Pseudocode For Starve Free Reader-Writer Problem:

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Below is the classical solution of Reader Writer Problem as taught in the class of CSN-232 Course.

Hence I am using this solution as a base to propose my starve free Solution for the Reader -Writer problem

Classical Solution Pseudocode:

Writer Process :

```
wait(wrt);
…
writing is performed
…
signal(wrt);
```

Reader Process :

```
wait(mutex);
readcount++;
if (readcount == 1) wait(wrt);
signal(mutex);
…
reading is performed
…
wait(mutex);
readcount--;
if (readcount == 0) signal(wrt);
signal(mutex):
```

Here above semaphores are initialized to following:

mutex=1; wrt=1;

Is this Solution Starve free?

No, this solution is not starve free because as per the code Writer have to wait for “wrt” semaphore before writing and in case of readers they have to wait for “mutex” semaphore to update “readcount” and require “wrt” only when no reader is reading. This gives Readers a higher priority in terms of Writers when reading is taking place so make this solution vulnerable for starvation hence we need to improve the following code to make it starvation free.

Purposed Solution for Starvation free Reader-Writer Problem :

Writer Process :

wait(jay);

wait(wrt);

…

writing is performed

…

signal(wrt);

signal(jay);

Reader Process :

wait(jay);

signal(jay);

wait(mutex);

readcount++;

if (readcount == 1) wait(wrt);

signal(mutex);

…

reading is performed

…

wait(mutex);

readcount--;

if (readcount == 0) signal(wrt);

signal(mutex):

Here the Initialization of semaphore are jay=1,mutex=1,jay=1

Here in the above proposed solution I have just added a new binary semaphore “jay”. It is initialized to 1.

This semaphore will make sure that reader process does not get higher priority over the writer when a reader process is still going on and hence solve the problem of starvation which was arising in the classical solution will be removed. To explain it further we can see that whenever a reader or writer start their process they have to first wait for the “jay” semaphore and in case of reader it gets signaled in the next step while in case of writer it get signaled after the completion of writer process which comply with the fact that multiple readers can read together while only a single writer can write at a point of time.