

ASSIGNMENT # 5

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SECTION: 4B

ANSWER:

```
#include <unistd.h>
#include <sys/types.h>
#include <errno.h>
#include <stdio.h>
#include <stdlib.h>
#include <pthread.h>
#include <string.h>
#include <semaphore.h>

#define NUM_RUNS 10000000

void handler ( void *ptr);

int counter;
sem_t mutex;

int main()
{
    int i[2];
    pthread_t thread_a;
    pthread_t thread_b;
    sem_init(&mutex, 0, 1);
    i[0] = 0;
    i[1] = 1;

    pthread_create ( &thread_a, NULL, ( void *) &handler, ( void *) &i[0]);
    pthread_create ( &thread_b, NULL, ( void *) &handler, ( void *) &i[1]);

    pthread_join( thread_a, NULL);
    pthread_join( thread_b, NULL);

    printf("-----\n");
    printf("Final counter value: %d\n", counter);
    printf("Error:          %d\n", (NUM_RUNS*2-counter));
    sem_destroy(&mutex);
    exit(0);
}
```

```
void handler( void *ptr)
{
    int iter = 0;
    int thread_num;
    thread_num = *(( int *) ptr);
    printf("Starting thread: %d \n", thread_num);
    sem_wait(&mutex);
    while ( iter < NUM_RUNS)
    {
        counter++;
        iter += 1;
    }
    sem_post(&mutex);
    printf("Thread %d, counter = %d \n", thread_num, counter);
    pthread_exit(0);
}
```

SCREENSHOT:



```
ahmed@ahmed-Inspiron-N4050: ~/Desktop
ahmed@ahmed-Inspiron-N4050:~/Desktop$ gcc osassignment5.c -lpthread
ahmed@ahmed-Inspiron-N4050:~/Desktop$ ./a.out
Starting thread: 0
Starting thread: 1
Thread 0, counter = 10000000
Thread 1, counter = 20000000
-----
Final counter value: 20000000
Error: 0
ahmed@ahmed-Inspiron-N4050:~/Desktop$
```