CSN-232

Starve Free Readers Writers Problem

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In Readers-Writers Problem,

We are preventing more than one thread modifying the shared resource simultaneously and allowing access of the shared resource to two or more readers at the same time.

It can be done by these methods :

- ➢ Writers Starve or First Readers-Writers Problem

(Where no Reader,once added to the queue shall be kept waiting)

- ➢ Readers Starve or Second Readers-Writers Problem

(Where no Writer,once added to the queue shall be kept waiting)

- ➢ Starve-Free or Third Readers-Writers Problem

(Where no thread shall be allowed to wait)

Writers Starve :

Here, the first reader will lock the resource for reading, thus it can't modify the resource while other files are reading it. Once the first reader is in the entry section, it will lock the resource, preventing any writers from accessing it. Subsequent readers can just utilize the locked resource. The reader finishing last must unlock the resource, making it available to the writers. Thus here, the stream of readers will lock out the resources from the writers which will result in the starvation of the writers.

Readers Starve :

Here, the constraint is that no writer, once added to the queue, shall be kept waiting longer than absolutely necessary . This solution is also called writers-preference. Here we force every reader to lock and release the readtry semaphore individually. The writers on the other hand don't need to lock it individually. Only the first writer will lock the readtry and then all subsequent writers can simply use the resource as it gets freed by the previous writer. The very last writer must release the readtry semaphore, thus opening the gate for readers to try reading. If there are no writers wishing to get to the resource, as indicated to the reader by the status of the readtry semaphore, then the readers will not lock the resource. This is done to allow a writer to immediately take control over the resource as soon as the current reader is finished reading.. As soon as a writer shows up, it will try to set the semaphore and hang up there waiting for the current reader to release the readtry. It will then take control over the resource as soon as the current reader is done reading and lock all future readers out, causing the readers to starve.

Starve Free :

In fact, the solutions implied by both problem statements can result in starvation. Here, the first one may starve writers in the queue, and the second one may starve readers. Therefore, the third readers–writers problem is sometimes proposed, which adds the constraint that no thread shall be allowed to starve . The code for this method execution is provided in the Starvefree file and the supporting statements have been attached within the file.
