Scala cruise

Snorkelling in some of the Scala features

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Itinerary

1. Let's meet Scala
2. Tools
3. The Play framework
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Let’s meet Scala

Figure 1: Martin Odersky, the creator of Scala

Scala programming language is:

- general purpose
- strongly statically typed (with type inference)
- compiling primarily to JVM 8+ bytecode[1]
- interoperable with Java 8+

[1] `scala.js` compiles to JS; `scala native` targets LLVM; jdk 9+ compatibility might require support; there is a Scala REPL.

Scala supports

- OOP
- FP

```
val value : Int    = 2;
val text : String = "hello";
val value : Int    = 2
val text : String = "hello"
val value = 2
val text = "hello"
```

```scala
val value = 2
val text = "hello"

print(text)
print(s"$value-$text") // string interpolation
print(s"${value*2}")
```

```
var value = 2
val text = "hello"

value = 4
text = "hello" // !!! forbidden
```

```
def square(x : Int) : Int = {
  return x*x
}
```

```scala
def square(x : Int) : Int = x*x
// evaluation strategy
```

```
def square(x : Int) = x*x
def abs(x : Int) : Int =
  if (x >= 0)
    x
  else
    -x

// if statement vs if control flow
```

```
def id(x : Int) : Int = {
  if (x >= 0) {
    print(s"$x")
  }
  x
}


id(-2)
id(2)
```

```
def square(x : Int) = x*x

square(2+3+4) // <-- how is this evaluated
```

```
def log(message : String) = ???
def log(message : String) : Unit = ???

// unit type
```

```
class Logger {
  def log(message : String) = ???
}
```

```scala
trait Logger {
  def log(message : String)
}

class PrintLogger extends Logger {
  override def log(message: String) = {
    print(message)
  }
}
class ProductionLogger() extends Logger {
  override def log(message: String) = {
  }
}
```

```
val logger : Logger = ???
// ...
logger.log("hello")
```

```
val logger : Logger = ???
// ...
logger.log("hello" + sqrt(2-3+10))
```

```
trait Logger {
  def log(message : => String)
 // call by name vs call by value
}
```

```
def squareCallByName(x : => Int) = x*x
```

```
val function : Int => Int = square
```

```
def f(x : Int, y : Int) : Int = x + y
def g(y : Int) : Int = f(1,y)
def h(y : Int) : Int => Int = f(_,y)

f(2,3)
g(3)
h(2)(3)
```

```scala
def div(x : Int) : Int = 1/x

div(1)
div(2)
div(0) // java.lang.ArithmeticException: / by zero
```

```
def div(x : Int) : Integer = {
  if ( x != 0 ) 1/x else null // !!!
}
```

```
def div(x : Int) : Option[Int] = {
  if ( x != 0 ) Some(1/x) else None
}
```

```
def div(x : Int) : Option[Int] = {
  if ( x != 0 ) Some(1/x) else None
}

div(0).map(square)
```

```
def div(x : Int) : Option[Int] = {
  if ( x != 0 ) Some(1/x) else None
}

def anotherFunction(x : Int) : Option[Int] = ???


div(0).map(square).flatMap(anotherFunction)
```

Tools

- IDE: intellij with Scala plugin
- Build tool: sbt
- Tests: scalatest vs specs2

The Play framework

What is play?

// not really FP // based on Options / Futures, must be already introduced at this point

Structure of a Play project

g8 template

Sbt configuration

Route file

A taste of contract driven development:

- apiary / blueprint
- dredd testing (local / staging)

Controller

Dependency injection (imperative): Guice

Controllers must be stupid, keep them simple (this is general architectural rule, no scala specific, no play specific)

Clients with play : write data classes and write the client

Json parsing

From futures to HTTP responses

Hydration

Learn more

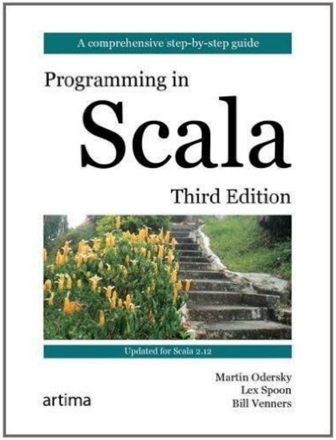


Figure 2: The reference guide

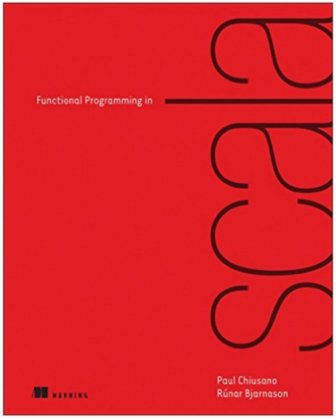
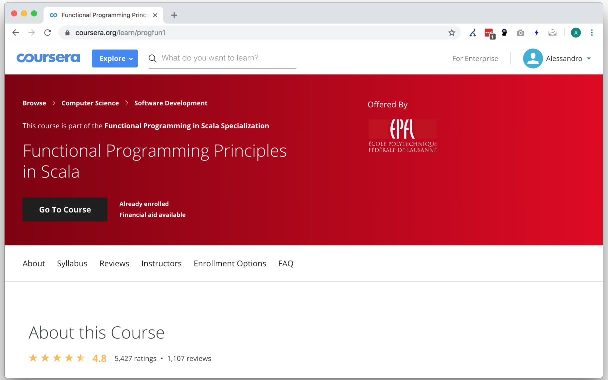


Figure 3: Gym to master FP in Scala



This course is part of the **Functional Programming in Scala Specialization**

Functional Programming Principles in Scala

About this Course

4.8 5,427 ratings • 1,107 reviews

Figure 4: Functional programming principles in Scala MOOC by Martin Odersky

Online exercises:

- `https://www.scala-exercises.org/`
- `http://www.scalakoans.org/`

Questions?