

Classless Java

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Abstract.

1 Introduction

- Using annotations to implement a rich notion of traits with a mechanism to instantiate objects (the of method). Goal 1: is to reduce the amount of code that is required to program with interfaces and default methods. Goal 2: To provide a convenient means to do multiple inheritance in Java.
- Specify the system more formally.
- Show that we can model all trait operations
- Implementation using Lombok
- Case studies: The expression problem, Trivially Case Studies from traits paper.

2 Overview

Yanlin

- * Explain what the Mixin annotations do using examples.
- * Motivate the use of multiple inheritance in Java.
- * Maybe use Marco's example.

3 Comparing to traits and mixins

Haoyuan

- vs both: we do automatic return type refinement, which has useful applications (example: Expression Problem)
- vs traits: we support of methods to create new objects (a replacement to constructors); Moreover we have the with and clone methods (we miss more applications for those). Show how to model the operations on traits; discuss operations that we cannot model (example: renaming).
- vs mixins: we use the trait model of explicitly resolving conflicts. This is arguably better for reasoning.

4 Formal Semantics

Yanlin and Haoyuan

We need to show 2 things:

- 1) The dynamic semantics: what's the code that gets generated by a mixin annotation;
- 2) The type system: what programs to reject; properties: generation of type-safe/checkable code.

BRUNO: The implementation is still missing the type system (rejecting some programs)!

5 Implementation

Haoyuan

discuss implementation in lombok; and limitations.

BRUNO: The implementation does not support separate compilation yet. Can we fix this?

6 Case studies

Haoyuan and Yanlin

6.1 A Trivial Solution to the Expression Problem

6.2 Other case studies

BRUNO: The case studies still need to be implemented!

Collections example from traits paper?

Other case studies using multiple inheritance?

7 Related Work

- traits (original, variations, scala) - mixins (original, scala) - multiple inheritance
- expression problem - ...

8 Conclusion