

# Java SE 8 Fundamentals

- What Is a Java Program?
  - Introduction to Computer Programs
  - Key Features of the Java Language
  - The Java Technology and Development Environment
  - Running/testing a Java program
- Creating a Java Main Class
  - Java Classes
  - The main Method
- Data In the Cart
  - Introducing variables
  - Working with Strings
  - Working with numbers
  - Manipulating numeric data
- Managing Multiple Items
  - Working with Conditions
  - Working with a List of Items
  - Processing a list of items
- Describing Objects and Classes
  - Working with objects and classes
  - Defining fields and methods
  - Declaring, Instantiating, and Initializing Objects
  - Working with Object References
  - Doing more with Arrays
  - Introducing the NetBeans IDE
  - Introducing the Soccer League Use Case
- Manipulating and Formatting the Data in Your Program

- Using the String Class
- Using the Java API Docs
- Using the StringBuilder Class
- More about primitive data types
- The remaining numeric operators
- Promoting and casting variables
  
- Creating and Using Methods
  - Using methods
  - Method arguments and return values
  - Static methods and variables
  - How Arguments are Passed to a Method
  - Overloading a method
  
- Using Encapsulation
  - Access Control
  - Encapsulation
  - Overloading constructors
  
- More on Conditionals
  - Relational and conditional operators
  - More ways to use if/else constructs
  - Using Switch Statements
  - Using the NetBeans Debugger
  
- More on Arrays and Loops
  - Working with Dates
  - Parsing the args Array
  - Two-dimensional Arrays
  - Alternate Looping Constructs
  - Nesting Loops
  - The ArrayList class
  
- Using Inheritance

- Overview of inheritance
  - Working with subclasses and superclasses
  - Overriding methods in the superclass
  - Introducing polymorphism
  - Creating and extending abstract classes
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- Using Interfaces
    - Polymorphism in the JDK foundation classes
    - Using Interfaces
    - Using the List Interface
    - Introducing Lambda expressions
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- Handling Exceptions
    - Handling Exceptions: An overview
    - Propagation of exceptions
    - Catching and throwing exceptions
    - Handling multiple exceptions and errors

# Java SE 8 Programming

- Java Platform Overview
- Java Syntax and Class Review
- Encapsulation and Subclassing
- Overriding Methods, Polymorphism, and Static Classes
- Abstract and Nested Classes
- Interfaces and Lambda Expressions
- Collections and Generics
- Collections Streams, and Filters
- Lambda Built-in Functional Interfaces
- Lambda Operations
- Exceptions and Assertions
- Java Date/Time API
- I/O Fundamentals
- File I/O (NIO.2)
- Concurrency
- The Fork-Join Framework
- Parallel Streams
- Database Applications with JDBC
- Localization

# Web Component Development with Servlets & JSPs, Java EE 6

- Introduction to Java Servlets
  - Describe web applications, CGI, and the role of Java
  - Describe benefits of Java servlet technology
  - Create a simple Java Servlet
  - Define three-tier architecture
  - Define Model-View-Controller (MVC) architecture
- Introduction to Java Server Pages
  - Describe why Servlets are not the whole solution
  - Describe essentials of JSPs
  - Understand the fundamentals and reasons for MVC architecture
- Implementing an MVC Design
  - Code a controller using a servlet
  - Code a view using a JSP
  - Forward control from a servlet to a JSP
  - Understand fundamentals of EL
  - Implement a simple MVC system
- The servlet's environment
  - Understand more details of the HTTP protocol
  - Understand fundamentals of HTML forms
  - Understand fundamentals of the HttpServlet and related APIs
  - Write code that manages client sessions and cookies
- Container facilities for servlets and JSPs
  - Understand the purpose and structure of deployment descriptors
  - Control context root and servlet mapping
  - Create and use context and init parameters
  - Use annotations to configure servlets

- More view facilities

- Understand the four data scopes
- Understand and use EL dot, ".", and array access, "[" operators with Java Beans, arrays, and collections
- Understand and use EL implicit objects
- Create and use arithmetic expressions in EL
- Identify the need for iteration and selection in the view, and use JSTL tags to address those needs

- Developing JSP pages

- Understand the origins, benefits, and weaknesses of JSPs
- Describe JSP technology, the conversion of JSPs to servlets, and the lifecycle of JSPs
- Understand JSP scripting elements, declarations and directives
- Use JSP implicit variables
- Understand and use jsp: tags

- Developing JSP pages using custom tags

- Relate the JSTL to common job roles in web application development and understand the use of tags in JSP development
- Recognize correct syntax for tags
- Configure a JSP to use tags from the JSTL
- Write JSP code using several standard tags
- List capabilities of JSTL tags

- More Controller facilities

- Understand the servlet lifecycle
- Describe and use more advanced elements of the servlet APIs
- Create filters and use them in web applications

- More options for the Model

- Understand the roles of JDBC and JPA
- Understand the many elements that make up the model
- Understand fundamentals of connecting to a database using JDBC or JPA

- Asynchronous web applications

- Understand the interactions that are essential to asynchronous web pages
- Understand the role of AJAX-style client side programming
- Implement asynchronous servlets using the facilities of Java EE 6

- Web application security

- Understand the role of the container in security
- Describe and implement four authentication models
- Force the use of encryption between a web application and the client browser
- Understand the role of JAAS in pluggable/extensible authentication for web applications

# Developing Applications for the Java EE 6 Platform

- EJB types: Session Beans
- EJB types: Message Driven beans
- Java Persistence API as a replacement for Entity EJBs
- Describe the role of EJBs in a Java EE application
- EJB lite
- Compare stateless and stateful behaviour
- Package and deploy session beans
- Create session bean clients
- The role of the Java Persistence API in a Java EE application
- Object Relational Mapping
- Entity class creation
- Using the EntityManager API
- The life cycle and operational characteristics of Entity components
- Persistent Units and Packaging
- Describe the properties and life cycle of message-driven beans
- Create a JMS message-driven bean
- Describe endpoints supported by the Java EE 6 platform
- Developing Web Services with Java
- Creating Web Service Clients with Java