Assignment 5

```c
/* Name-Gaurav Ghati
Div- TE10
Batch-L10
Rollno-33223*/
#include<stdio.h>
#include<pthread.h>
#include<semaphore.h>
pthread_mutex_t writeback;
pthread_mutex_t mutex;
pthread_t rtid[20], wtid[20];

int data = 1;
int rc = 0;

void *readerFunc(void *arg) {
    int f = ((int *) arg);
    sleep(rand()%3);

    pthread_mutex_lock(&mutex);

    rc++;
    if(rc==1)
        pthread_mutex_lock(&writeback);
    pthread_mutex_unlock(&mutex);

    printf("READER %d  |  DATA: %d\n", f, data);
    sleep(rand()%3);
    pthread_mutex_lock(&mutex);

    rc--;
    if(rc==0)
        pthread_mutex_unlock(&writeback);

    pthread_mutex_unlock(&mutex);
}

void *writerFunc(void *arg) {
    int f = ((int *) arg);
        sleep(rand()%3);

    pthread_mutex_lock(&writeback);
```

```c
    data = data * 2;
    printf("WRITER %d  |  DATA %d\n", f, data);
        pthread_mutex_unlock(&writeback);
}

int main() {
        pthread_mutex_init(&mutex,NULL);
        pthread_mutex_init(&writeback,NULL);

        for(int i=0;i<20;i++) {
        pthread_create(&wtid[i] ,NULL, writerFunc, (void *) i);
        pthread_create(&rtid[i] ,NULL, readerFunc, (void *) i);
        }

        for(int i=0;i<20;i++) {
        pthread_join(wtid[i] ,NULL);
        pthread_join(rtid[i] ,NULL);
        }
}
```

OUTPUT:

```
gauravghati@gauravghati:~/OS-Programming/assignment5-ReaderWriterProblem$ ./a.out
READER 3   |   DATA 1
READER 17  |   DATA 1
READER 13  |   DATA 1
WRITER 6   |   DATA 2
READER 9   |   DATA 2
WRITER 2   |   DATA 4
WRITER 10  |   DATA 8
READER 3   |   DATA 8
WRITER 0   |   DATA 16
WRITER 12  |   DATA 32
READER 11  |   DATA 32
READER 7   |   DATA 32
WRITER 2   |   DATA 64
WRITER 2   |   DATA 128
READER 7   |   DATA 128
READER 9   |   DATA 128
WRITER 2   |   DATA 256
READER 9   |   DATA 256
READER 13  |   DATA 256
READER 11  |   DATA 256
READER 9   |   DATA 256
READER 1   |   DATA 256
WRITER 4   |   DATA 512
WRITER 18  |   DATA 1024
READER 15  |   DATA 1024
READER 13  |   DATA 1024
READER 11  |   DATA 1024
WRITER 16  |   DATA 2048
WRITER 2   |   DATA 4096
WRITER 16  |   DATA 8192
READER 5   |   DATA 8192
WRITER 4   |   DATA 16384
WRITER 16  |   DATA 32768
WRITER 6   |   DATA 65536
READER 13  |   DATA 65536
WRITER 4   |   DATA 131072
WRITER 2   |   DATA 262144
WRITER 14  |   DATA 524288
WRITER 14  |   DATA 1048576
READER 3   |   DATA 1048576
READER 7   |   DATA 1048576
WRITER 16  |   DATA 2097152
WRITER 8   |   DATA 4194304
READER 3   |   DATA 4194304
WRITER 14  |   DATA 8388608
WRITER 12  |   DATA 16777216
WRITER 16  |   DATA 33554432
READER 19  |   DATA 33554432
WRITER 6   |   DATA 67108864
WRITER 14  |   DATA 134217728
gauravghati@gauravghati:~/OS-Programming/assignment5-ReaderWriterProblem$
```