

Parallel Computing Lab
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Lab 7

```
#include <semaphore.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <pthread.h>

sem_t x, y;
pthread_t tid;
pthread_t writerthreads[100], readerthreads[100];
int readercount = 0;

void *reader(void *param)
{
    sem_wait(&x);
    readercount++;
    if (readercount == 1)
        sem_wait(&y);
    sem_post(&x);
    printf("%d reader is inside\n", readercount);
    usleep(3);
    sem_wait(&x);
    readercount--;
    if (readercount == 0)
    {
        sem_post(&y);
    }
    sem_post(&x);
    printf("%d Reader is leaving\n", readercount + 1);
    return NULL;
}

void *writer(void *param)
{
    printf("A writer has arrived and waiting...\n");
    sem_wait(&y);
    printf("A writer is trying to enter.\n");
```

```
    sem_post(&y);
    printf("A Writer has left\n");
    return NULL;
}

int main()
{
    int n2, i;
    printf("Input readers and writers:\n");
    scanf("%d", &n2);
    printf("\n");
    int n1[n2];
    sem_init(&x, 0, 1);
    sem_init(&y, 0, 1);
    for (i = 0; i < n2; i++)
    {
        pthread_create(&writerthreads[i], NULL, reader, NULL);
        pthread_create(&readerthreads[i], NULL, writer, NULL);
    }
    for (i = 0; i < n2; i++)
    {
        pthread_join(writerthreads[i], NULL);
        pthread_join(readerthreads[i], NULL);
    }
}
```

Input/Output:

```
● nilay@Nilay-PC:~/Documents$ gcc reader_writer.c
● nilay@Nilay-PC:~/Documents$ ./a.out
Input readers and writers:
5

1 reader is inside
A writer has arrived and waiting...
1 Reader is leaving
A writer is trying to enter.
A Writer has left
1 reader is inside
A writer has arrived and waiting...
A writer is trying to enter.
A Writer has left
1 Reader is leaving
1 reader is inside
A writer has arrived and waiting...
1 Reader is leaving
A writer is trying to enter.
A Writer has left
1 reader is inside
A writer has arrived and waiting...
2 reader is inside
A writer has arrived and waiting...
2 Reader is leaving
1 Reader is leaving
A writer is trying to enter.
A Writer has left
A writer is trying to enter.
A Writer has left
○ nilay@Nilay-PC:~/Documents$ █
```