

Government Engineering College, Thrissur

CS334 – Network Programming Lab

Documentation -

Exp 9 – Second Reader Writer Problem

Date of Submission

13 June 2021

Submitted By

Kowsik Nandagopan D

Roll No 31

TCR18CS031

GECT CSE S6

Experiment 9

Implement the Second Readers-Writers problem (Using Process along with PIPE and Message Queue)

Executing program

- Code is provided in the **second.c** (Tested and verified on Ubuntu 20.04)

```
gcc second.c -lpthread -lrt && ./a.out
```

- **NOTE: This program is designed to accept only positive number. If the number is negative or zero, then corresponding error message will be displayed**

ALGORITHM

- Get number of readers and writers required from the console
- Initialize pipe variables
- Initialize threads reader and writer threads
- Run threads
- In reader thread – Readers can execute in parallel, but when ever a writer tries write the reader has to wait. In this problem readers are given less priority compared to writers.
- In writer thread – Writers should not wait for readers. Whenever a writer tries to write into shared memory space readers have to wait. **Writers are given more priority in second readers-writers problem**
- Wait until all threads complete execution

P. T, O

Output / Screenshots

Error Messages

Error messages produced for non positive number of readers and writers

```
hp@hp ~/Documents/S6/Network Lab/Exp9 <master*>
$ gcc second.c -lpthread -lrt && ./a.out
Enter number of readers: -1
Enter number of writers: 2
Error: Number of readers cannot be negative.
Enter number of readers: 2
Enter number of writers: -1
Error: Number of writers cannot be negative.
Enter number of readers: 2
Enter number of writers: 0
No writer thread created, only reader thread created
Enter number of readers: 0
Enter number of writers: 2
No reader thread created, only writer thread created
Enter number of readers: -1
Enter number of writers: -1
Error: Number of readers cannot be negative.
Error: Number of writers cannot be negative.
Enter number of readers: .
```

Thread Execution

Consider number of readers and writers as 100

```
hp@hp ~/Documents/S6/Network Lab/Exp9 <master*>
$ gcc second.c -lpthread -lrt && ./a.out
Enter number of readers: 100
Enter number of writers: 100
Reader thread and writer thread are created
Writer 1: 99
Reader 1: 101
Reader 2: 100
Writer 3: 100
Writer 2: 99
Reader 7: 101
Writer 4: 100
Reader 24: 100
Writer 6: 99
Reader 23: 101
Writer 7: 100
Reader 60: 100
Writer 5: 99
Reader 8: 101
Writer 8: 100
Reader 61: 100
Writer 9: 99
Reader 74: 101
Writer 10: 100
Reader 78: 100
Writer 14: 99
Reader 79: 101
Writer 13: 100
```

Observation and Explanation

- Writers start execution and readers are kept waiting. We cannot see reader in between writers. This is because writers are given higher priority than readers
- We can see writers after reader threads have begun, during this period no reader is allowed to access shared memory space.