

# CS402 Assignment 01 – Read/Write Locking

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## 1 Read Write Locking

Read write locking is implemented similarly to coarse grained locking in that we only have one global lock for the entire table, but instead of using a `pthread_mutex_t` we instead use a `pthread_rwlock_t`. This allows us to use the functions `pthread_rwlock_rdlock` in order to get a read lock and `pthread_rwlock_wrlock` in order to get a write lock.

There is also one small difference with the way we compile under linux (which can be seen in the `if (!initialized)` clause within `interpret_command` function). The POSIX spec does not mention anything about giving readers or writers priority. Because of that, a lot of the implementations seem to not really care about priority and just allow any waking thread to continue through the lock, as long as it is allowed. This has the unfortunate effect of basically allowing readers to continue pouring through a lock even if a writer is waiting to acquire it. In order to solve this we enable the attribute `PTHREAD_RWLOCK_PREFER_WRITER_NONRECURSIVE_NP` when we are compiling under linux (which supports this attribute). By doing this we should see an increase in performance when we have a relatively even number of readers and writers.

### 1.1 Testing

We test the correctness of the read write lock similarly to the coarse grained lock, using the test that adds a lot of elements to the database and then removes them, which should leave us with an empty database. This can, like with coarse, be done simply by running:

```
./server_rw < test/250_add_remove | tail -n 800 | less
```