# OS Project 1 Report
## Group 19

1. 設計

整體架構設計：

從stdin 讀取process 並fork 讓 child 去跑那些process ,且讓child process 都使用同一顆CPU來跑 ，這樣比較好控制每個process的占用時間。

FIFO 設計：

依照ready time 由小到大排序 ，並且依序執行即可。

SJF 設計：

每當一個process執行結束時, 判斷當前ready 的 process ( ready time < current time) 中 execution time 最短的來執行 (將其priority設為最高)。

PSJF 設計：

每當有新的process ready時，從那些可以執行的process ( ready time < current time ) 中選取剩餘時間最短的來執行,並且當某個process結束時將陣列裡的值設為-1以便分辨 。

RR 設計：

設定一個quantum, 每當經過一個quantum或者當前process執行結束時, 分別send 不同signal 來分辨 ,並且開始執行下一個process( 將其priority 設為最高) , 以循環的方式執行。


2. 執行範例測資的結果

```
allen@allen-VirtualBox:~/OSproject1-1$ time ./a.out

real    0m1.558s
user    0m1.535s
sys     0m0.008s
```
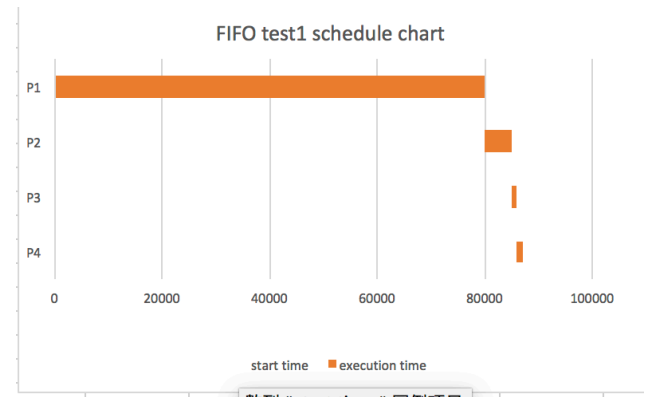
1000 unit = 1.558 sec

## FIFO

### Testcase 1

```
4
P1 0 80000
P2 100 5000
P3 200 1000
P4 300 1000
```



FIFO test1 schedule chart

```
[ 8986.691278] [Project1] 3144 1556647909.579259772 1556648027.710173891
[ 8994.092753] [Project1] 3145 1556647909.747965668 1556648035.111696248
[ 8995.570416] [Project1] 3146 1556647909.921038456 1556648036.589368255
[ 8997.045970] [Project1] 3147 1556647910.80342631 1556648038.64932244
allen@allen-VirtualBox:~/OSproject1-1$
```

理論花費時間：87000/1000*1.558=135.546 s

實際花費時間：129.0701s
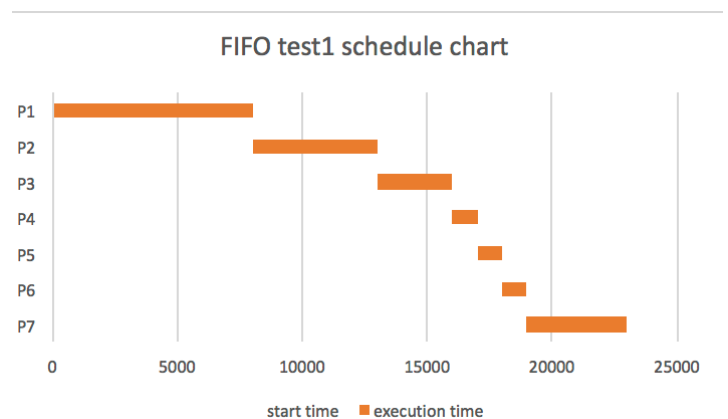

## FIFO

### Testcase 2

```
7
P1 0 8000
P2 200 5000
P3 300 3000
P4 400 1000
P5 500 1000
P6 500 1000
P7 600 4000
```



FIFO test1 schedule chart

```
[ 9194.679813] [Project1] 3198 1556648223.824924978 1556648235.700352431
[ 9202.074205] [Project1] 3199 1556648224.162709239 1556648243.94819377
[ 9206.507698] [Project1] 3200 1556648224.338656280 1556648247.528356697
[ 9207.993015] [Project1] 3201 1556648224.503055531 1556648249.13687617
[ 9209.465672] [Project1] 3202 1556648224.662686851 1556648250.486357794
[ 9210.938808] [Project1] 3203 1556648224.662777738 1556648251.959508633
[ 9216.842118] [Project1] 3204 1556648224.820615836 1556648257.862877795
allen@allen-VirtualBox:~/OSproject1-1$
```

理論花費時間：35.834
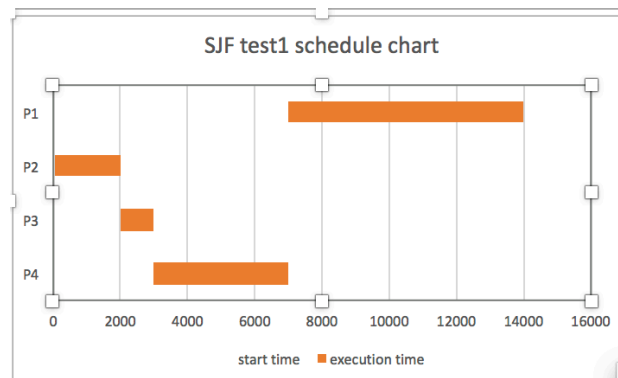
實際花費時間：34.038

SJF

Testcase 1

4
P1 0 7000
P2 0 2000
P3 100 1000
P4 200 4000



SJF test1 schedule chart

```
[ 9325.368795] [Project1] 3235 1556648363.425881125 1556648366.390709069
[ 9326.851255] [Project1] 3236 1556648363.577722978 1556648367.873188283
[ 9332.789425] [Project1] 3237 1556648363.739037053 1556648373.811425567
[ 9343.105960] [Project1] 3234 1556648363.425839238 1556648384.128078332
allen@allen-VirtualBox:~/OSproject1-1$
```

理論花費時間：14*1.558 = 21.812
實際花費時間：20.702
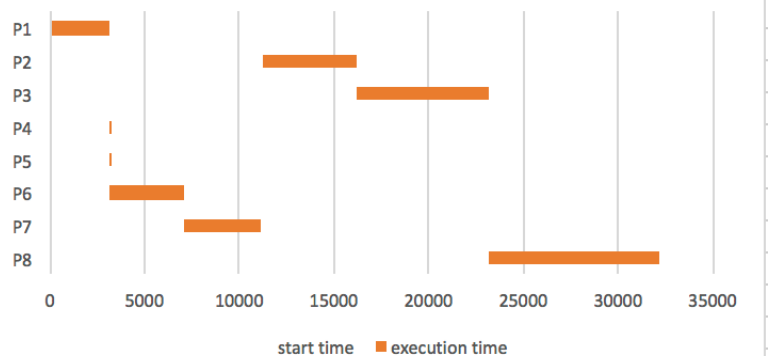
SJF

Testcase 2

8
P1 100 3000
P2 100 5000
P3 100 7000
P4 200 10
P5 200 10
P6 300 4000
P7 400 4000
P8 500 9000



```
[ 9385.316061] [Project1] 3249 1556648421.882779577 1556648426.338670747
[ 9385.331629] [Project1] 3252 1556648422.32941106 1556648426.354243425
[ 9385.346871] [Project1] 3253 1556648422.33032180 1556648426.369485272
[ 9391.291948] [Project1] 3254 1556648422.180368403 1556648432.314633155
[ 9397.203851] [Project1] 3255 1556648422.329566126 1556648438.226607460
[ 9404.580414] [Project1] 3250 1556648421.882902798 1556648445.603259754
[ 9414.912902] [Project1] 3251 1556648421.882985291 1556648455.935873337
[ 9428.238957] [Project1] 3256 1556648422.479281946 1556648469.262092338
allen@allen-VirtualBox:~/OSproject1-1$
```

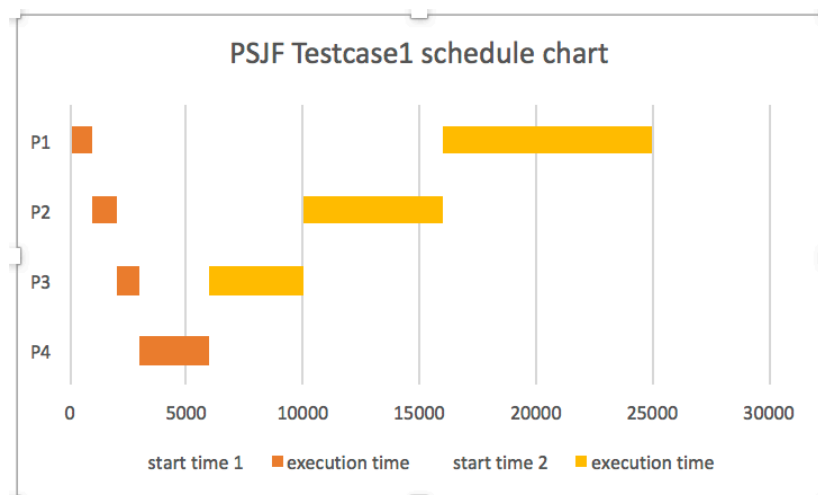理論花費時間：32.12*1.558 = 50.0430
實際花費時間：47.379

## PSJF

### Testcase 1

4
P1 0 10000
P2 1000 7000
P3 2000 5000
P4 3000 3000


PSJF Testcase1 schedule chart

```
[ 9466.472902] [Project1] 3268 1556648503.44503667 1556648507.496512514
[ 9472.270739] [Project1] 3267 1556648501.417587169 1556648513.294426912
[ 9480.987049] [Project1] 3266 1556648499.779642063 1556648522.10848771
[ 9494.124570] [Project1] 3265 1556648498.146959230 1556648535.148538439
allen@allen-VirtualBox:~/OSproject1-1$
```

理論花費時間：25 *1.558 = 38.95
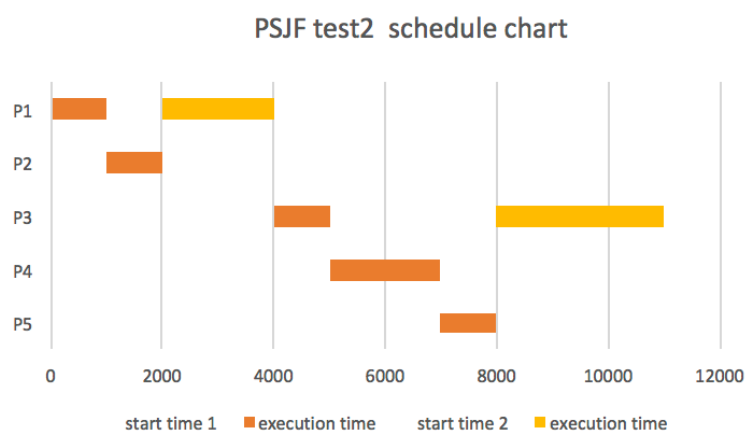實際花費時間：31.703

## PSJF

### Testcase 2

5
P1 0 3000
P2 1000 1000
P3 2000 4000
P4 5000 2000
P5 7000 1000


PSJF test2  schedule chart

```
[ 9515.646716] [Project1] 3277 1556648555.171563544 1556648556.670961980
[ 9518.481148] [Project1] 3276 1556648553.502294211 1556648559.505427387
[ 9523.578912] [Project1] 3280 1556648561.628610248 1556648564.603263015
[ 9525.323530] [Project1] 3281 1556648564.871278110 1556648566.347902050
[ 9528.868485] [Project1] 3278 1556648556.779578697 1556648569.892906273
allen@allen-VirtualBox:~/OSproject1-1$
```

理論花費時間：11 *1.558 = 17.138
實際花費時間：14.72

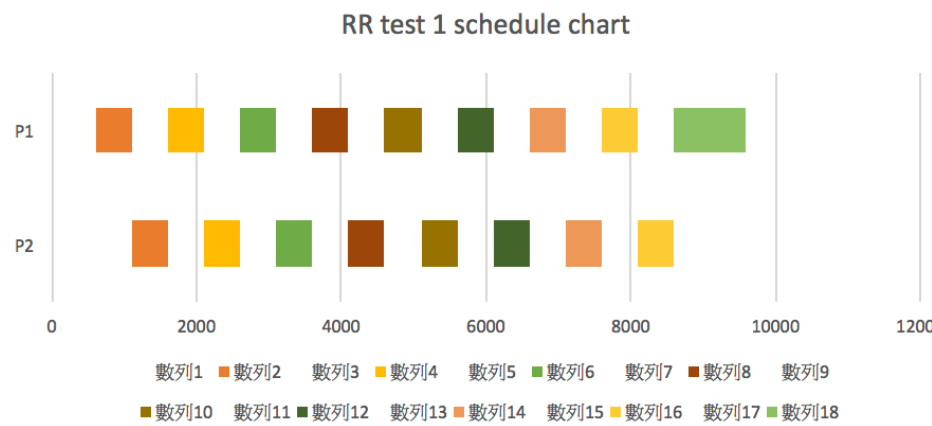RR test 1 schedule chart



RR

    Testcase 1

    2
    P1 600 4000
    P2 800 5000

```
[ 9609.192055] [Project1] 3316 1556648639.99094062 1556648650.217556940
[ 9611.417304] [Project1] 3317 1556648639.405642931 1556648652.442839851
allen@allen-VirtualBox:~/OSproject1-1$
```

理論花費時間：9.6 * 1.558 = 14.957
實際花費時間：12.4519


## 3.比較實際結果與理論結果 ,並解釋造成差異的原因

實驗結果顯示出實際的時間比較短，但在可接受的誤差範圍內, 可能原因為電腦在執行time 指令速度較慢, 因此用理論算出來的值會較大。

## 4. 各組員貢獻

Kernel : 林立珩
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Report : 袁其崧, 黃紹輔