Operating System
Assignment 3
Reader-Writer Problem

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QUESTION 1

In the given problem statement, we need to implement a chat system on queues that resolves the reader-writer problem. There is only one user for the system, but it can have multiple instances. The user has 3 choices when he enters into the system.

1. Write
2. Read
3. Exit

When the user chooses to write, that instance of the user acquires exclusive lock over the queue and no one else can modify it(either read or write). The write operation performed by the user enqueues at the end of the queue, and if the queue is full, the error message is displayed.

When the user chooses read, the user has 2 options

1. Dequeue
2. Read

When the user choses dequeue, the first element of the queue is returned and while someone is dequeuing, no one else can perform the same operation.if the queue is empty, the error for empty queue is returned.
When the user chooses to read, he/she needs to enter the index of the queue which the user needs to read. The error for incorrect is also handled.

We ensure that the queue is updated by only one user at a time by using semaphores. We use semaphore for every index of the queue and hence only one user can modify the queue, while the reader can read an index which is not being updated.
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INPUT EXPECTED:
The user is expected to provide input in the following way:
1 for Write
    Message
2 for Read
    1 for Dequeue
    2 for Read
        Index

EXPECTED OUTPUT:
Write: message (Empty if the element is not written)
Read
    Dequeue: Message on front
    Read: Message on index (Empty if the element is not written)

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COMPILATION: Using Makefile

ERRORS HANDLED:

1. Queue is full
2. Queue is empty
3. Shared Memory creation error
4. Semaphore creation error
5. Index not yet written.

QUESTION 2