

# Getting Started with Java Using Alice

## Overview

This workshop engages students with little or no programming experience to learn basic Java programming concepts. Participants use Carnegie Mellon's Alice\* platform to do something fun – create animated stories, movies and games. By dragging and dropping graphic tiles that contain standard Java programming statements, students develop programs that animate 3D objects. In the process, they learn basic object-oriented programming terminology and concepts such as procedure definition, algorithms, functions and conditional statements.

## Duration

- 8 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

- The ability to follow software installation instructions and install Alice on a computer

### Suggested

- Previous experience as a teacher/instructor of computer programming or ICT curriculum
- Previous experience with incorporating technology into curriculum

## Suggested Next Courses

- Creating Java Programs Using Greenfoot
- Java Fundamentals
- Java Programming

## Lesson-by-Lesson Objectives

### Prepare for this Course

- Describe the purpose for using Alice 3 to learn Java
- Check system requirements needed for the course
- Install necessary software for the course

### Get Started with Alice 3

- Identify scene components
- Create and save a new project
- Add an object to a scene
- Communicate the value of saving multiple versions of a scene
- Code a simple programming instruction
- Use the copy and undo command
- Understand the value of testing and debugging

## Add and Position Objects

- Open a saved version of a project
- Add multiple objects to a scene
- Describe the difference between precise positioning and drag-and-drop positioning
- Use a one-shot procedure to precisely position an object in a scene
- Edit properties of an object in the Scene editor
- Describe three-dimensional positioning axes
- Position the sub-parts of an object in the Scene editor

## Use Procedures and Arguments

- Toggle and describe the visual difference between the Scene editor and Code editor
- Locate and describe the purpose of the methods panel and procedures tab
- Use procedures to move objects
- Add Java programming procedures to the Code editor
- Demonstrate how procedure values can be altered
- Create programming comments
- Reorder, edit, delete, copy, and disable programming statements
- Test and debug an animation

## Add Rotation and Randomization

- Correlate storyboard statements with program execution tasks
- Add a control statement to the Code Editor
- Use random numbers to randomize motion

## Declare Procedures

- Compare and define an animation and a scenario
- Write a storyboard
- Flowchart a storyboard
- Describe inheritance and how traits are passed from superclasses to subclasses
- Describe when to implement procedural abstraction
- Demonstrate how to declare a procedure
- Identify and use procedural abstraction techniques to simplify animation development

## Use Control Statements

- Define multiple control statements to control animation timing
- Create an animation that uses a control statement to control animation timing
- Recognize programming constructs to invoke simultaneous movement

## Use Functions

- Use functions to control movement based on a return value

## Use the IF and WHILE Control Structures

- Use the IF control structure to effect execution of instructions
- Use the WHILE control structure to create a conditional loop for repetitive behavior

## Use Expressions

- Create an expression to perform a math operation
- Interpret a math expression

## Use Variables

- Understand variables and how they are used in programming

## Use Keyboard Controls

- Use keyboard controls to manipulate an animation

## Develop a Complete Animation

- Use functional decomposition to write a scenario and storyboard
- Complete an animation
- Test an animation
- Reposition objects at runtime
- Plan a presentation of a completed animation project

## Animation Design Worksheet and Academic Examples

- Use an animation design worksheet to complete an animation
- Observe how animations can support a variety of academic topics

\*Suitable for ages 8-22, Alice is the subject of 11 textbooks. It is taught in thousands of schools globally, including 19% of US colleges and universities. One study shows that exposure to Alice prior to or concurrent with CS1 improved performance in the course by a full letter grade and that middle school girls are perfectly willing to learn to write computer software if you present it as a storytelling activity.