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Assignment 5

Title:- Thread synchronization and mutual exclusion with Mutex

Problem Statement:- Thread synchronization and mutual execution using mutex. Application to demonstrate: Reader - writer problem with reade priority.

Theory:- Mutual Exclusion:- property of process synchronization which states that "no two process can exist in the critical section at any given point of time"

Reader- Writer Problem:-

- One set of data is shared among a number of processes
- Once a writer is ready, it performs its write. Only one writer may write at a time.
- If a process is writing, no other process can read it
- If atleast one reader is reading, no other process can write
- Reader may not write and only read

Three Variables are used:- mutex, wrt, readcnt

Writer Algorithm:-

```
do {
  // writer requests for critical section
  wait (wrt);
// performs the write
// leaves the critical section
```

```
  signal (wrt);
} while (true);
```

Reader Algorithm :·

```
            do{ // Reader wants to enter the critical section
      wait (mutex);
     // The no. of readers has now increased by 1
     readcnt ++;
   // there is atleast one reader in the critical section
   // this ensures no writer can enter if there is one reader
   // thus we give preference to readers here
  if (readcnt == 1)
      wait (writ);
 // the critical section
  signal (mutex)
// i.e. no reader is left in the critical section
  if (readcnt == 0)
     signal (wrt);   // writers can enter
     signal (mutex);  // readers leave
 }  while (true);
```

Conclusion :- I have successfully implemented Reader-Writer problem with reader priority. I have also ~~synchronized~~ th understood thread synchronization and mutual exclusion using mutex.