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#
# Makefile for ppd
# Author: Michael Kepple
# Date: 02 Apr 2013
#
all: ppd.c ppd.h
    gcc ppd.c ppd.h -lpthread -o ppd

clean:
    rm -rf *.o ppd

/*
 *
 * ppd.c
 *
 * Author: Michael Kepple
 * Date: 2 Apr 2013
 * Description: Program creates two "pseudo periodic" threads. The first will
 * continuously greet the user ever 300ms; the second will say "Goodbye!"
 * every 700ms.
 *
 */
#include "ppd.h"
pthread_mutex_t lock;
pthread_cond_t cond;

/*
 * Function: printMessage
 * Description: function run by each thread, periodically printing out their
 * assigned message.
 * Params: Args struct containing message to print and desired delay between
 * messages.
 * Returns: Nothing (should never return).
 * Modifies: lock
 */
void printMessage(void * arguments)
{
    struct timespec timeToWait;
    struct timeval now;
    Args *passedIn = (Args *)arguments;
    for (;;)
    {
        gettimeofday(&now, NULL);
        int nano = (now.tv_usec*U_IN_NANO + passedIn->delay);
        if (nano > N_IN_SEC)
        {
            timeToWait.tv_sec = now.tv_sec+1;
            timeToWait.tv_nsec = nano - N_IN_SEC;
        }
        else
        {
            timeToWait.tv_sec = now.tv_sec;
            timeToWait.tv_nsec = nano;
        }
        pthread_mutex_lock(&lock);
        pthread_cond_timedwait(&cond, &lock, &timeToWait);
        pthread_mutex_unlock(&lock);
        printf("%s\n", passedIn->msg);
    }
}

int main()
{
    pthread_mutex_init(&lock, NULL);
```

```
pthread_cond_init(&cond, NULL);
pthread_t hey_thread, bye_thread;
Args helloArgs, byeArgs;
strcpy(helloArgs.msg, HEY_MSG);
strcpy(byeArgs.msg, BYE_MSG);
helloArgs.delay = HELLO_WAIT;
byeArgs.delay = BYE_WAIT;
pthread_create(&hey_thread, NULL, (void*) &printMessage, (void*)&helloArgs);
pthread_create(&bye_thread, NULL, (void*) &printMessage, (void*)&byeArgs);
pthread_join(bye_thread, NULL);
}
/*
 * File:   ppd.h
 * Author: Michael Kepple
 * Date:   2 Apr 2013
 */
#ifndef PPD_H
#define PPD_H
#include <stdio.h>
#include <string.h>
#include <pthread.h>
#include <semaphore.h>
#include <sys/sem.h>
#include <time.h>
void printMessage(void * arguments);
typedef struct
{
    char msg[50];
    int delay;
} Args;
const char* const HEY_MSG = "Hello!";
const char* const BYE_MSG = "Goodbye!";
#define HELLO_WAIT 300000000L
#define BYE_WAIT 700000000L
#define N_IN_SEC 1000000000L
#define U_IN_NANO 1000
#endif
```