The two interfaces

In presence of delta programming

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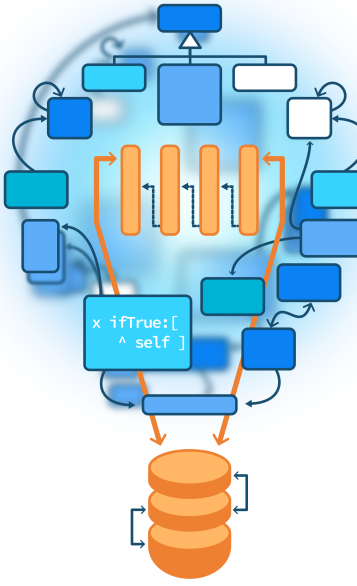
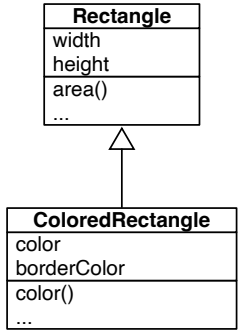


Outline

- 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**:

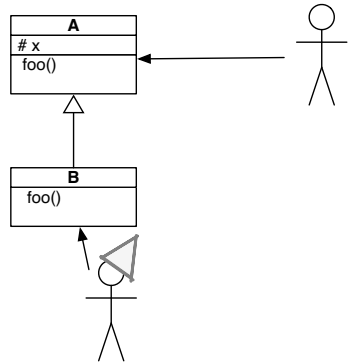
- Fields should be private **AND** the class should provide **protected** accessors

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**

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