Advanced Object-Oriented Design

The two interfaces

In presence of delta programming

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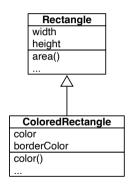


Outline

- 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
 - o 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**:

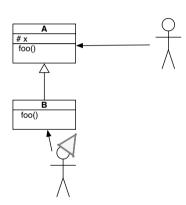
Fields should be private AND the class should provide protected accessors

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 kind of clients:
 - its **users**
 - its extenders

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

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