HW2 的題目位於 09/23 課程投影片最後一頁，另外，以下幾點請大家注意一下:

1. 第一題請參考課本 Table 1.1 的寫法。
2. (第二、三題) 證明題，請大家盡可能地詳列證明步驟。
3. (第四、五題) 請在 word 檔中以表格列出 n=100, 200, ..., 3000 時，程式執行所需的實際時間，並畫一張圖表，此外請標示清楚座標軸標題以及單位。
4. 這份功課請以 Word 撰寫，為避免格式跑掉，請同時將 WORD 和 PDF 檔上傳至"E-Learning > 作業/報告 > Homework 2"處。
5. 檔名格式為"HW2_學號_姓名"。

Exercise

p69 1.7.3(a)

```
1.  for(i=1; i<=n; i++)
2.      for(j=1; j<=i;j++)
3.          for(k=1;k<=j;k++)
4.              x++;
```

line	s/e	frequency	total steps
1	1	n+1	n+1
2	1	$\frac{n(n+1)}{2}+1$	$\frac{n(n+1)}{2}+1$
3	1	$\frac{n(n+1)(2n+1)}{6}+1$	$\frac{n(n+1)(2n+1)}{6}+1$
4	1	$\frac{n(n+1)(2n+1)}{6}$	$\frac{n(n+1)(2n+1)}{6}$
total	$\frac{4n^3+9n^2+11n+15}{6}$		

p69 1.7.3(b)

```
1.  i=1;
2.  while(i<=n)
3.  {
4.      x++;
5.      i++;
6.  }
```

line	s/e	frequency	total steps
1	1	1	1
2	1	n+1	n+1
3	0	0	0
4	1	n	n
5	1	n	n
6	0	0	0
total	3n+2		

p71 1.7.8(a)

show $5n^2 - 6n = \Theta(n^2)$ is correct

Prove:

$$5n^2 - 6n = \theta(n^2)\ as\ 5n^2 - 6n \geq 4(n^2), 5n^2 - 6n \leq 5(n^2), for\ all\ n, n \geq 6$$

p71 1.7.8(i)

show $n^{1.001} + nlogn = \Theta(n^{1.001})$ is correct

$n^{1.001} + nlogn \geq 1(n^{1.001}), n^{1.001} + nlogn \leq 2(n^{1.001}), for\ all\ n, n \geq 1$

Prove:

p72 1.7.9(b)

show $n^2logn = \Theta(n^2)$ is incorrect

Prove:

$$c1n^2 \leq n^2logn \leq c2n^2, for\ all\ n, n \geq n0$$
$$c1n^2 \leq n^2logn \rightarrow c1 \leq logn$$
$$n^{2logn} \leq c2 \rightarrow c2 \geq logn \rightarrow n < 2^{c2} (c2\ is\ a\ constant)$$
$$for\ all\ n, n \geq n0, but\ n \leq 2^{c2}, condition!$$
$$\rightarrow n^{2logn} = \Theta(n^2)\ is\ incorrect$$

p73 1.7.13(需要實際運行，並用 excel 畫出時間圖)

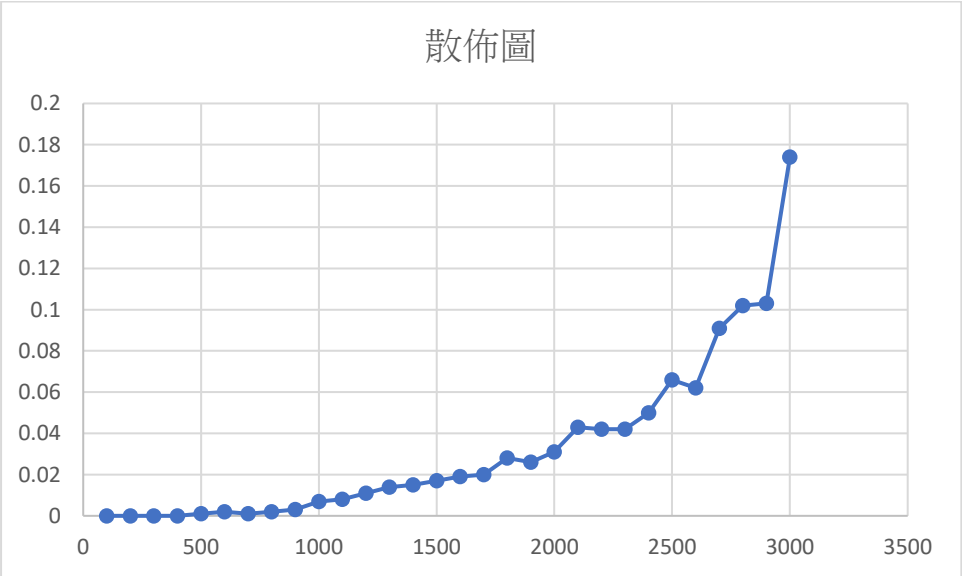
Consider function Add (Program 1.22).

(a) Obtain run time for n=100, 200, ...3000.

N	secend
100	0
200	0
300	0
400	0
500	0.001
600	0.002
700	0.001
800	0.002
900	0.003
1000	0.007
1100	0.008

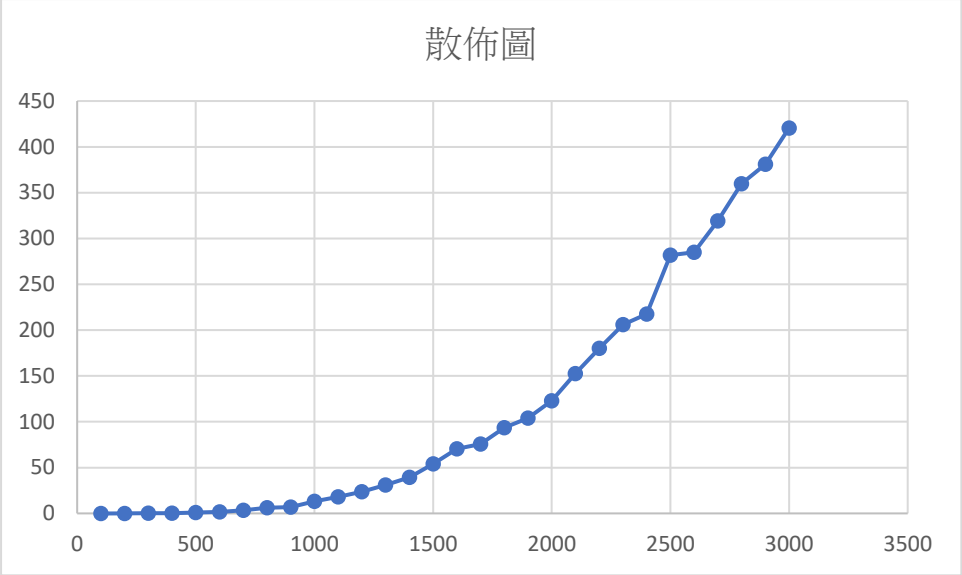
1200	0.011
1300	0.014
1400	0.015
1500	0.017
1600	0.019
1700	0.02
1800	0.028
1900	0.026
2000	0.031
2100	0.043
2200	0.042
2300	0.042
2400	0.05
2500	0.066
2600	0.062
2700	0.091
2800	0.102
2900	0.103
3000	0.174

(b) Plot the times obtained in part(a)



p73 1.7.14(需要實際運行，並用 excel 畫出時間圖)

Do the previous exercise for matrix multiplication (Program1.35)


散佈圖
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
3500