Automated Refactoring for Scala

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Scala Refactoring Project

Project Goal

Creating an IDE independent refactoring library that makes creating new refactorings as simple as possible.

Refactoring

Outline

- A Refactoring Example
- Refactorings for Scala
- 2 The Project
 - Architecture Overview
 - Implemented Refactorings
- Oemo
- 4 Outlook

What is *Refactoring*?

Refactorings are

program restructuring operations that support the design, evolution and reuse of object-oriented application frameworks.

[Opd92]



Outlook



ı	Refactor	<u>B</u> uild	R <u>u</u> n	Tools	Version <u>C</u> ontrol
ĺ	Renan	ne			Umschalt+F6
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l	Make Static				
l	C <u>o</u> nve	ert To Ir	stance	Method	l
	<u>M</u> ove F6				
		C <u>o</u> py F5			
	Safe Delete Alt+Entf				
Extract Method Strg+Alt+M					
	Extract Method Object				
Extract Class					
Replace Method Code Duplicates					
	Invert <u>B</u> oolean				
	Introduce Parameter Object				
	Introduce <u>V</u> ariable			Strg+Alt+V	
	Introduce <u>C</u> onstant Introduce Field			Strg+Alt+C	
					Strg+Alt+F
Introduce <u>P</u> arameter				Strg+Alt+P	
I <u>n</u> line Strg+Alt+N					
	Pull Members Up				
Push Members Down					
	Use Interface Where Possible				
	Replace <u>I</u> nheritance with Delegation Remove Middleman				
Wrap Return Value					
	Convert Anonymous to Inner				
	Encapsulate Fields				
	Replace Temp with <u>Ouery</u> Replace Constructor with Factory Method				
	Replace Constructor with Factory Method Replace Constructor with Builder				
	Generify				
	Migrate				
	Extract Include File				
	Extract Interface Extract Superclass				
	Extrac	t Super	ciass		

An Example: Extract Method in Scala

```
def sendNotification() {
   val connection = openSmtpConnection()
   val emailMessage = createMessage()
   val status = connection send emailMessage
}
```

Outlook

An Example: Extract Method in Scala

```
def sendAnEmail(connection: Connection) = {
   val emailMessage = createMessage()
   connection send emailMessage
}
def sendNotification() {
   val connection = openConnection()
   val status = sendAnEmail(connection)
}
```

```
def sendAnEmail(send: Message => Status) = {
   val emailMessage = createMessage()
   send(emailMessage)
}
def sendNotification() {
   val connection = openConnection()
   val status = sendAnEmail(connection.send)
}
```

Refactorings from Java

Most used refactorings in Eclipse JDT are:

- Rename
- Extract Local Variable
- Move
- Extract Method

Scala Specific

Traits

- Split
- Rename
- Extract

Outline

Traits

- Split
- Rename
- Extract

Pattern Matching

- Convert Conditionals
- Convert Instance Checks
- Introduce Extractor

Scala Specific

Outline

Traits

- Split
- Rename
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Pattern Matching

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and many more ...

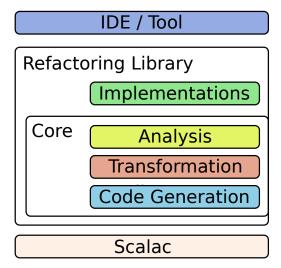


Automated Refactoring for Scala

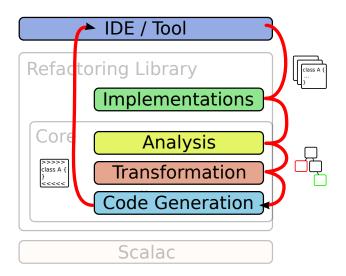
Scala Refactoring Project



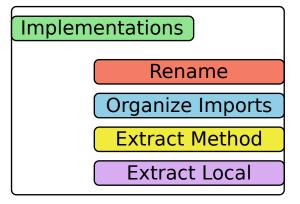
Architecture Overview



Architecture Overview



Implemented Refactorings



Demo

Outlook

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Next Steps

- Scala IDE Integration
- Stabilizing the Library
- More Refactorings

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- scala.ifs.hsr.ch
- misto.ch
- twitter.com/m_st





Outline

William F. Opdyke.

Refactoring Object-Oriented Frameworks. PhD thesis, Urbana-Champaign, IL, USA, 1992.



Martin Fowler.

Refactoring: improving the design of existing code. Addison-Wesley Longman Publishing Co., Inc., Boston, MA, USA. 1999.