



Programming Paradigms

159.272

Programming Paradigms

Course Overview

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Programming Paradigms

- Learning outcomes
 - Select appropriate programming languages for real-world applications.
 - Apply the principles of object-oriented program design in a practical setting.
 - Apply the principles of functional program design in a practical setting.
 - Use modern programming constructs appropriately and effectively.

Course structure

- The paper consists of two parts.
 - Part 1 will cover object-oriented programming (OOP), using Java as programming language.
 - Part 2 will cover Functional Programming (FP), the language used for this part is Scala. Functional features of some other languages will be discussed as well, including Haskell, Python and Java.

Software that we will use

- Functional Programming
 - The Haskell Platform
 - Standard text editors to write our programs
- OOP
 - Java Development Kit (JDK) 1.8
 - Eclipse IDE for Java Developers

Resources

- There are many online resource which you can use as references.
- Here are some recommendations:

OOP

- [Bruce Eckel's Thinking in Java](#).

FB

- <https://www.scala-lang.org/> : main Scala programming page – has lots of the resources.
- <https://www.coursera.org/course/progfun> : free online course on Scala

Topic Outline

- There are two equal parts of this paper:
- Part 1 – 6 weeks (11 topics)
 - Introduction to Java
 - Java Language Basics
 - Object Lifecycle
 - Inheritance and Polymorphism
 - Encapsulation
 - Exception Handling
 - Collections and Generic Parameter Types
 - Semantics
 - Swing 101
 - Functions as Objects
 - Advanced Features

Part one – 5 weeks (8 topics)

- Why learn about Functional Programming?
- Scala Basics
- Higher-order functions
- Types in Scala
- Lazy Evaluation
- Interactive Functional Programming
- Efficiency
- Concurrency and Parallelism

Assessment	Due Date / Deadline	weighting
Assignment 1	tba	15%
Assignment 2	tba	15%
Laboratory exercises	9-10 weekly exercises, starting in week 2	10%
Examinations	tba	60%

Assessment

- Weekly lab exercises
 - 9- 10 labs - starts in week 2
- Assignments – 3 weeks for submission
 - Assignment 1 (OO) – released around week 3
 - Assignment 2 (FP) -- released around week 8-9
- Final Exam (TBC.. mid June 2018)
 - 60%