CMSC 433 – Programming Language Technologies and Paradigms
Spring 2003

Midterm Review
March 18, 2003

Midterm Thursday

• Samples from previous semesters on web page
  – May have covered slightly different material

• Covers everything through today
  – Including projects 1, 2, and 3

• Be in class on time
  – Or you will have less time to do the test!

Java Basics

• Objects, inheritance, and interfaces
  – Mutability, equality, casts (dynamic types)

• Method dispatch
  – Overriding, overloading
  – Dynamic, static

• Exceptions
  – try, catch, finally

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

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
    • You won’t need to write any, but you should understand it

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
**Abstraction, Types, Polymorphism**

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

**Design Patterns**

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

**Project 3**

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