生产者–消费者问题实验报告

严晟嘉 09013119

本程序在 Mac OS X 10.11.4 上开发，经过测试运行正确。

本项目使用了Pthread。

缓冲区是一个长度为BUFFER_SIZE(程序中设定为5)的数组，按环形队列来处理。

从命令行接受参数

- argv[1]: 程序睡眠时间
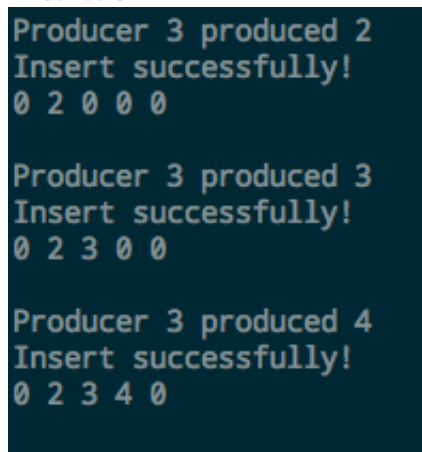- argv[2]: 生产者线程的数量 pthread_t pro[numPro]
- argv[3]: 消费者线程的数量 pthread_t con[numCon]

创建了三个信号量

- 一个互斥信号量(pthread_mutex_t the_mutex)
- 两个同步信号量(sem_t empty, full)

运行方法

1. 进入程序所在路径: cd
2. 编译: g++ boundedbuffer.cpp -o 1
3. 运行: ./1 1 5 5 (睡眠时间为5s, 生产者数量为5, 消费者数量为5)

运行结果

```
Producer 5 produced 5
Insert successfully!
0 2 3 4 5

Consume successfully!
Consumer 2 consumed 2
0 0 3 4 5

Consume successfully!
Consumer 3 consumed 3
0 0 0 4 5

Consume successfully!
Consumer 4 consumed 4
0 0 0 0 5

Producer 5 produced 6
Insert successfully!
6 0 0 0 5

Consume successfully!
Consumer 2 consumed 5
6 0 0 0 0

Consume successfully!
Consumer 5 consumed 6
0 0 0 0 0

Can't consume now!
Consumer 4 consumed 6
0 0 0 0 0

Producer 5 produced 7
Insert successfully!
0 7 0 0 0

Producer 3 produced 8
Insert successfully!
0 7 8 0 0

Producer 5 produced 9
Insert successfully!
0 7 8 9 0

Consume successfully!
Consumer 3 consumed 7
0 0 8 9 0
```