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日期：2016/10/19

一、

1.
```
> Slogan <- paste0(LETTERS[9]," ",letters[12],letters[15],letters[22],letters[5],"
",letters[19],letters[15],letters[3],letters[9],letters[1],letters[12],"
",letters[19],letters[20],letters[1],letters[20],letters[9],letters[19],letters[20],letters[9],letters[3],letters[19])
> Slogan
[1] "I love social statistics"
```

2.
```
> library(rio)
> GSS <- import("/Users/angelwang/Desktop/GSS2012.sav")
> GSS$ID <- 1:1457
> export(GSS,"GSS.xlsx")
> GSS <- import("GSS.xlsx")
```

3.
```
> library(plotrix)
> plot(x=c(-6,6),y=c(-6,6),type = "n")
> draw.circle(x=0,y=0,radius=4,nv=100,border="black",col="blueviolet")
> draw.circle(x=0,y=0,radius=3,nv=100,border="black",col="cyan")
> draw.circle(x=0,y=0,radius=2,nv=100,border="black",col="yellow")
> draw.circle(x=0,y=0,radius=1,nv=100,border="black",col="red")
```
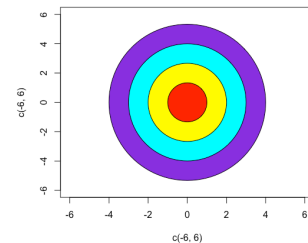


二、課本：
3.1

|  |  | Measure | Freshmen | Seniors |
|---|---|---|---|---|
| Region of Birth | nominal | Mode | North | North |
| Legalization | ordinal | Median | 3 | 5 |
| Out-of-Pocket Expenses | interval-ratio | Mean | 58.5 | 72.55 (四捨五入) |
| Movies | interval-ratio | Mean | 5.8 | 5.18 (四捨五入) |
| Cafeteria Food | ordinal | Median | 6 | 4 |
| Religion | nominal | Mode | Protestant | Protestant , None |

3.4
a. mean: 26.55 (四捨五入)
　 median: 26
b. Mean is the higher value because it is a positively skewed distribution.
c. mean: 25.71 (四捨五入)
　 The mean decreases because the highest score (higher than the mean) has been removed, which makes the new total become lower, and so does the new mean.
　 median: 26 (doesn't change)
　 The median remains the same because the 11th score is 26 (same as the mean of the 11th and 12th scores before).
d. The mean of annual person-hours lost to traffic congestion is about 26.55, and the median is 26.

3.11
mean: 310.73
median: 271
Mean is greater in value. There's a positive skew in the data because mean is greater than median.

You Are The Researcher:

| Variable | Name | Explain | Level of Measurement |
|---|---|---|---|
| 1 | attend | How often respondent attends religious services | ordinal |
| 2 | closeblk | How close feel to black | ordinal |
| 3 | educe | Highest year of school completed | interval-ratio |
| 4 | fefam | Better for man to work, woman tend home | ordinal |
| 5 | getahead | Opinion of how people get ahead | nominal |
| 6 | gunlaw | Favor or oppose gun permits | ordinal |
| 7 | hrs1 | Number of hours worked last week | interval-ratio |
| 8 | letdie1 | Allow incurable patients to die | ordinal |
| 9 | marhomo | Homosexuals should have right to marry | ordinal |
| 10 | premarsx | Sex before marriage | ordinal |

| Variable | Name | Level of Measurement | Mode | Median |
|---|---|---|---|---|
| 1 | attend | ordinal | | 3 |
| 2 | closeblk | ordinal | | 5 |
| 4 | fefam | ordinal | | 3 |
| 5 | getahead | nominal | hard work | |
| 6 | gunlaw | ordinal | | 1 |
| 8 | letdie1 | ordinal | | 1 |
| 9 | marhomo | ordinal | | 3 |
| 10 | premarsx | ordinal | | 4 |

| Variable | Name | Mean |
|---|---|---|
| 3 | educe | 13.57 |
| 7 | hrs1 | 39.75 |

```
> library(rio)
> GSS <- import("/Users/angelwang/Desktop/GSS2012.sav")
> median(GSS$attend,TRUE)
[1] 3
> median(GSS$closeblk,TRUE)
[1] 5
> mean(GSS$educ,na.rm=TRUE)
[1] 13.56564
> median(GSS$fefam,TRUE)
```

```
[1] 3
> median(GSS$gunlaw,TRUE)
[1] 1
> mean(GSS$hrs1,na.rm=TRUE)
[1] 39.74825
> median(GSS$letdie1,TRUE)
[1] 1
> median(GSS$marhomo,TRUE)
[1] 3
> median(GSS$premarsx,TRUE)
[1] 4
```

The typical American attends religious services several times a week, feels neither one or the other close to blacks, completes 13.57 years of school, disagrees with "man works, woman tends home", thinks that people get ahead by hard work, favors gun permits, works 39.75 hours a week, allows incurable patients to die, neither agree nor disagree with homosexuals should have right to marry, thinks sex before marriage not wrong at all.

4.7

	Labor Force Participation Rate		Percentage HS Graduates		Mean Income	
	Male	Female	Male	Female	Male	Female
mean	72.03	60.75	85.94	87.31	54271.30	50760.40
standard deviation	3.67	4.14	2.95	2.95	4245.89	4076.04

Males have the greater labor force participation rate than females, which shows the gender inequality. The percentage high school graduates are similar between males and females. Mean income is also similar between males and females, but males' mean income is a little greater than females' mean income.

4.8

	Life Expectancy(years)		Infant Mortality Rate		Fertility Rate	
	2010	2020	2010	2020	2010	2020
mean	71.55	73.64	26.99	20.89	2.65	2.45
range	30	29	110.9	89.2	5.3	4.2
standard deviation	9.99	9.32	32.75	25.92	1.77	1.44

Nations become less diverse on these three variables. The standard deviations on these variables in 2020 are lower than they were in 2010.

4.13

	1973	1975
median	7.55	18.25
mean	12.21	19.06
standard deviation	12.20	9.63
range	53.3	40.1
interquartile range	10.65	11.58

The average rate increased. The distribution became less dispersion since the standard deviation decreased. The range of the distribution deceased, however, the interquartile range increased.
The cause of increasing in the rates of abortion per 100000 women might be the legalization of abortion.
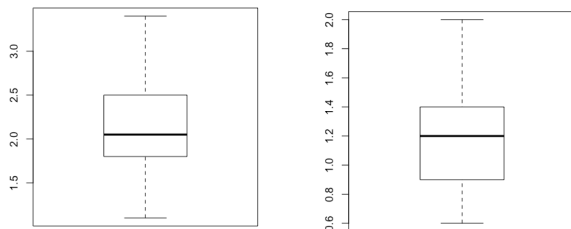
4.18
a.
```
> library(rio)
> States <- import("/Users/angelwang/Desktop/States.sav")
> quantile(States$TrafDths90)
   0%   25%   50%   75%  100%
1.100 1.825 2.050 2.500 3.400
> 2.500-1.825
[1] 0.675
> quantile(States$TrafDths09)
   0%   25%   50%   75%  100%
0.600 0.925 1.200 1.400 2.000
> 1.400-0.925
[1] 0.475
```

b.
```
> boxplot(States$TrafDths90)
> boxplot(States$TrafDths09)
```
1990:   2009:


```
> median(States$TrafDths90)
[1] 2.05
> median(States$TrafDths09)
[1] 1.2
> mean(States$TrafDths90)
[1] 2.13
> mean(States$TrafDths09)
[1] 1.222
> sd(States$TrafDths90)
[1] 0.49125
> sd(States$TrafDths09)
[1] 0.3345969
```

Median decreased from 2.05 to 1.2, and mean also decreased from 2.13 to 1.22.
We can tell that the range and interquartile range both decreased from the box plot above, and it became less dispersion since the standard deviation decreased.
In my opinion, the reason of the decrease of traffic fatalities might be the stricter traffic rules and fines. These made people be more careful when driving or riding because they're afraid of violating traffic rules and thus be fined.

4.19
```
> boxplot(States$FamPoor00)
> boxplot(States$FamPoor09)
```
2000:   2009:
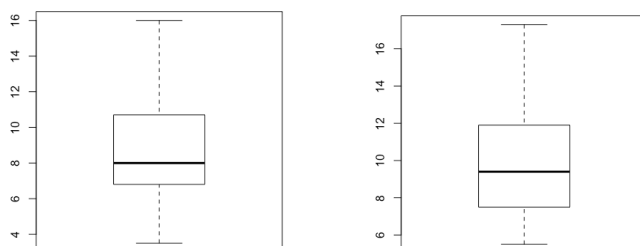
```
> median(States$FamPoor00)
[1] 8
> median(States$FamPoor09)
[1] 9.4
> mean(States$FamPoor00)
[1] 8.826
> mean(States$FamPoor09)
[1] 9.874
> range(States$FamPoor00)
[1]  3.5 16.0
> range(States$FamPoor09)
[1]  5.5 17.3
> quantile(States$FamPoor00)
   0%   25%   50%   75%  100%
 3.50  6.80  8.00 10.65 16.00
> quantile(States$FamPoor09)
    0%    25%    50%    75%   100%
 5.500  7.550  9.400 11.825 17.300
> sd(States$FamPoor00)
[1] 2.800496
> sd(States$FamPoor09)
[1] 2.753092
```

Median and mean both increased from 2000 to 2009.
Range decreased from 12.5 to 11.8, however, interquartile range increased from 3.85 to 4.275. Thus, standard deviation decrease and it became less dispersion.