Oracle Academy Java for AP Computer Science A – Course Description

Overview

This curriculum 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 create basic Java programs using hands-on, engaging activities. Students will learn the concepts of Java programming, design object-oriented applications with Java and create Java programs using hands-on, engaging activities.

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

- AP Daily videos
- Topic Questions
- Progress Checks
- My Reports
- The Question Bank

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, projects, and assessment

Target Audiences

Educators
- Educators at secondary, technical, vocational, or post-secondary institutions who prepare students to take the AP Computer Science A exam

Students
- Students at secondary, technical, vocational, or post-secondary institutions who are preparing to take the AP Computer Science A exam

Prerequisites

Suggested

- Oracle Academy Workshop - Getting Started with Java Using Alice
- Oracle Academy Workshop - Creating Java Programs with Greenfoot

Suggested Next Courses

- Oracle Academy Java Programming

Lesson-by-Lesson Topics

Introduction
- About the Course
- A Brief History
- Computer Career Research
- Setting up Java

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

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
- `while` and `do-while` Loops
- Tracing Java Loops
- 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
- ArrayLists
- Exception Handling
- Debugging Concepts and Techniques

JavaFX
- Introduction to `Java FX`
- Colors and Shapes
- Graphics, Audio and `MouseEvents`

Java AP Computer Science A Advanced Topics
- Inheritance
- Polymorphism
- Inheritance and Polymorphism Project
- Two-dimensional Arrays
- Arrays Projects
- Sorting and Searching
- Big O Notation
- Data Structures
- Sort and Search Project
- Recursion
- Computer Social, Ethical, and Risk Impacts