Review Exam 2

CS 537: Introduction to Operating Systems

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Administrivia

- Project 5 due Tue Apr 2nd @ 11:59pm
- Exam 2, Wed, Mar 20th, 5:45-7:30pm
  - Bring ID and #2 Pencil, same format as Exam 1
  - Lec 001 (**1pm**) – Humanities 3650
  - Lec 002 (**9:30am**)– Humanities 2650
  - McBurney – 5:45-8pm, CS 1325

Major Concepts

- Processes and `fork()`
- Threads
  - What is shared between threads
  - Create and Join Threads
  - Pass parameters and return values
  - Race conditions
- Locks
  - Create and use locks
  - Lock implementation goals
  - Lock implementations and types (spin-wait, blocking)
  - Hardware support (TestAndSet, xchg, CompareAndSwap, LoadLinked/StoreConditional)
- Locked Data Structures
  - Big lock vs. more smaller locks
  - Counter, Approximate Counter, linked-list, queue, hash table

Major Concepts (cont.)

- Condition Variables
  - Create and use CV
  - Example use in thread join, producer/consumer
  - Program state
  - Hoare vs. Mesa semantics
  - Covering conditions and broadcast()
- Semaphores
  - Create and use Semaphores
    - replacing locks
    - replacing CV
  - Producer/Consumer problem with semaphores
  - Reader-Writer locks
  - Dining Philosophers
  - Building Semaphores with locks and CV
  - Zemaphores

Major Concepts (cont. . .)

- Concurrency Problems
  - Atomicity violations
  - Order violations
  - Deadlock
    - mutual exclusion, hold-and-wait, no preemption, circular wait
  - deadlock avoidance, recovery