統計學—實習課

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AGENDA

› HW01重點錯誤提醒

› 複習Week2上課內容

› 實作

ex 1.3

A politician who is running for the office of mayor of a city with 25,000 registered voters commissions a survey. In the survey, 48% of the 200 registered voters interviewed say they plan to vote for her.

a. What is the population of interest?

b. What is the sample?

c. Is the value 48% a parameter or a statistic? Explain.

› Population, Sample請寫完整（人數、群體），這次不扣分，下次開始不完整全扣。

ex 1. 7

Suppose that in Exercise 1.6 you decide to flip the coin 100 times.

a. What conclusion would you be likely to draw if you observed 95 heads?

b. What conclusion would you be likely to draw if you observed 55 heads?

c. Do you believe that, if you flip a perfectly fair coin 100 times, you will always observe exactly 50 heads?

注意給的結論不要太武斷，如：硬幣不公正、硬幣公正

ex 2.13

When will the world run out of oil? Graphically describe the figures.

› Title

› X, Y Label

› Unit

› Readable

› Describe
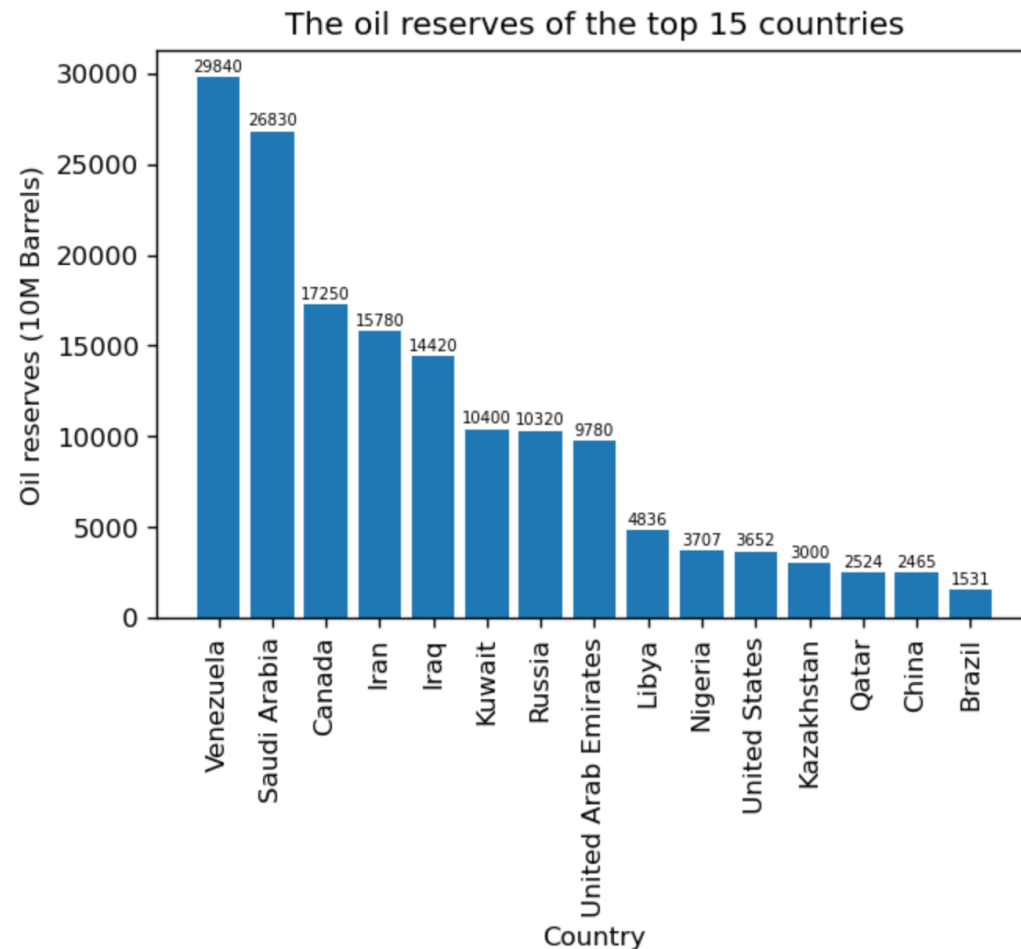
ex 2.29

Subway train riders frequently pass the time by reading a newspaper.
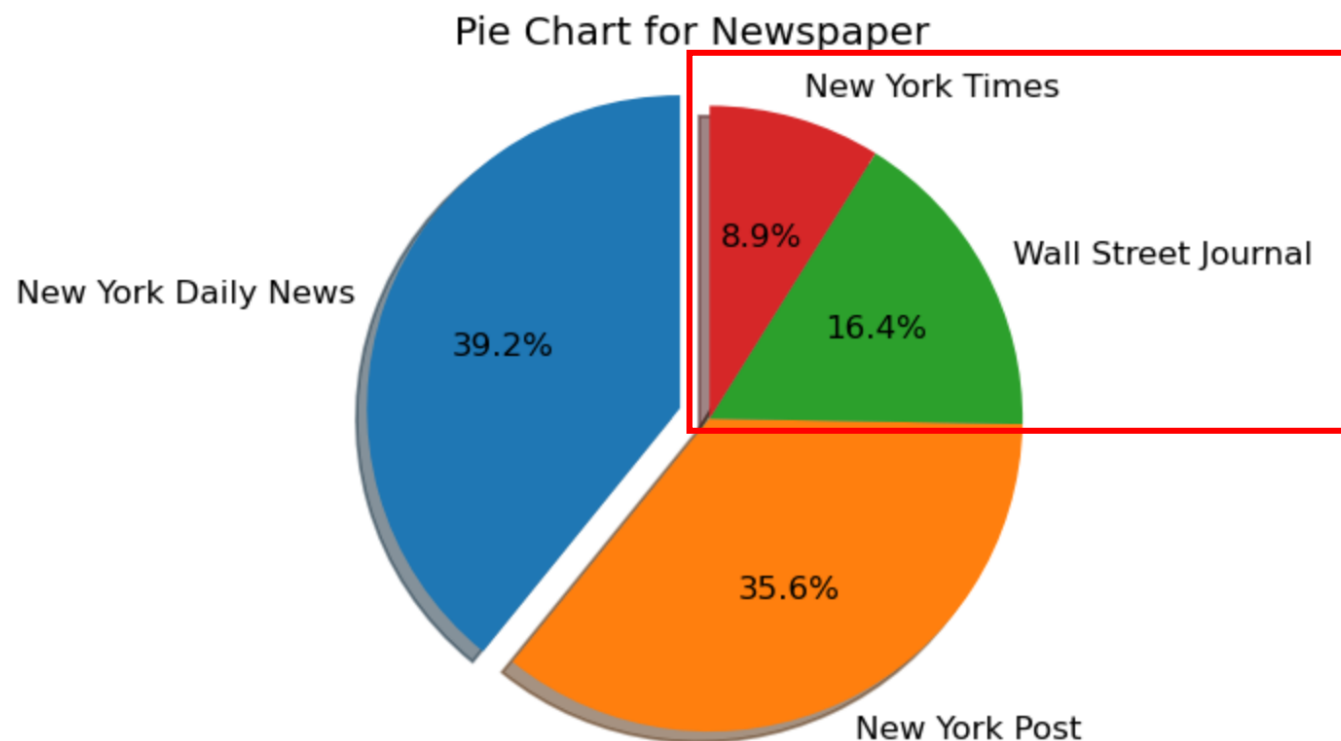
› 沒標Frequency, Relative Frequency全錯

› 沒標Newspaper Name全錯

```
1      141
2      128
4       59
3       32
Name: Newspaper, dtype: int64
1      0.391667
2      0.355556
4      0.163889
3      0.088889
Name: Newspaper, dtype: float64
```

	Newspaper	Frequency	Relative Frequency
1	New York Daily News	141	0.391667
2	New York Post	128	0.355556
4	Wall Street Journal	59	0.163889
3	New York Times	32	0.088889

ex 2.29

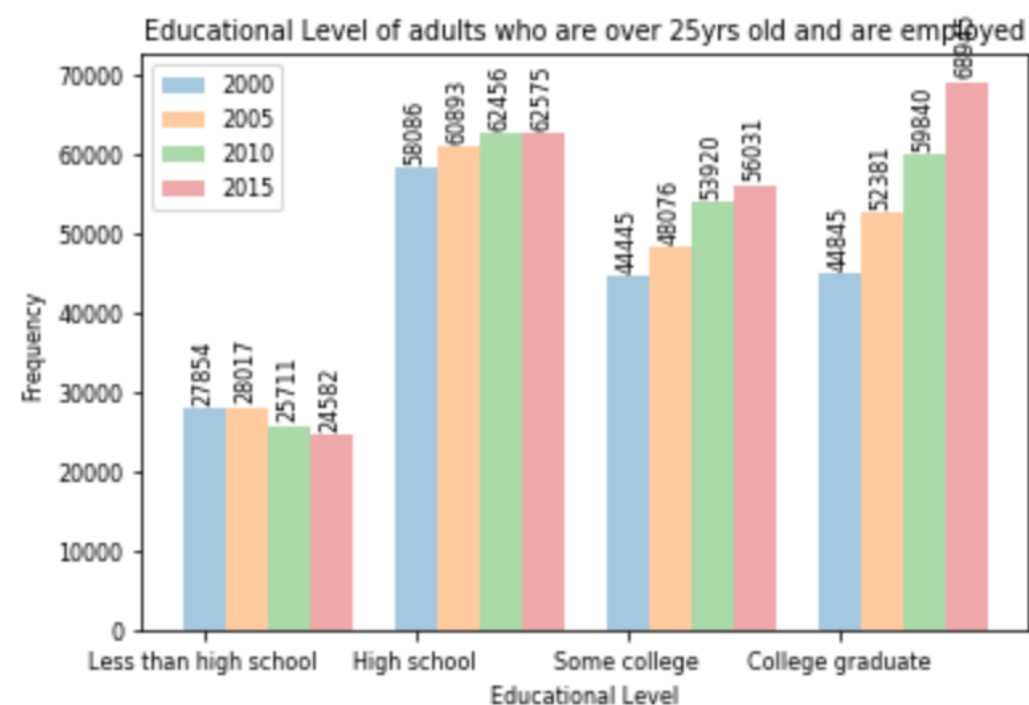Subway train riders frequently pass the time by reading a newspaper.

› 注意1>2>4>3

Pie Chart for Newspaper
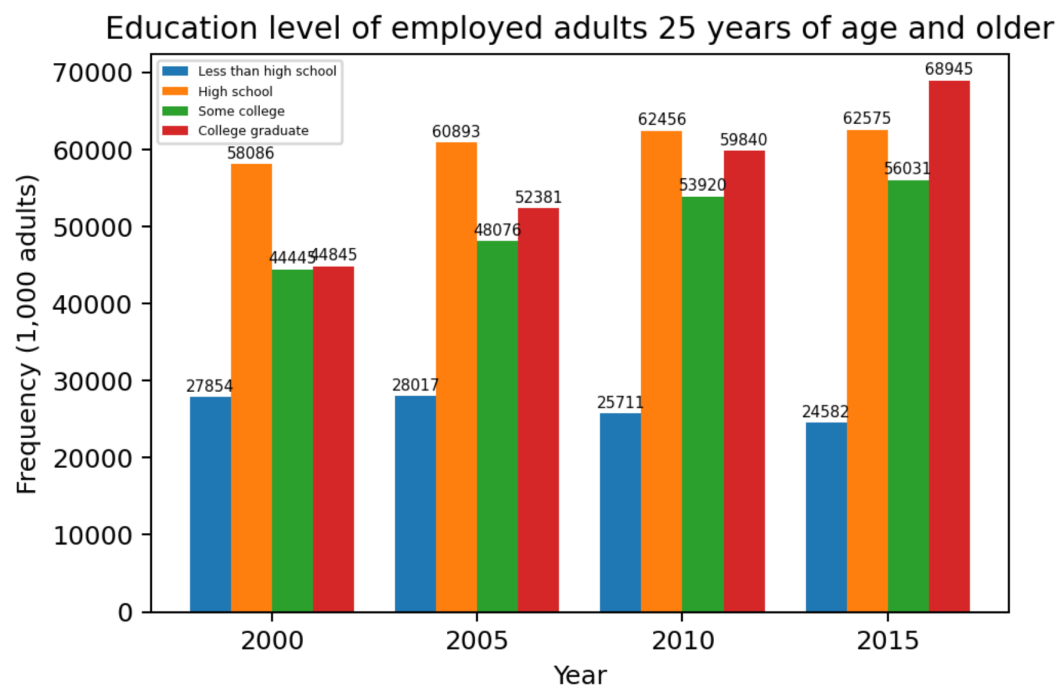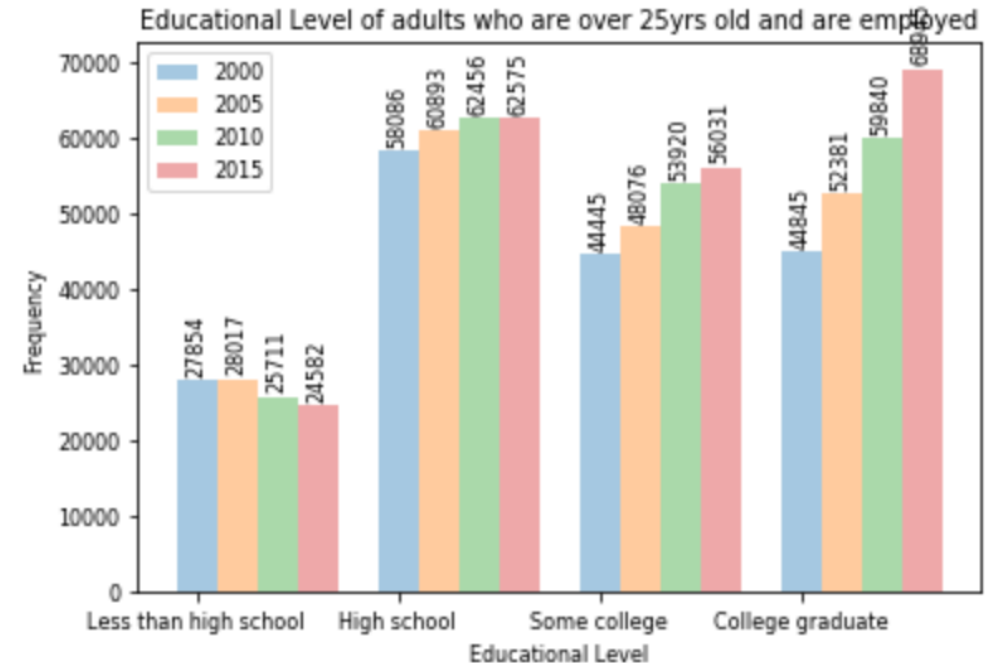
ex 2.41

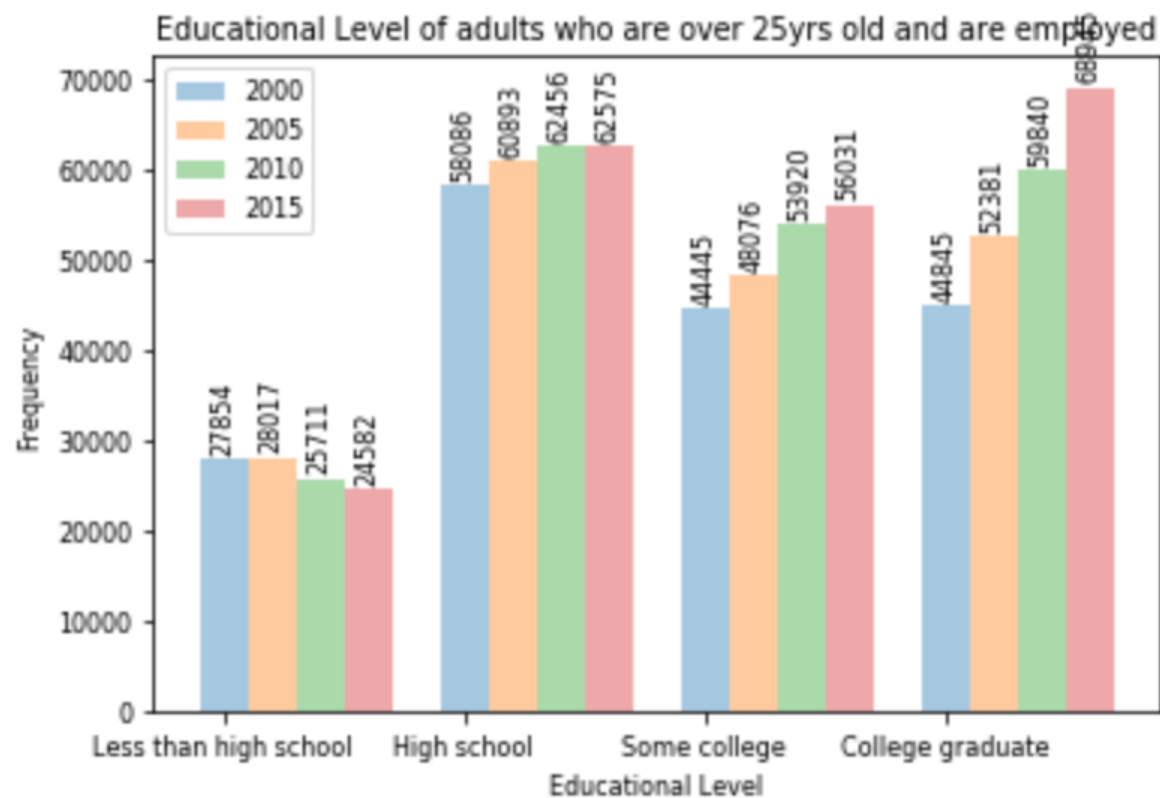Has the educational level of adults changed over the past 15 years?

ex 2.41

1. Less than high school↓, the others ↑,

2. Less than high school↓, the others ↑,
   so education level ↑

3. College graduate grows rapidly

4. A lot of people go to college

5. People with low edu Level ↓,
   People with high edu Level ↑

Educational Level of adults who are over 25yrs old and are employed

ex 2.41

1. Less than high school↓, the others ↑,

2. Less than high school↓, the others ↑, so education level ↑

3. College graduate grows rapidly

4. A lot of people go to college

5. People with low edu Level ↓, People with high edu Level ↑

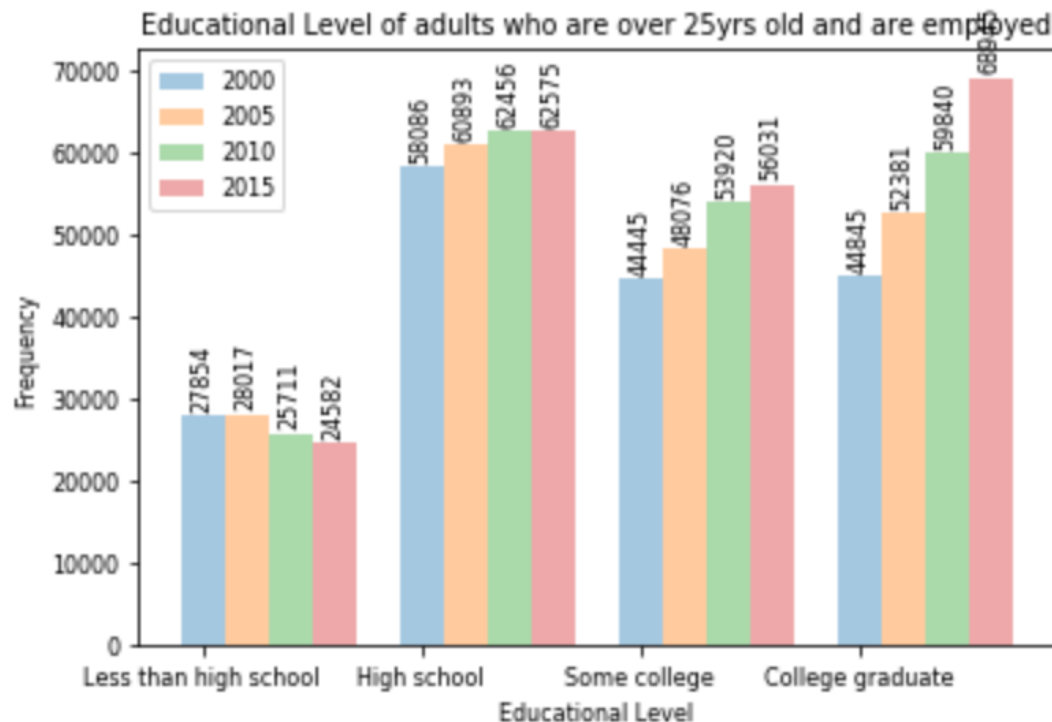Educational Level of adults who are over 25yrs old and are employed
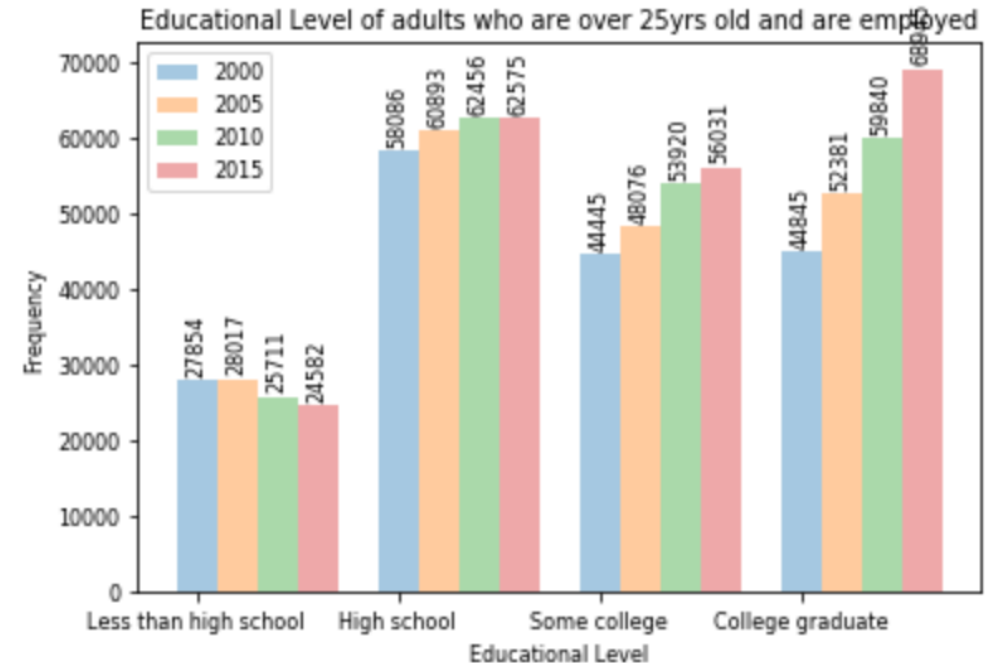
ex 2.41

本題三大雷點

1. 不合理的推論

2. 形容詞

3. 比例、趨勢

Educational Level of adults who are over 25yrs old and are employed

ex 2.41-不合理的推論

1. Less than high school↓,

2. the others ↑,

3. so education level ↑
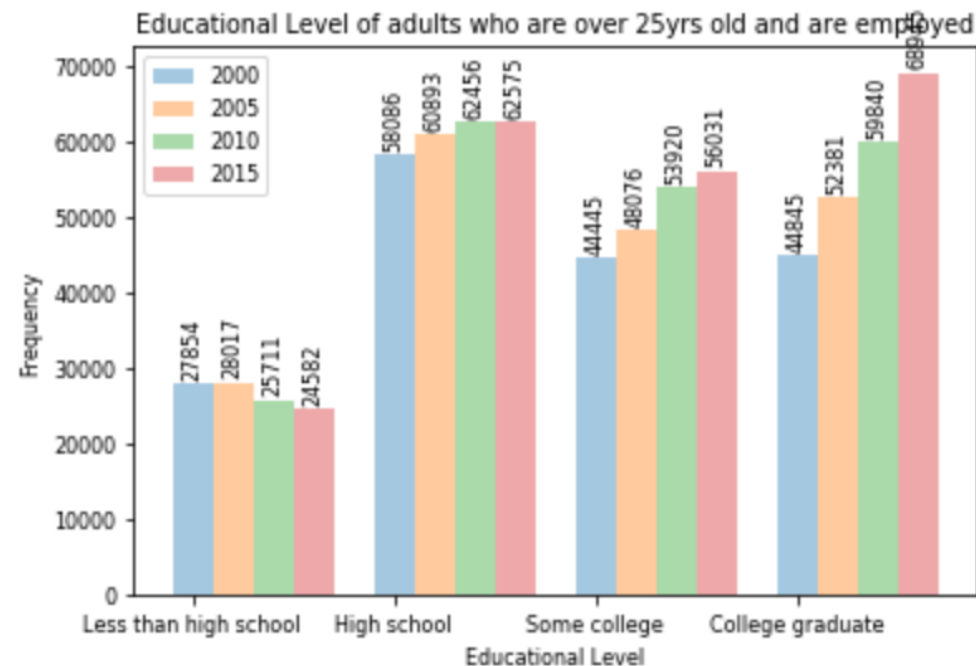
1+2 ≠ 3
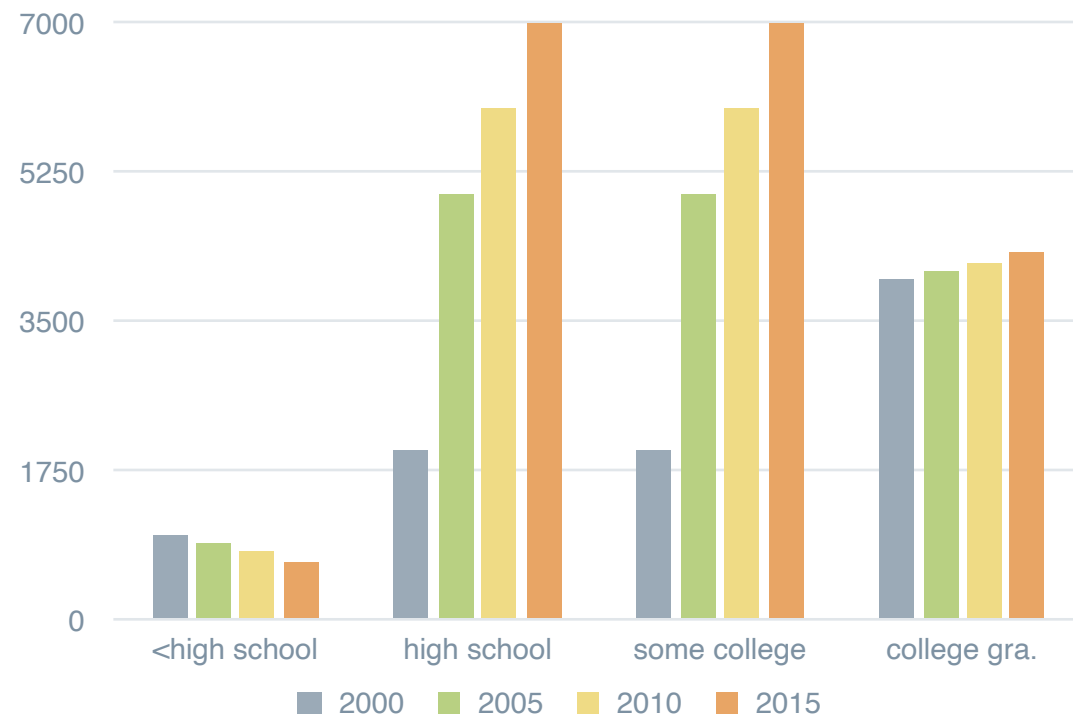
ex 2.41-形容詞

1. College graduate grows rapidly

2. A lot of people go to college

3. People with low edu Level ↓,
   People with high edu Level ↑

› 形容詞僅能用於「比較」

› 大學畢業的成長率… %，
  相對高於其他…，是…的…倍

› 對High, low 的定義？

› Bar chart：比較、數字

Educational Level of adults who are over 25yrs old and are employed

ex 2.41-比例

> 人數變多可以代表比例成長嗎？

> 每年總數不同，無法直接比較，可依年份換算成比例

Education	2000	2005	2010	2015
Less than high school	27,854	28,017	25,711	24,582
High school	58,086	60,893	62,456	62,575
Some college	44,445	48,076	53,920	56,031
College graduate	44,845	52,381	59,840	68,945
Total	175,230	189,367	201,927	212,133

Educational Level of adults who are over 25yrs old and are employed
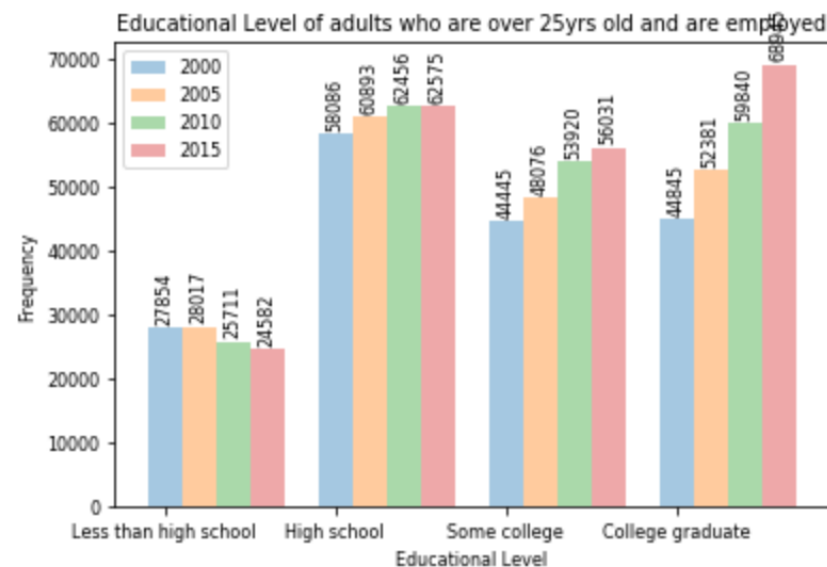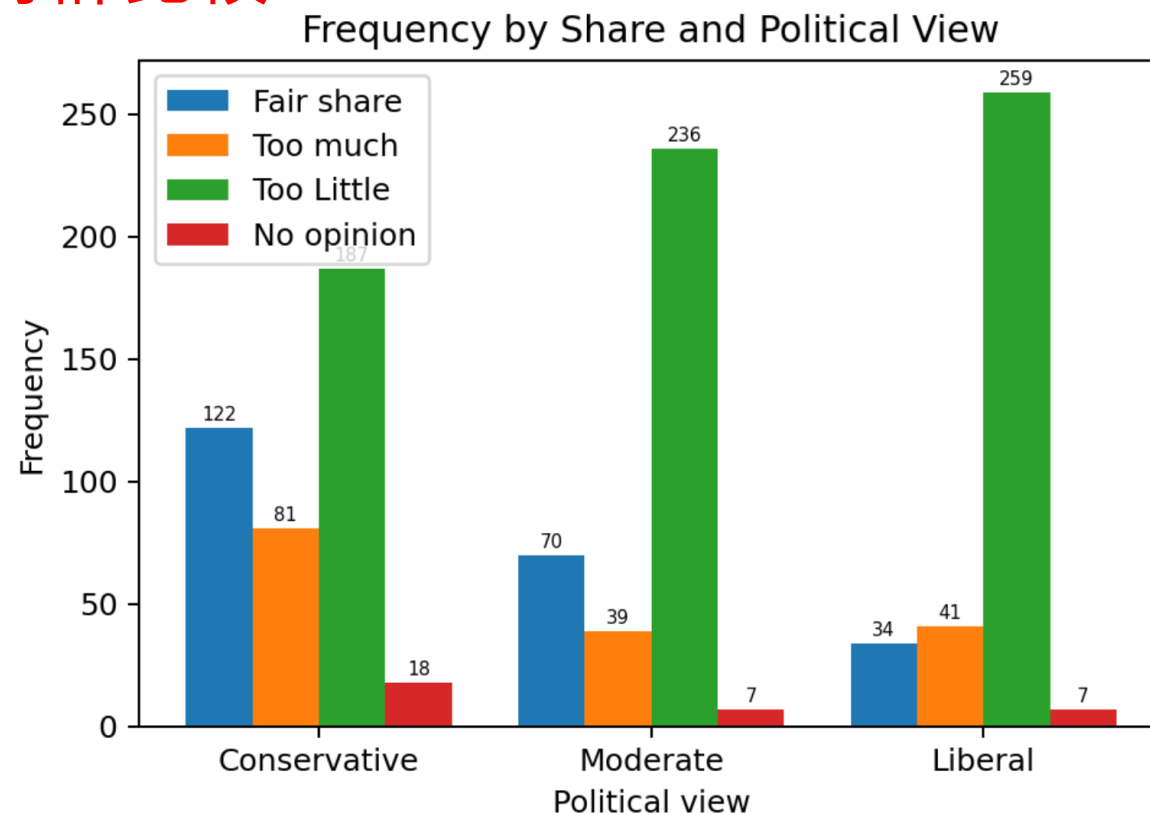
> 基本上有講到比例（甚至延伸到趨勢）的敘述都錯

> Data是母體或樣本，解釋會不同

ex 2.41

Has the educational level of adults changed over the past 15 years?
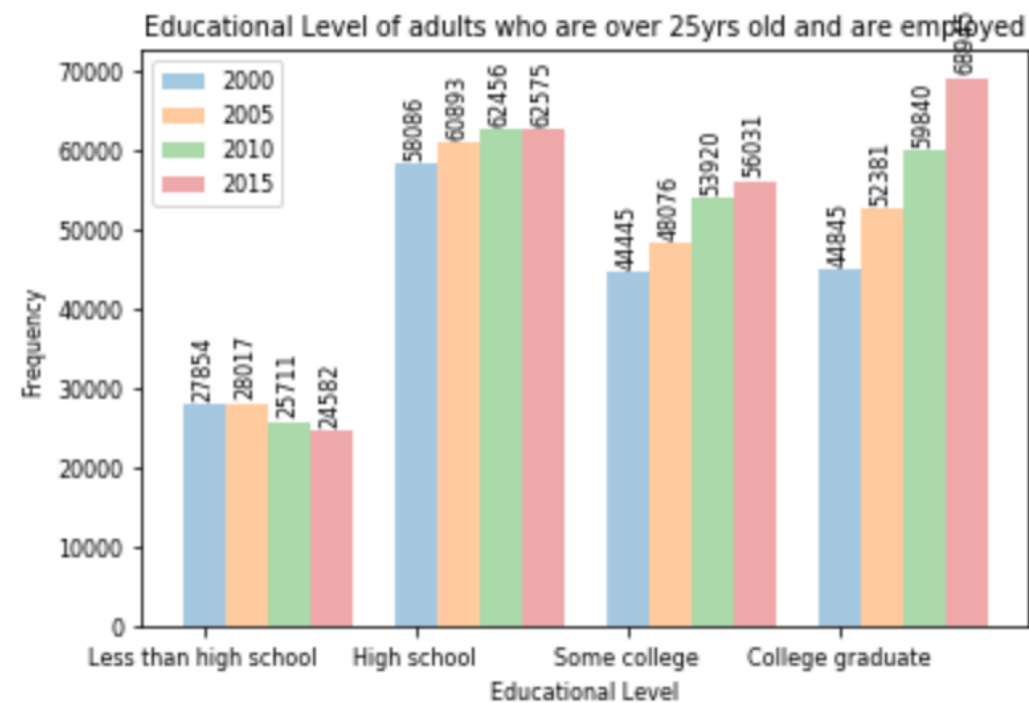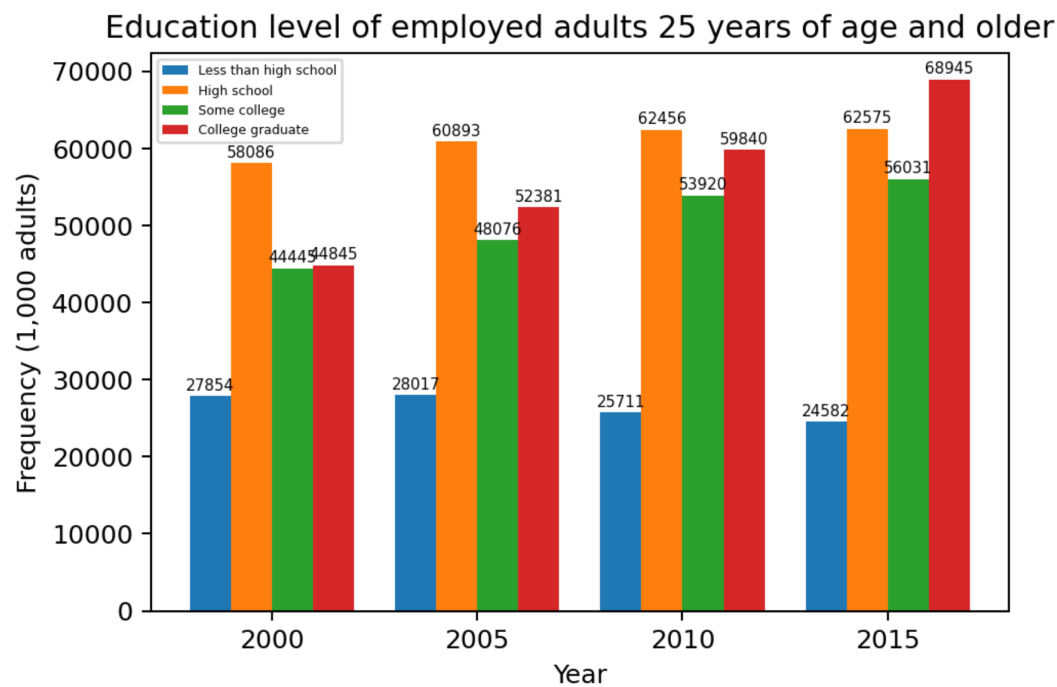
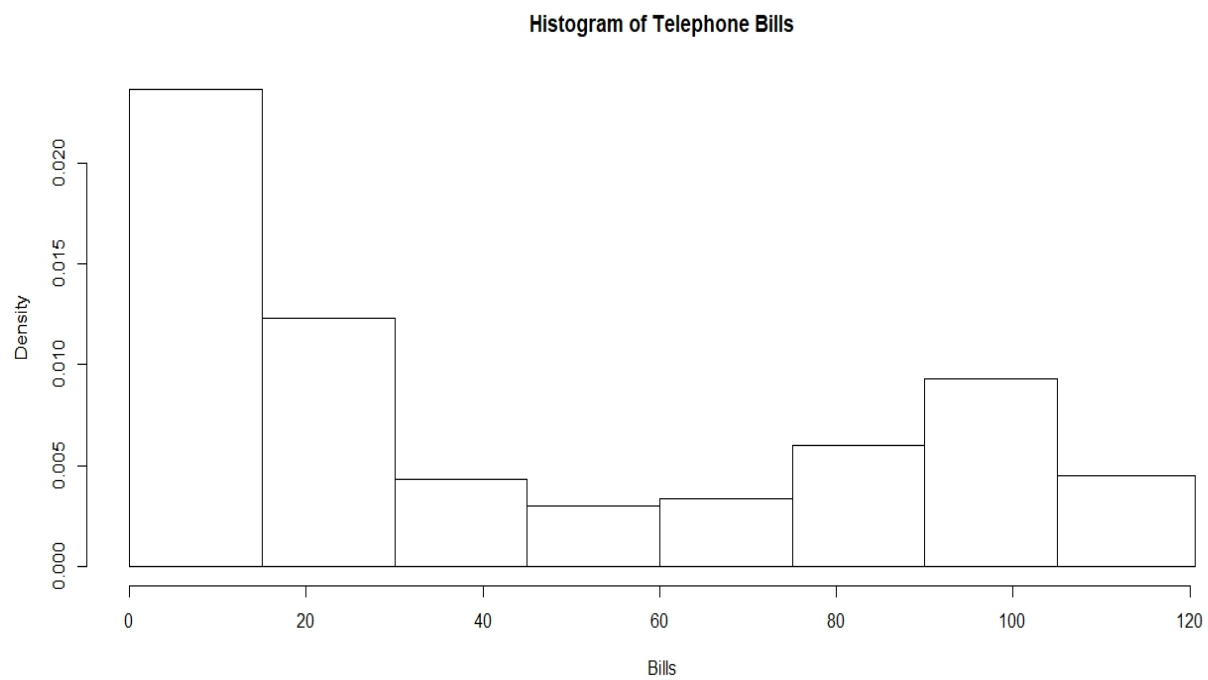# ex 2.51

› 大部分的問題同ex 2.41

› 可以群內比較比例、不可跨群比較

› 分布差不多？分布極端？

Frequency by Share and Political View
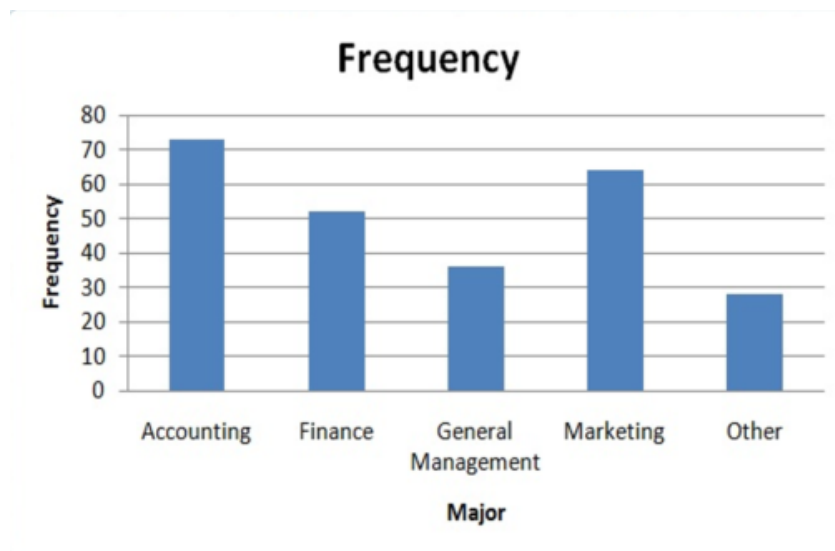
QUESTION ?

課程複習

- Describe a Set of Interval Data
  - 直方圖 (Histogram)

Histogram of Telephone Bills

課程複習

- Attention
  - 長條圖 v.s. 直方圖

長條分開

表示不同類別
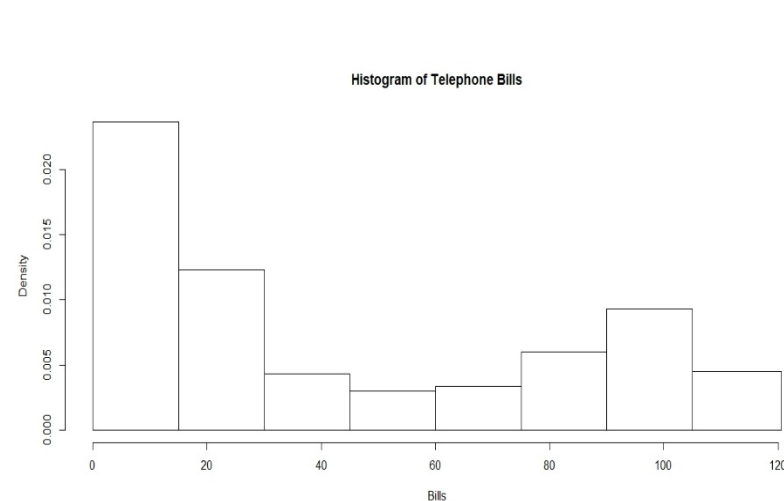
長條相連

表示連續區段

課程複習

- 直方圖步驟
  - **決定組數**
  - **計算組距**
  - 計算每一組的上下界
  - Count

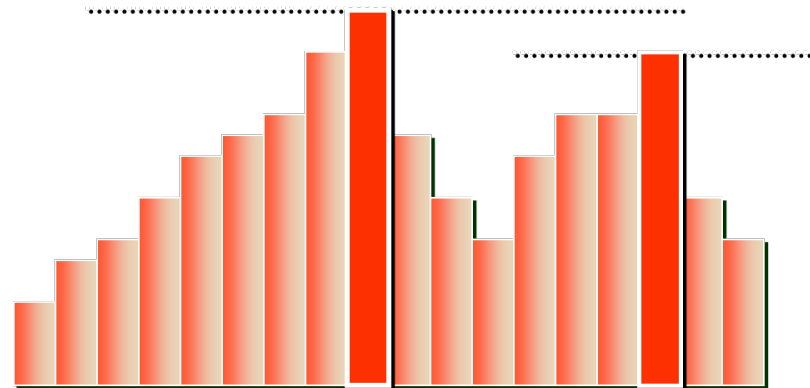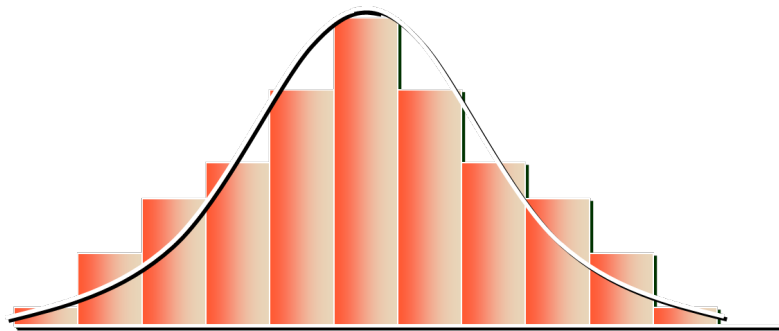| # of observations	# of classes
< 50	5--7
50--200	7--9
200--500	9--10
500--1000	10--11
1000--5000	11--13
5000--50000	13--17
More than 50000	17--20

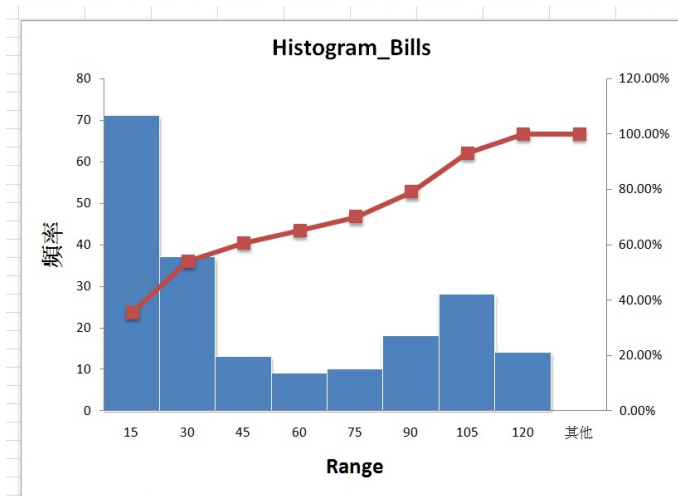$$\text{Class width} \geq \frac{M - m}{n}$$

課程複習
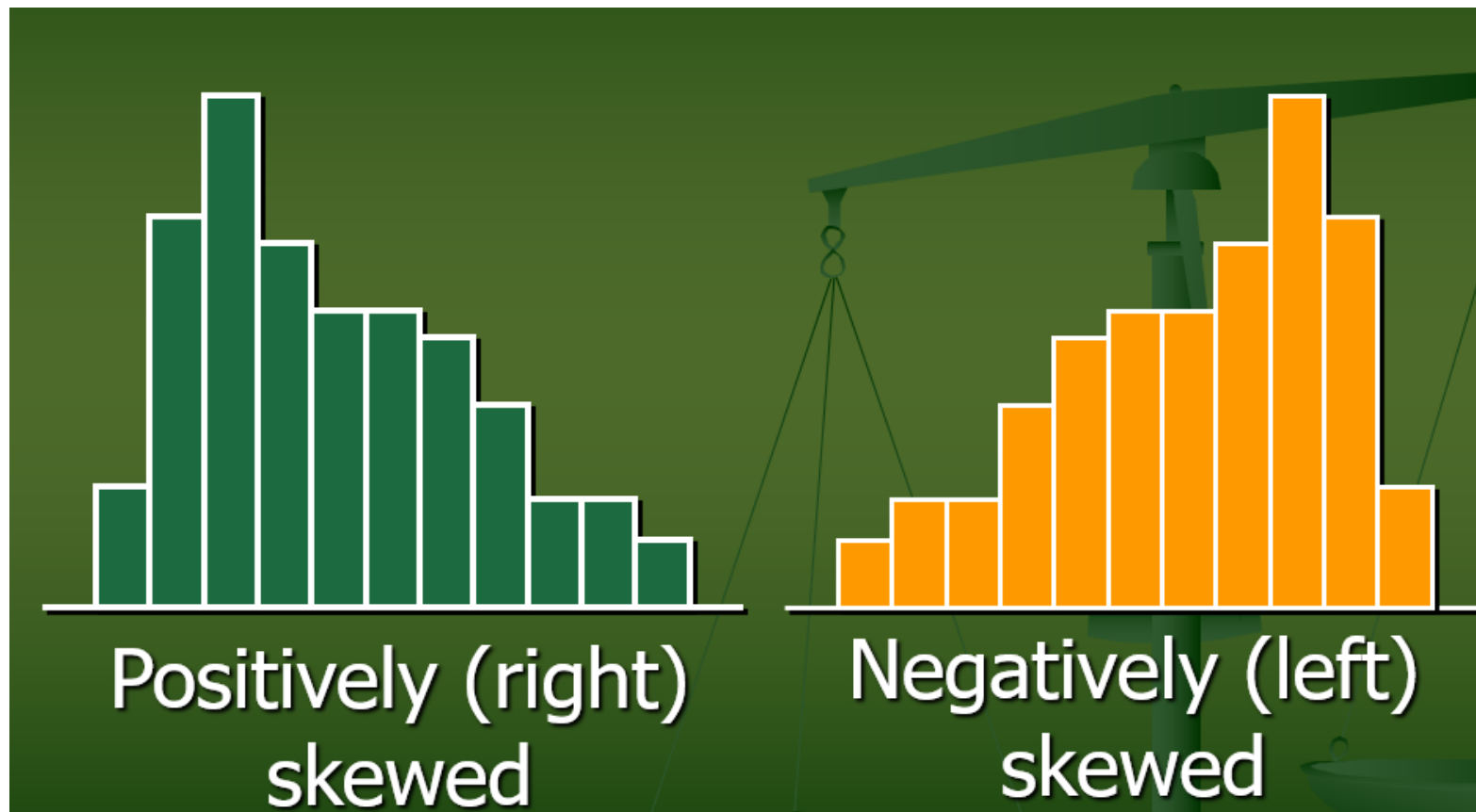
課程複習

- 單峰 (Unimodal) v.s. 多峰 (Multimodal)

- 鐘形 (Bell Shaped)
  - 單峰且對稱

課程複習

- Ogive
- Stem and Leaf


```
The decimal point is 1 digit(s) to the right of the |

 0 | 000000001112222233333334455555666677777888889999999
 1 | 00001111122334444444555556678999
 2 | 00001111112334467778999999
 3 | 112345589
 4 | 12446699
 5 | 34666
 6 | 4569
 7 | 02233456779
 8 | 033455899999
 9 | 0001223333344555669
10 | 0000134555779
11 | 0013566889
12 | 0
```
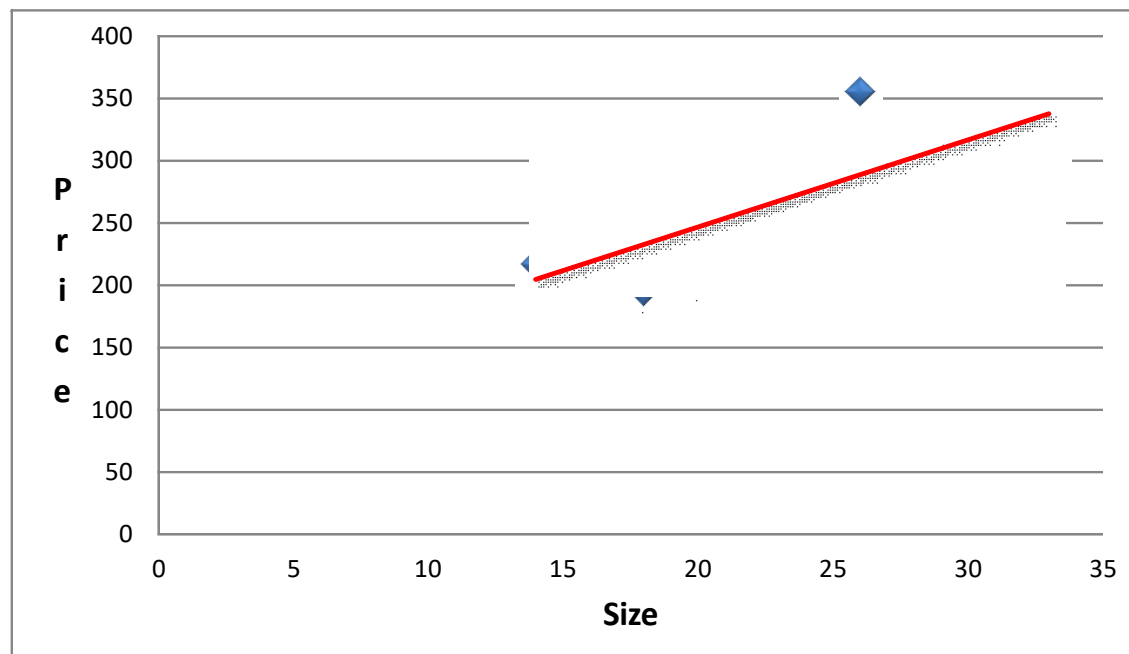
課程複習

- Describing Time-Series Data
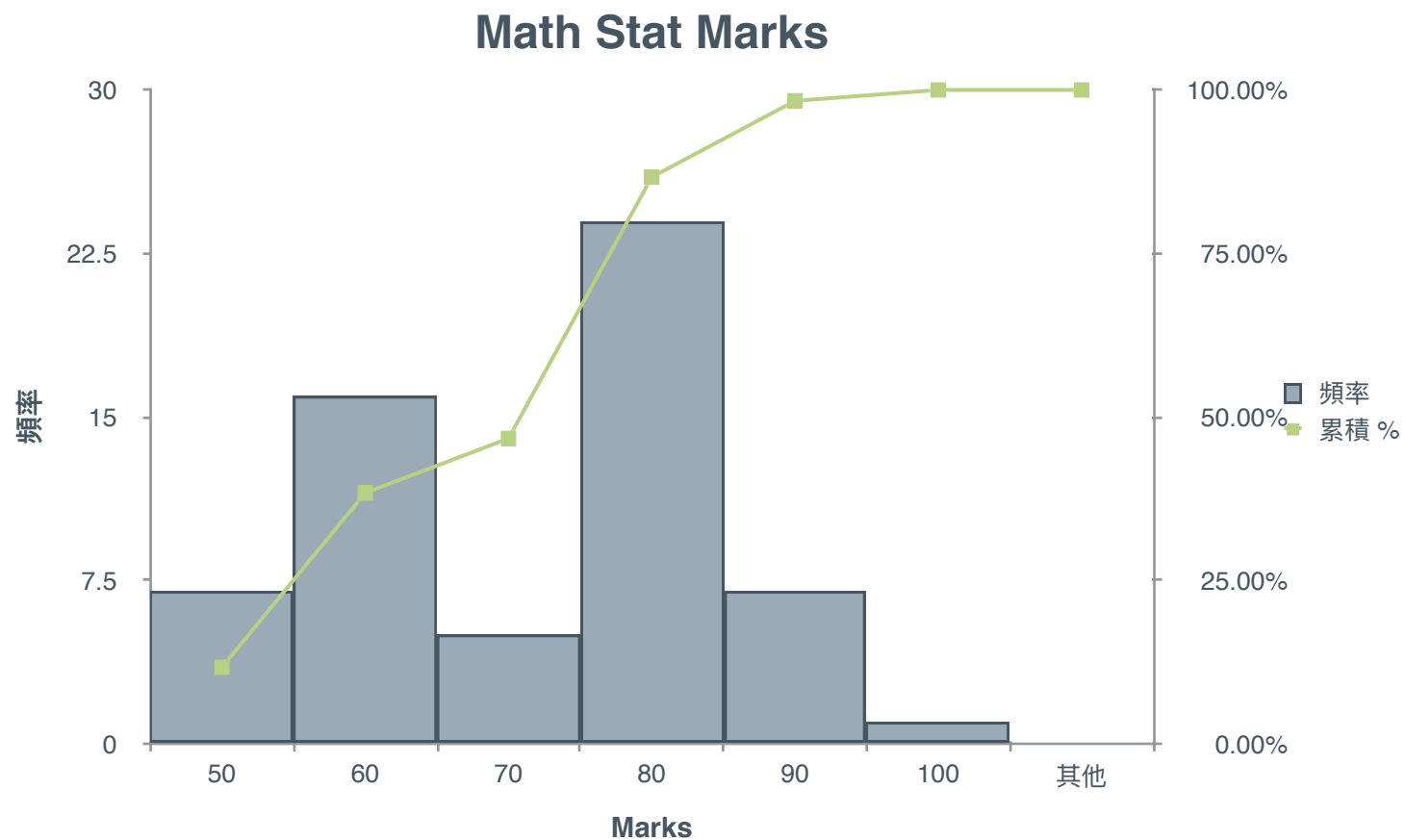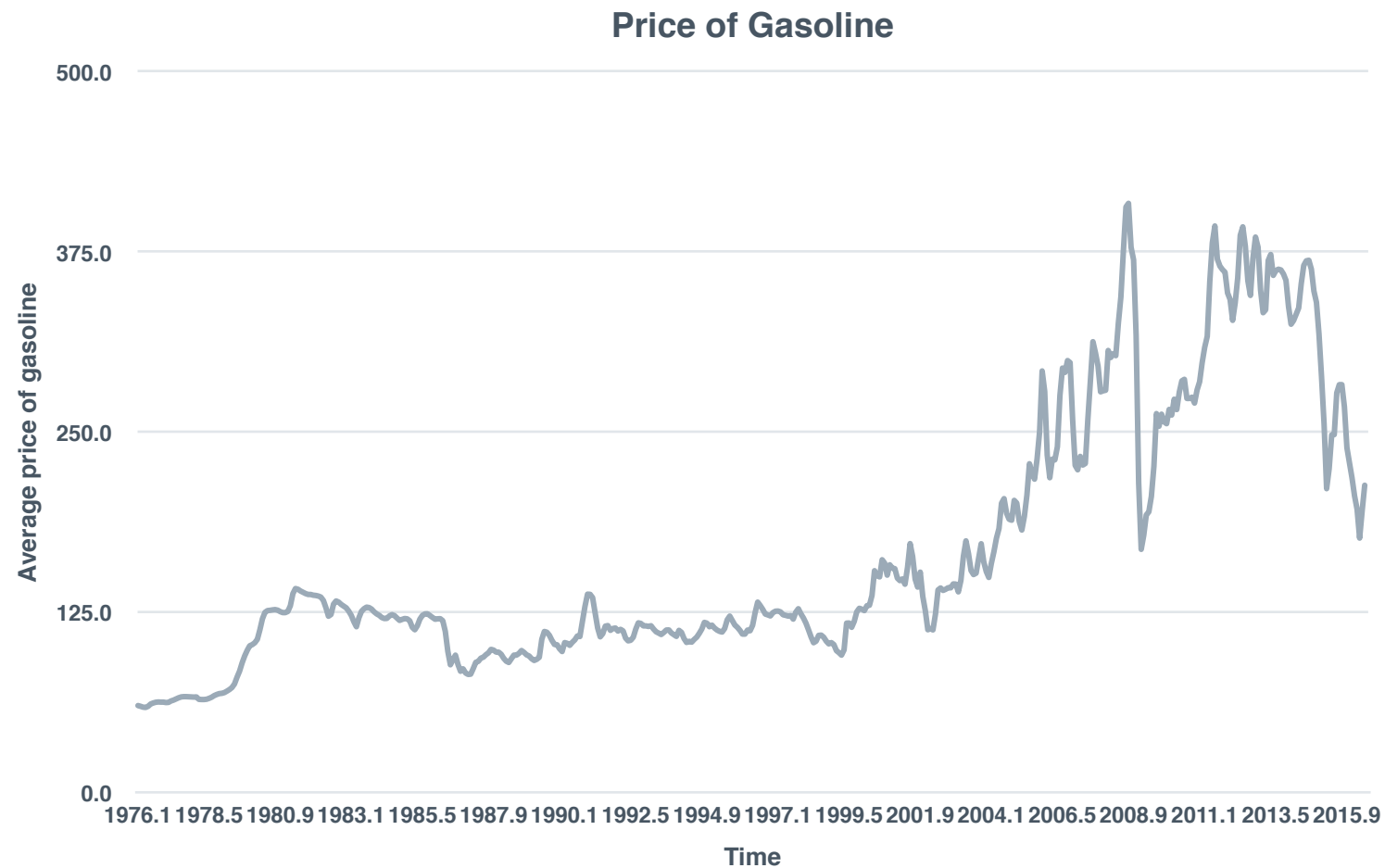 - 折線圖 (Line Chart)
    - 看趨勢
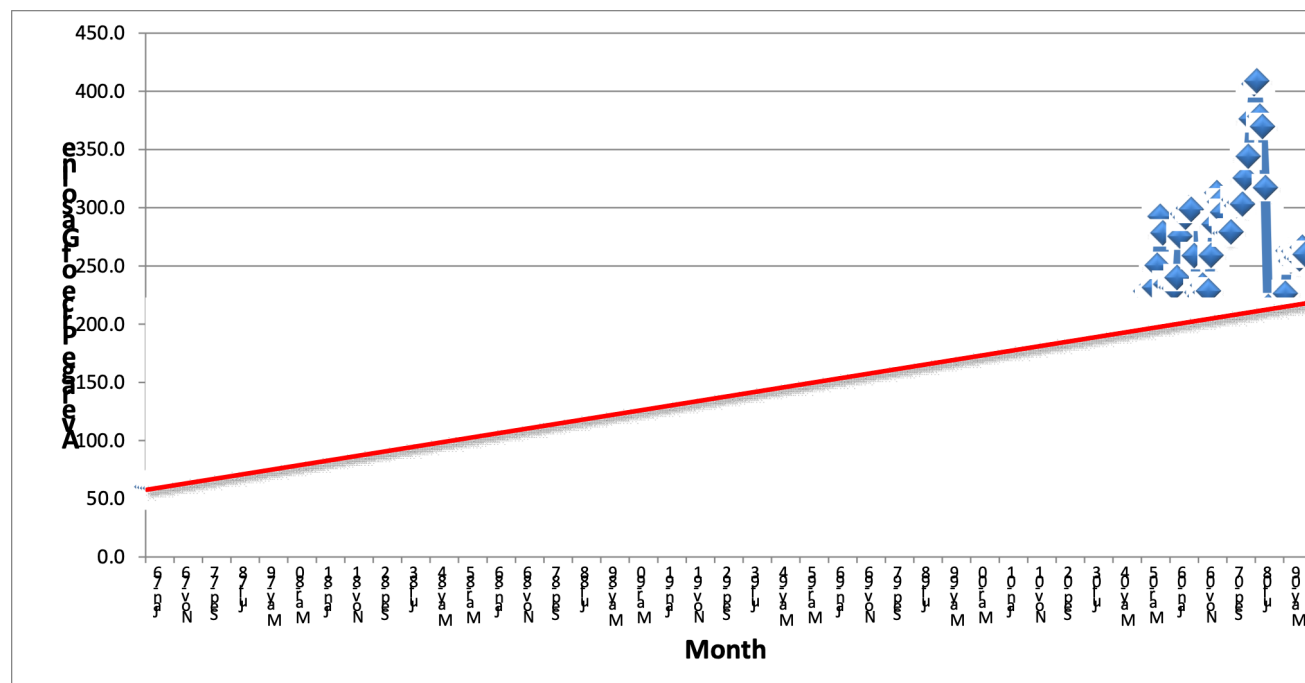
課程複習

- Describing the Relationship between Two Interval Variables
  - 散布圖 (Scatter Diagram)
    - 是否呈線性關係、正負相關

實作練習（直方圖）

Math Stat Marks

實作練習（Line Chart）

Price of Gasoline

使用資料：Xm03-05

Question?