CS334: Network Programming Lab

Experiment 8

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S6 CSE

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TCR18CS055

AIM

Implement the First Readers-Writers Problem (Using Threads and
Shared Memory)

THEORY

Suppose that a database is to be shared among several concurrent processes. Some of these processes may want only to read the database, whereas others may want to update (that is, to read and write) the database. We distinguish between these two types of processes by referring to the former as readers and to the latter as writers. Obviously, if two readers access the shared data simultaneously, no adverse effects will result. However, if a writer and some other process (either a reader or a writer) access the database simultaneously, chaos may ensue.

In first readers-writers problem, multiple readers are possible. But while one reader is in critical section, no writers can come up. Also when only one writer can come up in critical section.

● Writer can only write when the read count is zero or there are no readers waiting.

● If the first reader executes wait(wrt) operation before the writer does, then writer gets blocked.

● Only when the last reader exits, it calls the signal(wrt) operation signalling writer to continue

● Similarly, when a writer starts writing(readcount=0) then the first reader gets blocked on wait(wrt) and this blocks all the readers.

HOW TO RUN

Open in terminal.

● gcc -pthread exp8.c

● ./a.out

Then enter no of readers and writers.

SCREENSHOTS

```
C:\Windows\System32\cmd.exe

C:\Users\shree\OneDrive\Desktop\E8>a
Enter no of readers
-2
Enter No of writers
3
expected final count value is no of writers - no of readers=5
Error!!!!
No of Readers or Writers is invalid

C:\Users\shree\OneDrive\Desktop\E8>a
Enter no of readers
4
Enter No of writers
-3
expected final count value is no of writers - no of readers=-7
Error!!!!
No of Readers or Writers is invalid

C:\Users\shree\OneDrive\Desktop\E8>a
Enter no of readers
0
Enter No of writers
3
expected final count value is no of writers - no of readers=3
No reader thread created.only writer thread created
Writer 1 modified
Writer 2 modified
Writer 3 modified
final count value is  3.Hence success
```

```
C:\Windows\System32\cmd.exe

C:\Users\shree\OneDrive\Desktop\E8>a
Enter no of readers
3
Enter No of writers
0
expected final count value is no of writers - no of readers=-3
No writer thread created.only reader thread created
Reader 1: read
Reader 3: read
Reader 2: read
final count value is  -3.Hence success

C:\Users\shree\OneDrive\Desktop\E8>a
Enter no of readers
4
Enter No of writers
5
expected final count value is no of writers - no of readers=1
both threads created
Reader 1: read
Reader 2: read
Reader 4: read
Reader 3: read
Writer 1 modified
Writer 2 modified
Writer 3 modified
Writer 4 modified
Writer 5 modified
final count value is  1.Hence success
```