

ASSIGNMENT 4B

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Problem Statement: B. Thread synchronization and mutual exclusion using mutex. Application to demonstrate: Reader/Writer problem with reader priority.

Code:

```
#include<stdio.h>
#include<stdlib.h>
#include<pthread.h>
#include<sys/types.h> void
*reader(void *argp); void
*writer(void *argp); int
buf;

int getbuff()
{
    int temp;
    printf("enter item in buffer: ");
    scanf("%d",&temp);    return
temp;
}

void readbuff(int buf){
    printf("item read from buffer:%d\n",buf);
}

pthread_mutex_t
mutex1=PTHREAD_MUTEX_INITIALIZER;
pthread_mutex_t
wrt=PTHREAD_MUTEX_INITIALIZER;

int read_count=0;
int flag=0;

void *writer(void *argp)
{
    while(1)
    {
        pthread_mutex_lock(&wrt);  if(flag==0)
```

```

        {
            buf=getbuff();
            flag=1;
        }
        pthread_mutex_unlock(&wrt);
    }
}

void *reader(void *argp)
{
    while(1)
    {
        pthread_mutex_lock(&mutex1);
        read_count++;
        if(read_count==1)
        {
            pthread_mutex_lock(&wrt);
        }
        pthread_mutex_unlock(&mutex1);
        if(flag==1)
        {
            readbuff(buf);
            sleep(1);
            flag=0;
        }
        pthread_mutex_lock(&mutex1);
        read_count--;
        if(read_count==0)
        {
            pthread_mutex_unlock(&wrt);
        }
        pthread_mutex_unlock(&mutex1);
    }
}

int main()
{
    pthread_t tid1,tid2,tid3;
    pthread_create(&tid1,NULL,writer,NULL);
    pthread_create(&tid2,NULL,reader,NULL);

```

```
pthread_create(&tid3,NULL,reader,NULL);
pthread_join(tid1,NULL); pthread_join(tid2,NULL);
pthread_join(tid3,NULL);    return 0;
}
```

Output student@student-

```
OptiPlex390:~/skn$ ./a.out enter item in
buffer: 1 item read from buffer:1 item read
from buffer:1 enter item in buffer: 3 item read
from buffer:3 item read from buffer:3 enter
item in buffer: 8 item read from buffer:8 item
read from buffer:8 enter item in buffer: 0 item
read from buffer:0 item read from
buffer:0
```