Chicago Institute of Technology

CORE JAVA

Java Introduction:

- The Java Environment - Overview
- Writing a Java Program
- Obtaining The Java Environment
- Setting up your Java Environment
- Software Installation

Basics:

- Basic Java Syntax
  - General Syntax Rules
  - Java Statements
  - Blocks of Code
  - Comments
  - Variables
- Data
  - Primitive Data Types
  - Object Data Types
  - Literal Values
  - Constants and the final keyword
- Mathematics in Java
  - Expressions
  - Operator Precedence
  - Multiple Assignments
  - Order of Evaluation
  - Bitwise Operators
  - Compound Operators
  - Expressions that Mix Data Types: Typecasting
- Creating and Using Methods
  - Creating Methods
  - Variable Scope

Java Objects:

- Objects
  - Object-Oriented Languages
  - Object-Oriented Programs
  - Encapsulation
  - Creating and Using an Instance of an Object
  - References
  - Defining a Class
  - Java Beans
  - Constructors
  - Method Overloading
  - The this Keyword
  - static Elements
  - Garbage Collection
  - Java Packages

Inheritance:

- Inheritance
  - Payroll with Inheritance
  - Objects
- Polymorphism
  - Inheritance and References
  - Dynamic Method Invocation
- Creating a Derived Class
  - Inheritance and Access
  - Inheritance and Constructors - the super Keyword
  - Derived Class Methods That Override Base Class Methods
  - Inheritance and Default Base Class Constructors
  - The Instantiation Process at Runtime
- Example - Factoring Person Out of Employee and Dependent
- Typecasting with Object References
  - Typecasting, Polymorphism, and Dynamic Method Invocation
  - More on Overriding
  - Object Typecasting Example
  - Checking an Object's Type: Using
  - Typecasting with Arrays of Objects
- Other Inheritance-Related Keywords
  - abstract
  - final
- Methods Inherited from Object

Interfaces:

- Interfaces
- Creating an Interface Definition
- Implementing Interfaces
  - Implementing Interfaces - Example
- Reference Variables and Interfaces
  - Calling an Interface Method
- Interfaces and Inheritance
- Some Uses for Interfaces
  - Interfaces and Event-Handling
  - Interfaces and "Pluggable Components"

  - Dealing with Keyboard Input
- String, StringBuffer, and StringBuilder

Comparisons and Flow Control Structures:

- Controlling Program Flow
  - Boolean-Valued Expressions
  - Complex boolean Expressions
  - Simple Branching
  - Two Mutually Exclusive Branches
  - ... elseStatements - Comparing a Number of Mutually Exclusive Options
  - Comparing a Number of Mutually Exclusive Options - The switch Statement
  - Comparing Objects
  - Conditional Expression
  - while and .while Loops
  - for Loops
- Additional Loop Control: break and continue
  - Breaking Out of a Loop
  - Continuing a Loop
- Classpath, Code Libraries, and Jar files
  - Using CLASSPATH
- Creating a jar File (a Libr)

Arrays and Collections:

- Arrays
  - Defining and Declaring Arrays
  - Instantiating Arrays
  - Initializing Arrays
  - Working With Arrays
  - Array Variables
  - Copying Arrays
  - Arrays of Objects
- Enhanced for Loops - the For-Each Loop
- Multi-Dimensional Arrays
  - Multidimensional Arrays in Memory
  - Example - Printing a Picture
- Typecasting with Arrays of Primitives
- Dynamic Collections vs. Arrays

Exception Handling and Logging:

- Exceptions
  - Handling Exceptions
  - Exception Objects
- Attempting Risky Code - try and catch
- Guaranteeing Execution of Code - the finally Block
- Letting an Exception be Thrown to the Method Caller
- Throwing an Exception
- Exceptions and Inheritance
  - Exception Class Constructors and Methods
- Creating and Using Your Own Exception Classes
- Rethrowing Exceptions
- Initializer Blocks
  - Static Initializer Blocks
  - Assertions
- Logging
- The Java SE Logging API
- Loggers
- Logging Levels
- Handlers

Generics and Collections:

- Fundamental Collections: Sets, Lists, and Maps
- Iterators
- Creating Collectible Classes
  - hashCode and equals
  - Comparable and Comparators
- Generics
  - Basic Generics Syntax
  - Bounded Types and Wildcards

Inner Classes:

- Inner Classes, aka Nested Classes
  - Inner Class Syntax
  - Instantiating an Inner Class Instance from Within the Enclosing Class
  - Inner Classes Referenced from Outside the Enclosing Class
  - Working with Inner Classes