Inheritance and Data Structures in Java

Instructor

Brandon Krakowsky, Lecturer at the School of Engineering and Research & Education Director at the Wharton School

Course Description

This course provides a comprehensive look at Java inheritance, including access modifiers and overriding methods. Students are introduced to abstract classes, and will learn how to read and write to files, use regular expressions for parsing text, and how to leverage complex data structures like collections and maps.

Additionally, this course offers strategies for catching errors and debugging code, including an overview of Eclipse's debugging tool.

Course Learning Objectives

- Examine the concept of inheritance in object-oriented programming and learn how to extend classes and override methods in a subclass
- Analyze and fix different parts of a Java program using Eclipse's interactive debugger
- Explore different methods for opening, reading, and writing to external files, and deal with errors and exceptions
- Examine advanced techniques for storing and manipulating data in collections, and parse text using regular expressions (or regex)

Intended Audience

This course is intended for students and professionals who have minimal or no prior programming exposure. It's for motivated learners who have experience with rigorous coursework, and are looking to gain a competitive edge in advancing their career.

Course Prerequisites

- High school or college math.
- "Introduction to Java and Object-Oriented Programming" Coursera course.

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Course Outline

Module 1: Inheritance, Polymorphism Using Overriding, & Access Modifiers

- Learning Outcomes
  - Examine the concept of inheritance in object-oriented programming and learn to extend classes
  - Demonstrate how to override methods in a subclass
  - Consider use cases for calling an overridden method or constructor in a superclass
  - Contrast overloading with overriding a method
  - Apply access modifiers to restrict scope in a program and to control access to variables and methods
- Topics
  - Inheritance
  - Polymorphism – Overriding
  - Constructors & Calling Overriden Methods
  - Access Modifiers

Module 2: Abstract Classes & Debugging

- Learning Outcomes
  - Define abstract methods without bodies (or implementations)
  - Design an abstract class with abstract methods and concrete methods
  - Extend an abstract class and implement abstract methods
  - Analyze and fix different parts of a Java program using Eclipse's interactive debugger
- Topics
  - Abstract Classes
  - Debugging

Module 3: File I/O & Exceptions

- Learning Outcomes
  - Write Java code that can communicate with the outside world
  - Experiment with ways of communicating and interacting with external files
  - Compare and contrast options available in Java's File I/O (Input/Output) capabilities
  - Select the most appropriate method for opening, reading, and writing to an external file

- Demonstrate methods for handling errors and exceptions in a Java program, especially when dealing with files
- Topics
  - File I/O
  - Exceptions

Module 4: Collections, Maps, & Regular Expressions

- Learning Outcomes
  - Examine advanced techniques for storing and manipulating information in collections, or structured groups of objects
  - Organize data using different kinds of collections in Java's Collections Framework
  - Associate keys with values using Maps
  - Manipulate and parse text using regular expressions (or regex)
- Topics
  - Collections & Maps
  - Regular Expressions

Course Assessment

This course will use a variety of assessments. Ungraded code-along videos allow students to practice along with the instructor, and self-assess their ability to apply the concepts and skills they learned, before attempting the graded assessments. Graded assessments include:

- Quizzes to check your knowledge in each module
- Programming assignments to test your level of understanding

To earn a certificate in this course, learners must earn a passing score on all assessments:

- Homework Assignments: 60% or above
- Quizzes: 75% or above

Recommended Resources

- *Head First Java*, by Kathy Sierra: https://www.amazon.com/Head-First-Java-Kathy-Sierra-dp-0596009208/dp/0596009208/
- *Java in Easy Steps*, by Mike McGrath: https://www.amazon.com/Java-easy-steps-Mike-McGrath-dp-1840788739/dp/1840788739/

Effort

We expect this course will take you 4-6 hrs per week to complete, for a total of 4 weeks.

Communication and Support

You can communicate with course staff and other students through the discussion forums. Please reach out to us through the discussion forum with any questions about the course content. Please allow at least 48 hours to receive a response from a TA or course staff.

Note: All communication on the discussion forum must follow the Coursera Honor Code . Never post code or solutions to assignments on the discussion forum. If you are having difficulty with code or solutions, a TA may provide an email address to send it in for private assistance.