Scala 2
and Spark 3

Author : Christophe le cam

Agenda (day 1)

- What are your expectations from this course ?

Agenda (day 1)

- Reminder : How to develop well ?
  - From a business perspective
    - Write what you want to do before coding
    - Understand the business rules (even the implicit one).
  - Value analysis
    - Is there another way to do ? Think out of the box
    - Quick win
    - Sometimes the solution is just changing a requirement or someting in the business process : less code to write

Agenda (day 1)

- Reminder : How to develop well ?
  - From a developer perspective
    - KISS (Keep it Simple Stupid)
    - The code must be readable like a book
    - Do POCs
    - Any part of the code must be testable.
  - Mind spirit
    - Learn something new everyday
    - Practice Pair programming and code reviews
    - Have a glance at Scala frameworks
    - Look at other langages

Agenda (day 1)

- Overview of Scala
  - Comparison between Scala and other langages
  - What is a functional langage ?
  - Why learning a functional langage ?
  - What is scala good at ?
  - Scala frameworks

Agenda (day 1)

- First steps in Scala
  - IDE
  - Build tool
  - Your first application
  - Scala import, package, package object
- Scala types
  - Primitive types
  - Scala type hierarchy
  - Type keyword

Agenda (day 1)

- Functions and variable definition
  - Val, var, def (call by name & by value), ??? keyword
  - Comparison between lazy, eager, def
- Scala types
  - User defined types
    - Object, Class. What is the type of an object ?
  - Sealed keyword

Agenda (day 1)

- Scala types
  - Tuple
  - Companion object
  - Case class
    - Apply, unapply
  - Enumeration? Sealed trait vs Scala enum vs Enumeratum
  - Pattern matching
  - Regular expressions

Agenda (day 1)

- Scala testing
  - Unit test
    - TDD approach
    - Unit test or feature test ?
    - Improve the way we develop by testing first
    - Do we really need to test ?
      - Error management
      - Design
      - Function separation
  - Integration test
    - Example

Agenda (day 2)

- Scala collections
  - Overview
    - Option, Lists, Set, Dictionnaries
  - Operating over sequences
    - map, flatMap, flatten
    - FoldLeft, Fold, reduce
    - Zip, zipWithIndex
    - Collect
    - Filter, Find, exists

Agenda (day 2)

- Scala inheritance
  - Trait vs Abstract class
  - Final keyword and case class
  - Generic types
  - Variance
    - Example : Function signature
  - Using this.type
  - Type constraints (phantom type for information only)
  - This & self keywords

Agenda (day 2)

- Scala loop
  - For
  - Foreach
  - For comprehensive
  - If, then, else

Agenda (day 3)

- Implicit keyword
  - Different meaning
    - Implicit parameter
    - Implicit class
    - Implicit conversion
  - Different patterns
    - Implicit context
    - Type class implicit
    - Derived implicit

Agenda (day 3)

- Implicit keyword
  - The basic rule : don’t use it execpt no alternative
  - Use it only when there is no alternative
    - Example of bad use
  - Why not use it ?
    - The code is more difficult to review (try without an IDE)
  - What is the signature of a function with an implicit ?

Agenda (day 3)

- Functional Scala
  - Currying
  - Partial function
  - Typeclass
    - Example : String enhancement
  - Functor & Monad
    - Cats library

Agenda (day 4)

- Scala concurrency
  - Parallel collections
  - Scala Future
  - Future vs Fiber
  - Reactive frameworks
    - Akka
    - Monix

Agenda (day 5)

- Spark introduction
  - What is Spark ? The architecture in a few words
  - Modes of execution (standalone, cluster, number of processors)
  - Action vs Transformation
  - Example
    - Define a spark session
    - Create RDDs, dataframes & Datasets from scratch
    - Read csv (infer schema)
    - Write data (different format)

Agenda (day 5)

- Spark IO
  - Format (csv, json, avro, parquet, delta, ...)
  - Data warehouse vs Lakehouse with Delta tables
  - Define a schema from scratch
  - Join between tables
  - Aggregate
  - Execution plan
    - Physical plan
    - Logical plan