

Final Exam Contents & Format

CSCI-UA.0471, Fall 2015

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The exam will cover everything we have discussed in the course during lecture. It will draw primarily from the lectures slides, but may be inspired in part by in the in-class exercises, homeworks or the readings.

The format will include 'code reading' questions where you will be as to read some code and explain its function and 'short answer' questions which will be conceptual questions that will be answered using English, diagrams and possibly some code.

The subjects covered will be as follows:

Object-Oriented Design & Analysis

- Motivation for OOP
- Language Agnostic Primitives of OOP
- Phases: Analysis, Design & Implementation
- The Pillars of OOP
- Substitution Principle
- Single Responsibility Principle
- Composition
- Design Patterns
- Implementation vs Definition Inheritance

Java & C++

- Compilation
- Linking
- Source Management
- Binary Management

Java

- Packages
- Enums & Type Safety
- Classes & Objects
- Generics
- java.lang.Object Hierarchy
- Arrays
- Interfaces
- Inheritance
- Overriding
- Overloading
- Garbage Collection

C++

- Namespaces
- Preprocessor & Directives
- References & Pointers
- Higher Order Functions
- Function Pointers
- Classes
- Class Inheritance
- Virtual Inheritance
- Multiple Inheritance
- Templates & Specializations
- Value & 'Reference' Semantics
- Operator Overloading
- Destructors
- Rule of Three
- Memory Management

Translation Concepts

- Virtual Method Dispatch
- Vtables & Data Layouts
- Covariance
- Static vs Dynamic Typing
- Abstract Syntax Trees
- Visitor Pattern
- Scope
- Symbol Tables
- Overload Resolution
- Reference Counting & Smart Pointers