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**Week 10**

**Aim :** To implement Readers-Writers Problem using Semaphores

**Code :**

```
#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("Writer is trying to enter\n");
    sem_wait(&y);
    printf("Writer has entered\n");
    sem_post(&y);
    printf("Writer is leaving\n");
    return NULL;
}
int main()
{
    int n2, i;
    printf("Enter the number of readers:");
    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);
}
}

```

### Output :

```

piratepanda@SastaPC:~/Documents/oslab/week10$ gcc -pthread ReaderWriter.c
piratepanda@SastaPC:~/Documents/oslab/week10$ ./a.out
Enter the number of readers:5

Writer is trying to enter
1 reader is inside
Writer is trying to enter
2 reader is inside
2 Reader is leaving
Writer is trying to enter
Writer has entered
Writer is leaving
Writer has entered
Writer is leaving
1 Reader is leaving
1 reader is inside
2 reader is inside
Writer is trying to enter
2 reader is inside
2 Reader is leaving
2 Reader is leaving
1 Reader is leaving
Writer is trying to enter
Writer has entered
Writer is leaving
Writer has entered
Writer is leaving
Writer has entered
Writer is leaving
piratepanda@SastaPC:~/Documents/oslab/week10$ █

```