

Java Fundamentals

Overview

This course engages students with little or no programming experience to create Java programs. Participants are introduced to object-oriented programming concepts, terminology, and syntax, and the steps required to create basic Java programs using the Alice, Greenfoot, and Eclipse interactive development environments. Hand-on practices figure prominently throughout this course so students can experience firsthand the power of computer programming.

Duration

- 90 hours

Target Audiences

Primary Audience

- College/university faculty who teach computer programming, information communications technology (ICT), or a related subject
- Secondary school teachers who teach computer programming

Secondary Audience

- None

Prerequisites

Required

- Basic understanding of at least one programming language
- The ability to follow software installation instructions and install Alice, Greenfoot, and Eclipse on a computer

Suggested

- Getting started with Java using Alice and creating Java programs with Greenfoot or previous experience with at least one programming language

Suggested Next Courses

- Java Programming

Lesson-by-Lesson Topics

Welcome and Introduction

- Welcome
- Introduction

Storytelling with Alice 3

- Telling a story visually
- Creating a scene by adding and positioning objects
- Using procedures
- Declaring procedures
- Using control statements and functions
- Using the IF and WHILE control statements
- Using expressions
- Using variables and keyboard controls to manipulate motion
- Correlating Java variables, data types, and expressions with Alice 3
- Correlating Java methods, classes, and other structures with Alice 3

Using Greenfoot

- Getting started with Greenfoot
- Using methods, variables and parameters
- Working with source code and documentation
- Developing and testing an application
- Using randomization and understanding dot notation and constructors
- Defining methods
- Using sound and keyboard control
- Creating a world, animating actors, and ending a game
- Understanding abstraction
- Using loops, variables, and strings
- Putting it all together with Greenfoot
- Creating an inventory of Java fundamentals

Getting Started with Eclipse

- Compiling with Eclipse
- Control flow statements and blocks of code
- Programming with data types and operators

Control Statements, Classes, Objects and Methods

- Using program control statements
- Using classes, objects, and methods

Arrays and Strings

- Using arrays
- Using string objects
- Handling errors

Recursion, Abstraction, and Inheritance

- Passing objects & overloading methods
- Understanding recursion, the static modifier, and nested classes
- Understanding inheritance
- Understanding polymorphism