Design Points - Law of Demeter

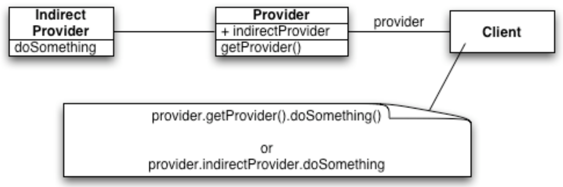
Stéphane Ducasse
stephane.ducasse@inria.fr
http://stephane.ducasse.free.fr/

Stéphane Ducasse --- 2005

About Coupling

- Why coupled classes is fragile design?
- Law of Demeter
- Thoughts about accessor use

The Core of the Problem



The Law of Demeter

You should only send messages to:
- an argument passed to you
- instance variables
- an object you create
- self, super
- your class

Avoid global variables

Avoid objects returned from message sends other than self

Correct Messages

```
someMethod: aParameter
        self foo.
        super someMethod: aParameter.
        self class foo.
        self instVarOne foo.
        instVarOne foo.
        aParameter foo.
        thing := Thing new.
        thing foo
```

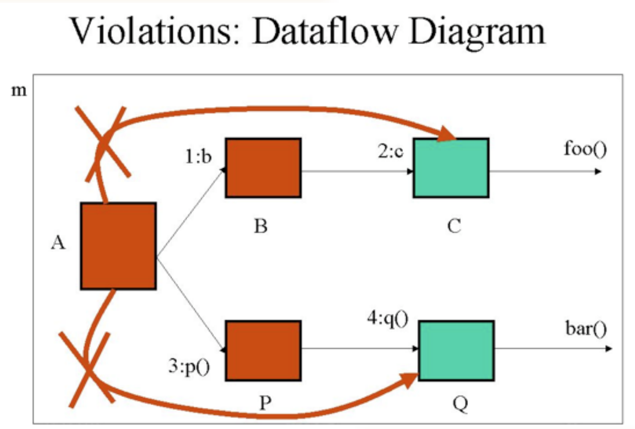
In other words

- Only talk to your immediate friends.
- In other words:
  - You can play with yourself. (this.method())
  - You can play with your own toys (but you can't take them apart). (field.method(), field.getX())
  - You can play with toys that were given to you. (arg.method())
  - And you can play with toys you've made yourself. (A a = new A(); a.method())

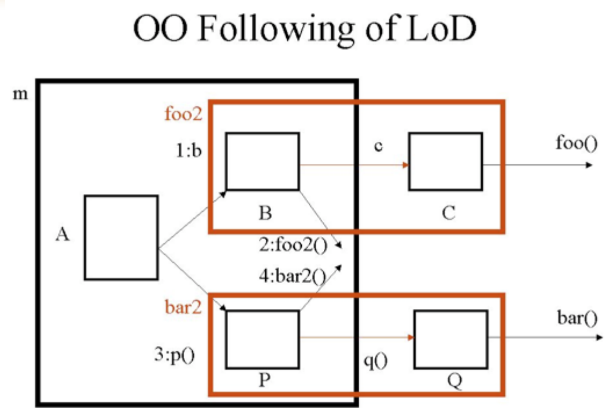
Halt!

```
class A {public: void m(); P p(); B b; };
class B {public: C c; };
class C {public: void foo(); };
class P {public: Q q(); };
class Q {public: void bar(); };
void A::m() {
   this.b.c.foo(); this.p().q().bar();}
```

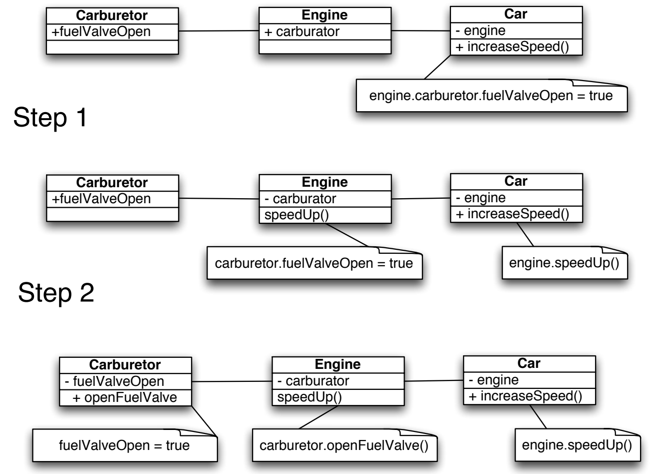
To not skip your intermediate



Solution



Transformation



Law of Demeter's Dark Side

Class A

instVar: myCollection

```
A>>do: aBlock
        myCollection do: aBlock
A>>collect: aBlock
        ^ myCollection collect: aBlock
A>>select: aBlock
        ^ myCollection select: aBlock
A>>detect: aBlock
        ^ myCollection detect: aBlock
A>>isEmpty
```

About the Use of Accessors

Some schools say: "Access instance variables using methods"

But

- Be consistent inside a class, do not mix direct access and accessor use
- First think accessors as protected methods that should not be invoked by clients
- Only when necessary put accessors in accessing protocol

Example

Scheduler>>initialize
self tasks: OrderedCollection new.

Scheduler>>tasks
^ tasks

But now everybody can tweak the tasks!

Accessors

Accessors are good for lazy initialization

```
Scheduler>>tasks
  tasks isNil ifTrue: [task := ...].
  ^ tasks
```

BUT accessors methods should be Protected by default at least at the beginning

Accessors open Encapsulation

The fact that accessors are methods doesn't support a good data encapsulation.
You could be tempted to write in a client:

```
ScheduledView>>addTaskButton
   ...
   model tasks add: newTask
```

What's happen if we change the representation of tasks?

Tasks

If tasks is now an array it will break

Take care about the coupling between your objects and provide a good interface!

```
Schedule>>addTask: aTask
        tasks add: aTask

ScheduledView>>addTaskButton
        ...
        model addTask: newTask
```

About Copy Accessor

Should I copy the structure?

```
Scheduler>>tasks
    ^ tasks copy
```

But then the clients can get confused...

Scheduler uniqueInstance tasks removeFirst
and nothing happens!

Use intention revealing names

Better

```
Scheduler>>taskCopy  or copiedTasks
   "returns a copy of the pending tasks"

    ^ task copy
```

Provide a Complete Interface

```
Workstation>>accept: aPacket
            aPacket addressee = self name
               …
```

It is the responsibility of an object to offer a complete interface that protects itself from client intrusion.

Shift the responsibility to the Packet object

```
Packet>>isAddressedTo: aNode
          ^ addressee = aNode name
Workstation>>accept: aPacket
```