

**Martin is getting the  
projector  
to work  
with his  
laptop.**

# Reuse in the Mist

---



**Class**  
**Composition**  
**vs. Class**  
**Inheritance**

---

**Martin McClure**

# Mist

- [mist-project.org](http://mist-project.org)
- [Github](#)

# **Reuse of Functionality**

# Decomposition

**Decomposition**

**Composition**

**Large Scale**

**Small Scale**

**Small Scale**



**Building  
a  
Factory**

# Reusing a Method

# Reusing a Method

- Expose
- Change
- Omit
- Use

# TemperatureRecord

- add:
- size
- average
- highTemp

# OrderedCollection

- size
- <indexed>
- add:
- remove:
- size
- do:

# AverageKeeper

- size
- total
- add:
- remove:
- average
- total
- size

# OrderedCollection

- **add:** – Change
- **remove:** – Omit
- **size** – Expose
- **do:** – Use

# AverageKeeper

- **add:** – Change
- **remove:** – Omit
- **average** – Expose
- **total** – Omit
- **size** – Expose

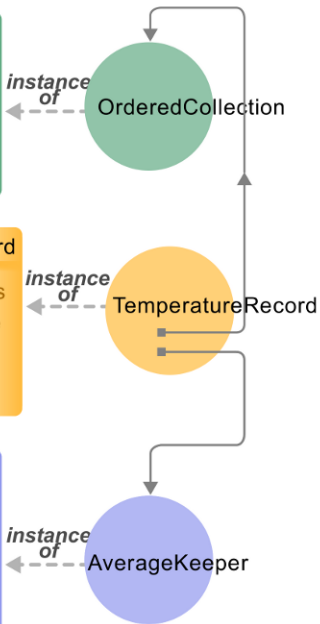
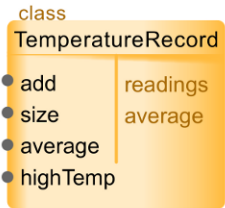
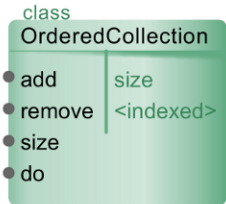


**Reuse  
in  
Smalltalk-80**

# Object Composition

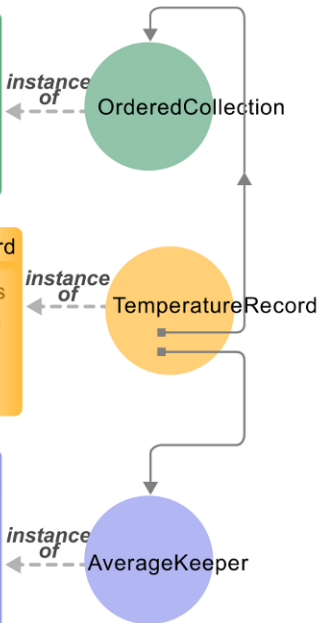
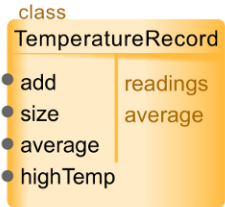
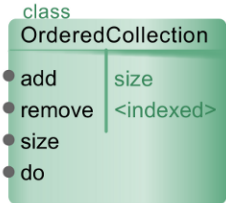
# Object Composition

CLASSES NOT RELATED



# Object Composition

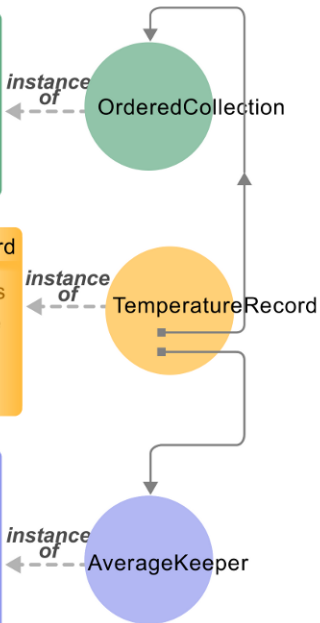
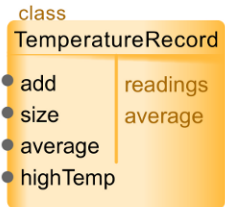
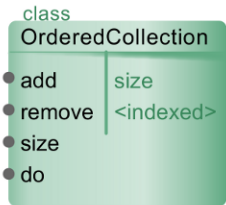
CLASSES NOT RELATED



```
add: aReading
readings
add: aReading.
average
add: aReading.
```

# Object Composition

CLASSES NOT RELATED



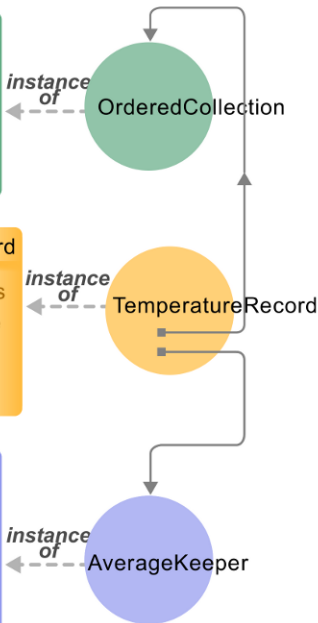
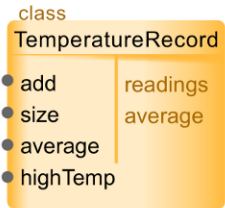
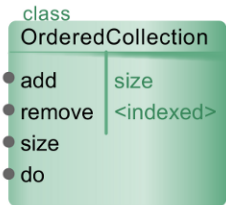
```
add: aReading  
readings  
add: aReading.  
average  
add: aReading.
```

---

```
size  
^readings size.
```

# Object Composition

CLASSES NOT RELATED



```
add: aReading  
readings  
add: aReading.  
average  
add: aReading.
```

---

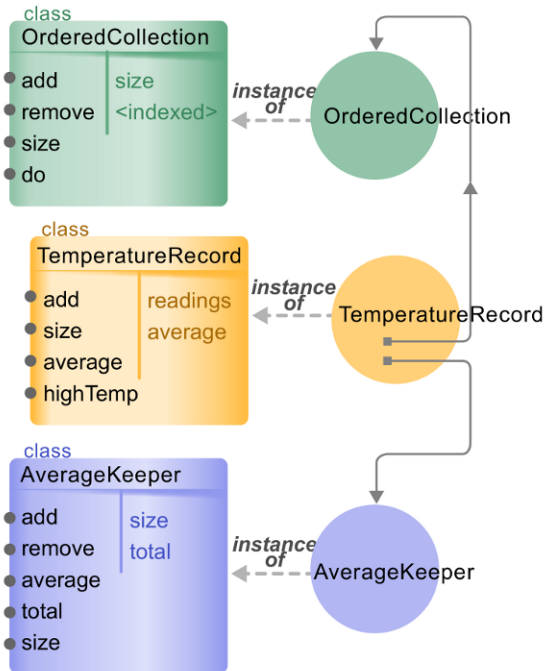
```
size  
^readings size.
```

---

```
average  
^average  
average.
```

# Object Composition

CLASSES NOT RELATED



```
highTemp
| highest |
highest := -100.
readings
do: [:each |
  highest :=
    highest
    max: each].
^highest.
```

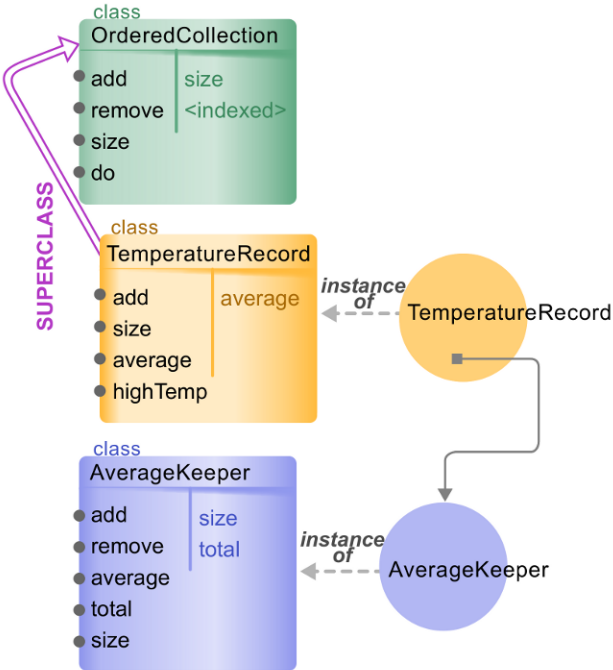
# Black Box Reuse



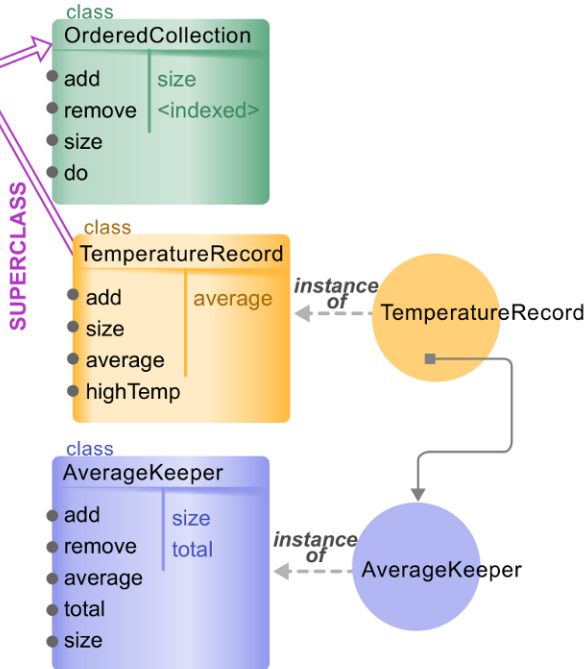


# **Class Inheritance**

# Class Inheritance, Variant 1

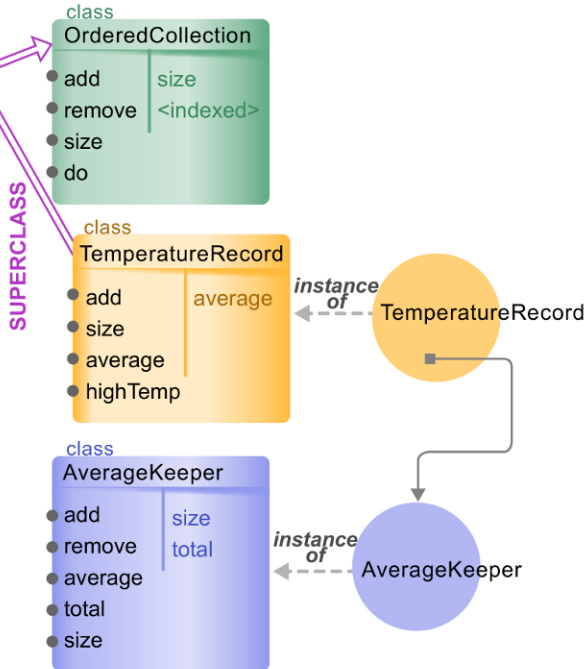


# Class Inheritance, Variant 1



```
add: aReading
super
  add: aReading.
average
  add: aReading.
```

# Class Inheritance, Variant 1

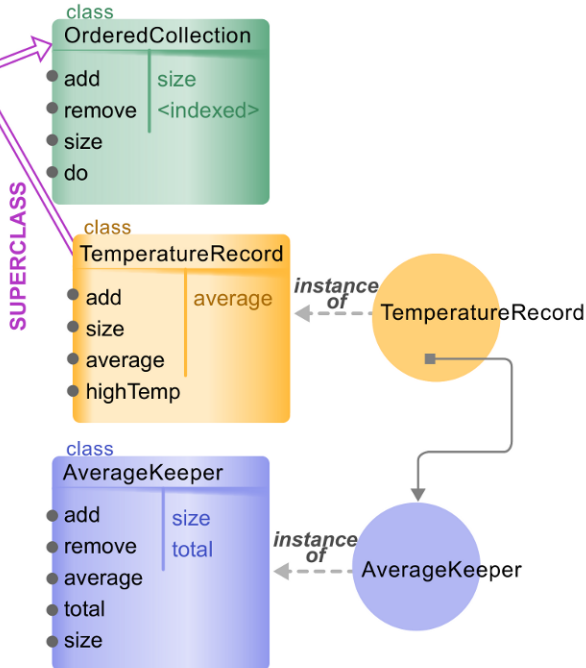


```
add: aReading
super
  add: aReading.
average
  add: aReading.
```

---

(size—no method)

# Class Inheritance, Variant 1



```
add: aReading  
super  
  add: aReading.  
average  
  add: aReading.
```

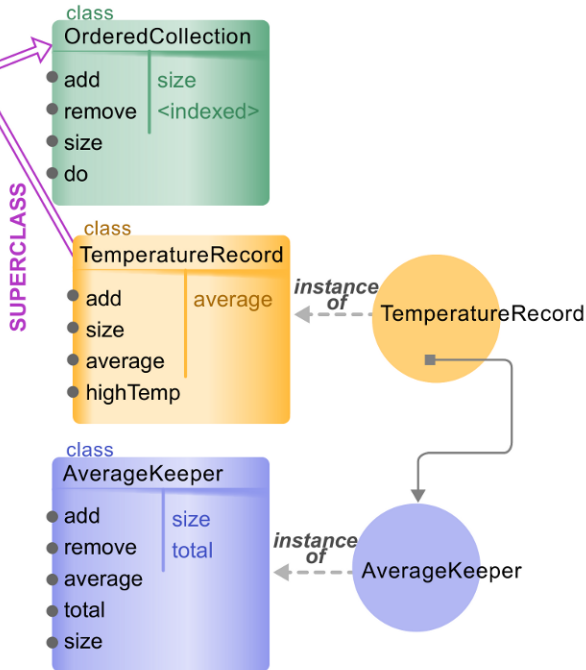
---

```
(size—no method)
```

---

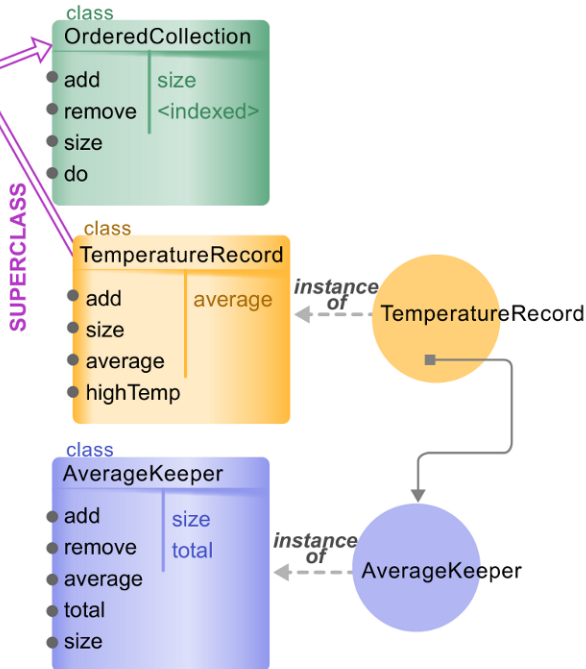
```
average  
^average  
average.
```

# Class Inheritance, Variant 1



```
highTemp
| highest |
highest := -100.
self
do: [:each |
highest :=
highest
max: each].
^highest.
```

# Class Inheritance, Variant 1

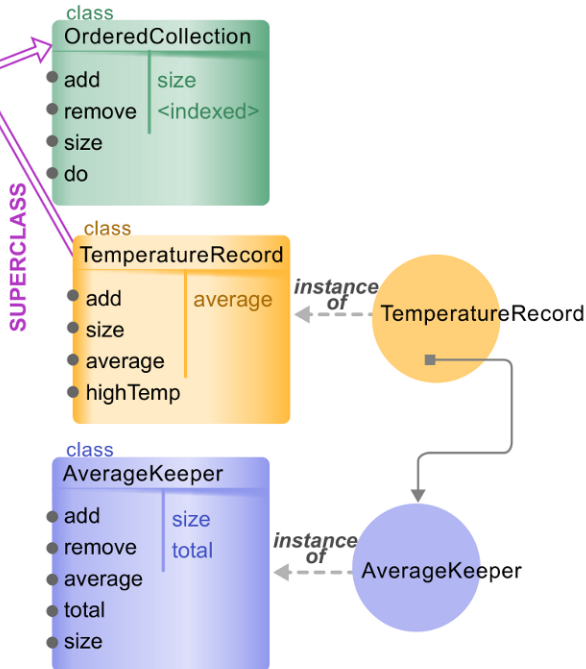


```
highTemp
| highest |
highest := -100.
self
do: [:each |
highest :=
highest
max: each].
^highest.
```

---

```
remove: aReading
self
shouldNotImplement
```

# Class Inheritance, Variant 1



```
highTemp
| highest |
highest := -100.
self
do: [:each |
    highest :=
        highest
        max: each].
^highest.
```

---

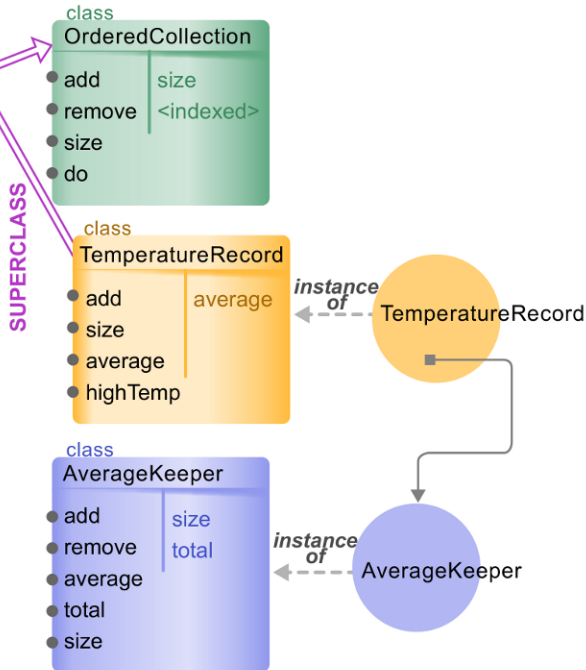
```
remove: aReading
self
    shouldNotImplement
```

---

```
do: aBlock
self
    shouldNotImplement
```



# Class Inheritance, Variant 1



```
highTemp
| highest |
highest := -100.
super
do: [:each |
    highest :=
        highest
        max: each].
^highest.
```

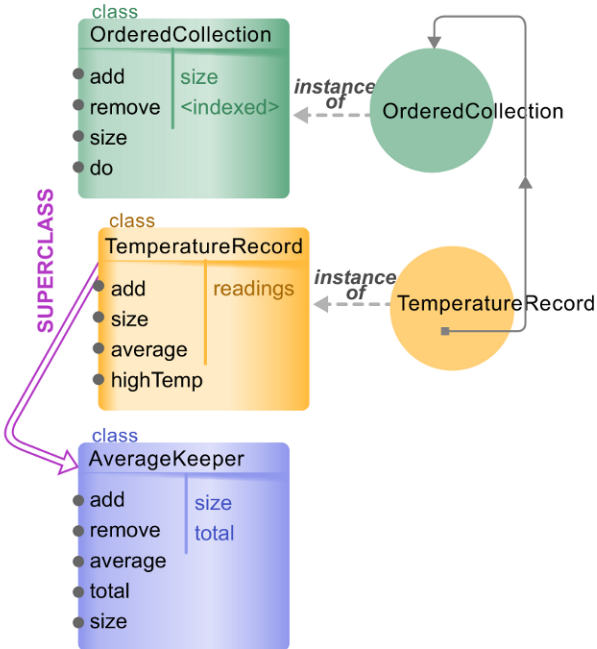
---

```
remove: aReading
self
    shouldNotImplement
```

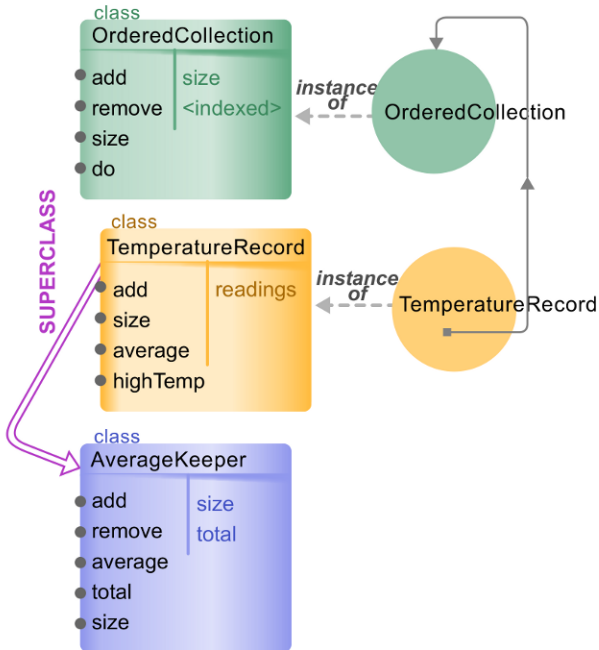
---

```
do: aBlock
self
    shouldNotImplement
```

# Class Inheritance, Variant 2



## Class Inheritance, Variant 2

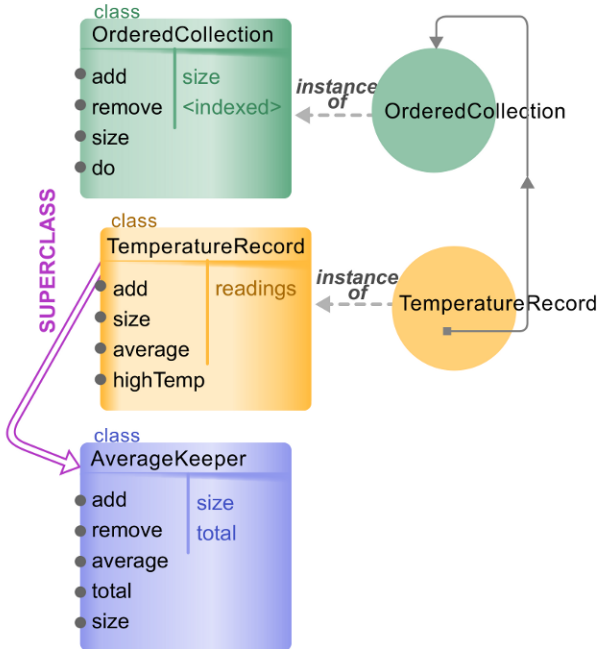


```
add: aReading
readings
add: aReading.
super
add: aReading.
```

---

(size—no method)

## Class Inheritance, Variant 2



```
add: aReading  
readings  
add: aReading.  
super  
add: aReading.
```

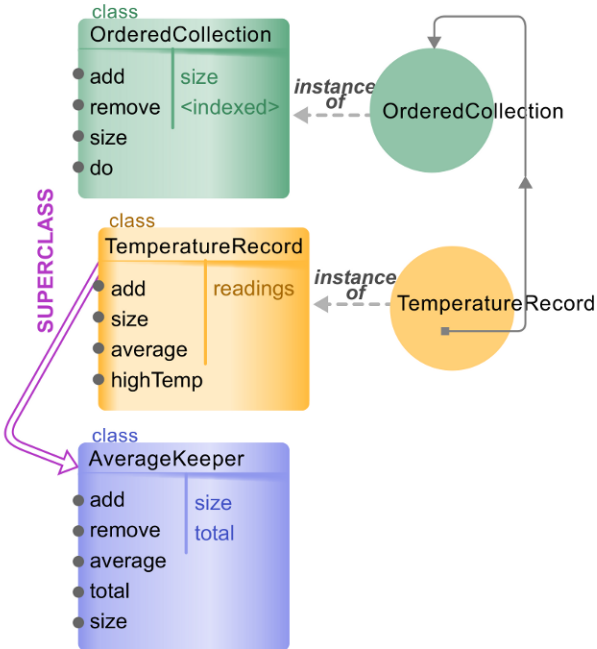
---

(size—no method)

---

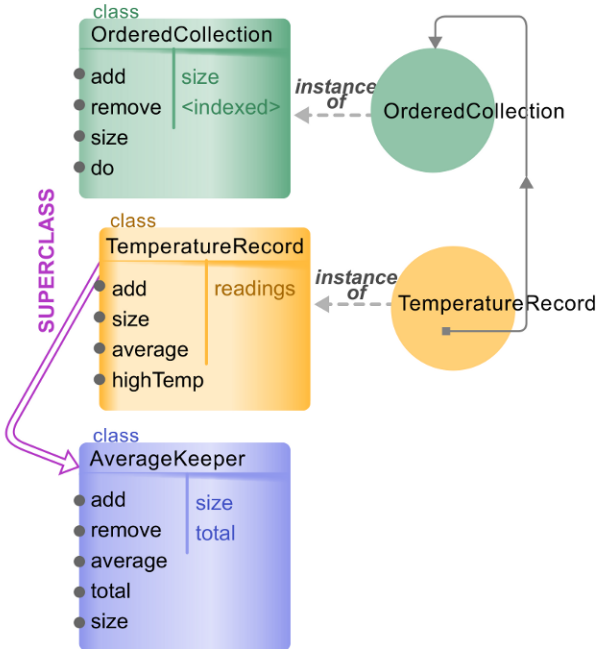
(average  
no method)

## Class Inheritance, Variant 2



```
highTemp
| highest |
highest := -100.
readings
do: [:each |
    highest :=
        highest
        max: each].
^highest.
```

## Class Inheritance, Variant 2



```
highTemp
| highest |
highest := -100.
readings
do: [:each |
    highest :=
        highest
        max: each].
^highest.
```

---

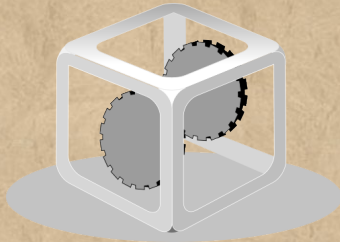
```
remove: aReading
self
    shouldNotImplement
```

---

```
total
self
    shouldNotImplement
```

**super**  
***is weird***

# White Box Reuse





**Reuse  
in  
Mist**

# Object Composition

# Traits

## Composing Classes from Behavioral Building Blocks

Inauguraldissertation  
der Philosophisch-naturwissenschaftlichen Fakultät  
der Universität Bern

vorgelegt von

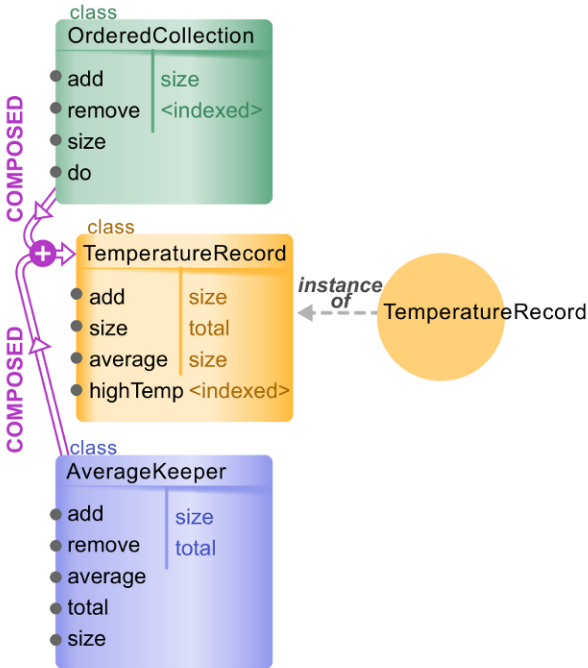
**Nathanael Schärli**

von Zell (LU)

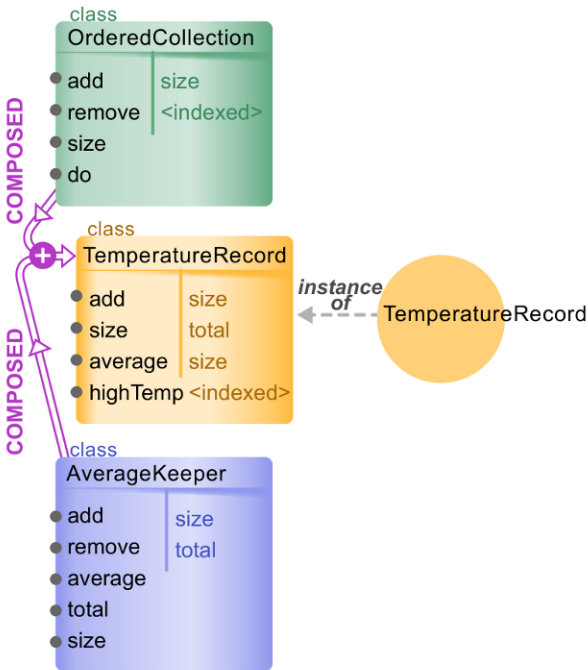
# **Class Composition**

**Compose a  
Composite Class  
from  
Component  
Classes**

# Class Composition

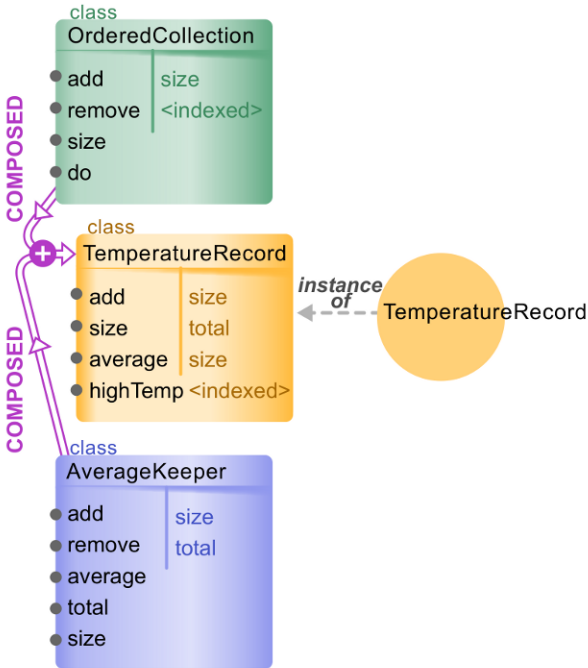


# Class Composition



**Class named:**  
**#TemperatureRecord**  
**composedOf:**  
**{OrderedCollection.**  
**AverageKeeper}.**

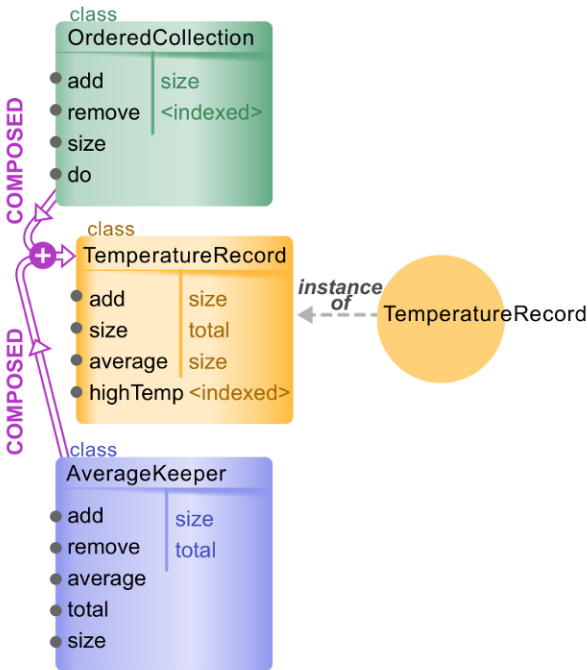
# Class Composition



```
Class named:
#TemperatureRecord
composedOf:
{OrderedCollection
omit:
#(remove:).
AverageKeeper
omit:
#(remove:
total
size)}.
}
```

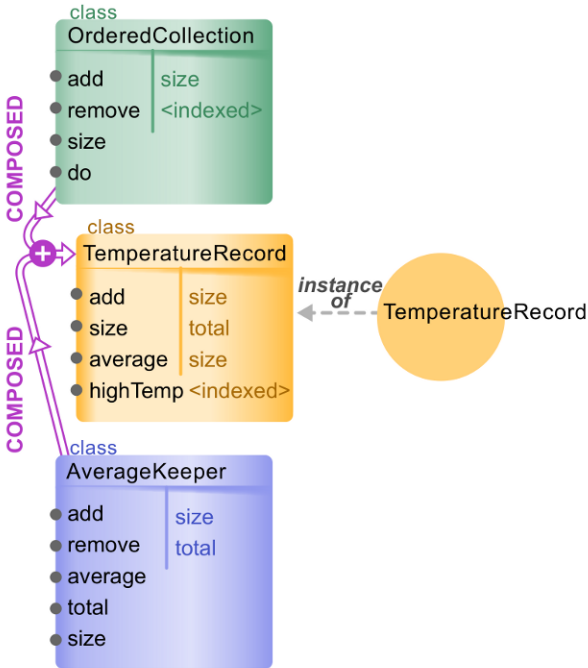


# Class Composition



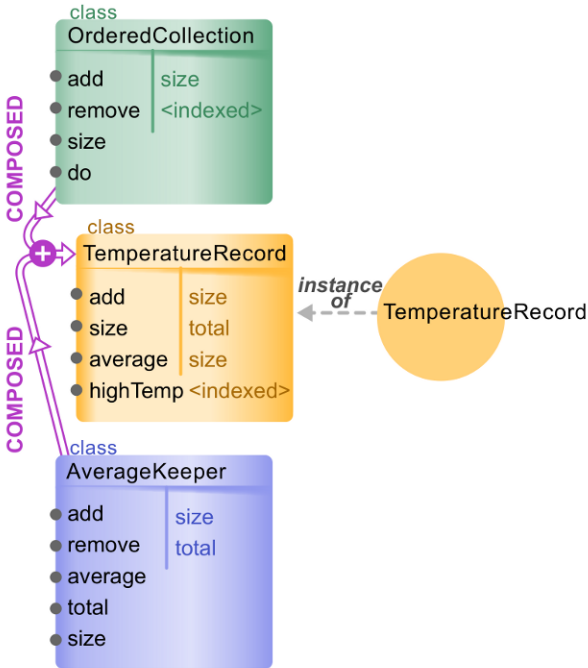
```
Class named:
#TemperatureRecord
composedOf:
{OrderedCollection
omit:
#(remove:);
alias: #add
to: #ocAdd.
AverageKeeper
omit:
#(remove:
total
size);
alias: #add
to: #avAdd}.
```

# Class Composition



```
add: aReading
self
  ocAdd: aReading.
self
  avAdd: aReading.
```

# Class Composition



```
add: aReading
self
ocAdd: aReading.
self
avAdd: aReading.
```

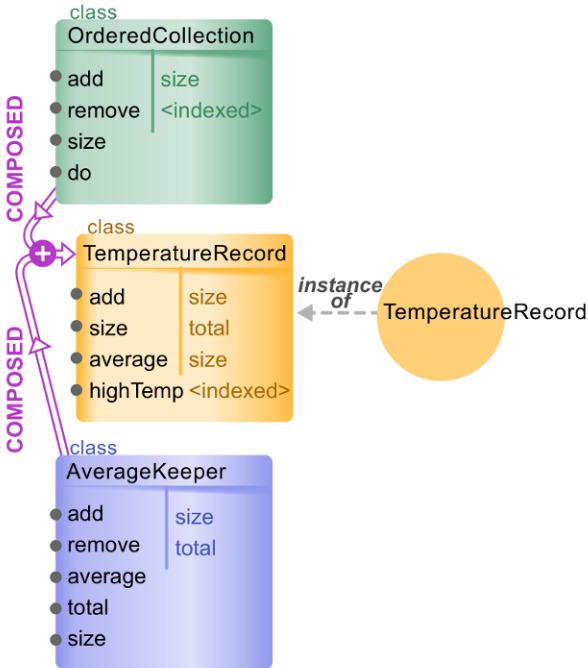
---

```
(size—no method)
```

---

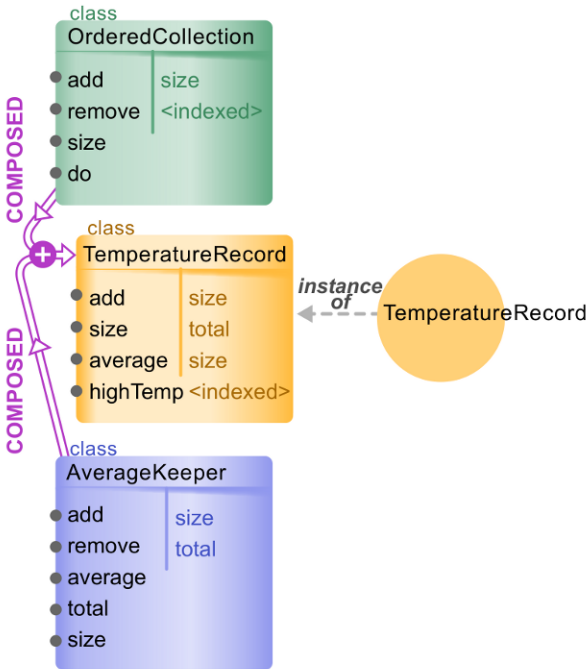
```
(average
no method)
```

# Class Composition



```
highTemp
| highest |
highest := -100.
self
do: [:each |
highest :=
highest
max: each].
^highest.
```

# Class Composition

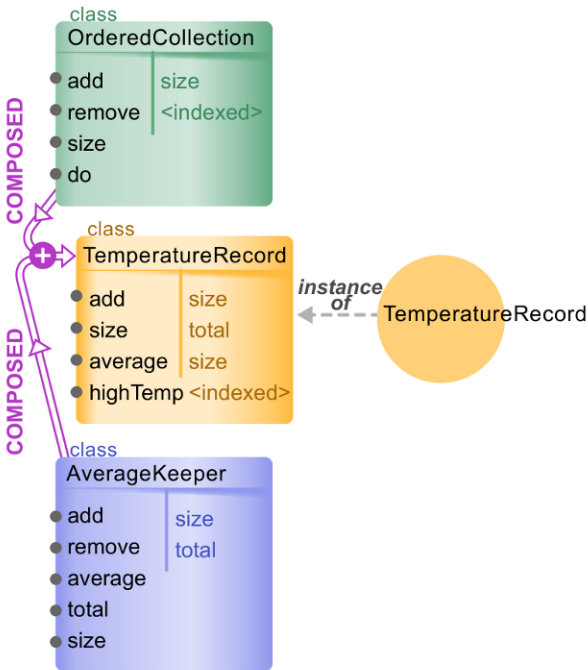


```
Class named:
#TemperatureRecord
composedOf:
{OrderedCollection
omit:
#(remove:);
private:
#(do:);
alias: #add
toPrivate: #ocAdd.
AverageKeeper
omit:
#(remove:
total
size);
alias: #add
toPrivate: #avAdd}.
```

# Black Box Reuse



# Class Composition



```
Class named:
#TemperatureRecord
composedOf:
{OrderedCollection
omit:
#(remove:);
private:
#(do:);
alias: #add
toPrivate: #ocAdd.
AverageKeeper
omit:
#(remove:
total
size);
alias: #add
toPrivate: #avAdd}.
```

**self**

***is weird***





“has a”

**Object  
Composition**

“is a”

**Class  
Inheritance**

**Class  
Composition**

**USE**

send to  
component

can't!  
(super+SNI)

make private,  
self send

**EXPOSE**

forwarding  
method

default

default

**CHANGE**

code +  
forward

override +  
super send

private alias  
+ self send

**OMIT**

default

#shouldNot  
Implement

omit

# Mist

- [mist-project.org](http://mist-project.org)
- [Github](#)

# Reuse in the Mist

---



**Class**  
**Composition**  
**vs. Class**  
**Inheritance**

---

**Martin McClure**