

OS_LAB_10_Assignment

CE_054

- Program :-

1. Priority Higher => Reader : Implementation of Code.

Code :-

```
// Author : Dhruv B Kakadiya
#include <stdio.h>
#include <pthread.h>
#include <semaphore.h>
#include <unistd.h>

#define rdr 3
#define wtr 1

sem_t rdrsema, wrtsema;
int rdrcnt = 0;
int content = 0;

void* rdrFun(void *args)
{
    int *rdrArg = (int *)args;
    while(1)
    {
        sem_wait(&rdrsema);
        rdrcnt++;
        if(rdrcnt == 1)
        {
            sem_wait(&wrtsema);
        }
        sem_post(&rdrsema);
        printf("Reader %d is reading number %d\n", *rdrArg, content);
        sem_wait(&rdrsema);
        rdrcnt--;
        if(rdrcnt==0)
        {
            sem_post(&wrtsema);
        }
        sem_post(&rdrsema);
        sleep(2);
    }
}

void* wrtFun(void *args)
{

```

```

int *wrtArg=(int *)args;
int i = 0;
while(1)
{
    sem_wait(&wrtsema);
    content++;
    printf("Writer number %d is writing number %d\n", *wrtArg, content);
    sem_post(&wrtsema);
    sleep(1);
}
}

void main()
{
    int i=0;
    int rdrArr[rdr], wrtArr[wtr];
    pthread_t rdr_thread_array[rdr], wtr_thread_array[wtr];

    sem_init(&rdrsema, 0, 1);
    sem_init(&wrtsema, 0, 1);

    for(i = 0 ; i < rdr ; i++)
    {
        rdrArr[i] = i + 1;
        pthread_create(&rdr_thread_array[i], NULL, rdrFun, (void*)&rdrArr[i]);
    }
    for(i = 0 ; i < wtr ; i++)
    {
        wrtArr[i] = i + 1;
        pthread_create(&wtr_thread_array[i], NULL, wrtFun, (void*)&wrtArr[i]);
    }
    for(i = 0 ; i < rdr ; i++)
    {
        pthread_join(rdr_thread_array[i], NULL);
    }
    for(i = 0 ; i < wtr ; i++)
    {
    }
}

```

Output :-

```
File Actions Edit View Help
dhruvkakadiya@kali:~/OS_LAB/lab10$ gcc reader_rdrwtr.c -lpthread
dhruvkakadiya@kali:~/OS_LAB/lab10$ ./a.out
Reader 1 is reading number 0
Reader 2 is reading number 0
Reader 3 is reading number 0
Writer number 1 is writing number 1
Writer number 1 is writing number 2
Reader 1 is reading number 2
Reader 3 is reading number 2
Writer number 1 is writing number 3
Reader 2 is reading number 3
Writer number 1 is writing number 4
Reader 1 is reading number 4
Reader 3 is reading number 4
Reader 2 is reading number 4
Writer number 1 is writing number 5
Writer number 1 is writing number 6
Reader 1 is reading number 6
Reader 2 is reading number 6
Reader 3 is reading number 6
Writer number 1 is writing number 7
Writer number 1 is writing number 8
Reader 1 is reading number 8
Reader 2 is reading number 8
Reader 3 is reading number 8
Writer number 1 is writing number 9
Writer number 1 is writing number 10
Reader 1 is reading number 10
Reader 2 is reading number 10
Reader 3 is reading number 10
Writer number 1 is writing number 11
Writer number 1 is writing number 12
Reader 1 is reading number 12
Reader 2 is reading number 12
Reader 3 is reading number 12
```

2. Higher priority => Writer : Implementation of Code :

Code :-

```
// Author : Dhruv B Kakadiya
#include <stdio.h>
#include <pthread.h>
#include <semaphore.h>
#include <unistd.h>

#define rdr 3
#define wtr 2

sem_t sem_z, rdr_sema_cnt, wrt_sema_cnt, rdrsema, wrtsema;
int rdrCnt = 0, wrtCnt = 0;
int content = 0;

void *rdr_function(void* args)
{
    int *rdrArg = (int *)args;
    while(1)
    {
        sem_wait(&sem_z);
        sem_wait(&rdrsema);
```

```

        sem_wait(&rdr_sema_cnt);
        rdrCnt++;
        if(rdrCnt == 1)
        {
            sem_wait(&wrtsema);
        }
        sem_post(&rdr_sema_cnt);
        sem_post(&rdrsema);
        sem_post(&sem_z);
        printf("Reader %d is reading number %d\n", *rdrArg, content);
        sem_wait(&rdr_sema_cnt);
        rdrCnt--;
        if(rdrCnt==0)
        {
            sem_post(&wrtsema);
        }
        sem_post(&rdr_sema_cnt);
        sleep(3);
    }
}

void *wrt_function(void* args)
{
    int *wrtArg = (int *)args;
    while(1)
    {
        sem_wait(&wrt_sema_cnt);
        wrtCnt++;
        if(wrtCnt==1)
        {
            sem_wait(&rdrsema);
        }
        sem_post(&wrt_sema_cnt);
        sem_wait(&wrtsema);
        content++;
        printf("Writer number %d is writing number %d\n", *wrtArg, content);
        sem_post(&wrtsema);
        sem_wait(&wrt_sema_cnt);
        wrtCnt--;
        if(wrtCnt==0)
        {
            sem_post(&rdrsema);
        }
        sem_post(&wrt_sema_cnt);
        sleep(2);
    }
}

void main(){

```

```

int i = 0;
int rdrArr[rdr], wrtArr[wtr];
pthread_t rdr_thread_array[rdr], wrt_thread_array[wtr];

sem_init(&rdr_sema_cnt, 0, 1);
sem_init(&wrt_sema_cnt, 0, 1);
sem_init(&rdrsema, 0, 1);
sem_init(&wrtsema, 0, 1);
sem_init(&sem_z, 0, 1);

for(i = 0 ; i < rdr ; i++)
{
    rdrArr[i] = i + 1;
    pthread_create(&rdr_thread_array[i], NULL, rdr_function, (void*)&rdrAr
r[i]);
}
for(i = 0 ; i < wtr ; i++)
{
    wrtArr[i] = i + 1;
    pthread_create(&wrt_thread_array[i], NULL, wrt_function, (void*)&wrtAr
r[i]);
}

for(i = 0 ; i < rdr ; i++)
{
    pthread_join(rdr_thread_array[i], NULL);
}
for(i = 0 ; i < wtr ; i++)
{
    pthread_join(wrt_thread_array[i], NULL);
}
}

```

Output :-

File Actions Edit View Help

```
dhruvkakadiya@kali:~/OS_LAB/lab10$ gcc writer_rdrwtr.c -lpthread
```

```
dhruvkakadiya@kali:~/OS_LAB/lab10$ ./a.out
```

```
Reader 1 is reading number 0
Reader 2 is reading number 0
Writer number 2 is writing number 1
Writer number 1 is writing number 2
Reader 3 is reading number 2
Writer number 2 is writing number 3
Writer number 1 is writing number 4
Reader 2 is reading number 4
Reader 1 is reading number 4
Reader 3 is reading number 4
Writer number 2 is writing number 5
Writer number 1 is writing number 6
Writer number 2 is writing number 7
Writer number 1 is writing number 8
Reader 1 is reading number 8
Reader 3 is reading number 8
Reader 2 is reading number 8
Writer number 2 is writing number 9
Writer number 1 is writing number 10
Reader 1 is reading number 10
Reader 3 is reading number 10
Reader 2 is reading number 10
Writer number 2 is writing number 11
Writer number 1 is writing number 12
Writer number 2 is writing number 13
Writer number 1 is writing number 14
Reader 1 is reading number 14
Reader 2 is reading number 14
Reader 3 is reading number 14
Writer number 2 is writing number 15
Writer number 1 is writing number 16
```