Oracle Academy Java for AP Computer Science A Course Description

Overview

This yearlong course is an extension of the Java Foundations course that includes content to cover the objectives outlined by College Board for AP Computer Science A. This course prepares students for the College Board AP Computer Science A exam, and the Oracle Java Certified Foundations Exam (1Z0-811). Students are introduced to object-oriented concepts, terminology and syntax, and the steps required to design applications with Java and create basic Java programs using hands-on, engaging activities.

In addition to this course, students are expected to sign into AP Classroom (https://myap.collegeboard.org/login), as assigned by the instructor, and explore these resources:

- Unit Guides
- AP Daily videos
- Topic Questions
- Progress Checks
- Question Bank
- Resources & Assignments – including Labs
- Reports

Available Curriculum Languages:

- English

Duration

- Recommended total course time: 180 hours*
- Professional education credit hours for educators who complete Oracle Academy training: 60

** Course time includes instruction, self-study/homework, practices, labs, projects, assessments, and at least 20 hours of in-class instructional time spent in computer-based lab experiences*

Target Audiences

Educators

- Secondary, technical, vocational, and 2- and 4-year college and university faculty members who teach computer programming or who prepare students to take the AP Computer Science A exam and/or the Oracle Java Certified Foundations Exam (1Z0-811)

Students

- Students who wish to learn Java programming and build their Object-Oriented Programming experience using Java
- This course is a suitable foundational class for computer science majors and may be used to prepare students for the AP Computer Science A exam and/or the Oracle Java Certified Foundations Exam (1Z0-811)

Prerequisites

Suggested

- Oracle Academy Workshop – Getting Started with Java Using Alice
- Oracle Academy Workshop – Creating Java Programs with Greenfoot
- Oracle Academy Full Curriculum – Java Fundamentals

Suggested Next Courses

- Oracle Academy Education Bytes – JavaFX
- Oracle Academy Full Curriculum – Java Programming

Lesson-by-Lesson Topics

Introduction

- About the Course
- Java: A Brief History
- Computer Careers Research Project
- Setting up Java

Java Software Development

- The Software Development Process
- What is my Program Doing?
- Introduction to Object-Oriented Programming Concepts
- Algorithms and Data

Java Data Types

- What Is a Variable?
- Numeric Data
- Number Systems
- Textual Data
- Converting Between Data Types
- Keyboard Input

Java Methods and Library Classes

- What is a Method?
- The `import` Declaration and Packages
- Java `API` Documentation
- The `String` Class
- The `Random` Class
- The `Math` Class

Decision Statements

- `Boolean` Expressions and if/else Constructs
- Understanding Conditional Execution
- Relational Operators, Truth Tables, and De Morgan's Law
- `switch` Statement

Loop Constructs

- `for` Loops
- 6-2 `while` and `do-while` Loops
- Java Loops Practices 1-3
- 6-3 Using `break` and `continue` Statements

Creating Classes

- Creating a Class
- Instantiating Objects
- Constructors
- Overloading Methods
- Java `String` Project
- Object Interaction and Encapsulation
- `static` Variables and Methods

Arrays and Exceptions

- One-dimensional Arrays
- Two-Dimensional Arrays
- Java Arrays Practices 1-4
- Java Matrix Arrays Project
- Java 2D Array Project – Find Mode
- Arrays Utilities Project
- `ArrayLists`
- `ArrayList` Utilities Project
- Exception Handling
- Debugging Concepts and Techniques

Advanced Topics

- Inheritance
- Sorting and Searching
- Big O Notation
- Sort and Search Project
- Recursion
- Advanced Recursion with Examples
- Social and Ethical Impacts of Computers