Creating Java Programs with Greenfoot

Overview

This workshop engages students who understand basic programming concepts to create Java programs. Participants use Greenfoot*—a free development environment from the University of Kent—to write standard Java syntax and create games, simulations, and applications that interest them. Along the way, students master object-oriented programming terminology and concepts such as procedure definition, algorithms, functions, compiling, debugging, and conditional statement execution.

Duration

- 16 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

- Secondary schools teachers who seek to incorporate technology into their curriculum and awaken students' interest in computer science

Prerequisites

Required

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

Suggested

- Getting Started with Java Using Alice

Suggested Next Courses

- Java Fundamentals
- Java Programming

Lesson-by-Lesson Objectives

Getting Started With Greenfoot

- Download and install Greenfoot
- Describe the components of the Greenfoot development environment
- Create an instance of a class
- Describe classes and subclasses
- Recognize Java syntax used to correctly create a subclass

Using Methods, Variables and Parameters

- Define parameters and how they are used in methods
- Understand inheritance
- Describe the properties of an object
- Examine the purpose of a variable
- Discuss programming concepts and define terminology

Working with Source Code and Documentation

- Demonstrate source code changes to invoke methods programmatically
- Demonstrate source code changes to write an IF decision statement
- Describe a procedure to display object documentation

Developing and Testing an Application

- Demonstrate program testing strategies
- Recognize phases for developing a software application

Using Randomization and Understanding Dot Notation and Constructors

- Create randomized behaviors
- Define comparison operators
- Create IF-ELSE control statements
- Create an instance of a class
- Recognize and describe dot notation

Defining Methods

- Describe effective placement of methods in a super or subclass
- Simplify programming by creating and calling defined methods

Using Sound and Keyboard Control

- Write programming statements to include sound in a program
- Write programming statements to include keyboard movements in a program

Creating a World, Animating Actors, and Ending a Game

- Construct a world object using a constructor method
- Create an object using a constructor
- Write programming statements to use the new keyword
- Define the purpose and syntax of a variable
- Recognize the syntax to define and test variables
- Write programming statements to switch between two images
- Write programming statements to end a game

Understanding Abstraction

- Define abstraction and provide an example of when it is used

Using Loops, Variables, and Strings

- Create a while loop in a constructor to build a world
- Describe an infinite loop and how to prevent one from occurring
- Use an array to store multiple variables used to create a world
- Create an expression using logic operators
- Describe the scope of a local variable in a method
- Use string variables to store and concatenate strings

Putting it All Together with Greenfoot

- Apply your Greenfoot knowledge to create a Java game

*Developed at the University of Kent and LaTrobe University, Greenfoot helps beginners transition from drag-and-drop environments like Alice into pure Java, which later eases their transition into more advanced Java tools like BlueJ, NetBeans, and Eclipse.