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Class : TE (IT)

Practical : 4B

Statement : [Thread synchronization and mutual exclusion using mutex. Application to demonstrate: ReaderWriter problem with reader priority.](https://drive.google.com/file/d/1pabBLrdbL-5ATQIiyrfRotlz2keIVxO1/view?usp=sharing)

#include<stdio.h>

#include<unistd.h>

#include<semaphore.h>

#include<pthread.h>

#include<sys/syscall.h>

void \*reader(void \*argp);

void \*writer(void \*argp);

int buffer;

int flag=0;

int read\_count=0;

int getbuff() {

int temp;

printf("Enter the no to add in buffer : ");

scanf("%d",&temp);

return temp;

}

void readbuff(int buffer) {

printf("Element read by reader=%d\n",buffer);

}

pthread\_mutex\_t mutex1=PTHREAD\_MUTEX\_INITIALIZER;

pthread\_mutex\_t wrt=PTHREAD\_MUTEX\_INITIALIZER;

int main() {

pthread\_t wtid1,rtid1,rtid2 ;

pthread\_create(&wtid1,NULL,writer,NULL);

pthread\_create(&rtid1,NULL,reader,NULL);

pthread\_create(&rtid2,NULL,reader,NULL);

pthread\_join(wtid1,NULL);

pthread\_join(rtid1,NULL);

pthread\_join(rtid2,NULL);

return 0;

}

void\* writer(void \*argp) {

while(1) {

pthread\_mutex\_lock(&wrt);

if(flag==0) {

buffer=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(buffer);

sleep(1);

flag=0;

}

pthread\_mutex\_lock(&mutex1);

read\_count--;

if(read\_count==0) {

pthread\_mutex\_unlock(&wrt);

}

pthread\_mutex\_unlock(&mutex1);

}

}

Output :-

sarthak1594@UbuntuInWin:~/OS Practical/4$ gcc reader-writer.c

sarthak1594@UbuntuInWin:~/OS Practical/4$ ./a.out

Enter the no to add in writer buffer : 1

Element read by reader=1

Element read by reader=1

Enter the no to add in writer buffer : 2

Element read by reader=2

Element read by reader=2

Enter the no to add in writer buffer : 3

Element read by reader=3

Element read by reader=3

Enter the no to add in writer buffer : 4

Element read by reader=4

Element read by reader=4

Enter the no to add in writer buffer : 5

Element read by reader=5

Element read by reader=5

Enter the no to add in writer buffer : 6

Element read by reader=6

Element read by reader=6

Enter the no to add in writer buffer : 7

Element read by reader=7

Element read by reader=7

Enter the no to add in writer buffer : 8

Element read by reader=8

Element read by reader=8

Enter the no to add in writer buffer : 9

Element read by reader=9

Element read by reader=9

Enter the no to add in writer buffer : 0

Element read by reader=0

Element read by reader=0