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// ************************************************************************
// Example of use of pthreads library.
// ************************************************************************

#include <stdio.h>
#include <pthread.h>
#include <semaphore.h>

#define Max 10
#define Limit 1000000

int counter = 0;
sem_t mutex;
pthread_t tid[Max];
int ourtid[Max];

void *increment0 (void *arg)
{ int j, id = * ((int *)arg);

  printf ("Thread %d, %x started!\n", id, tid[id]);
  for (j=0; j<Limit; j++)
  { sem_wait (&mutex);
    counter++;
    sem_post (&mutex);
  }
  printf ("Thread %d, %x is ending!\n", id, tid[id]);
}

void *increment1 (void *arg)
{ int j, id = * ((int *)arg);

  printf ("Thread %d, %x started!\n", id, tid[id]);
  for (j=0; j<Limit; j++) counter++;
  printf ("Thread %d, %x is ending!\n", id, tid[id]);
}

void main()
{ int i, numT;  // numT: number of threads

  for (i=0; i<Max; i++) ourtid[i] = i;

  printf ("Enter #threads: ");
  scanf ("%d", &numT);

  if (numT <= 0 || numT > Max) numT = 5;  // invalid #threads, use default
  printf ("\nCreating %d threads!\n", numT);

  sem_init (&mutex, 0, 1);
  for (i=0; i<numT; i++)
    pthread_create (&tid[i], NULL, increment1, (void *) &ourtid[i]);
  for (i=0; i<numT; i++) pthread_join (tid[i], NULL);

  printf ("Final counter value = %d, should have been %d\n",
          counter, numT*Limit);
}
```