Lecture 21
Midterm Review
Topics Covered

- Object composition
- Java Monitor Pattern
- Instance confinement
- Delegating thread safety
- State-dependent actions
- Balking / guarded suspension / optimistic retry
- busy-waiting
- wait() / notify() / notifyAll()
- notify() and deadlock
- Timed waiting
- Nested monitor lockout
- Collections.synchronizedXXX() (XXX is the name of a type of collection)
- Thread safety, compound actions and client-side locking
- ConcurrentModificationException and hidden iteration
- Concurrent collections
- ConcurrentHashMap and lock striping
- Fail-fast vs. weakly consistent iterators
- CopyOnWriteArrayList
- ConcurrentLinkedQueue
- Blocking queues
- SynchronousQueue
- Producer/Consumer pattern
- Synchronizers
- Explicit (reentrant) locks
- Conditions, await() / signal() / signalAll()
- Latches
- Futures / FutureTasks
- Counting semaphores
- Barriers
- Tasks, task boundaries
- Executors, thread pools and execution policies
- Executor shutdown and rejected execution handling
- CompletionService
- Thread-starvation deadlock
- Thread-pool sizing
- Saturation policies and rejected execution
- Thread factories
- Parallelizing algorithms: iterative, recursive
- Tail recursion
- Performance tuning
- Parallelization and dependent tasks
- Fork/Join framework and divide-and-conquer
- Deques and work stealing