

OS project1 report

1. 設計

- 我們使用**clock_gettime**取代**getnstimeofday**，因為可以得到精確度的資訊和一樣準確的效果。
- 我們把要寫入**dmesg**的資料從user space直接寫入"/dev/kmsg"取代呼叫**printk**，因為這樣比較快速安全，避免改到kernel log不必要的地方而造成自己電腦其他問題。
- 使用**sched_setaffinity**來讓使用的CPU都固定在第一顆，這樣能避免一些多Core執行的問題。
- 使用**sched_setscheduler**來調整process的priority，並且設定成FIFO的mode，讓運行中的process不會被搶斷。
- 使用**sched_yield**來把當前process的執行權交給同priority的其他process。
- schedule每隔一段時間會把執行權從process那裡收回來，然後再依照情況分給processes。

2. 執行範例測資的結果

<https://github.com/qazwsxedcrfvtg14/OS-Proj1/blob/master/dmesg>

https://github.com/qazwsxedcrfvtg14/OS-Proj1/tree/master/OS_PJ1_Test

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FIFO_1
P1 26427
P2 26428
P3 26429
P4 26430
P5 26431
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FIFO_2
P1 26436
P2 26437
P3 26438
P4 26439
```

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FIFO_3
P1 26473
P2 26474
P3 26475
P4 26476
P5 26477
P6 26478
P7 26479
```

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FIFO_4
P1 26492
P2 26493
P3 26494
P4 26495
```

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FIFO_5
P1 26500
P2 26501
P3 26502
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P4 26503
P5 26504
P6 26505
P7 26506

RR_1
P1 26557
P2 26558
P3 26559
P4 26560
P5 26561

RR_2
P1 26566
P2 26567

RR_3
P1 26577
P2 26578
P3 26579
P4 26580
P5 26581
P6 26582

RR_4
P1 26591
P2 26598
P3 26599
P4 26601
P5 26602
P6 26603
P7 26604

RR_5
P1 26879
P2 26880
P3 26881
P4 26882
P5 26883
P6 26884
P7 26885

SJF_1
P1 26906
P2 26907
P3 26915
P4 26916

SJF_2
P1 26922
P2 26923
P3 26924
P4 26925
P5 26926

SJF_3

P1 26933
P2 26934
P3 26935
P4 26936
P5 26937
P6 26938
P7 26939
P8 26940

SJF_4

P1 26948
P2 26949
P3 26950
P4 26951
P5 26952

SJF_5

P1 26957
P2 26958
P3 26959
P4 26960

PSJF_1

P1 26513
P2 26514
P3 26515
P4 26516

PSJF_2

P1 26522
P2 26523
P3 26524
P4 26525
P5 26526

PSJF_3

P1 26531
P2 26532
P3 26533
P4 26534

PSJF_4

P1 26539
P2 26540
P3 26541
P4 26542

PSJF_5

P1 26547
P2 26548
P3 26549
P4 26550
P5 26551

FIFO_1

[18742379.859604]	[Project1]	26427	1556630002.396618518	1556630003.723154186
[18742381.195962]	[Project1]	26428	1556630003.723735910	1556630005.059576070
[18742382.531638]	[Project1]	26429	1556630005.060184223	1556630006.395322802
[18742383.865171]	[Project1]	26430	1556630006.395879884	1556630007.728916650
[18742385.190484]	[Project1]	26431	1556630007.729476411	1556630009.054294586

FIFO_2

[18742597.994019]	[Project1]	26436	1556630009.057845834	1556630221.867336732
[18742611.295011]	[Project1]	26437	1556630221.868138694	1556630235.168925223
[18742613.952359]	[Project1]	26438	1556630235.169686397	1556630237.826421482
[18742616.617525]	[Project1]	26439	1556630237.827041699	1556630240.491678526

FIFO_3

[18742637.912021]	[Project1]	26473	1556630240.496255720	1556630261.787119227
[18742651.216085]	[Project1]	26474	1556630261.787889283	1556630275.091787332
[18742659.197529]	[Project1]	26475	1556630275.092534173	1556630283.073596212
[18742661.862928]	[Project1]	26476	1556630283.074281649	1556630285.739080440
[18742664.525964]	[Project1]	26477	1556630285.740002456	1556630288.402288095
[18742667.180435]	[Project1]	26478	1556630288.402864886	1556630291.056864899
[18742677.816566]	[Project1]	26479	1556630291.057496512	1556630301.693458132

FIFO_4

[18742683.131067]	[Project1]	26492	1556630301.697970202	1556630307.008203702
[18742684.472220]	[Project1]	26493	1556630307.008885500	1556630308.349429919
[18742684.997650]	[Project1]	26494	1556630308.350006538	1556630308.874894575
[18742686.328842]	[Project1]	26495	1556630308.875415962	1556630310.206131254

FIFO_5

[18742707.611935]	[Project1]	26500	1556630310.210641227	1556630331.490144390
[18742720.893246]	[Project1]	26501	1556630331.490926324	1556630344.772055995
[18742728.875337]	[Project1]	26502	1556630344.772749562	1556630352.754504889
[18742731.539991]	[Project1]	26503	1556630352.755190654	1556630355.419284172
[18742734.189323]	[Project1]	26504	1556630355.419905525	1556630358.068738911
[18742736.848997]	[Project1]	26505	1556630358.069345349	1556630360.728510833
[18742747.483799]	[Project1]	26506	1556630360.729237480	1556630371.363791202

RR_1

[18742931.904550]	[Project1]	26557	1556630554.465789911	1556630555.792719363
[18742933.235613]	[Project1]	26558	1556630555.793360244	1556630557.123861892
[18742934.570048]	[Project1]	26559	1556630557.124428286	1556630558.458358734
[18742935.893308]	[Project1]	26560	1556630558.458912938	1556630559.781677135
[18742937.220598]	[Project1]	26561	1556630559.782234917	1556630561.109014119

RR_2

[18742958.776652]	[Project1]	26566	1556630562.731121224	1556630582.665999703
[18742962.762985]	[Project1]	26567	1556630564.060055065	1556630586.652503375

RR_3

[18743011.244283]	[Project1]	26579	1556630597.882343990	1556630635.135948609
[18743015.232698]	[Project1]	26577	1556630589.910472589	1556630639.124553674
[18743016.566200]	[Project1]	26578	1556630593.897375537	1556630640.458112218

[18743037.831074]	[Project1]	26582	1556630608.521037802	1556630661.723915903
[18743043.138533]	[Project1]	26581	1556630604.533556837	1556630667.031623704
[18743045.794641]	[Project1]	26580	1556630603.206119931	1556630669.687858078

RR_4

[18743060.525735]	[Project1]	26601	1556630673.783695732	1556630684.419585569
[18743061.853564]	[Project1]	26602	1556630675.112677336	1556630685.747480055
[18743063.193996]	[Project1]	26603	1556630676.445419853	1556630687.087958043
[18743084.476706]	[Project1]	26599	1556630672.459352620	1556630708.371607078
[18743095.111764]	[Project1]	26604	1556630679.096785769	1556630719.007139493
[18743099.104106]	[Project1]	26598	1556630671.122894620	1556630722.999648685
[18743107.087053]	[Project1]	26591	1556630669.789588676	1556630730.982954768

RR_5

[18743121.789142]	[Project1]	26882	1556630734.997460380	1556630745.685677924
[18743123.116079]	[Project1]	26883	1556630736.336303738	1556630747.012706458
[18743125.778530]	[Project1]	26884	1556630739.008805642	1556630749.675280322
[18743145.795720]	[Project1]	26881	1556630733.665075206	1556630769.693326851
[18743156.483829]	[Project1]	26885	1556630740.340284886	1556630780.381906199
[18743160.474890]	[Project1]	26880	1556630732.337111435	1556630784.373154592
[18743168.461454]	[Project1]	26879	1556630730.987819758	1556630792.360066316

SJF_1

[18743174.568566]	[Project1]	26907	1556630792.771449170	1556630798.467438416
[18743177.237164]	[Project1]	26915	1556630798.468182293	1556630801.136166857
[18743187.877736]	[Project1]	26916	1556630801.136801109	1556630811.777199757
[18743206.493976]	[Project1]	26906	1556630811.777894084	1556630830.394251392

SJF_2

[18743207.027653]	[Project1]	26922	1556630830.664997488	1556630830.927973109
[18743207.565032]	[Project1]	26924	1556630830.928924866	1556630831.465387611
[18743218.204267]	[Project1]	26923	1556630831.465913537	1556630842.105048590
[18743228.839285]	[Project1]	26925	1556630842.105806623	1556630852.740550022
[18743247.453535]	[Project1]	26926	1556630852.741268482	1556630871.355616855

SJF_3

[18743255.701408]	[Project1]	26933	1556630871.626813944	1556630879.603845987
[18743255.728786]	[Project1]	26936	1556630879.604546679	1556630879.631252681
[18743255.756374]	[Project1]	26937	1556630879.631807916	1556630879.658845681
[18743266.399984]	[Project1]	26938	1556630879.659388801	1556630890.302884915
[18743277.020278]	[Project1]	26939	1556630890.303649679	1556630900.923646376
[18743290.313334]	[Project1]	26934	1556630900.924405868	1556630914.217292163
[18743308.915611]	[Project1]	26935	1556630914.218022187	1556630932.820385570
[18743332.830741]	[Project1]	26940	1556630932.821146900	1556630956.736561169

SJF_4

[18743340.805579]	[Project1]	26948	1556630956.741204145	1556630964.711771916
[18743343.470176]	[Project1]	26949	1556630964.712468397	1556630967.376490690
[18743354.094652]	[Project1]	26950	1556630967.377142046	1556630978.001431336
[18743356.753137]	[Project1]	26952	1556630978.002121219	1556630980.660043949
[18743362.066915]	[Project1]	26951	1556630980.660638026	1556630985.974049380

SJF_5

[18743367.400268]	[Project1]	26957	1556630985.987253172	1556630991.307633614
[18743368.725426]	[Project1]	26958	1556630991.308298864	1556630992.632868832

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[18743370.051611] [Project1] 26959 1556630992.633417312 1556630993.959117288
[18743371.386664] [Project1] 26960 1556630993.959652649 1556630995.294226157

PSJF_1
[18742763.436607] [Project1] 26516 1556630379.342911996 1556630387.317295698
[18742774.060566] [Project1] 26515 1556630376.681699367 1556630397.941741920
[18742789.997267] [Project1] 26514 1556630374.018205680 1556630413.879147114
[18742813.903266] [Project1] 26513 1556630371.367537893 1556630437.786203200

PSJF_2
[18742819.222151] [Project1] 26523 1556630440.451333611 1556630443.105343067
[18742824.544445] [Project1] 26522 1556630437.790704518 1556630448.427869024
[18742832.521111] [Project1] 26525 1556630451.081544168 1556630456.404888501
[18742835.172963] [Project1] 26526 1556630456.405614436 1556630459.056865043
[18742843.138493] [Project1] 26524 1556630448.428517291 1556630467.022732191

PSJF_3
[18742845.800265] [Project1] 26532 1556630468.362154349 1556630469.684642737
[18742847.126403] [Project1] 26533 1556630469.685311381 1556630471.010830862
[18742848.464493] [Project1] 26534 1556630471.011540047 1556630472.348991244
[18742852.443088] [Project1] 26531 1556630467.027304426 1556630476.327747803

PSJF_4
[18742855.372385] [Project1] 26541 1556630476.597126862 1556630479.257180359
[18742860.419286] [Project1] 26540 1556630476.332268521 1556630484.304286116
[18742871.032870] [Project1] 26542 1556630484.305038640 1556630494.918346252
[18742889.630113] [Project1] 26539 1556630494.919034956 1556630513.516403557

PSJF_5
[18742890.165963] [Project1] 26547 1556630513.788178937 1556630514.052302984
[18742890.702657] [Project1] 26549 1556630514.053244708 1556630514.589022288
[18742901.333706] [Project1] 26548 1556630514.589583710 1556630525.220520782
[18742911.959026] [Project1] 26550 1556630525.221296933 1556630535.846313802
[18742930.555902] [Project1] 26551 1556630535.847001384 1556630554.444012769

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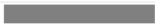








































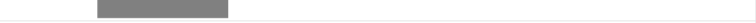
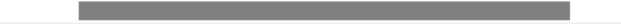





3. 比較實際結果與理論結果，並解釋造成差異的原因

- 每組測資第一個圖表為實際時間，第二個圖表為理論時間

1. FIFO

	A	B	C	D	E
1	Name	PID	Start Time	End Time	Chart
2					
3	FIFO_1				
4	P1		1,556,630,002.40	1,556,630,003.72	
5	P2		1,556,630,003.72	1,556,630,005.06	
6	P3		1,556,630,005.06	1,556,630,006.40	
7	P4		1,556,630,006.40	1,556,630,007.73	
8	P5		1,556,630,007.73	1,556,630,009.05	
9					
10	P1		0.00	500.00	
11	P2		500.00	1,000.00	
12	P3		1,000.00	1,500.00	
13	P4		1,500.00	2,000.00	
14	P5		2,000.00	2,500.00	
15					
16	FIFO_2				
17	P1		1,556,630,009.06	1,556,630,221.87	
18	P2		1,556,630,221.87	1,556,630,235.17	
19	P3		1,556,630,235.17	1,556,630,237.83	
20	P4		1,556,630,237.83	1,556,630,240.49	
21					
22	P1		0.00	80,000.00	
23	P2		80,000.00	85,000.00	
24	P3		85,000.00	86,000.00	
25	P4		86,000.00	87,000.00	
26					
27	FIFO_3				
28	P1		1,556,630,240.50	1,556,630,261.79	
29	P2		1,556,630,261.79	1,556,630,275.09	
30	P3		1,556,630,275.09	1,556,630,283.07	
31	P4		1,556,630,283.07	1,556,630,285.74	
32	P5		1,556,630,285.74	1,556,630,288.40	
33	P6		1,556,630,288.40	1,556,630,291.06	
34	P7		1,556,630,291.06	1,556,630,301.69	
35					
36	P1		0.00	8,000.00	
37	P2		8,000.00	13,000.00	
38	P3		13,000.00	16,000.00	
39	P4		16,000.00	17,000.00	
40	P5		17,000.00	18,000.00	
41	P6		18,000.00	19,000.00	
42	P7		19,000.00	23,000.00	
43					
44	FIFO_4				
45	P1		1,556,630,301.70	1,556,630,307.01	
46	P2		1,556,630,307.01	1,556,630,308.35	
47	P3		1,556,630,308.35	1,556,630,308.87	
48	P4		1,556,630,308.88	1,556,630,310.21	
49					
50	P1		0.00	2,000.00	
51	P2		2,000.00	2,500.00	
52	P3		2,500.00	2,700.00	
53	P4		2,700.00	3,200.00	
54					
55	FIFO_5				
56	P1		1,556,630,310.21	1,556,630,331.49	
57	P2		1,556,630,331.49	1,556,630,344.77	
58	P3		1,556,630,344.77	1,556,630,352.75	
59	P4		1,556,630,352.76	1,556,630,355.42	
60	P5		1,556,630,355.42	1,556,630,358.07	
61	P6		1,556,630,358.07	1,556,630,360.73	
62	P7		1,556,630,360.73	1,556,630,371.36	
63					
64	P1		0.00	8,000.00	
65	P2		8,000.00	13,000.00	
66	P3		13,000.00	16,000.00	
67	P4		16,000.00	17,000.00	
68	P5		17,000.00	18,000.00	
69	P6		18,000.00	19,000.00	
70	P7		19,000.00	23,000.00	

2. RR

198	RR_1				
199	P1		1,556,630,554.47	1,556,630,555.79	
200	P2		1,556,630,555.79	1,556,630,557.12	
201	P3		1,556,630,557.12	1,556,630,558.46	
202	P4		1,556,630,558.46	1,556,630,559.78	
203	P5		1,556,630,559.78	1,556,630,561.11	
204					
205	P1		0.00	500.00	
206	P2		500.00	1,000.00	
207	P3		1,000.00	1,500.00	
208	P4		1,500.00	2,000.00	
209	P5		2,000.00	2,500.00	
210					
211	RR_2				
212	P1		1,556,630,562.73	1,556,630,582.67	
213	P2		1,556,630,564.06	1,556,630,586.65	
214					
215	P1		600.00	8,100.00	
216	P2		1,100.00	9,600.00	
217					
218	RR_3				
219	P1		1,556,630,589.91	1,556,630,639.12	
220	P2		1,556,630,593.90	1,556,630,640.46	
221	P3		1,556,630,597.88	1,556,630,635.14	
222	P4		1,556,630,603.21	1,556,630,669.69	
223	P5		1,556,630,604.53	1,556,630,667.03	
224	P6		1,556,630,608.52	1,556,630,661.72	
225					
226	P1		1,200.00	20,200.00	
227	P2		2,700.00	20,700.00	
228	P3		4,200.00	18,200.00	
229	P4		6,200.00	31,200.00	
230	P5		6,700.00	30,200.00	
231	P6		7,200.00	28,200.00	
232					
233	RR_4				
234	P1		1,556,630,669.79	1,556,630,730.98	
235	P2		1,556,630,671.12	1,556,630,723.00	
236	P3		1,556,630,672.46	1,556,630,708.37	
237	P4		1,556,630,673.78	1,556,630,684.42	
238	P5		1,556,630,675.11	1,556,630,685.75	
239	P6		1,556,630,676.45	1,556,630,687.09	
240	P7		1,556,630,679.10	1,556,630,719.01	
241					
242	P1		0.00	23,000.00	
243	P2		500.00	20,000.00	
244	P3		1,000.00	14,500.00	
245	P4		1,500.00	5,500.00	
246	P5		2,000.00	6,000.00	
247	P6		2,500.00	6,500.00	
248	P7		3,000.00	18,000.00	
249					
250	RR_5				
251	P1		1,556,630,730.99	1,556,630,792.36	
252	P2		1,556,630,732.34	1,556,630,784.37	
253	P3		1,556,630,733.67	1,556,630,769.69	
254	P4		1,556,630,735.00	1,556,630,745.69	
255	P5		1,556,630,736.34	1,556,630,747.01	
256	P6		1,556,630,739.01	1,556,630,749.68	
257	P7		1,556,630,740.34	1,556,630,780.38	
258					
259	P1		0.00	23,000.00	
260	P2		500.00	20,000.00	
261	P3		1,000.00	14,500.00	
262	P4		1,500.00	5,500.00	
263	P5		2,000.00	6,000.00	
264	P6		2,500.00	6,500.00	
265	P7		3,000.00	18,000.00	

3. SJF

131	SJF_1				
132	P1		1,556,630,811.78	1,556,630,830.39	
133	P2		1,556,630,792.77	1,556,630,798.47	
134	P3		1,556,630,798.47	1,556,630,801.14	
135	P4		1,556,630,801.14	1,556,630,811.78	
136					
137	P1		7,000.00	14,000.00	
138	P2		0.00	2,000.00	
139	P3		2,000.00	3,000.00	
140	P4		3,000.00	7,000.00	
141					
142	SJF_2				
143	P1		1,556,630,830.66	1,556,630,830.93	
144	P2		1,556,630,831.47	1,556,630,842.11	
145	P3		1,556,630,830.93	1,556,630,831.47	
146	P4		1,556,630,842.11	1,556,630,852.74	
147	P5		1,556,630,852.74	1,556,630,871.36	
148					
149	P1		100.00	200.00	
150	P2		400.00	4,400.00	
151	P3		200.00	400.00	
152	P4		4,400.00	8,400.00	
153	P5		8,400.00	15,400.00	
154					
155	SJF_3				
156	P1		1,556,630,871.63	1,556,630,879.60	
157	P2		1,556,630,900.92	1,556,630,914.22	
158	P3		1,556,630,914.22	1,556,630,932.82	
159	P4		1,556,630,879.60	1,556,630,879.63	
160	P5		1,556,630,879.63	1,556,630,879.66	
161	P6		1,556,630,879.66	1,556,630,890.30	
162	P7		1,556,630,890.30	1,556,630,900.92	
163	P8		1,556,630,932.82	1,556,630,956.74	
164					
165	P1		100.00	3,100.00	
166	P2		11,120.00	16,120.00	
167	P3		16,120.00	23,120.00	
168	P4		3,100.00	3,110.00	
169	P5		3,110.00	3,120.00	
170	P6		3,120.00	7,120.00	
171	P7		7,120.00	11,120.00	
172	P8		23,120.00	32,120.00	
173					
174	SJF_4				
175	P1		1,556,630,956.74	1,556,630,964.71	
176	P2		1,556,630,964.71	1,556,630,967.38	
177	P3		1,556,630,967.38	1,556,630,978.00	
178	P4		1,556,630,980.66	1,556,630,985.97	
179	P5		1,556,630,978.00	1,556,630,980.66	
180					
181	P1		0.00	3,000.00	
182	P2		3,000.00	4,000.00	
183	P3		4,000.00	8,000.00	
184	P4		9,000.00	11,000.00	
185	P5		8,000.00	9,000.00	
186					
187	SJF_5				
188	P1		1,556,630,985.99	1,556,630,991.31	
189	P2		1,556,630,991.31	1,556,630,992.63	
190	P3		1,556,630,992.63	1,556,630,993.96	
191	P4		1,556,630,993.96	1,556,630,995.29	
192					
193	P1		0.00	2,000.00	
194	P2		2,000.00	2,500.00	
195	P3		2,500.00	3,000.00	
196	P4		3,000.00	3,500.00	

4. PSJF

72	PSJF_1				
73	P1		1,556,630,371.37	1,556,630,437.79	
74	P2		1,556,630,374.02	1,556,630,413.88	
75	P3		1,556,630,376.68	1,556,630,397.94	
76	P4		1,556,630,379.34	1,556,630,387.32	
77					
78	P1		0.00	25,000.00	
79	P2		1,000.00	16,000.00	
80	P3		2,000.00	10,000.00	
81	P4		3,000.00	6,000.00	

83	PSJF_2				
84	P1		1,556,630,437.79	1,556,630,448.43	
85	P2		1,556,630,440.45	1,556,630,443.11	
86	P3		1,556,630,448.43	1,556,630,467.02	
87	P4		1,556,630,451.08	1,556,630,456.40	
88	P5		1,556,630,456.41	1,556,630,459.06	
89					
90	P1		0.00	4,000.00	
91	P2		1,000.00	2,000.00	
92	P3		4,000.00	11,000.00	
93	P4		5,000.00	7,000.00	
94	P5		7,000.00	8,000.00	
95					
96	PSJF_3				
97	P1		1,556,630,467.03	1,556,630,476.33	
98	P2		1,556,630,468.36	1,556,630,469.68	
99	P3		1,556,630,469.69	1,556,630,471.01	
100	P4		1,556,630,471.01	1,556,630,472.35	
101					
102	P1		0.00	3,500.00	
103	P2		500.00	1,000.00	
104	P3		1,000.00	1,500.00	
105	P4		1,500.00	2,000.00	
106					
107	PSJF_4				
108	P1		1,556,630,494.92	1,556,630,513.52	
109	P2		1,556,630,476.33	1,556,630,484.30	
110	P3		1,556,630,476.60	1,556,630,479.26	
111	P4		1,556,630,484.31	1,556,630,494.92	
112					
113	P1		7,000.00	14,000.00	
114	P2		0.00	3,000.00	
115	P3		100.00	1,100.00	
116	P4		3,000.00	7,000.00	
117					
118	PSJF_5				
119	P1		1,556,630,513.79	1,556,630,514.05	
120	P2		1,556,630,514.59	1,556,630,525.22	
121	P3		1,556,630,514.05	1,556,630,514.59	
122	P4		1,556,630,525.22	1,556,630,535.85	
123	P5		1,556,630,535.85	1,556,630,554.44	
124					
125	P1		100.00	200.00	
126	P2		400.00	4,400.00	
127	P3		200.00	400.00	
128	P4		4,400.00	8,400.00	
129	P5		8,400.00	15,400.00	

- 我們使用了關掉了turbo boost的伺服器來跑我們的程式以減少誤差
- 在程式中使用迴圈來等待執行時間會有迴圈本身每次執行時間不固定的問題
- 因為實驗數據和理論數據太過接近，如果要確認真實性可以檢查我們的數據表格：

https://docs.google.com/spreadsheets/d/10juCjTIHYU_fRDRzz_UOGjr-l86Pfyujyi1fBLcOJeY/edit

4. 各組員的貢獻

B05902086 周 逸：全部的程式部分

B05902052 劉家維：計算理論值、繪製分析圖

B06501051 陳政瑞：寫report、繪製分析圖、協助debug