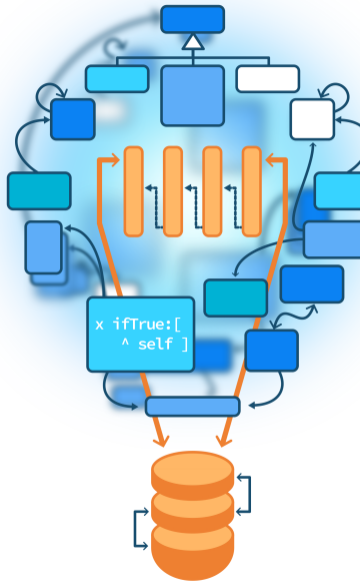


Inheritance and Lookup: Self

Understand lookup once for all

S.Ducasse, L. Fabresse, G. Polito, and P. Tesone



Goals

Understand:

- Sending a message
- Method lookup
- Semantics of `self/this`



Remember inheritance

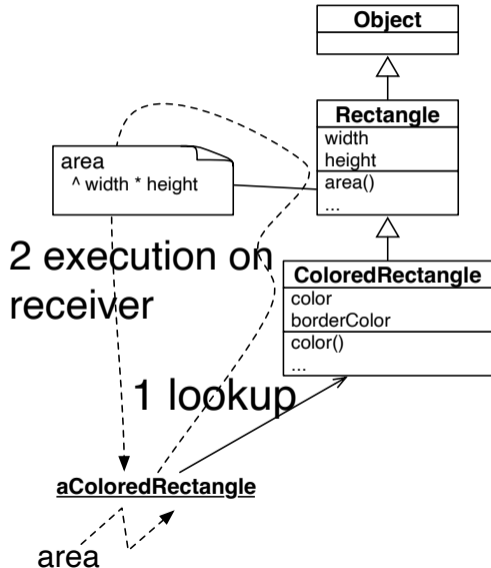
- Inheritance of **state** is **static** (done at compile time)
- Inheritance of **behavior** is **dynamic**
- In this lecture we focus on the behavior part



Message sending

Sending a message is a two-step process:

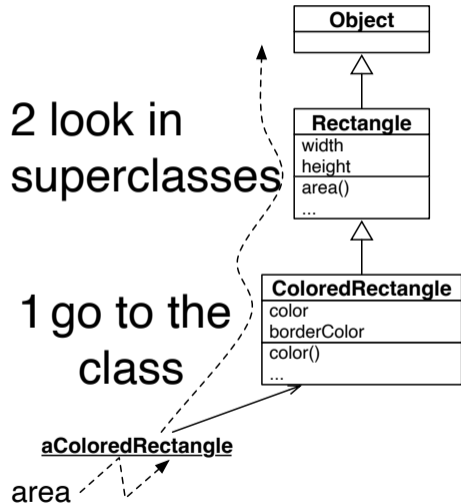
1. **look up** the **method** matching the message
2. **execute** this method on the **receiver**



Method lookup

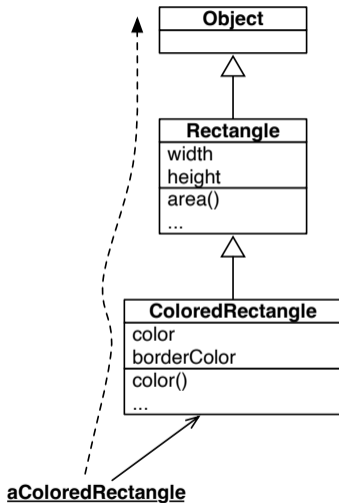
The lookup starts in the **class** of the **receiver** then:

- if the method is defined in the class, it is returned
- otherwise the search continues in the superclass



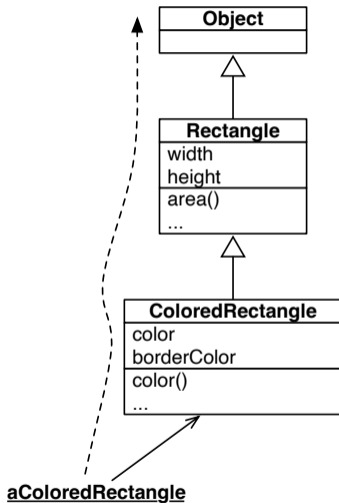
Some lookup cases

Sending the message `color` to `aColoredRectangle`



Some lookup cases

Sending the message `area` to `aColoredRectangle`

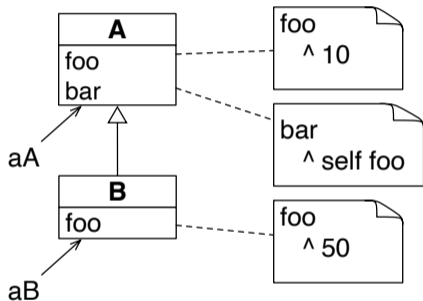


About lookup implementation

- Most of the time, the result of a lookup is **cached** and a lookup happens only once
- In some languages, there are dispatch tables
- The point is that conceptually there is a lookup at execution



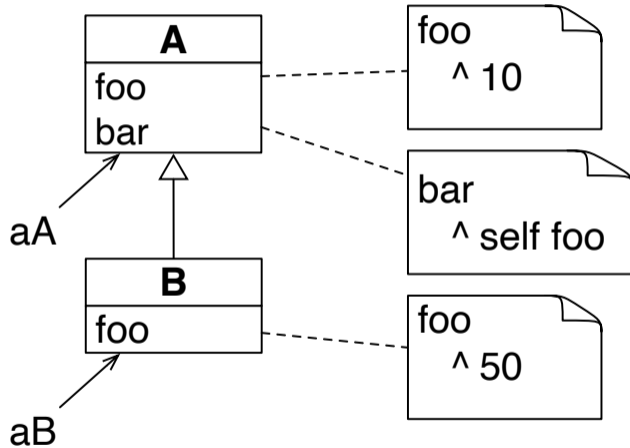
What is self/this?



- Take 5 min and write the definition of self (this in Java)
- Your definition should have two points:
 - what does self represent?
 - how is a method looked up when a message is sent to self?



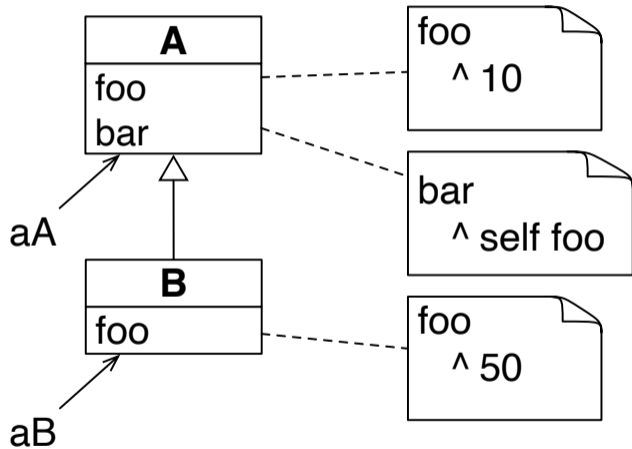
Let us explore a bit



- `aA` is an instance of A (obtained executing `A new`)
- `aB` is an instance of B (obtained executing `B new`)



Let us explore a bit



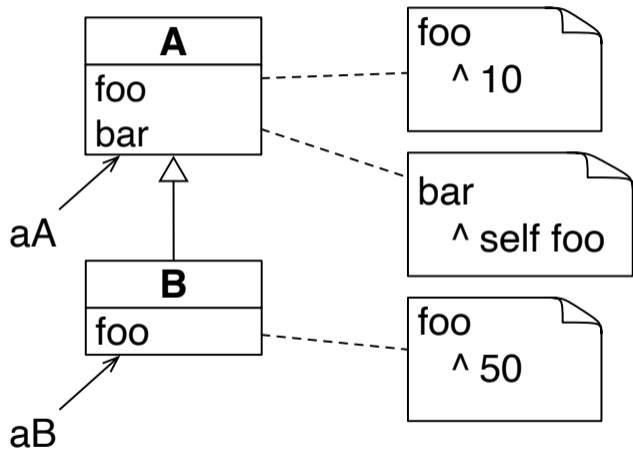
> aA foo

...

> aB foo

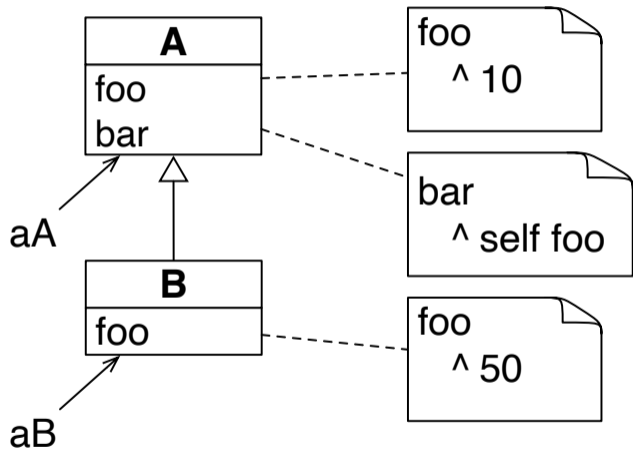
...

self always represents the receiver



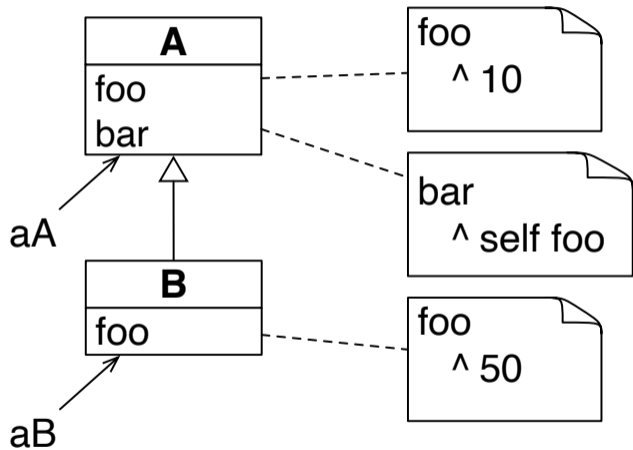
```
> aA foo
10
> aB foo
50
```

self always represents the receiver



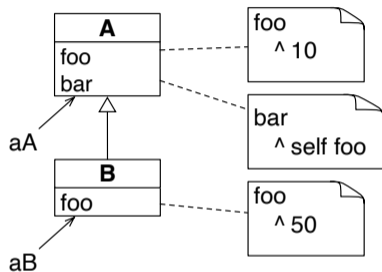
```
> aA bar
...
> aB bar
...
```

self always represents the receiver



```
> aA bar
10
> aB bar
50
```

Following message lookup and execution



Evaluation of `aB bar`

1. `aB`'s class is B
2. no method `bar` in B
3. look up in A - `bar` is found
4. method `bar` is executed
5. `self` refers to the receiver `aB`
6. `foo` is sent to `self`
7. look up `foo` in the `aB`'s class: B
8. `foo` is found there and executed

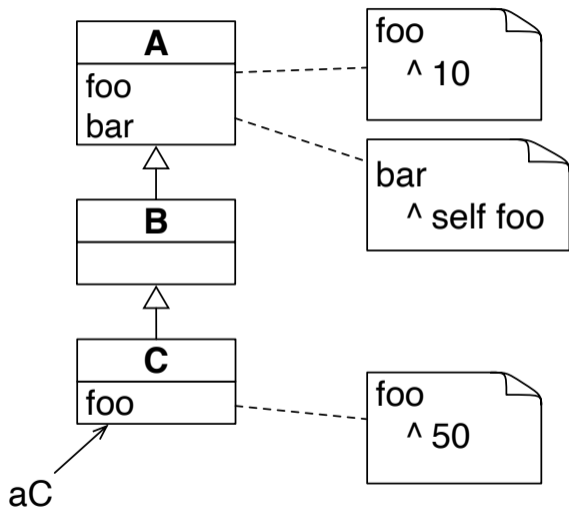
```
> aB bar
50
```

self/this in two sentences

- self represents the **receiver** of the message
 - self in Pharo, this in Java
- The method lookup **starts in the class of the receiver**

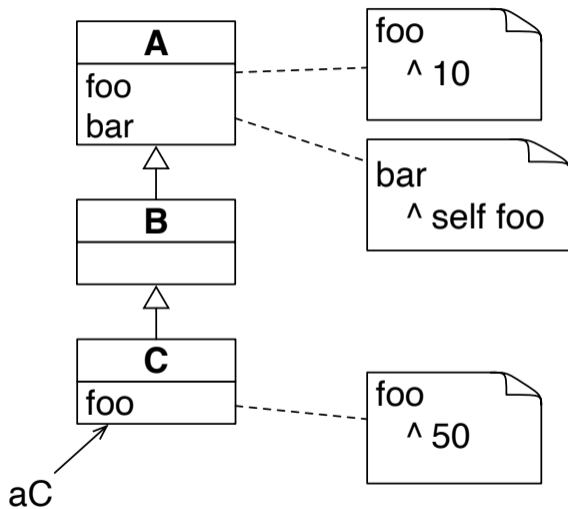


self always represents the receiver



```
> aA bar
...
> aB bar
...
> aC bar
...
```

self always represents the receiver



```
> aA bar
10
> aB bar
10
> aC bar
50
```

What you should know

- `self` always represents the receiver
- Sending a message is a **two-step** process:
 1. **Look up** the method matching the message
 2. Execute this method **on the receiver**
- Method lookup maps a message to a method
- Method lookup starts in the **class of the receiver**
 - ...and goes up in the hierarchy



Produced as part of the course on <http://www.fun-mooc.fr>

Advanced Object-Oriented Design and Development with Pharo

A course by

S.Ducasse, L. Fabresse, G. Polito, and P. Tesone



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