BÀI TẬP 3:

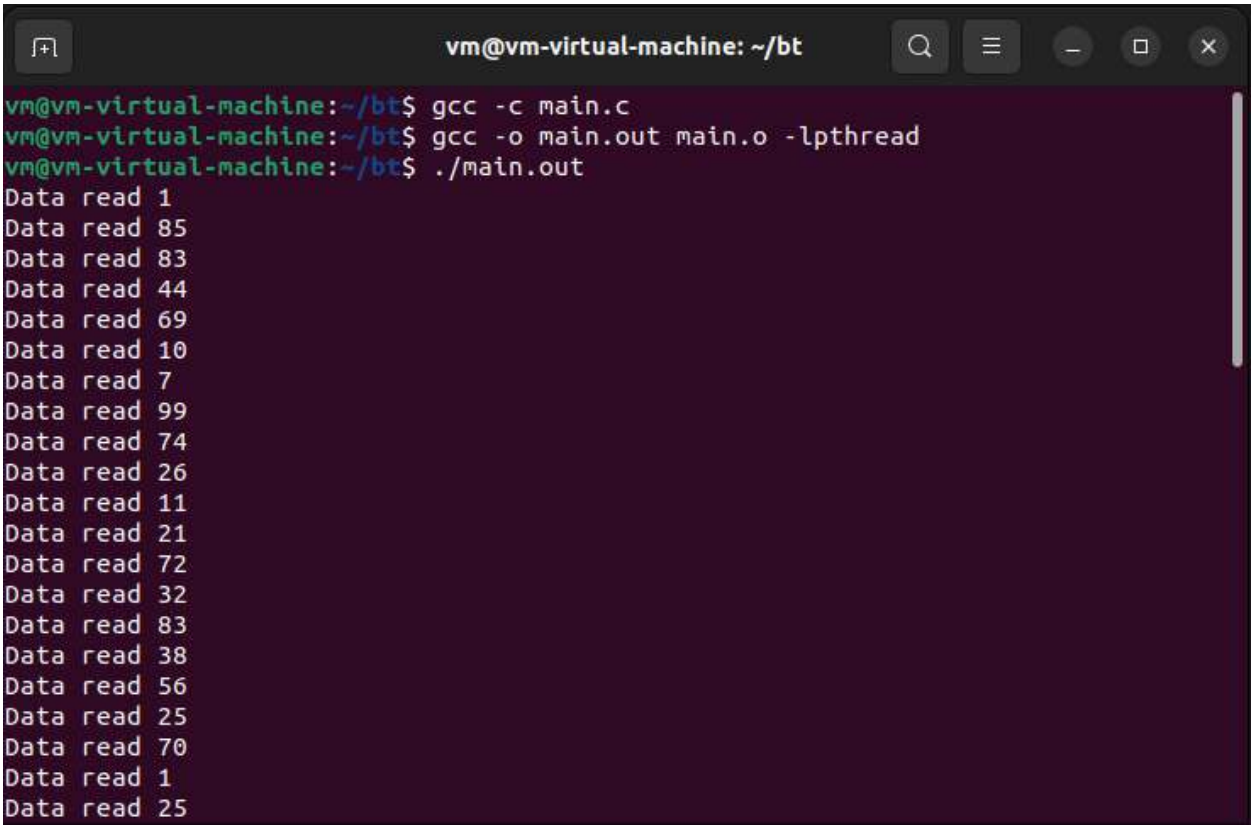
Code:

```
#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) {
   //lap 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);

        // Consume
        printf("Data %d\n", y);
        sleep(1);
    }
}

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;
}
```

Kết quả:


vm@vm-virtual-machine: ~/bt
vm@vm-virtual-machine:~/bt$ gcc -c main.c
vm@vm-virtual-machine:~/bt$ gcc -o main.out main.o -lpthread
vm@vm-virtual-machine:~/bt$ ./main.out
Data read 1
Data read 85
Data read 83
Data read 44
Data read 69
Data read 10
Data read 7
Data read 99
Data read 74
Data read 26
Data read 11
Data read 21
Data read 72
Data read 32
Data read 83
Data read 38
Data read 56
Data read 25
Data read 70
Data read 1
Data read 25