

# The two interfaces

In presence of delta programming

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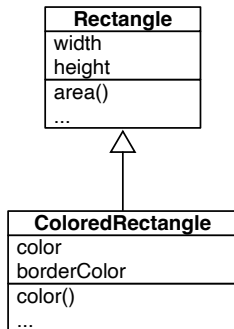
# Outline

- Reminder: the essence of OOP
- One question
- Classes have two different kind of clients!



# Back to the roots: Inheritance

- Needs:
  - Usually we want small adaptations to existing classes
  - We want to **reuse** existing behavior (not reimplement)
- Solution: **class inheritance**



# Inheritance: expressing deltas

Inheritance is a reuse mechanism.

A class:

- does not reimplement the code of its superclasses
- extends the definition of its superclasses
  - add state
  - extends/specializes behavior
- expresses a **delta** i.e. differences to its superclasses



# Time to think

What are the consequences of the idiom: “**Fields should be private**”?

```
class A {  
    private x;  
  
    void foo(){ ... x ...}  
}
```



# Consequences

- Clients cannot access `x`
  - sounds good
- But, subclasses cannot access `x` too
  - not ok because how can we express a delta?
  - copying the body of `foo` in subclasses to extend it manually is also impossible!



# Clients?

What are the clients of a class?

- Its users (e.g., Person is a client of Address)
- But also its subclasses i.e. its **extenders**



# Extensibility?

- Think about your extenders
  - When writing a class, you cannot predict how it **MUST** be extended in 5 years from now!
- **final** and **private** prevent expressing deltas
  - **better use** **protected**





# So, the correct idiom is...

To support both encapsulation and **extension**:

- Fields should be private **AND** the class should provide **protected** accessors

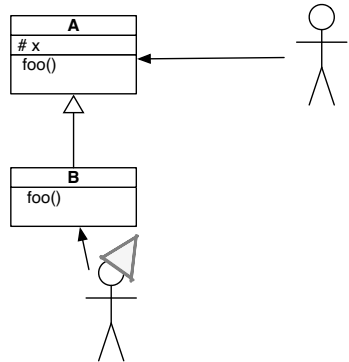
Or

- Fields should be **protected**



# Benefits

- Clients cannot access your state (**encapsulation**)
- Subclasses can **extend/refine** the behavior of superclasses (**extensibility**)



# Conclusion

- OOP is about encapsulation AND extension
- A class has always two kinds of clients:
  - its **users**
  - its **extenders**



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

# Advanced Object-Oriented Design and Development with Pharo

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