

作业详情

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## [11-13班]实验03: Barriers

截止时间: 2023.11.05 23:59 允许迟交 允许申请重做

In this assignment we will explore how to implement a barrier using condition variables provided by the pthread library. A barrier is a point in an application at which all threads must wait until all other threads reach that point too. Condition variables are a sequence coordination technique similar to sleep and wakeup.

Download barrier.c and compile it on your laptop

**注意barrier.c 在附件中**

```
$ gcc -g -O2 -pthread barrier.c
```

```
$ ./a.out 2
```

```
Assertion failed: (i == t), function thread, file barrier.c, line 55.
```

The 2 specifies the number of threads that synchronize on the barrier ( nthread in barrier.c). Each thread sits in a tight loop. In each loop iteration a thread calls barrier() and then sleeps for some random number of microseconds. The assert triggers, because one thread leaves the barrier before the other thread has reached the barrier. The desired behavior is that all threads should block until nthreads have called barrier.

Your goal is to achieve the desired behavior. In addition to the lock primitives that you have seen before, you will need the following new pthread primitives (see man pthreads for more detail):

```
pthread_cond_wait(&cond, &mutex); // go to sleep on cond, releasing lock mutex
pthread_cond_broadcast(&cond);    // wake up every thread sleeping on cond
pthread_cond_wait releases the mutex when called, and re-acquires the mutex before returning.
```

We have given you barrier\_init(). Your job is to implement barrier() so that the panic won't occur. We've defined struct barrier for you; its fields are for your use.

There are two issues that complicate your task:



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round starts.  
You have to handle the case in which one thread races around the loop before the others have exited the barrier. In particular, you are re-using bstate.nthread from one round to the next. Make sure that a thread that leaves the barrier and races around the loop doesn't increase bstate.nthread while a previous round is still using it.

Test your code with one, two, and more than two threads.

Submit: your modified barrier.c

barrier.c(1.30KB)

李罡创建于 10月18日

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