Classes as Layers:
Rewriting Design Patterns with COP

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Context-oriented Programming
- COP is a technique for modularizing cross-cutting concerns that allows for dynamic adaptation at runtime
- Partial Methods defined in Layers can add/modify behavior in other classes and be combined (layering)
- Our approach: Classes act as Layers
- This poster: Rewrite design patterns with COP to overcome shortcomings compared to trad. implementations

Observer Design Pattern
- Notification Trigger Granularity
Observers can listen to only method invocations (not inside a method).

Dynamic Adaptation
Design patterns can be added at any time.

Visitor Design Pattern
- Simple Object Interaction
No double dispatch required. "visit" method belongs to obj.

Language Features
- Assumption: OperationCounterVisitor is the only active layer
- L | C: projection of L by C
  Contains only methods in L targeting C.
- L[y] = \sum_{i=0}^{\mid L \mid} (super \mid L | C)
  |C| number of superclasses of C
- C dismantles L composition stack (L[i] is i-th element)
- L[y] is list with only C

Method Lookup
Assumption: OperationCounterVisitor is the only active layer

Method Lookup
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Potential Name Clashes
Methods of multiple visitors could have the same name.

No Object Schizophrenia
Object identity is preserved when applying a decorator.

Observer Design Pattern
class LoginMonitor {
def loginMonitor = new LoginMonitor();
// global activation
loginMonitor = new LoginMonitor();
// per-object activation
loginMonitorствовать(loginMonitor);
}

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class LoginMonitor {
def loginMonitor = new LoginMonitor();
// per-object activation
manager.activate(loginMonitor);
// global activation
loginMonitor activates(loginMonitor);
}

Debugging Design Pattern
- No double dispatch required.
- "visit" method belongs to obj.

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