Recitation 16

Administravia

Pset4 Final due on April 27, 2012 (Fri)
Quiz 2 on April 30, 2012 (Mon)
Project 2 Milestone due on May 1, 2012 (Tues)

Quiz Review

Concurrency

Concurrent program: A program where multiple threads are executing at once

Shared Memory vs. Message Passing

Process vs. Thread

Java.lang.Thread vs. Runnable interface, run()

Synchronization: to restrict the interleavings
  Ensures safety: Avoid race conditions
  Coordinate actions of thread

Race conditions

Mutual exclusion: Prevent more than one thread from accessing critical section at a given time. Serialize.

Atomicity

Locks

Block synchronization: synchronized(object)
  Takes as a parameter an object whose lock the system needs to obtain before it can continue

Synchronized methods

Deadlocks

  Concurrent modules are stuck waiting from each other to do something
Livelocks
Starvation
Lack of fairness

**Processes and Sockets**

Queue
“Happens-before” relationship
Synchronized queue
BlockingQueue: interface java.util.concurrentBlockingQueue
Blocking
Immutable object for thread safety
Client-server programming
Sockets

**Event-Based Programming (GUI)**

Composite pattern
View hierarchy
Publish-Subscribe pattern
Event/Listener
Model-View-Controller

  Model: Data, View: Output, Controller: Input

Decoupling

**Performance Engineering**

Performance measures

  Response time, expandability, scalability, and power/resource usage

Many room for improvement
Algorithm selection, architectural details, language construct selection, programming language used, memory management, parallelism, etc.

**Equality**

Referential equality
Behavioral equality
Observational equality

`==` vs. `equals()`

Equivalence relations: symmetry, transitivity, reflexivity

Object class

Overriding vs. overloading

`equals()` and hashcode contract

Inheritance

Composition

**Debugging Procedures/Strategies**