.data$final + score.data$mid)/2
> score.data$average <- average
> score.data[order(average, decreasing=T),]
           id mid final average
58 410273102 100
                    100
                          100.0
79 410275058 100
                    100
                          100.0
94 49981011 95
                      98
                             96.5
                            92.5
18 410183004 95
                     90
```

61 410273108	90	94	92.0
64 410273116	82	100	91.0
9 410172027	82	95	88.5
25 410273007 1	.00	76	88.0
70 410275020	95	81	88.0
63 410273110	87	87	87.0
50 410273070 1	.00	72	86.0
71 410275029	79	93	86.0
14 410173134	92	78	85.0
62 410273109	90	80	85.0
16 410173136	80	88	84.0
74 410275034	85	81	83.0
66 410275005	92	73	82.5
51 410273073	75	88	81.5
29 410273016	62	100	81.0
10 410172103	92	66	79.0
90 49973086	82	76	79.0
57 410273096	87	70	78.5
48 410273067	70	86	78.0
15 410173135 1	.00	55	77.5
23 410273004	99	56	77.5
39 410273042	70	85	77.5
47 410273065	85	70	77.5
56 410273095	90	64	77.0
87 410279063	72	82	77.0
34 410273031	85	68	76.5
60 410273106	80	71	75.5
7 410079121	72	78	75.0
32 410273020	95	55	75.0
44 410273057	80	70	75.0
80 410279001 1	.00	48	74.0
49 410273069	82	65	73.5
13 410173101	82	64	73.0
1 410072106	80	60	70.0
35 410273032	75	64	69.5
78 410275055	85	53	69.0
8 410172016	62	75	68.5
31 410273019	70	67	68.5

85	52	68.5
82	55	68.5
82	55	68.5
60	76	68.0
77	54	65.5
90	41	65.5
75	55	65.0
55	73	64.0
38	90	64.0
87	40	63.5
70	57	63.5
90	36	63.0
.00	25	62.5
.00	25	62.5
35	90	62.5
50	73	61.5
67	56	61.5
47	75	61.0
90	31	60.5
85	33	59.0
70	47	58.5
62	54	58.0
60	55	57.5
55	60	57.5
52	62	57.0
50	63	56.5
67	45	56.0
72	40	56.0
72	40	56.0
85	25	55.0
.00	8	54.0
47	60	53.5
57	47	52.0
67	35	51.0
45	57	51.0
47	55	51.0
55	45	50.0
57	42	49.5
	82 82 60 77 90 75 53 87 70 90 90 90 85 70 85 70 85 70 85 70 72 85 90 47 75 76 77 77 78 78 78 78 78 78 78 78 78 78 78	82 55 82 55 60 76 77 54 90 41 75 55 55 73 38 90 87 40 70 57 90 36 00 25 35 90 50 73 67 56 47 75 90 31 85 33 70 47 62 54 60 55 50 63 67 45 72 40 85 25 00 8 47 60 57 47 67 35 45 57 47 55 55 45

75 410275036	72	26	49.0
21 410184015	52	45	48.5
67 410275015	52	43	47.5
20 410184012	75	16	45.5
45 410273060	50	40	45.0
73 410275033	60	29	44.5
86 410279054	32	54	43.0
38 410273041	57	28	42.5
3 410079062	45	35	40.0
83 410279021	42	32	37.0
65 410275001	61	9	35.0
11 410173029	42	11	26.5
43 410273051	47	6	26.5
81 410279006	32	14	23.0

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