Assignment 10: Producer-Consumer

Implementing **Producer-Consumer** problem in a C program for process synchronization:

To declare a semaphore:

#include <semaphore.h>

sem_t semaphore;

C function used to initialize a semaphore variable:

#include <sempahore.h>

int sem_init(sem_t *sem, int pshared, unsigned int value);

Here pshared is set to 0 for threads, 1 for processes.

C function for wait(mutex) function:

int sem_wait(sem_t *sem);

C function for signal(mutex) function:

int sem_post(sem_t *sem);

In producer-consume we need 3 semaphore variables:

a. empty: to indicate whether buffer is empty

b. full: to indicate whether buffer is full

c. mutex: to synchronize access to buffer

Pseudo code:

Producer:

```
do {
    /*
    * PRODUCE ITEM
    */
    wait(empty);
    wait(mutex);
    /*
```

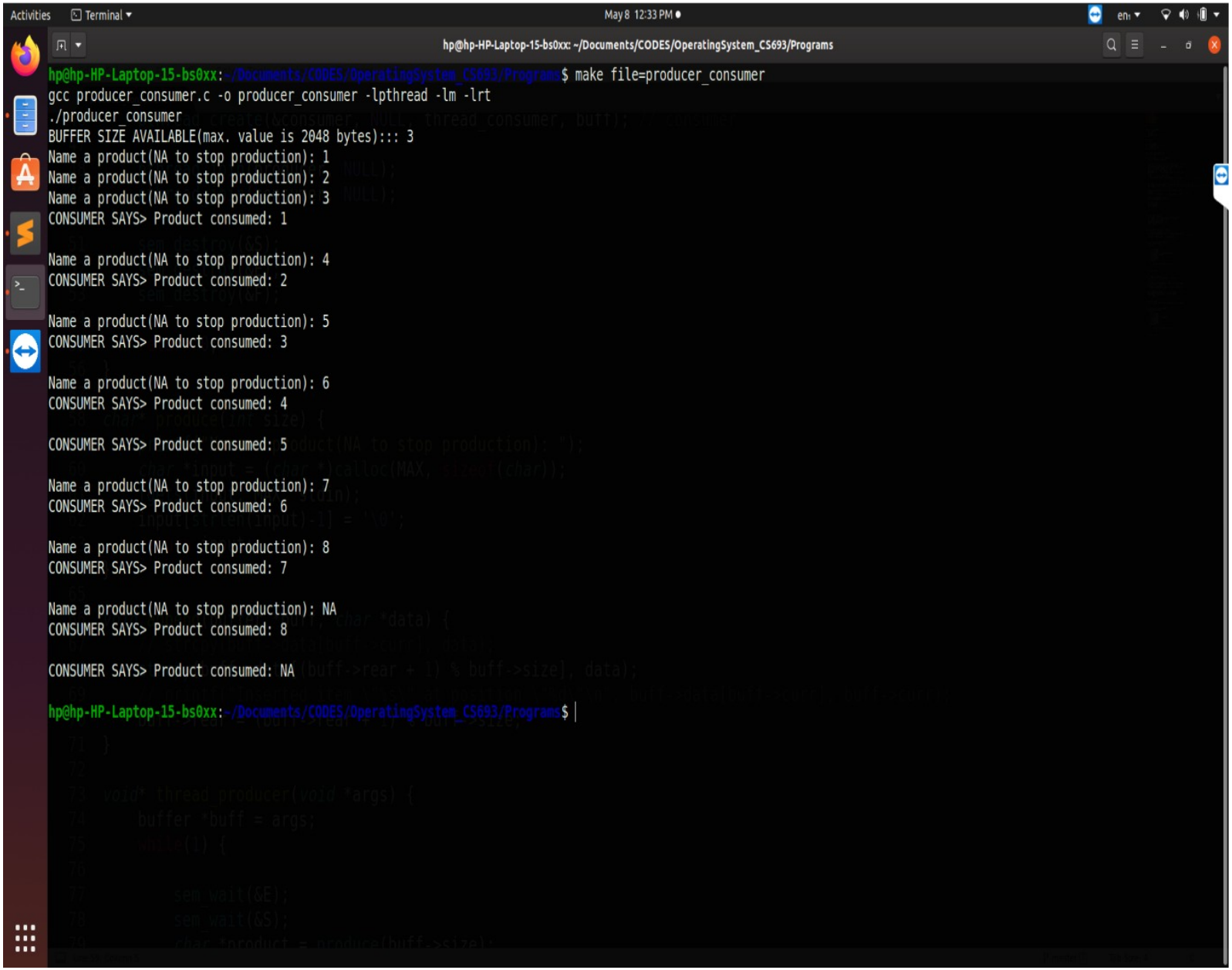
```
    * PUT THEM IN BUFFER
    */
    signal(mutex);
    signal(full);

} while(1);
```

Consumer:

```
do {
    wait(full);
    wait(mutex);
    /*
    * REMOVE ITEM FROM BUFFER
    */
    signal(mutex);
    signal(empty);
    /*
    * CONSUME ITEM
    */
} while(1);
```

Output:


Activities
Terminal
May 8 12:33 PM
en
hp@hp-HP-Laptop-15-bs0xx: ~/Documents/CODES/OperatingSystem_CS693/Programs
hp@hp-HP-Laptop-15-bs0xx:~/Documents/CODES/OperatingSystem_CS693/Programs$ make file=producer_consumer
gcc producer_consumer.c -o producer_consumer -lpthread -lm -lrt
./producer_consumer
BUFFER SIZE AVAILABLE(max. value is 2048 bytes)::: 3
Name a product(NA to stop production): 1
Name a product(NA to stop production): 2
Name a product(NA to stop production): 3
CONSUMER SAYS> Product consumed: 1
Name a product(NA to stop production): 4
CONSUMER SAYS> Product consumed: 2
Name a product(NA to stop production): 5
CONSUMER SAYS> Product consumed: 3
Name a product(NA to stop production): 6
CONSUMER SAYS> Product consumed: 4
CONSUMER SAYS> Product consumed: 5
Name a product(NA to stop production): 7
CONSUMER SAYS> Product consumed: 6
Name a product(NA to stop production): 8
CONSUMER SAYS> Product consumed: 7
Name a product(NA to stop production): NA
CONSUMER SAYS> Product consumed: 8
CONSUMER SAYS> Product consumed: NA
hp@hp-HP-Laptop-15-bs0xx:~/Documents/CODES/OperatingSystem_CS693/Programs$