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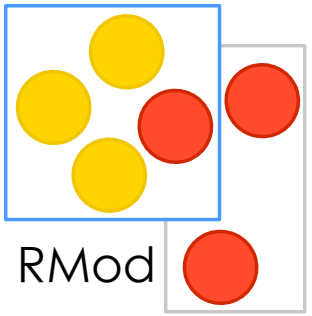

Design Points - Law of Demeter

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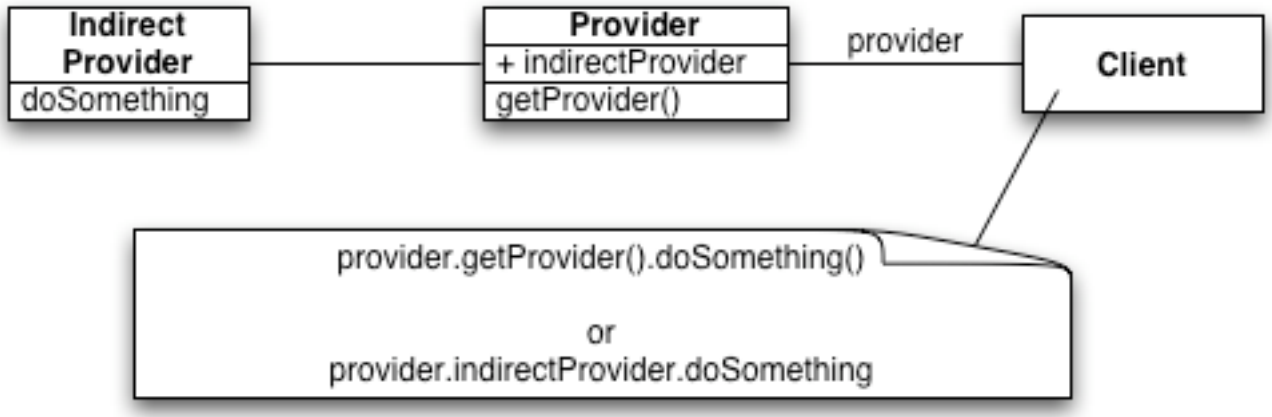
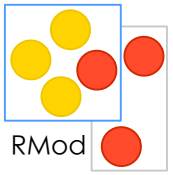
About Coupling

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

The Core of the Problem



The Law of Demeter



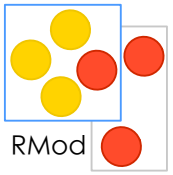
You should only send messages to:

- an argument passed to you
- instance variables
- an object you create
- self, super
- your class

Avoid global variables

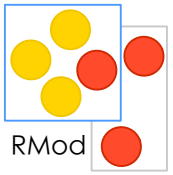
Avoid objects returned from message sends other than self

Correct Messages



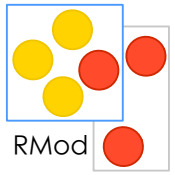

```
someMethod: aParameter
        self foo.
        super someMethod: aParameter.
        self class foo.
        self instVarOne foo.
        instVarOne foo.
        aParameter foo.
        thing := Thing new.
        thing foo
```

In other words



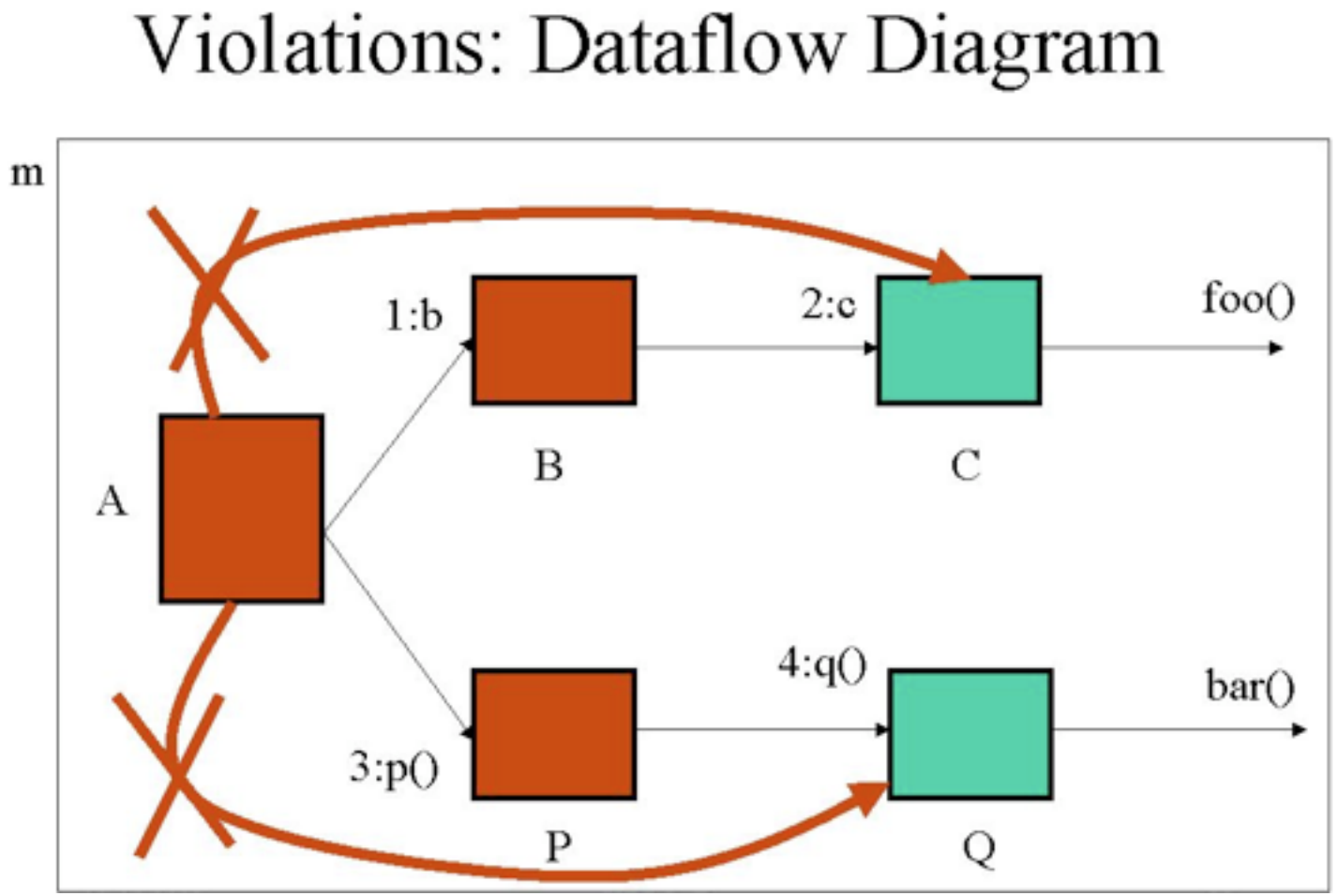
- Only talk to your immediate friends.
- In other words:
  - You can play with yourself. (this.method())
  - You can play with your own toys (but you can't take them apart). (field.method(), field.getX())
  - You can play with toys that were given to you. (arg.method())
  - And you can play with toys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

Halt!

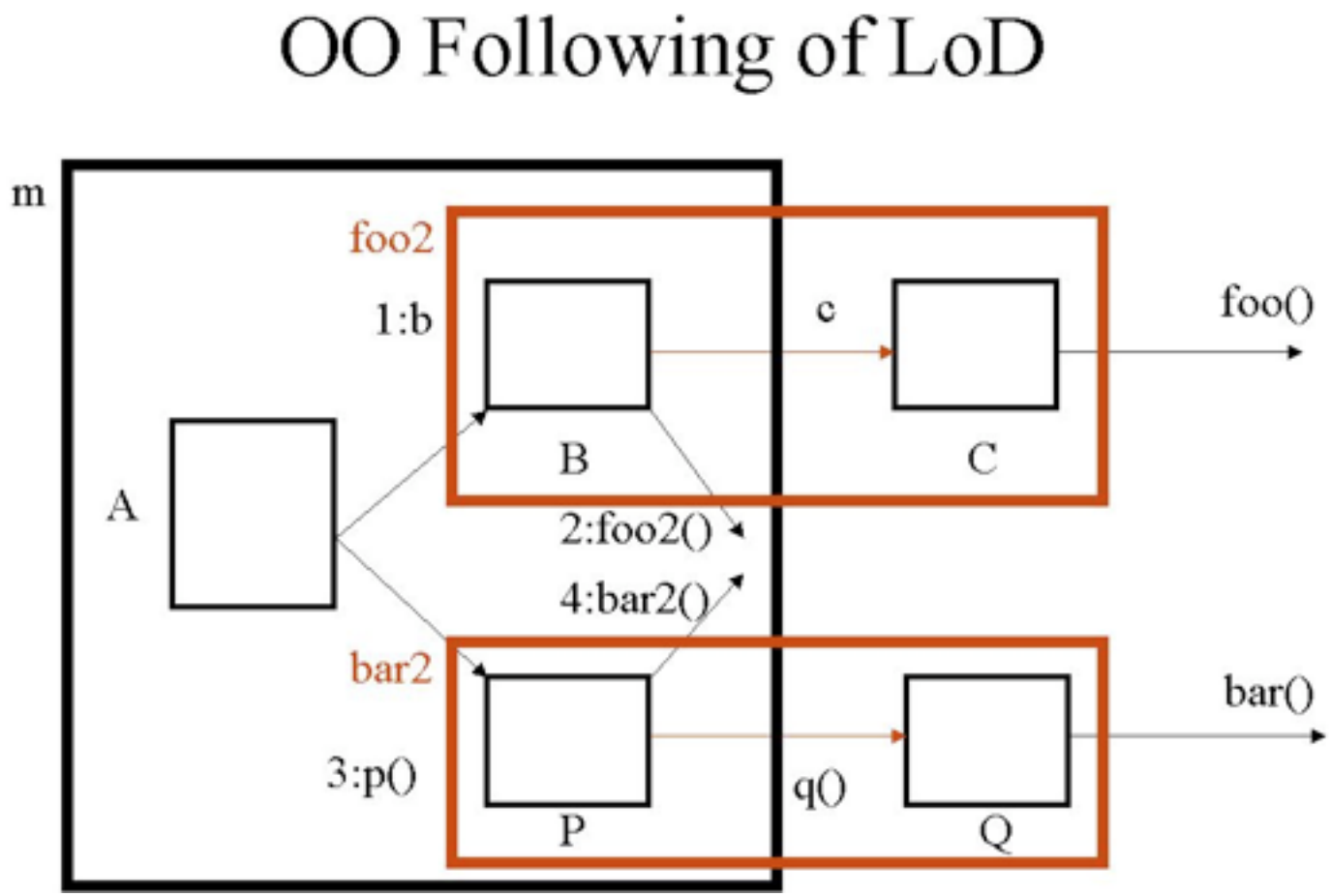



```
class A {public: void m(); P p(); B b; };
class B {public: C c; };
class C {public: void foo(); };
class P {public: Q q(); };
class Q {public: void bar(); };
void A::m() {
    this.b.c.foo(); this.p().q().bar();}
```

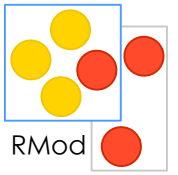
To not skip your intermediate

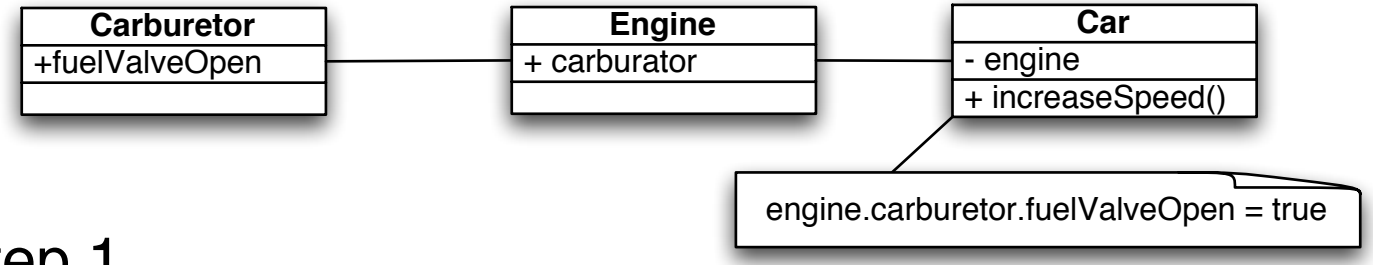


Solution

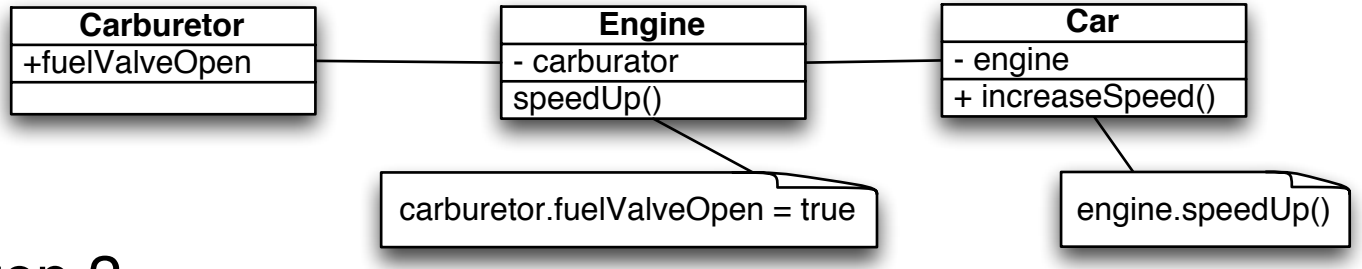

OO Following of LoD
m
foo2
1:b
c
foo()
B
C
A
2:foo2()
4:bar2()
bar2
bar()
3:p()
q()
P
Q

Transformation

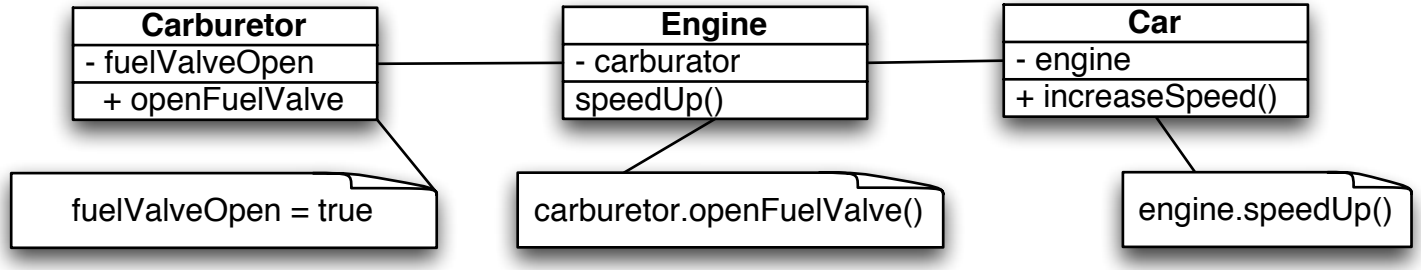




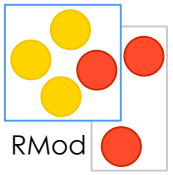
Step 1



Step 2



Law of Demeter's Dark Side

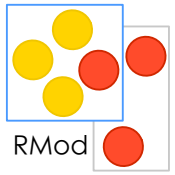


Class A

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

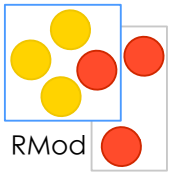


Some schools say: "Access instance variables using methods"

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

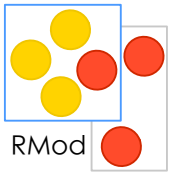



```
Scheduler>>initialize
        self tasks: OrderedCollection new.

Scheduler>>tasks
        ^ tasks
```

But now everybody can tweak the tasks!

Accessors

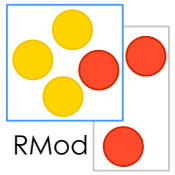


Accessors are good for lazy initialization

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

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

Accessors open Encapsulation

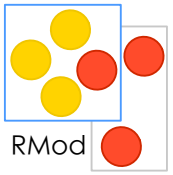


The fact that accessors are methods doesn't support a good data encapsulation.
You could be tempted to write in a client:

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

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

Tasks



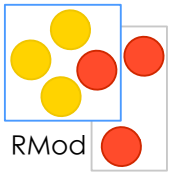
If tasks is now an array it will break

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?

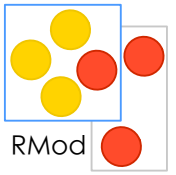
```
Scheduler>>tasks
    ^ tasks copy
```

But then the clients can get confused...

```
Scheduler uniqueInstance tasks removeFirst
```

and nothing happens!

Use intention revealing names

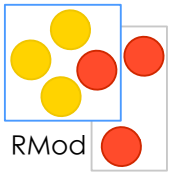


Better

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
```