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 \texttt{import} Declaration and Packages
- Java API Documentation
- The \texttt{String} Class
- The \texttt{Random} Class
- The \texttt{Math} Class

Decision Statements
- Boolean Expressions and \texttt{if/else} Constructs
- Understanding Conditional Execution
- Relational Operators, Truth Tables, and De Morgan's Law
- \texttt{switch} Statement

Loop Constructs
- \texttt{for} Loops
- while and do-while Loops
- Tracing Java Loops
- Using \texttt{break} and \texttt{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 JavaFX
• Colors and Shapes
• Graphics, Audio and Mouse Events

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