

Georgia State University
CSc 4320/6320 Operating Systems
Spring 2018

Programming Assignment 3
Due Time: 11:59 PM, March 10

Objective:

To understand and experiment with the implementation of synchronization.

Problem Statement:

Design and implement a solution for *Producer–Consumer Problem* using Pthreads library in Linux virtual machine.

Steps:

- Download *buffer.h* and the incomplete version of *hw3.c* from iCollege
- Read through Programming Project 3 of Chapter 5 (**Producer–Consumer Problem**) in the textbook.
- Follow the suggestion in the textbook to complete the C program using Pthreads. Do NOT solve the problem using Windows API.
- In addition to the requirement in the textbook, print a message every time an item is produced or consumed in your producer and consumer threads. The message should also include the thread ID of the producer or consumer. To get a thread's ID, you may call `pthread_self()` function and convert the result into an integer. For example, you can use `printf("Consumer %u consumed %d \n", (unsigned int)pthread_self(), consumed_number);` for the consumer. You can use a similar code for the producer.
- Compile the C source file using `gcc -pthread -o hw3 hw3.c`
- Use `./hw3 <sleep time> <# of producer threads> <# of consumer threads>` to test the program. The number of producer threads and number of consumer threads should be larger than 1, e.g., `./hw3 5 8 5`
- Take a screenshot of the program output message after you test the program.

Notes

- Appropriate error checking of the command line is always a good practice for programmers. It is strongly encouraged because it also reduces grading error. (You can follow the examples in the textbook and the slides).
- Design your program in a clear and modular fashion.

Submission:

Submit the following to iCollege:

- The C source file *hw3.c*
- A report in PDF or Word that includes
 - The screenshot of your program output message
 - A copy of your C source code from *hw3.c* file

Failure to follow the submission requirement will cause 10% deduction in the score.