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P200086 BSCS 4A



Q1

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Assignment_05.c - Operating Systems - Visual Studio Code
File Edit Selection View Go Run Terminal Help

C Assignment_05.c X
C Assignment_05.c > main()
1  #include<unistd.h>
2  #include<sys/types.h>
3  #include<errno.h>
4  #include<stdio.h>
5  #include<stdlib.h>
6  #include<pthread.h>
7  #include<string.h>
8
9  //1
10 #include <semaphore.h> //Including the header
11
12 #define NUM_RUNS 10000000
13
14 void handler( void *ptr );
15
16 int counter;
17
18 //2
19 sem_t mutex; //Create a mutex (globally)
20
21 int main(){
22     //3
23     sem_init(&mutex, 0, 1);/*initialize semaphore variable - */
24     int i[2];
25     pthread_t thread_a;
26     pthread_t thread_b;
27     i[0] = 0;
28     i[1] = 1;
29     pthread_create (&thread_a,NULL,(void *)&handler,(void *) &i[0]);
30     pthread_create (&thread_b,NULL,(void *)&handler,(void *) &i[1]);
31     pthread_join(thread_a, NULL);
32     pthread_join(thread_b, NULL);
33     printf("-----\n");
34     printf("Final counter value: %d\n", counter);
35     printf("Error : %d\n", (NUM_RUNS*2-counter));
36
37     //5
38     sem_destroy(&mutex); //Destroy the mutex
39     exit(0);
40
41 void handler ( void *ptr ){
42     //3
43     sem_wait(&mutex);
44     int iter = 0;
45     int thread_num;
46     thread_num = *((int *)ptr);
47     printf("Starting thread: %d\n",thread_num);
48
49     while(iter < NUM_RUNS){
50         counter++;
51         iter +=1;
52     }
53
54     printf("Thread %d,counter = %d\n", thread_num, counter);
55
56     //4
57     sem_post(&mutex);
58     pthread_exit(0);
59 }
60
61 }
```

Output:

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+  abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/...  🔍  ...  ● ● ●
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems$
gcc -o Assignment_05 Assignment_05.c
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems$
./Assignment_05
Starting thread: 0
Thread 0,counter = 10000000
Starting thread: 1
Thread 1,counter = 20000000
-----
Final counter value: 20000000
Error :          0
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems$
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems$
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems$
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems$
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