Java Fundamentals – Course Description

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.

Available Curriculum Languages:
- Arabic, Simplified Chinese, English, Japanese, Brazilian Portuguese, Spanish

Duration
- 90 hours (one semester)

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

Introduction

• Introduction

Alice 3

• Getting Started with Alice 3
• Add and Position Objects
• Procedures and Arguments
• Rotation and Randomization
• Declare Procedures
• Control Statements
• Functions
• IF and WHILE Control Structures
• Expressions
• Variables
• Keyboard Controls
• Develop a Complete Animation
• Java Variables and Data Types
• Java Methods and Classes

Greenfoot

• Getting Started With Greenfoot
• Methods, Variables and Parameters
• Source Code and Documentation
• Developing and Testing an Application
• Randomization and Constructors
• Defined Methods
• Sound and Keyboard Control
• World Animating and Game End
• Abstraction
• Loops, Variables, and Arrays

Java Basics

• Getting Started with Eclipse
• Object and Driver Classes
• Data Types and Operators
• Strings

Program Structure

• Using Scanner and Conditional Statements
• Using Program Control Statements

Arrays and Exceptions

• Arrays
• Handling Errors

Java Classes

• Classes, Objects, and Methods
• Parameters and Overloading Methods
• The Static Modifier and Nested Classes
• Inheritance
• Polymorphism

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