

Yash Bahekar.

TCOD35.

```
#include<stdio.h>
#include<unistd.h>
#include<stdlib.h>
#include<pthread.h>

pthread_t philosopher[5];
pthread_mutex_t spoon[5];

void *func(int n)
{
    printf("Philosopher %d is thinking\n",n);
    pthread_mutex_lock(&spoon[n]);
    pthread_mutex_lock(&spoon[(n+1)%5]);
    printf("Philosopher %d is eating\n",n);
    sleep(3);
    pthread_mutex_unlock(&spoon[n]);
    pthread_mutex_unlock(&spoon[(n+1)%5]);
    printf("Philosopher %d finished eating\n",n);
    return(NULL);
}

int main()
{
    int i;
    for(i=0;i<5;i++)
        pthread_mutex_init(&spoon[i],NULL);
    for(i=0;i<5;i++)
        pthread_create(&philosopher[i],NULL,(void *)func,(void *)i);
    for(i=0;i<5;i++)
        pthread_join(philosopher[i],NULL);
    for(i=0;i<5;i++)
        pthread_mutex_destroy(&spoon[i]);
    return 0;
}
```

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Activities Terminal Tue 14:19 ubuntu@ubuntu-Vostro-460: ~/Downloads
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ubuntu@ubuntu-Vostro-460:~/Downloads$ gcc dp.c -pthread
dp.c: In function 'main':
dp.c:28:52: warning: cast to pointer from integer of different size [-Wint-to-pointer-cast]
pthread_create(&philosopher[i],NULL,(void *)func,(void *)i);
                                         ^
ubuntu@ubuntu-Vostro-460:~/Downloads$ ./a.out
Philosopher 0 is thinking
Philosopher 0 is eating
Philosopher 3 is thinking
Philosopher 1 is thinking
Philosopher 2 is thinking
Philosopher 4 is thinking
Philosopher 3 is eating
Philosopher 0 finished eating
Philosopher 3 finished eating
Philosopher 4 is eating
Philosopher 2 is eating
Philosopher 4 finished eating
Philosopher 2 finished eating
Philosopher 1 is eating
Philosopher 1 finished eating
ubuntu@ubuntu-Vostro-460:~/Downloads$
```

```
#include<stdio.h>
#include<stdlib.h>
#include<sys/types.h>
#include<pthread.h>
#include<unistd.h>
#include<semaphore.h>
#define BUFFER_SIZE 5

sem_t empty;// for buffer empty
sem_t full;// for buffer full
pthread_mutex_t mutual;// used for mutual exclusion
int buffer[BUFFER_SIZE];

void *producer(void *arg)
{
    int item,i=0;
    while(1)
    {
        item=rand()%100;
        sem_wait(&empty);
        pthread_mutex_lock(&mutual);
        sleep(1);
        printf("\n%d item is inserting in buffer at posn %d\n\n",item,i);
        buffer[i++]=item;
        if(i==BUFFER_SIZE)
            i=0;
        pthread_mutex_unlock(&mutual);
        sem_post(&full);
        sleep(1);
    }
}
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}
void *consumer(void *args)
{
    int item,i=0;
    while(1)
    {
        sem_wait(&full);
        pthread_mutex_lock(&mutual);
        sleep(1);
        item=buffer[i];
        printf("\n%d item is consumed from buffer from position %d\n",item,i);
        i++;
        if(i==BUFFER_SIZE)
            i=0;
        pthread_mutex_unlock(&mutual);
        sem_post(&empty);
        sleep(1);
    }
}
int main()
{
    sem_init(&empty,0,BUFFER_SIZE);
    sem_init(&full,0,0);
    pthread_mutex_init(&mutual,NULL);
    pthread_t pid,cid;
    pthread_create(&pid,NULL,producer,NULL);
    pthread_create(&cid,NULL,consumer,NULL);
    pthread_join(pid,NULL);
    pthread_join(cid,NULL);
    return 0;
}

```

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Tue 14:22
ubuntu@ubuntu-Vostro-460: ~/Downloads
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ubuntu@ubuntu-Vostro-460:~/Downloads$ gcc pc.c -pthread
ubuntu@ubuntu-Vostro-460:~/Downloads$ ./a.out
83 item is inserting in buffer at posn 0
83 item is consumed from buffer from position 0
86 item is inserting in buffer at posn 1
86 item is consumed from buffer from position 1
77 item is inserting in buffer at posn 2
77 item is consumed from buffer from position 2
15 item is inserting in buffer at posn 3
15 item is consumed from buffer from position 3
93 item is inserting in buffer at posn 4
93 item is consumed from buffer from position 4
35 item is inserting in buffer at posn 0
35 item is consumed from buffer from position 0
86 item is inserting in buffer at posn 1
86 item is consumed from buffer from position 1
92 item is inserting in buffer at posn 2
92 item is consumed from buffer from position 2
49 item is inserting in buffer at posn 3
49 item is consumed from buffer from position 3

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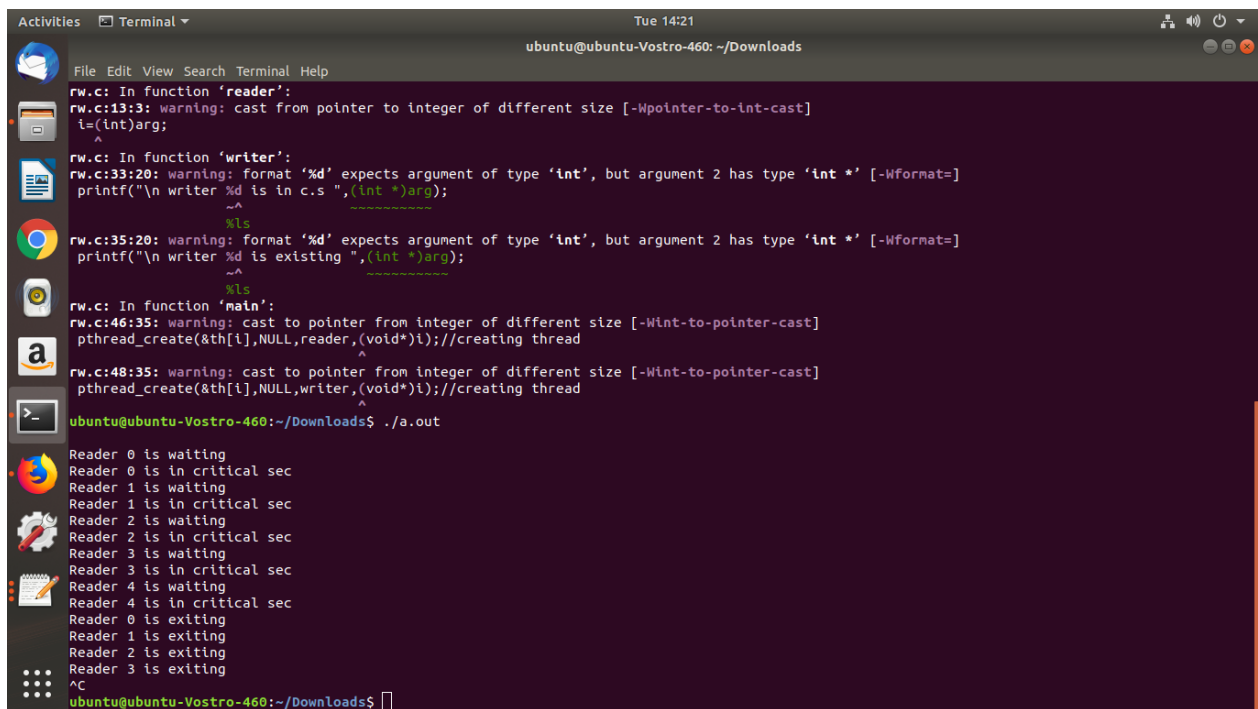
#include<stdio.h>
#include<stdlib.h>
#include<unistd.h>
#include<pthread.h>
#include<semaphore.h>
int rc=0;          //initialise counter
sem_t mutex,wc;    //declaring semaphore object
void *reader(void *arg) //function definition
{
    int i;
    i=(int)arg;
    sem_wait(&mutex);    //function call
    rc=rc+1;
    printf("\nReader %d is waiting ",i);
    if(rc==1)
    sem_wait(&wc);        //function call
    sem_post(&mutex);     //function call
    printf("\nReader %d is in critical sec ",i);
    sleep(2);
    printf("\nReader %d is exiting",i);
    sem_wait(&mutex);     //function call
    rc=rc--;
    if(rc==0)
    sem_post(&wc);        //function call
    sem_post(&mutex);     //function call
    pthread_exit(NULL);
}
void *writer(void *arg) //function definition
{
    sem_wait(&wc);        //function call
    printf("\n writer %d is in c.s ",(int *)arg);
    sleep(2);
    printf("\n writer %d is existing ",(int *)arg);
    sem_post(&wc);        //function call
    pthread_exit(NULL);
}
int main()
{
    int i;
    pthread_t th[10];
    sem_init(&mutex,0,1); //initialise semaphore
    sem_init(&wc,0,1);    //iniialise semaphore
    for(i=0;i<5;i++)
    pthread_create(&th[i],NULL,reader,(void*)i);//creating thread
    for(i=5;i<10;i++)
    pthread_create(&th[i],NULL,writer,(void*)i);//creating thread

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pthread_join(th[4],NULL);
pthread_join(th[9],NULL);
pthread_join(th[3],NULL);
pthread_join(th[0],NULL);
pthread_join(th[5],NULL);
pthread_join(th[6],NULL);
pthread_join(th[7],NULL);
pthread_join(th[2],NULL);
pthread_join(th[8],NULL);
pthread_join(th[1],NULL);
return(0);
}

```



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Tue 14:21
ubuntu@ubuntu-Vostro-460: ~/Downloads
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rw.c: In function 'reader':
rw.c:13:3: warning: cast from pointer to integer of different size [-Wpointer-to-int-cast]
    i=(int)arg;
    ^
rw.c: In function 'writer':
rw.c:33:20: warning: format '%d' expects argument of type 'int', but argument 2 has type 'int *' [-Wformat=]
    printf("\n writer %d is in c.s ",(int *)arg);
                        ~^
rw.c:35:20: warning: format '%d' expects argument of type 'int', but argument 2 has type 'int *' [-Wformat=]
    printf("\n writer %d is existing ",(int *)arg);
                        ~^
rw.c: In function 'main':
rw.c:46:35: warning: cast to pointer from integer of different size [-Wint-to-pointer-cast]
    pthread_create(&th[i],NULL,reader,(void*)i);//creating thread
                                   ^
rw.c:48:35: warning: cast to pointer from integer of different size [-Wint-to-pointer-cast]
    pthread_create(&th[i],NULL,writer,(void*)i);//creating thread
                                   ^
ubuntu@ubuntu-Vostro-460:~/Downloads$ ./a.out
Reader 0 is waiting
Reader 0 is in critical sec
Reader 1 is waiting
Reader 1 is in critical sec
Reader 2 is waiting
Reader 2 is in critical sec
Reader 3 is waiting
Reader 3 is in critical sec
Reader 4 is waiting
Reader 4 is in critical sec
Reader 0 is exiting
Reader 1 is exiting
Reader 2 is exiting
Reader 3 is exiting
^C
ubuntu@ubuntu-Vostro-460:~/Downloads$

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