

Functional Programming in Java

Duration: 3 days (9 hours each day with working lunch)

Java is arguably one of the most widely used languages. This popular language has gone through a major makeover. This has had a significant impact on how programmers code and design applications with Java. With the introduction of lambda expressions, method references, and the Streams API in Java 8, we can now make use of the functional style of programming. This style has greater emphasis on immutability and state transformation instead of state mutation. This means fewer errors, more expressive and concise code that's easier to parallelize. All this comes with one caveat, we have to learn and adapt to not just the new syntax, but different and better ways of thinking. This course is designed, by author of the first book on Java 8 to hit the market, to help you make a quick and effective transition to Java 8 and its functional capabilities.

The course has a good balance of interactive lectures and hands-on exercises. The attendees are expected to pair-up and work on the lab exercises. The instructor will assist the attendees as they work on the labs. The objective of the course is for the attendees to gain an in depth practical knowledge of the concepts so they can put them to immediate use on their real projects.

The course content will be customized to meet your teams' specific needs. Please review this detailed outline and suggest changes (additions, deletions, modifications) as you feel fit.

Topics

The Next Big Thing in Java

- * The evolution of Java
- * Major changes in the language
- * What's in it for you?
- * Exercises

Starting with Lambda Expressions

- * What are Lambda Expressions?
- * Why change the way we think and code?
- * The paradigm shift
- * Benefits of the paradigm shift
- * Adapting the functional style of programming
- * Exercises

Thinking in Functional Style

- * From imperative to functional style
- * Change to everyday tasks
- * Reading files and listing directories
- * Iterating Strings

- * Discovering declarative style
- * Programming with immutability
- * Evolving code in functional style
- * Exercises

Using Method References

- * Making the code concise and expressive
- * When and how to use method references
- * Dealing with ambiguity
- * Exploring the Comparators
- * Using fluent comparisons
- * Exercises

Working with Collections

- * Iterating lists
- * Transforming lists
- * Finding elements in a list
- * Map and reduce operations on list
- * Joining values
- * Exercises

Design Patterns in Functional Style

- * Change to common OO patterns when adapting functional style
- * Patterns native to functional style
- * Designing with lambda expressions
- * Using default methods
- * Creating fluent interfaces
- * Exercises

Function Composition

- * Composing with functions
- * Expressing problems using function composition
- * Performance concerns
- * Lazy evaluation
- * Intermediate and terminal operations
- * Programming with lazy collections
- * Exercises

Exploiting Concurrency

- * Concurrency as a master switch
- * Turning operations into concurrent operations
- * Words of caution
- * Designing to exploit concurrency
- * Exercises

Automated Testing of Functional Style Code

- * Functional Programming and Testing Benefits
- * Challenges that lambdas and lazy evaluations introduce
- * Testing approaches and methods
- * Exercises

About the Instructor

Dr. Venkat Subramaniam is an award-winning author, founder of Agile Developer, Inc., creator of agilelearner.com, and an instructional professor at the University of Houston.

He has trained and mentored thousands of software developers in the US, Canada, Europe, and Asia, and is a regularly-invited speaker at several international conferences. Venkat helps his clients effectively apply and succeed with sustainable agile practices on their software projects.

Venkat is a (co)author of multiple technical books, including the 2007 Jolt Productivity award winning book Practices of an Agile Developer. You can find a list of his books at agiledeveloper.com. You may read more about Venkat and Agile Developer, Inc. at <http://agiledeveloper.com>.

