Chapter 4: Threads

Question: Write a C program that calculates the sum of the numbers from 1 to 100,000,000. Split the numbers between 4 threads equally where each thread calculates the sum of one fourth of the numbers. For example, the 1st thread will calculate the sum of the numbers from 1 to 25,000,000 whereas the 2nd thread will calculate the sum of the numbers from 25,000,001 to 50,000,000 and so forth. The main thread will have to print out the sum after gathering the results of the 4 created threads.

Answer:

```c
#include <pthread.h>
#include <stdio.h>

unsigned long sum[4]; /* this data is shared by the thread(s) */

void *sum_thread(void *param); /* the thread */

int main(int argc, char *argv[]) {
      pthread_t workers[4];
      pthread_attr_t attr;

      /* get the default attributes */
      pthread_attr_init(&attr);

      /* create the thread */
      int i;
      for(i=0; i<4; i++)
            pthread_create(&workers[i], &attr, sum_thread,(void *) i);

      /* now wait for the thread to exit */
      for(i=0; i<4; i++)
            pthread_join(workers[i],NULL);

      printf("sum = %lu\n",sum[0]+sum[1]+sum[2]+sum[3]);
}

/**
 * The thread will begin control in this function
 */
void *sum_thread(void *param)
{
      long id = (long) param;
      int start = id*25000000;
      int i=0;
      while (i<25000000) {
            sum[id] += (i+start);
            i++;
      }
       pthread_exit(0);
}
```