

Assignment 6

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#include<stdio.h>
#include<semaphore.h>
#include<pthread.h>
#define N 5

sem_t mutex;
sem_t S[N];

void *philospher(void *num);
void forkUp(int);
void forkDown(int);

int state[N];
int phil_num[N]={0,1,2,3,4};

int main() {
    int i;
    pthread_t thread_id[N];

    for(i=0;i<N;i++)
        sem_init(&S[i],0,1);

    for(i=0;i<N;i++) {
        pthread_create(&thread_id[i],NULL,philospher,&phil_num[i]);
        printf("Philosopher %d is now thinking \n",i+1);
    }
    for(i=0;i<N;i++)
        pthread_join(thread_id[i],NULL);
}

void *philospher(void *num) {
    while(1)
    {
        int *i = num;
        sleep(1);
        forkUp(*i);
        printf("Philosopher %d is eating\n", (*i)+1);
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    sleep(1);
    forkDown(*i);
}

void forkUp(int ph_num) {
    int LEFT = ph_num;
    int RIGHT = (ph_num+1)%N;

    if (ph_num==N-1) {
        sem_wait(&S[RIGHT]);
        printf("Philosopher %d picked the fork %d Up\n", (ph_num)+1, RIGHT);
        sem_wait(&S[LEFT]);
        printf("Philosopher %d picked the fork %d Up\n", (ph_num)+1, LEFT);
    } else {
        sem_wait(&S[LEFT]);
        printf("Philosopher %d picked the fork %d Up\n", (ph_num)+1, LEFT);
        sem_wait(&S[RIGHT]);
        printf("Philosopher %d picked the fork %d Up\n", (ph_num)+1, RIGHT);
    }
}

void forkDown(int ph_num) {
    int LEFT = ph_num;
    int RIGHT = (ph_num+1)%N;

    sem_post(&S[LEFT]);
    printf("Philosopher %d put the fork %d down\n", (ph_num)+1, LEFT);
    sem_post(&S[RIGHT]);
    printf("Philosopher %d put the fork %d down \n", (ph_num)+1, RIGHT);
}

```

OUTPUT:

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gauravghati@gauravghati:~/OS-Programming/assignment6-DiningPhilosopher$ gcc using-binary-semaphore.c -pthread
using-binary-semaphore.c: In function 'philosopher':
using-binary-semaphore.c:35:9: warning: implicit declaration of function 'sleep' [-Wimplicit-function-declaration]
 35 |         sleep(1);
    |         ^~~~~~
gauravghati@gauravghati:~/OS-Programming/assignment6-DiningPhilosopher$ ./a.out
Philosopher 1 is now thinking
Philosopher 2 is now thinking
Philosopher 3 is now thinking
Philosopher 4 is now thinking
Philosopher 5 is now thinking
Philosopher 1 picked the fork 0 Up
Philosopher 1 picked the fork 1 Up
Philosopher 1 is eating
Philosopher 3 picked the fork 2 Up
Philosopher 3 picked the fork 3 Up
Philosopher 3 is eating
Philosopher 1 put the fork 0 down
Philosopher 1 put the fork 1 down
Philosopher 5 picked the fork 0 Up
Philosopher 5 picked the fork 4 Up
Philosopher 5 is eating
Philosopher 3 put the fork 2 down
Philosopher 2 picked the fork 1 Up
Philosopher 2 picked the fork 2 Up
Philosopher 2 is eating
Philosopher 4 picked the fork 3 Up
Philosopher 3 put the fork 3 down
Philosopher 5 put the fork 4 down
Philosopher 4 picked the fork 4 Up
Philosopher 2 put the fork 1 down
Philosopher 2 put the fork 2 down
Philosopher 4 is eating
Philosopher 1 picked the fork 0 Up
Philosopher 1 picked the fork 1 Up
Philosopher 1 is eating
Philosopher 5 put the fork 0 down
Philosopher 3 picked the fork 2 Up
Philosopher 4 put the fork 3 down
Philosopher 4 put the fork 4 down
Philosopher 1 put the fork 0 down
Philosopher 3 picked the fork 3 Up
Philosopher 3 is eating
Philosopher 1 put the fork 1 down
Philosopher 2 picked the fork 1 Up
Philosopher 5 picked the fork 0 Up
Philosopher 5 picked the fork 4 Up
Philosopher 5 is eating
Philosopher 3 put the fork 2 down
Philosopher 3 put the fork 3 down
Philosopher 2 picked the fork 2 Up
Philosopher 2 is eating
Philosopher 4 picked the fork 3 Up
Philosopher 4 picked the fork 4 Up
Philosopher 4 is eating
```