

LAVA

Object-based Inheritance in Java

Günter Kniesel

Uwe Bardey

Tobias Windeln

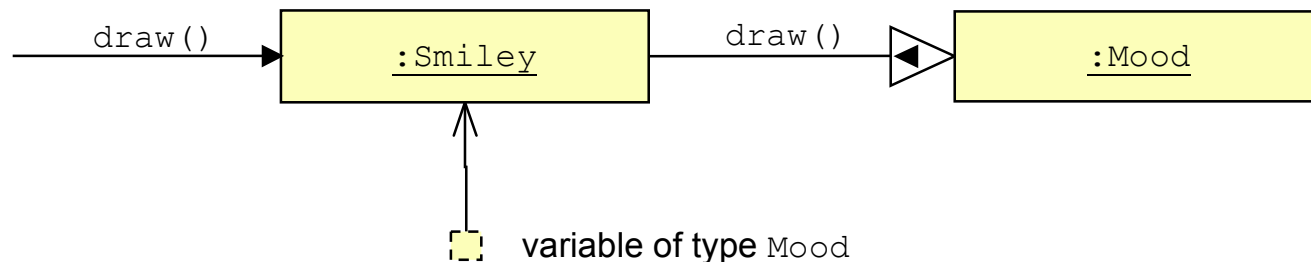
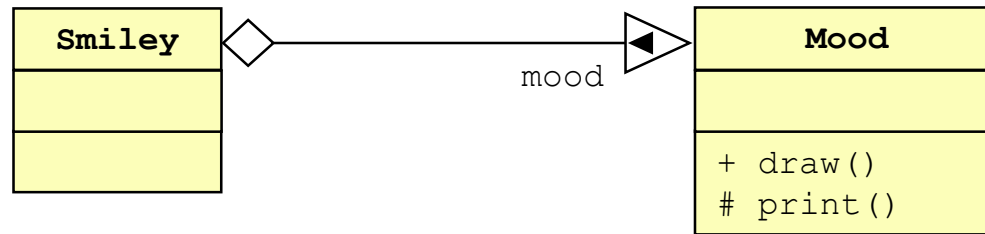
Jörg Gonska

University of Bonn

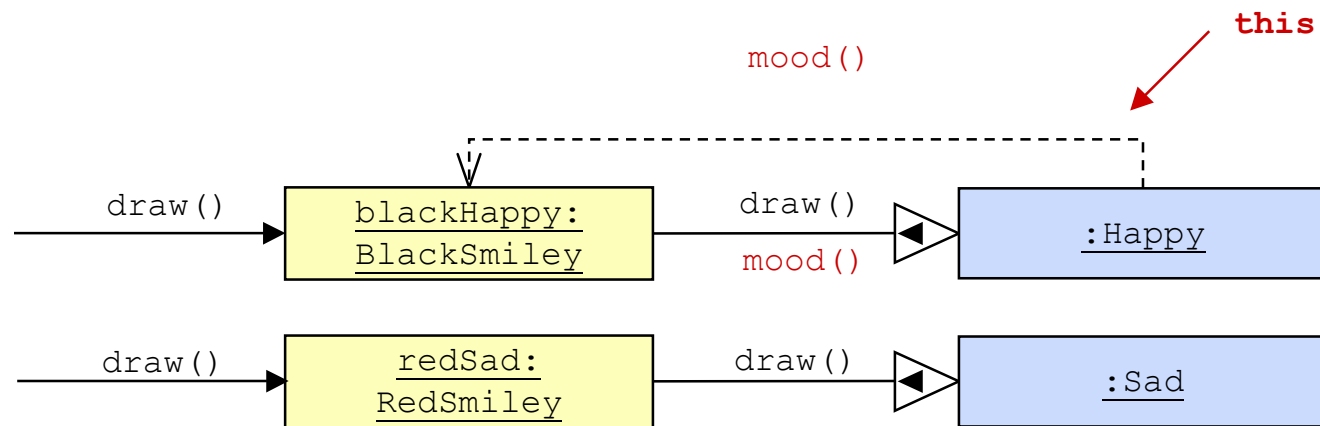
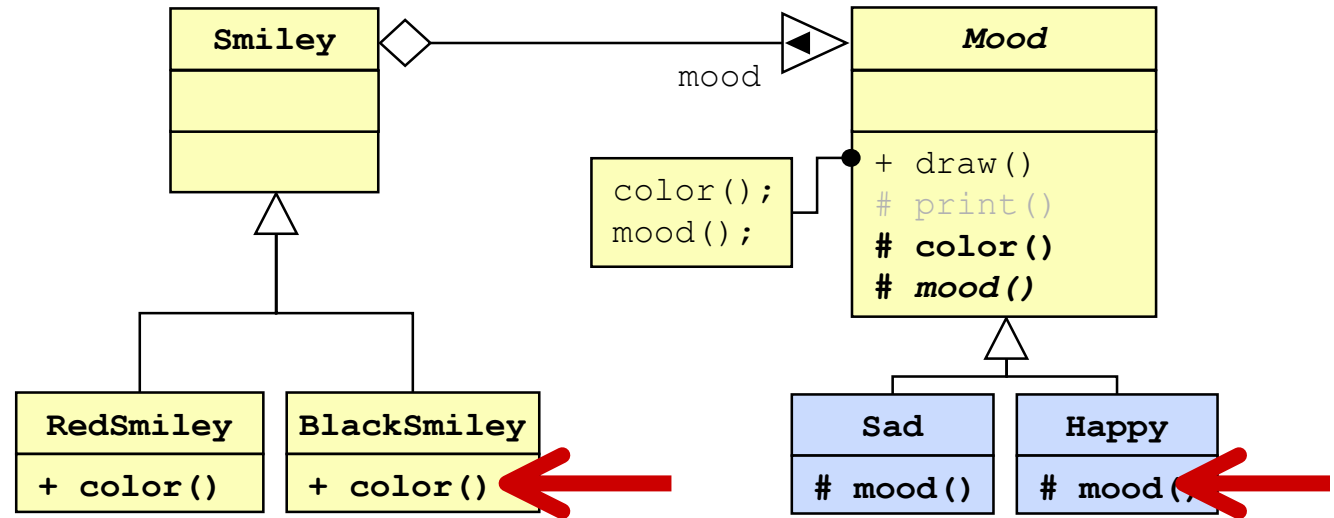
Computer Science Department III

<http://javalab.cs.uni-bonn.de/research/darwin/>

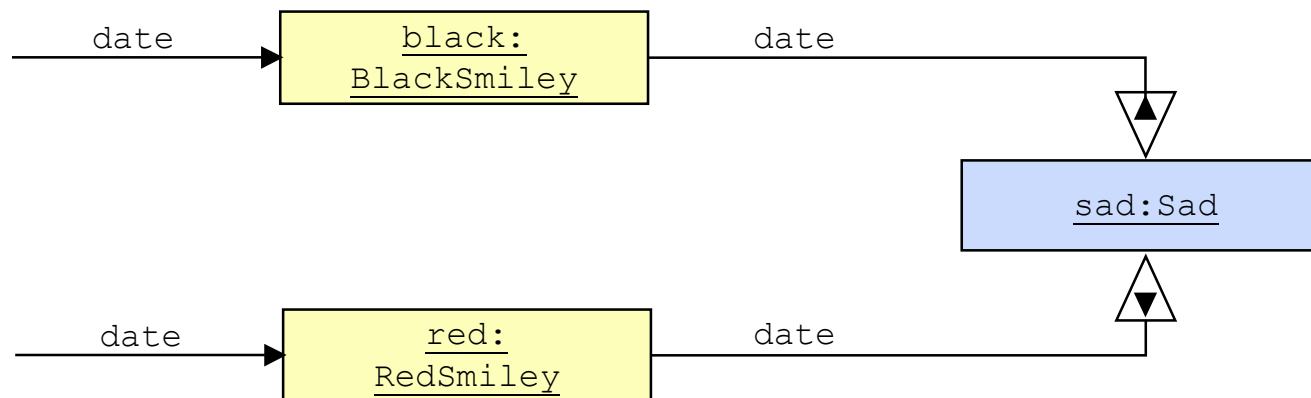
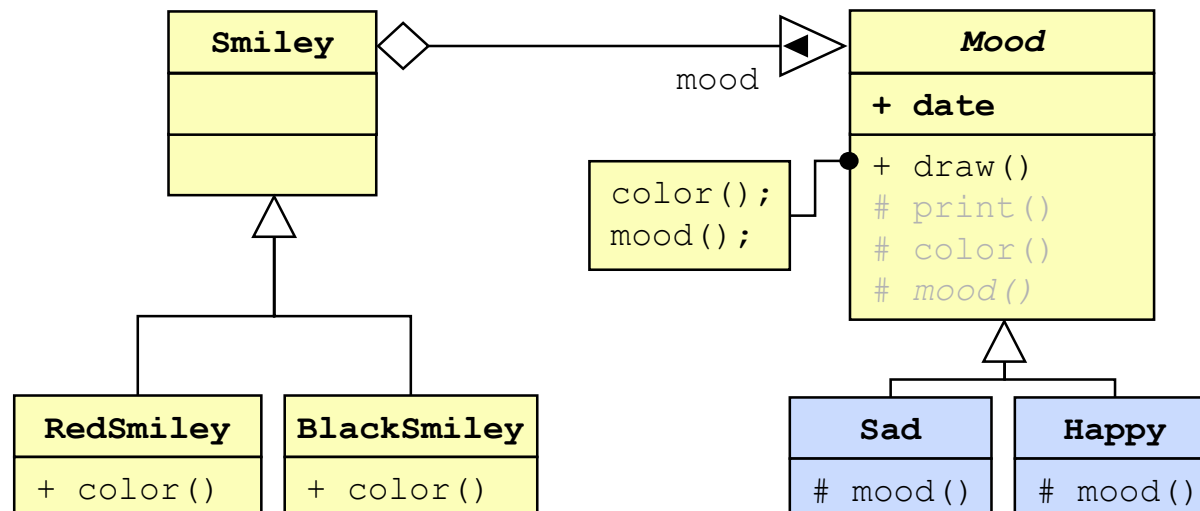
1: Automatic Forwarding and Extended Subtyping



3: Overriding



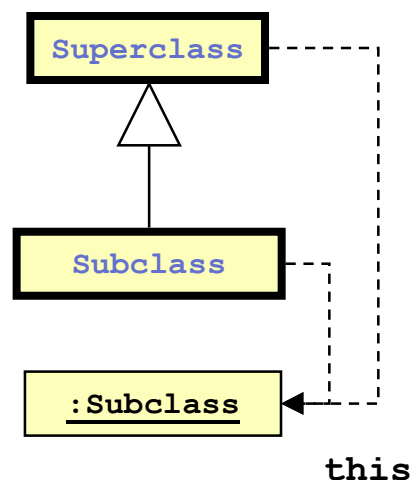
5: Forwarding of Field Access



Flavours of Inheritance

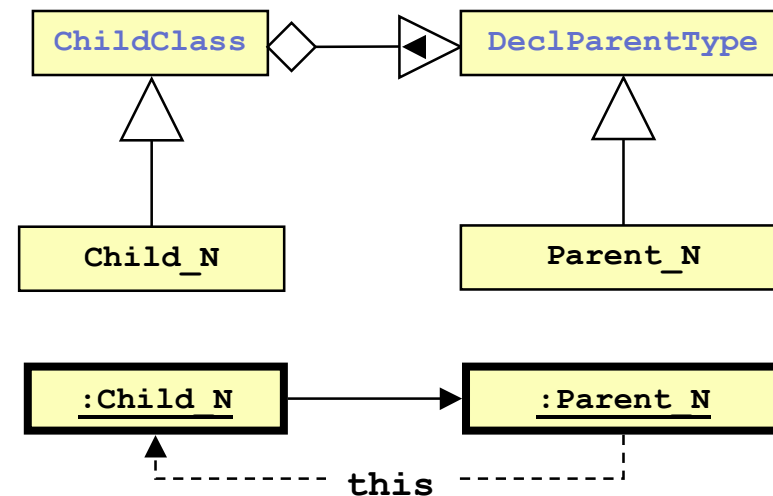
Class-based

- ➔ **static inheritance** of methods and fields
- ➔ **subtyping**: subclass is subtype of superclass
- ➔ **overriding** of superclass's methods
- ➔ **visibility** of protected methods from superclass

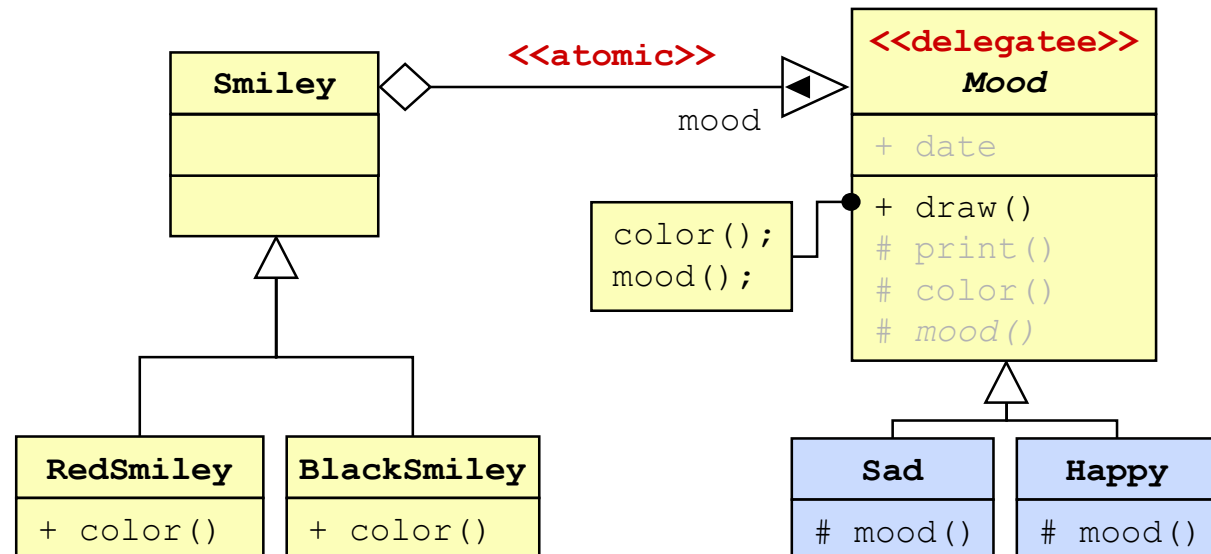


Object-based

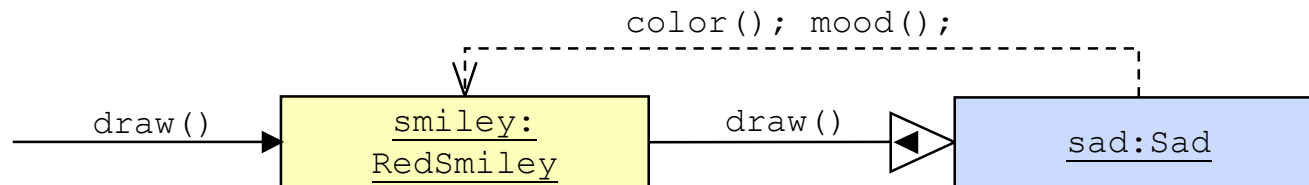
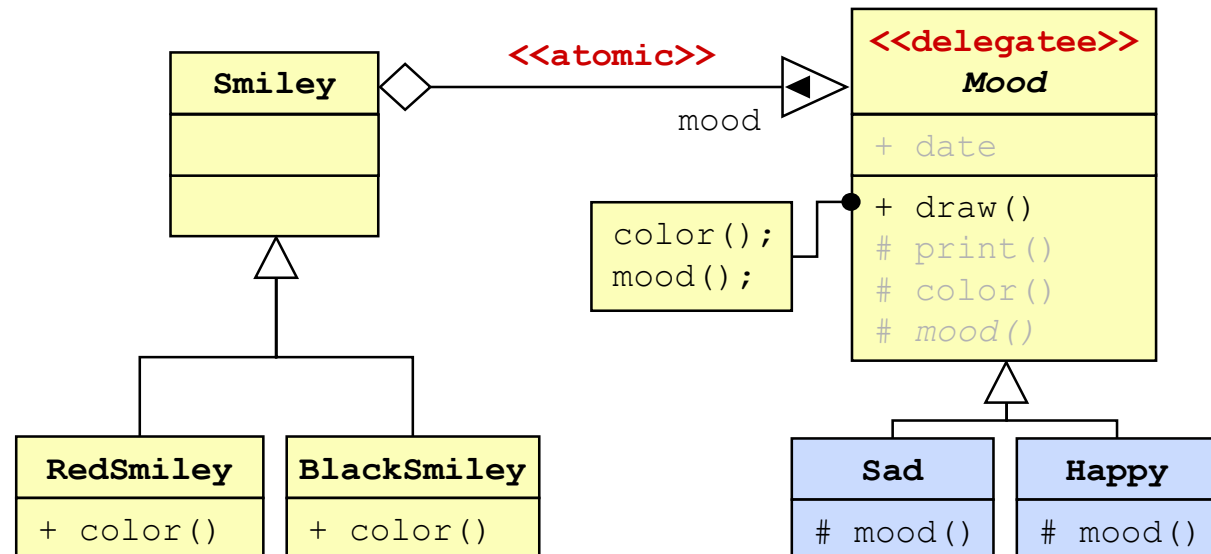
- ➔ **dynamic forwarding** of method invocations and field accesses
- ➔ **subtyping**: child class is subtype of declared parent type
- ➔ **overriding** of parent object's methods
- ➔ **visibility** of protected methods from declared parent type



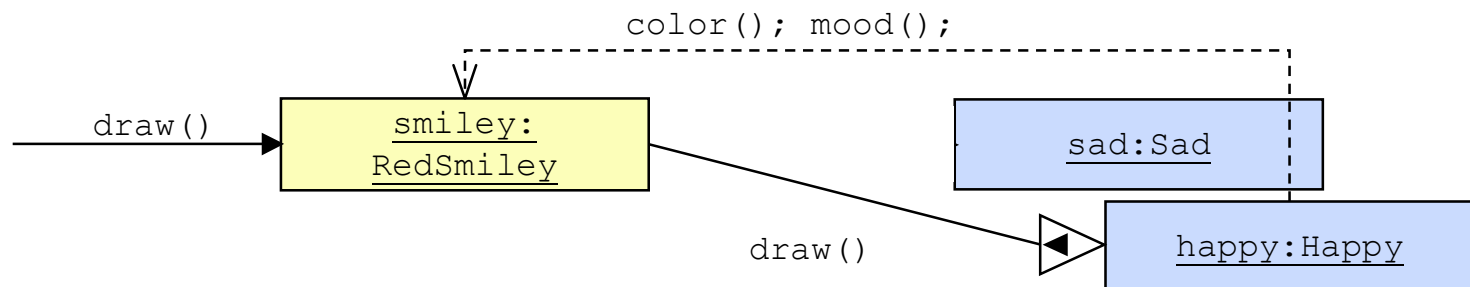
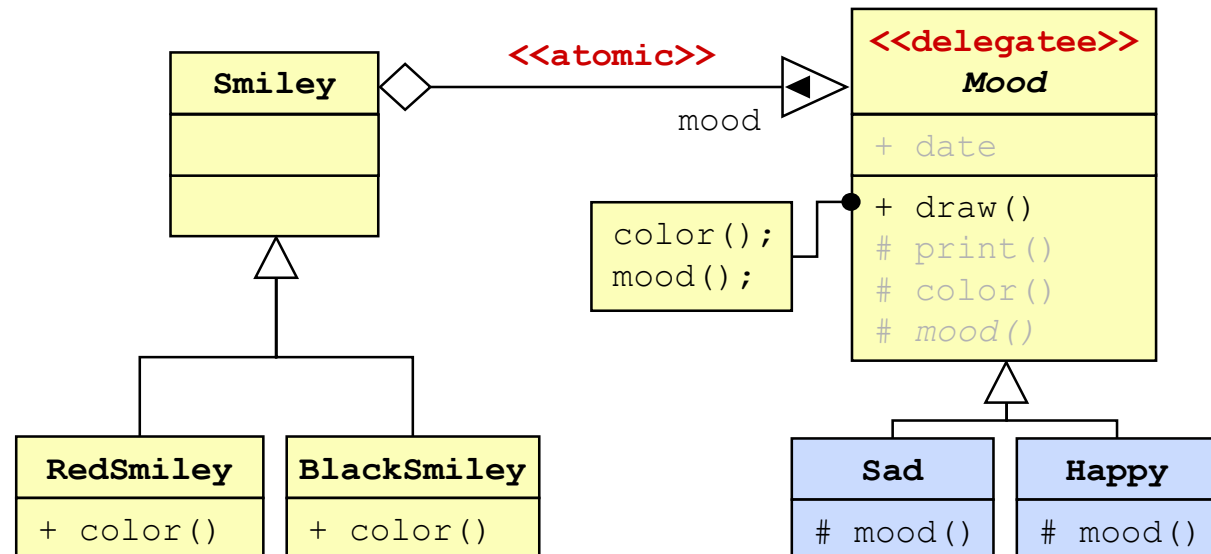
7: Mutable Delegation



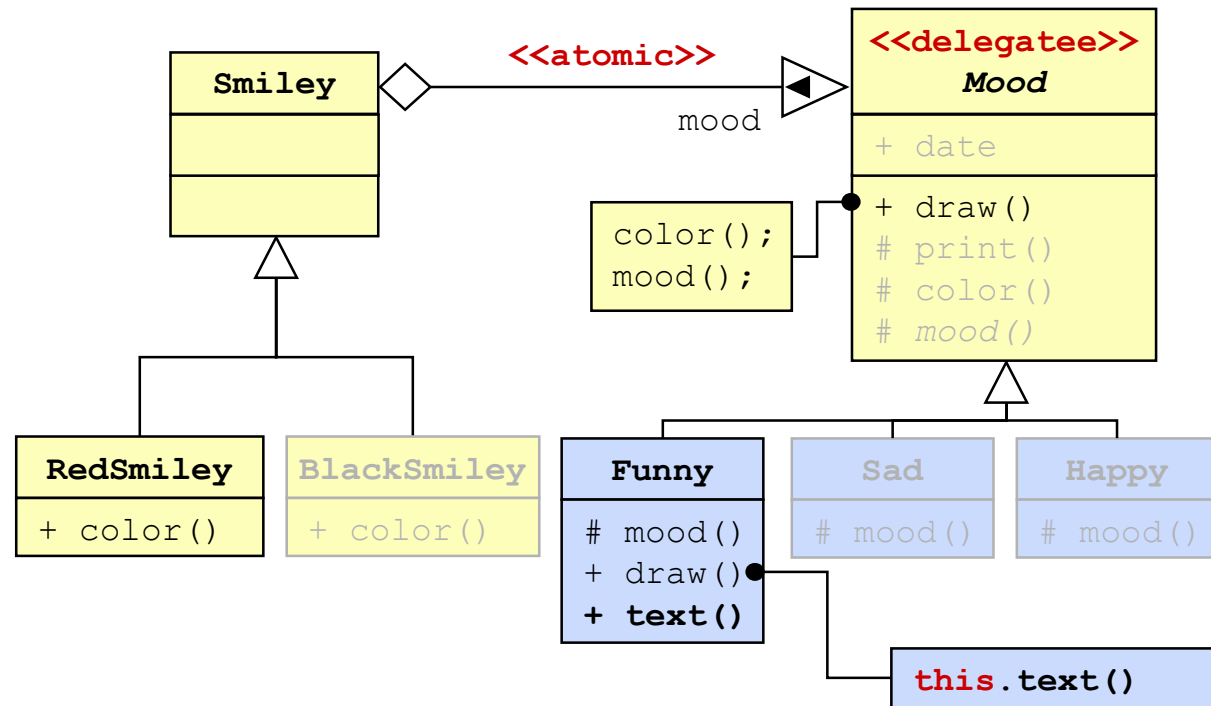
7: Mutable Delegation



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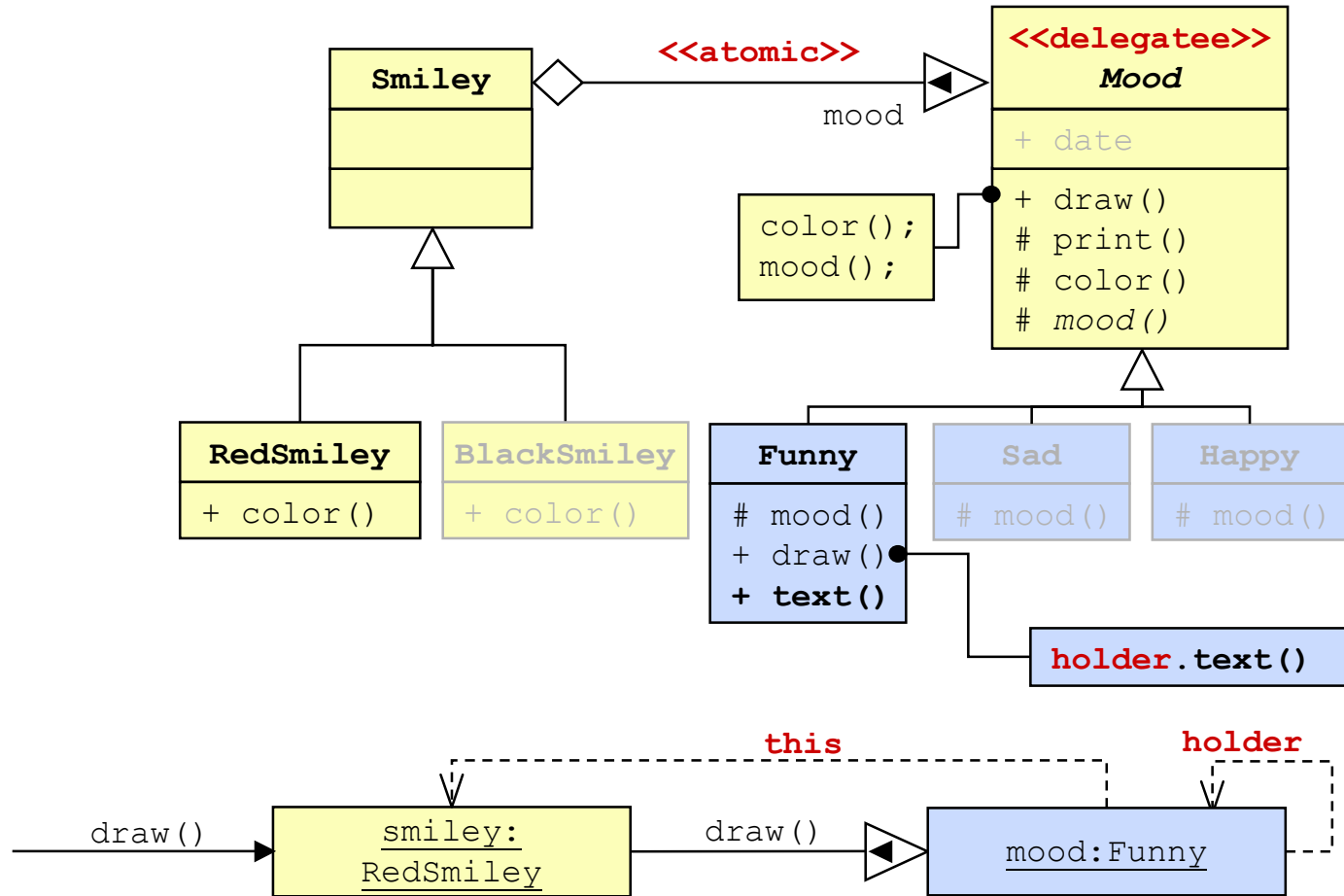


8: Mutable Delegation



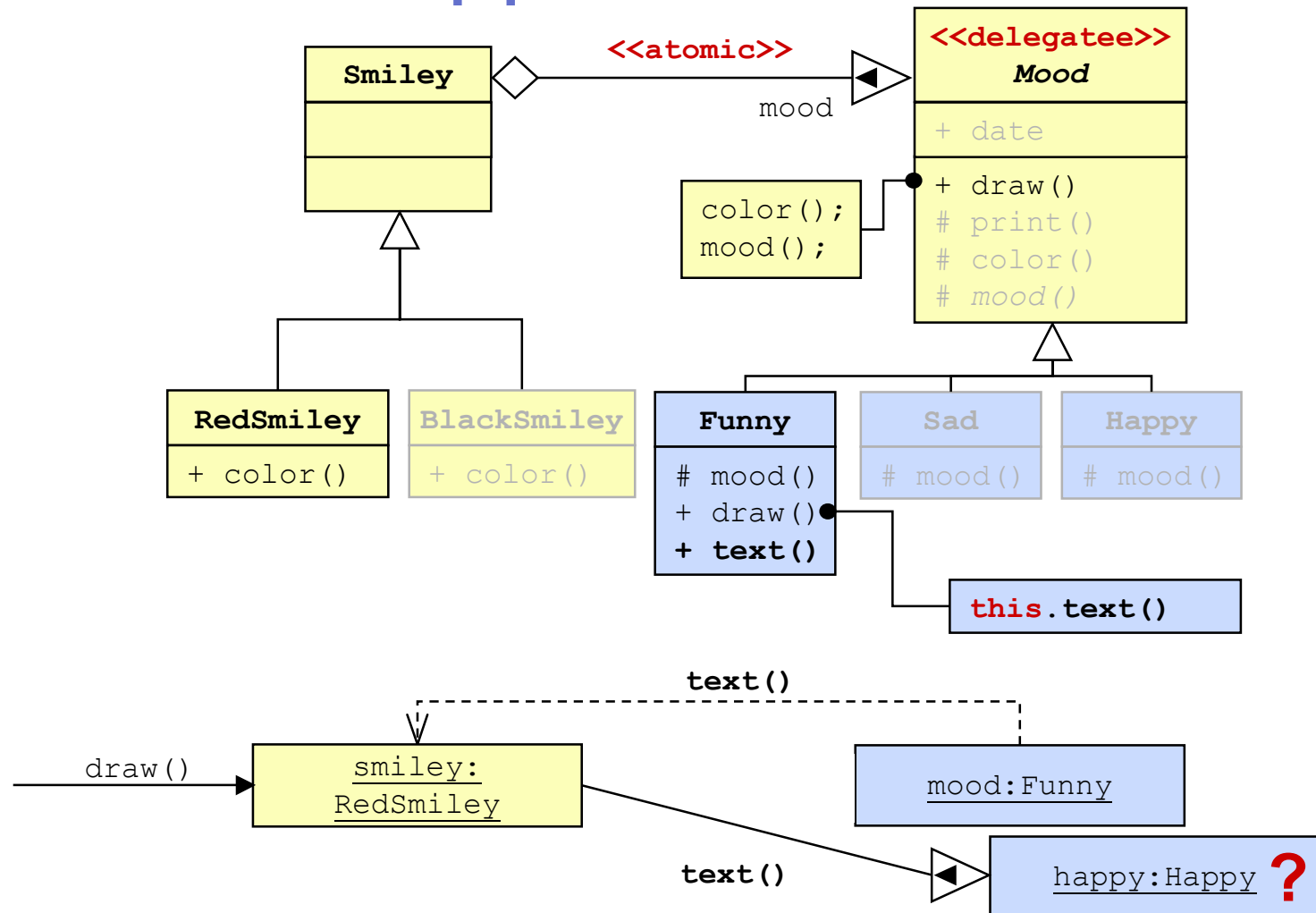
8: Mutable Delegation

- this and holder -



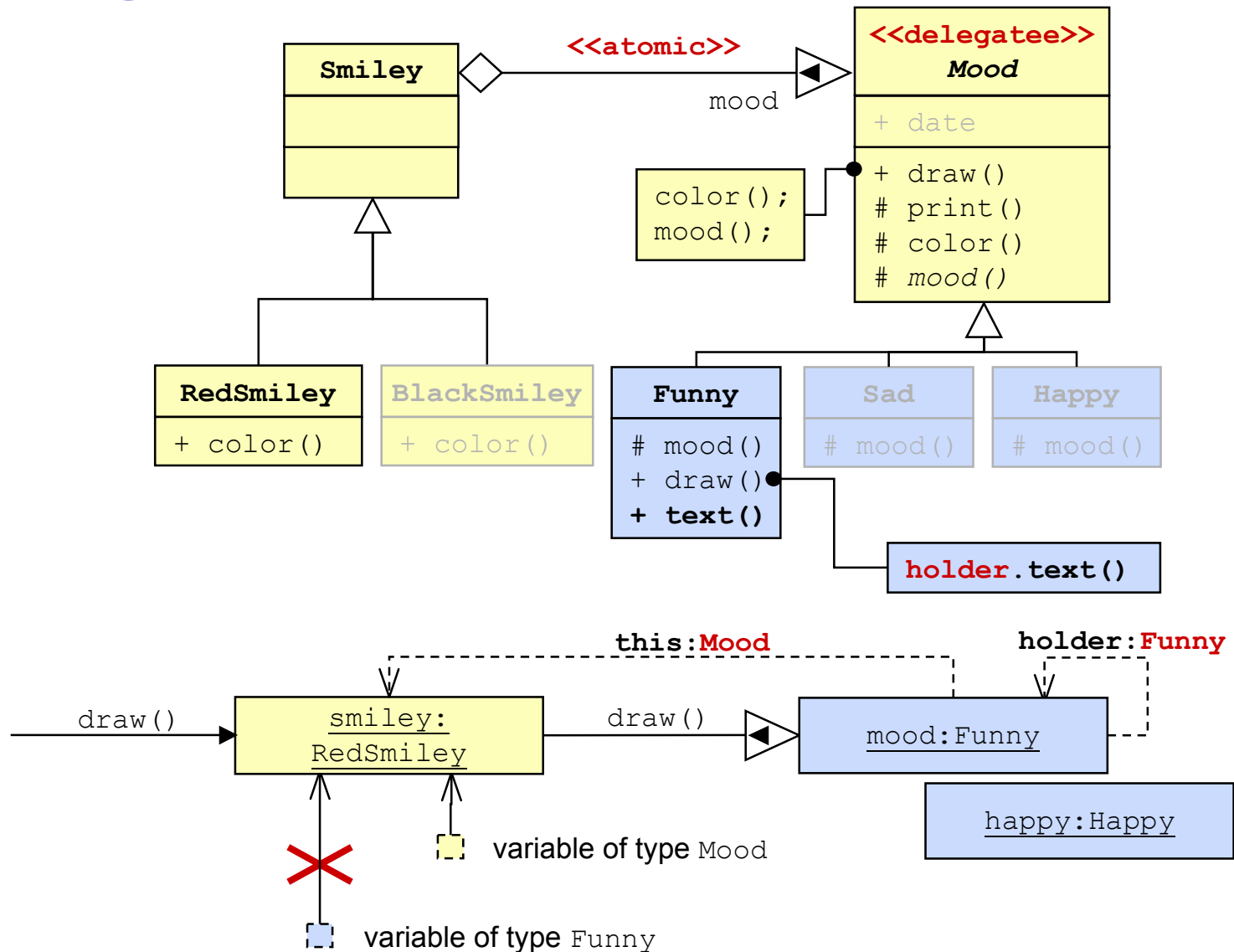
8: Mutable Delegation

What would happen otherwise?



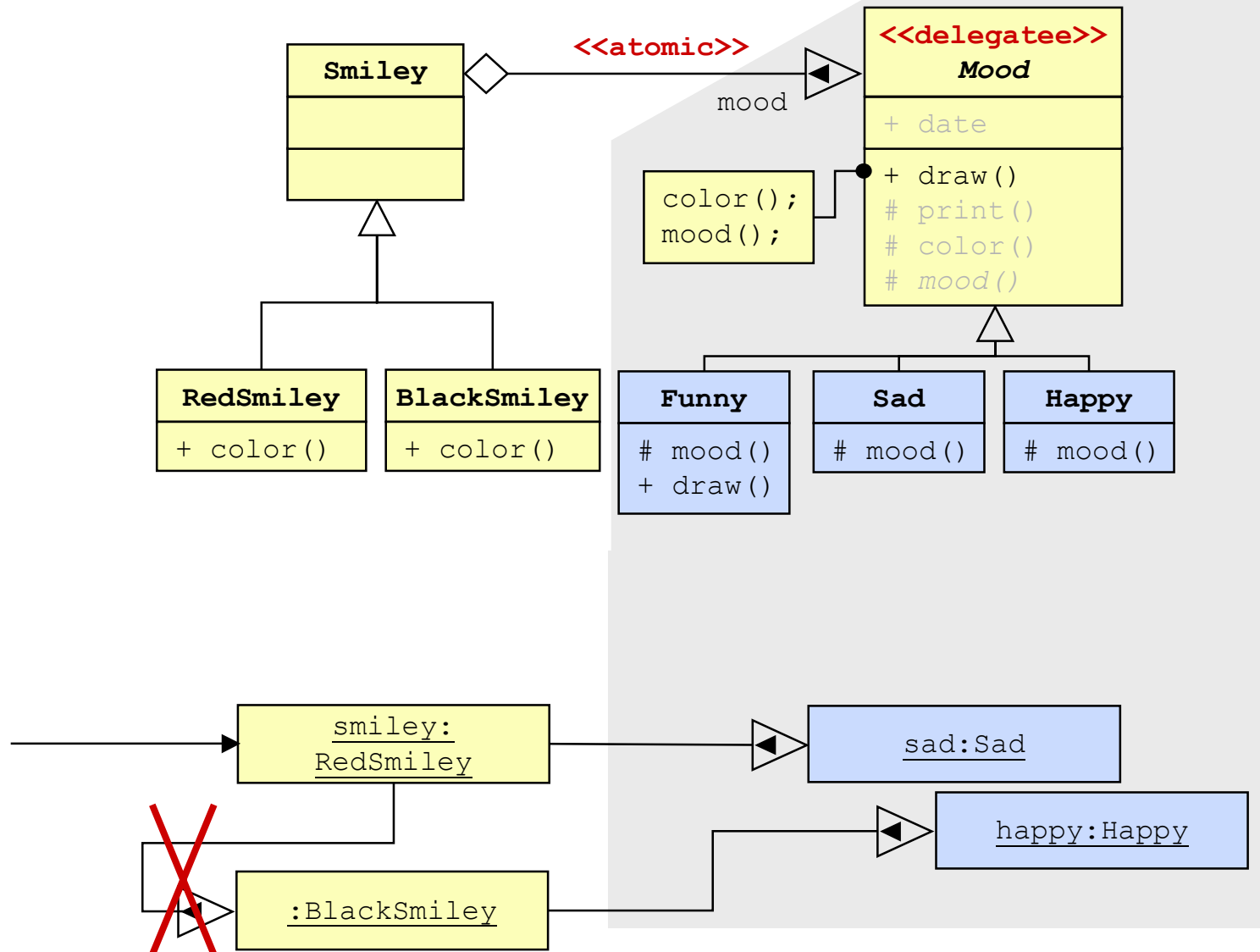
9: Mutable Delegation

Typing of holder and this

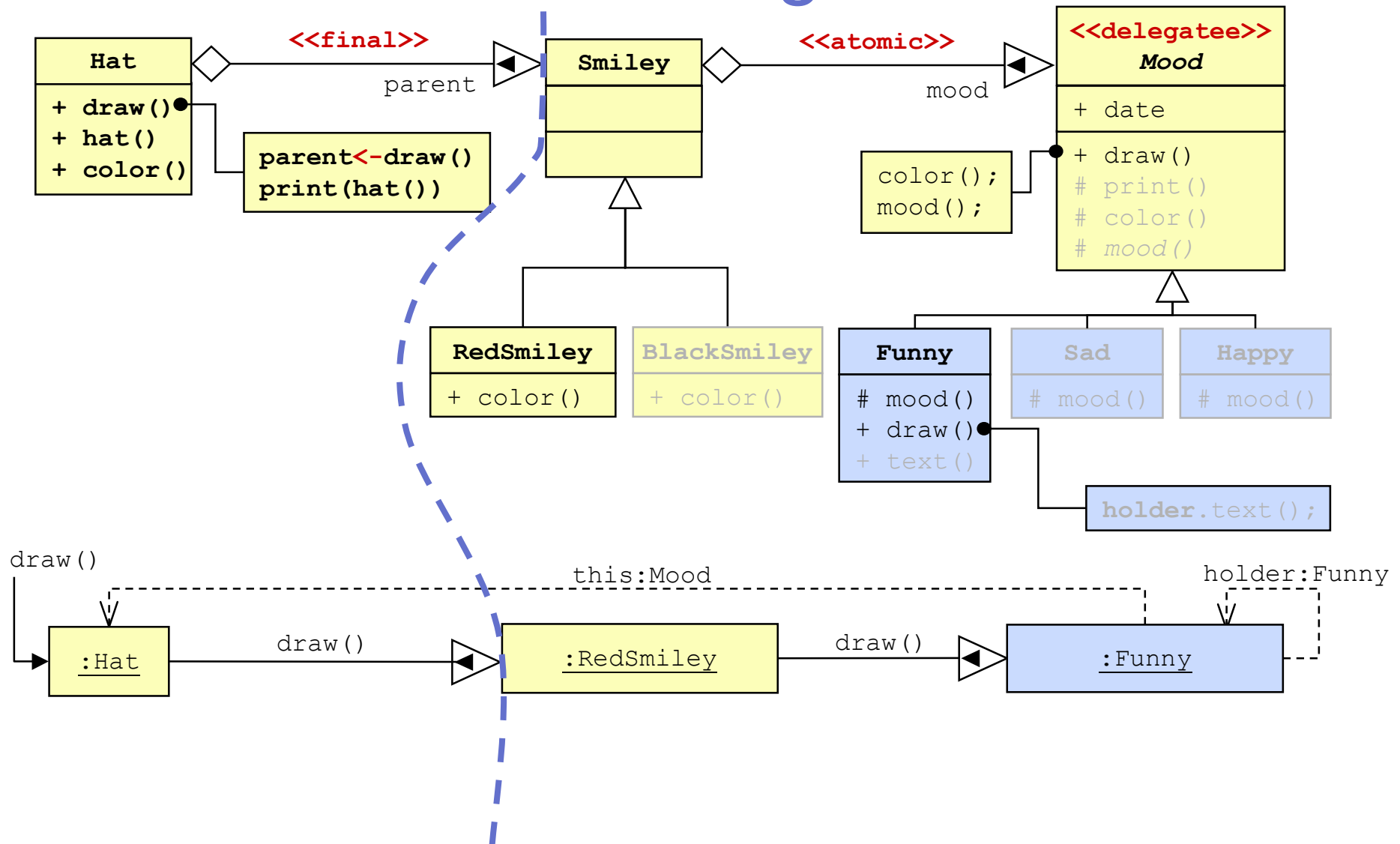


7: Mutable Delegation

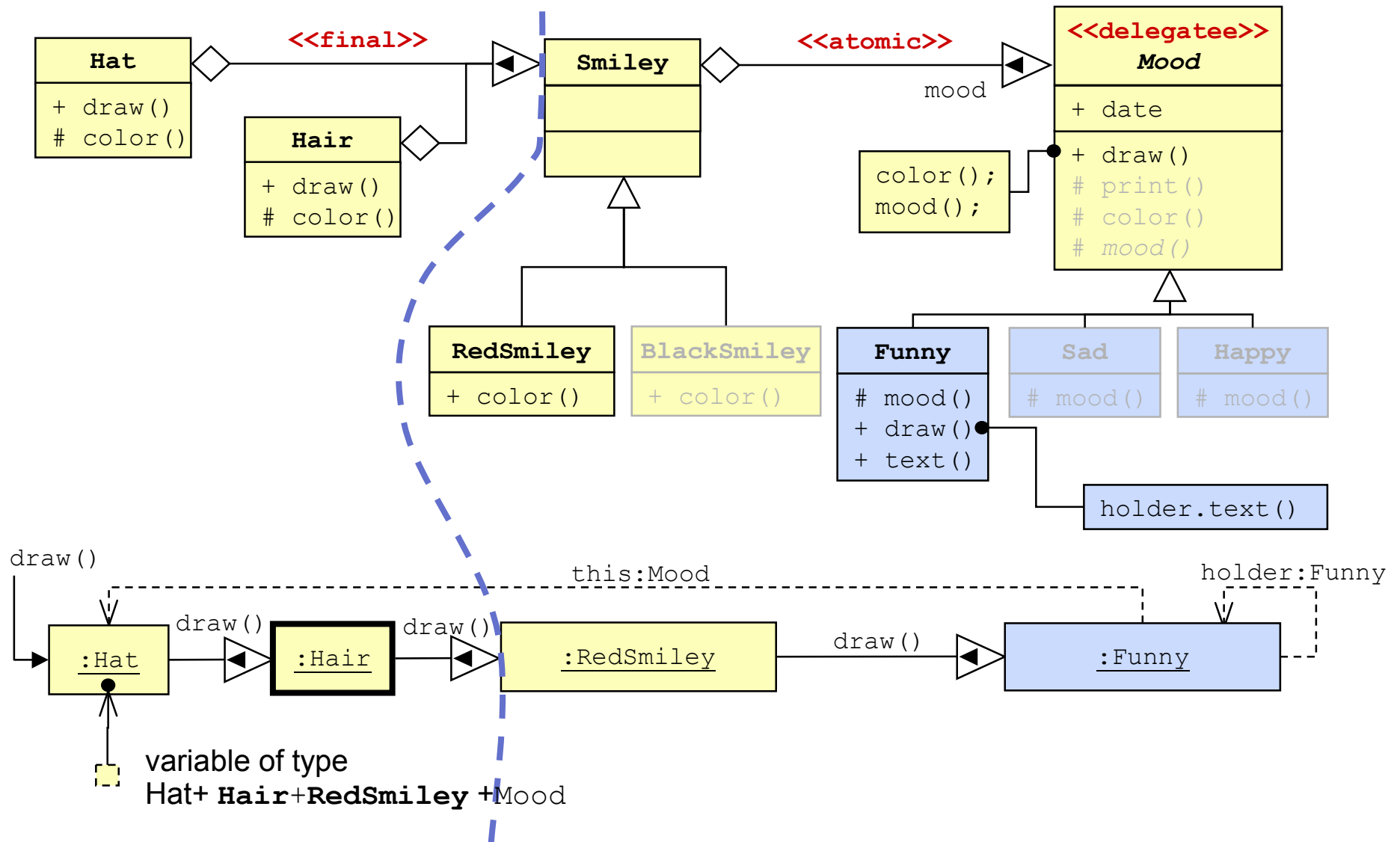
- atomic -



11: Unanticipated Extension with Fixed Delegation



12: Combination of Decorators

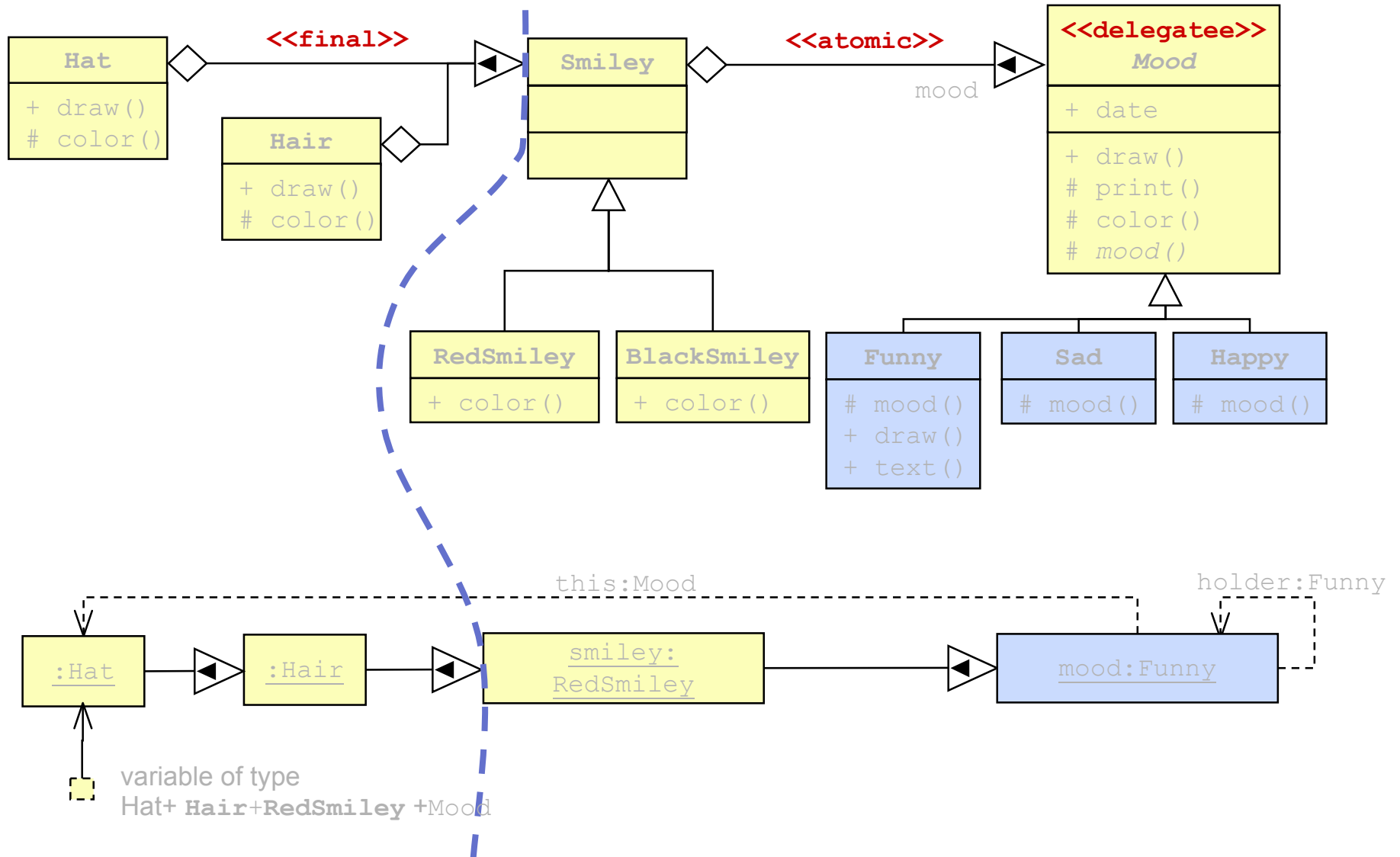


Unanticipated Variability

→ Fixed Delegation

Anticipated Variability

→ Mutable Delegation



State of affairs

- ✓ Darwin
 - ◆ a model for statically typed dynamic delegation

- ✓ Lava
 - ◆ Java with delegation and consultation

- ✓ Current implementation (0.19 alpha)
 - ◆ full functionality except that ...
 - ◆ ... parent classes must be compiled with the Lava compiler
 - ◆ ... inner classes are not supported yet

- ➔ <http://javalab.cs.uni-bonn/research/darwin>
 - ➔ full demo code contained in the release

Questions?