

CMSC 433 – Programming Language Technologies and Paradigms Spring 2003

May 13, 2003

Project 6

- Test oracle available
 1. Peering and accepting messages
 2. Handling slow clients
 3. Symmetric disconnects
 4. Does your portal forward a probe packet
 5. Does your portal generate and forward response
 6. Does your portal pass through a response msg
 7. Can downloaded code connect to port 80
 8. Can downloaded code not connect elsewhere
- Don't forget to test with p5 oracle ²

Final Exam

- Pugh's section
 - Tuesday, May 20, 10:30am-12:30pm
- Foster's section
 - Thursday, May 22, 10:30am-12:30pm
- Topics:
 - Everything
 - More emphasis on material after midterm
 - Looks at sample midterm 2's, finals

3

Java Basics

- Objects, inheritance, and interfaces
 - Mutability, equality, casts (dynamic types)
- Method dispatch
 - Overriding, overloading
 - Dynamic, static
- Exceptions
 - try, catch, finally

4

Project 1

- Build a toy Java web server
 - MiniServlet interface between web server and servlets
 - A little bit of reflection
 - Some generic container classes (e.g., Map)
 - Some sockets and I/O
 - If you need any java.* APIs, we'll give them to you on the exam

5

Testing and Specifications

- Benefits and limitations of testing
- Black box vs. white/glass box
 - Tips on generating tests from specs
 - Statement, branch, condition coverage
 - Tradeoffs, design choices (e.g., unit vs. integration)
- Specifications
 - Issues (tradeoffs between formal and informal etc.)
 - What makes a good specification
 - Javadoc

6

Project 2

- Use JUnit to test Graphs
 - JUnit philosophy: full automated, test-as-you-go
 - Test case components: set up, run, tear down
 - Test suites, test runner
 - Testing against a specification

7

Abstraction, Types, Polymorphism

- Data abstraction
 - Abstraction function, rep invariant
- Subtypes and overloading methods
- Polymorphism
 - Subtype polymorphism
 - Parametric polymorphism with GJ

8

Design Patterns

- Object Modeling Technique
- Iterators
- Singleton, typesafe enum
- Abstract Factory
- Adapter
- Proxy
- Decorator
- Template
- State
- Observer
- Composite
- Strategy
- Bridge
- Command
- Visitor

9

Project 3

- GoogleMap (and LazyList)
 - Generic Java
 - GJ Container classes
 - Iterators and laziness
 - Abstraction

10

Threads

- What are threads?
- Data races and synchronization
- Wait and notify(All)
 - Producer/consumer example
- Thread cancellation
- Deadlock

11

Project 4

- Thread pool
 - Programming with threads in Java
 - Avoiding data races (checkSync, findBugs)
 - Avoiding deadlock

12

Distributed Programming

- Java RMI
 - Remote interfaces
 - RMI registry
 - Stubs and downloading code
 - Gnutella
- Security
 - Security managers
 - Policy files

13

Project 5

- Distributed peer-to-peer network
 - Using RMI
 - Application-level network abstraction
 - Peer-to-peer network architecture, design choices

14

Special Topics

- Graphical user interfaces
 - Using Swing, do's and don'ts
- Reflection
 - Example applications
- Garbage collection
 - Ref counting, mark and sweep, stop and copy
 - Soft and weak pointers
- XML and ant

15

Project 6

- Enhancing project 5
 - Adding robustness
 - Slow portals, symmetric failures
 - Reverse path forwarding
 - Downloading code
 - Installing security manager, adding policy file
 - Finding routes on the network

16