Assignment - Starve free Reader-Writer

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→ Below is the pseudocode of the functions which will prevent starvation in Reader-writers problem.

① Declare class Database.

② In database declare —
   int readers = 0;
   bool writing = False;
   int waitingWriters = 0;
   bool readersTurn = False;
   Queue Q to store waiting readers or writers.

③ Declare thread functions acquireRead(), acquireWrite(), releaseRead(), releaseWrite().

* Pseudocode for acquireRead() —

(i) while(writing || (waitingWriters > 0 && !readersTurn)){
       call .wait() function // add process to queue
   }

(ii) ~~mutex~~ wait(mutex1);   // mutex1 initialized to 1

     readers ++;

     signal(mutex1);

* Pseudocode for acquireWrite() —
// mutex2 initialized to 1

(i) while (readers > 0 || writing) {
        wait(mutex2);
        waitingWriters++;
        signal(mutex2);
        call .wait() function
    }

(ii) if (waitingWriters > 0) {
     wait(mutex2);
        waitingWriters--;
        signal(mutex2);
    }

(iii) writing = true;

* Pseudocode for releaseRead() —

(i) wait(mutex1)
        readers--;
        signal(mutex1)

(ii) readersTurn = false;

(iii) if (readers == 0) {
        notify();
    }

* Pseudocode for releaseWrite() —

(i) writing = false;

(ii) readersTurn = TRUE;

(iii) notify();