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### Bài 3:

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <pthread.h>
#include <unistd.h>
#include <time.h>
#include <semaphore.h>

#define MAX_THREAD 2
pthread_t th[MAX_THREAD];
pthread_mutex_t mutexBuffer;

sem_t semEmpty;
sem_t semFull;

int buffer[5];
int count = 0;

void* producer(void* args) {
    //lập day du lieu vao
    while (1) {
        //Dua de lieu vao bo nho
        int x = rand() % 100;
        sleep(1);

        sem_wait(&semEmpty);
        pthread_mutex_lock(&mutexBuffer);
        buffer[count++] = x;
        pthread_mutex_unlock(&mutexBuffer);
        sem_post(&semFull);
    }
}

void* consumer(void* args) {
    while (1) {
        int y;
        // Lay du lieu
        sem_wait(&semFull);
        pthread_mutex_lock(&mutexBuffer);
        y = buffer[count - 1];
        count--;
        pthread_mutex_unlock(&mutexBuffer);
        sem_post(&semEmpty);
    }
}
```

```

    }
}

int main(int argc, char* argv[]) {
    srand(time(NULL));
    pthread_mutex_init(&mutexBuffer, NULL);
    sem_init(&semEmpty, 0, 5);
    sem_init(&semFull, 0, 0);
    int i;
    for (i = 0; i < MAX_THREAD; i++) {
        int ret1=pthread_create(&th[i], NULL, &producer, NULL);
        int ret2=pthread_create(&th[i], NULL, &consumer, NULL);
        if (ret1 != 0){
            printf("Thread producer [%d] created error\n", i);
        }
        if (ret2 != 0)
        {
            printf("Thread consumer [%d] created error\n", i);
        }
    }
    for (i = 0; i < MAX_THREAD; i++) {
        if (pthread_join(th[i], NULL) != 0) {
            perror("Failed to join thread");
        }
    }
    sem_destroy(&semEmpty);
    sem_destroy(&semFull);
    pthread_mutex_destroy(&mutexBuffer);
    return 0;
}

```

```

trongdat1108@ubuntu: ~/baitonghop
trongdat1108@ubuntu:~/baitonghop$ gcc -c bai3.c
trongdat1108@ubuntu:~/baitonghop$ gcc -o bai3.out bai3.o -lpthread
trongdat1108@ubuntu:~/baitonghop$ ./bai3.out
Data 67
Data 12
Data 22
Data 95
Data 74
Data 81
Data 22
Data 41
Data 25
Data 22
Data 32
Data 56
Data 89
Data 63
Data 28
Data 28
Data 34
Data 85
Data 76
Data 90
Data 97

```