Project 3: Producer & Consumer

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***Abstract*— Using shared memory across two threads using three semaphores to lock it.**

I. INTRODUCTION

In this project we use shared memory across two created threads, one producer and one consumer. We use three semaphores to lock the char array. The semaphores prevent memory read/write collisions.

II. FUNCTIONS USED & OUTPUT

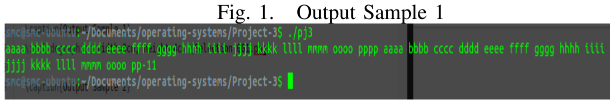
A. Functions Used

For this project, we are required to create two threads, one producer and one consumer. We do this by using pthreads, two functions, three semaphores, and shared memory char array. The three semaphores are mutex, full, and empty. We also use shmget() for getting shared memory ID, shmat() for attaching the shared memory to the process, shmdt() for detaching the shared memory once the process is done with it, and shmctl() for removing the shared memory once the parent process recognizes all the children have finished. We also use the semaphores and functions sem_wait(), which waits until the semaphore is positive and decrements its value by one, and sem_post() which increments the semaphore value. This prevents memory access collisions as well as keeping the producer and consumer threads in sync with each other.

B. Output

The output for this is whatever string is in mytest.dat. The consumer prints to the screen whatever the producer puts into the char array. The three semaphores help control this and keep the two threads in sync.

Fig. 1. Output Sample 1



```
smc@smc-ubuntu:~/Documents/operating-systems/Project-3$ ./pj3
aaaa bbbb cccc dddd eeee ffff gggg hhhh iiii jjjj kkkk llll mmmm oooo pppp aaaa bbbb cccc dddd eeee ffff gggg hhhh iiii
jjjj kkkk llll mmmm oooo pp-11
smc@smc-ubuntu:~/Documents/operating-systems/Project-3$
```

III. CONCLUSIONS

As you can see from the figure above, using the three semaphores to control access to the shared memory char array, both threads are able to work together in order to read out of the file and print it to the screen.