**Midterm**

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The midterm will be on Thursday, June 29 (next week) during regular class hours. We will cover Object-Oriented Programming and Parallel Programming. You should review the lecture slides and make sure you are comfortable with the following topics:

* Inheritance
* Composition (i.e. a “has a” relationship instead of “is a”)
* High cohesion
* Loose coupling
* Encapsulation
* Abstraction
* Pre- and post-conditions and side-effects
* The SOLID principles:
  + Single responsibility
  + Open/closed
  + Liskov substitution
  + Interface segregation
  + Dependency inversion
* Threads: sleep, join, interrupt
* Mutual exclusion: implicit and explicit locks
* Deadlocks: identifying and fixing them
  + Mutual exclusion (avoid by using immutable or local resources when possible)
  + No preemption (avoid by allowing interrupt to cancel locks)
  + **Hold-and-wait (avoid by acquiring all locks or none)**
  + Circular wait (avoid by acquiring locks in the same order when possible)