

[2016 網路系統程式設計 Homework 5]

主旨： 本次作業著重於讓學生練習 IPC 方法中的 share memory。

內容：

1. 本題必須分別用 **System V share memory** 與 **POSIX share memory**，利用 IPC 的 share memory 撰寫 producer.c、consumer.c。

Hint: 可參考講義上 share memory 部分

2. System V 版本需使用 ftok()產生 key。

3. producer.c：

- 將資料寫到 share memory 中，由數個 consumers 讀取，其中每筆資料 大小為 100bytes，以資料結構 struct packet 代表(如下圖所示)，資料數 量總共 5000 筆。

```
struct packet { //共有 100bytes
    int id;
    short dataShort[5];
    long dataLong[5];
    double dataDouble[5];
    byte dataByte[6];
};
```

- struct packet 的 id 欄位必須為 0~4999，其餘欄位內容可任意給予。
- Share memory 大小為 struct packet 的整數倍，此倍數(shmblocks)則 為所輸入之參數(參數大小可為 5~30)。
- 請先 sleep 15 秒後，才開始寫資料到 share memory。將資料第 0~shmblocks-1 筆，依序寫入 share memory 中，第 shmblocks 筆覆 寫到第 0 筆位置，依此類推，直到寫完 5000 筆資料。

4. consumer.c：使用無窮迴圈方式檢查 share memory 是否有新資料寫入，一 旦有新資料，立即讀取出來(以 memory copy 來取出資料)，直到所有資料讀 取完成。因為寫入與讀取之速度差異，有可能 consumer 會有來不及讀取的遺 失資料，所以印出遺失資料的數量。

5. 請於命令列執行任意個 consumer 來測試。助教 demo 時也是隨意執行數個 consumer。

6. 執行順序：先背景執行一個 producer，在執行數個 consumer
執行結果：(以 System V、6 個 consumer、shmblocks = 10 為例)

```

yin@yin:~/sp_hw5/systemv$ ./producer 10 &
[1] 2516
yin@yin:~/sp_hw5/systemv$ ./consumer 10 &
[2] 2517
yin@yin:~/sp_hw5/systemv$ ./consumer 10 &
[3] 2518
yin@yin:~/sp_hw5/systemv$ ./consumer 10 &
[4] 2523
yin@yin:~/sp_hw5/systemv$ ./consumer 10 &
[5] 2526
yin@yin:~/sp_hw5/systemv$ ./consumer 10 &
[6] 2527
yin@yin:~/sp_hw5/systemv$ ./consumer 10
Lost: 71 datas
Lost: 95 datas
Lost: 78 datas
Lost: 78 datas
Lost: 122 datas
Lost: 77 datas
[1] Done ./producer 10
[3] Done ./consumer 10
[2] Done ./consumer 10
[4] Done ./consumer 10
[5]- Done ./consumer 10
[6]+ Done ./consumer 10

```

Upload:

1. Please compress your homework into zip or tar archive.
2. Naming rules: "StudentID_SP_HW5.zip". For example: M043040001_SP_HW5.zip
3. Upload your homework to National Sun Yat-sen Cyber University.
4. Deadline: 2016/11/08(Tue.) 23:59.

Rules:

1. Please use C language in this homework and run your program on Ubuntu 16.04.
2. Please provide Makefile to compile your homework; otherwise, you will get ZERO.
3. Do not copy homework of others. If it happened, you will get ZERO whether you are either the owner of the homework or the copycat.
4. You have to deeply understand what your program do because TA will ask you something about your program during the demo.
5. If you have any question, please send email to sp_ta@net.nsysu.edu.tw or come to EC5018, but TA does not help to debug.
6. If you do not submit your assignment on time, you will not hand in the delayed homework and get ZERO as well. If you have trouble, please advise in advance by email. Moreover, time and place for demo will be announced later.