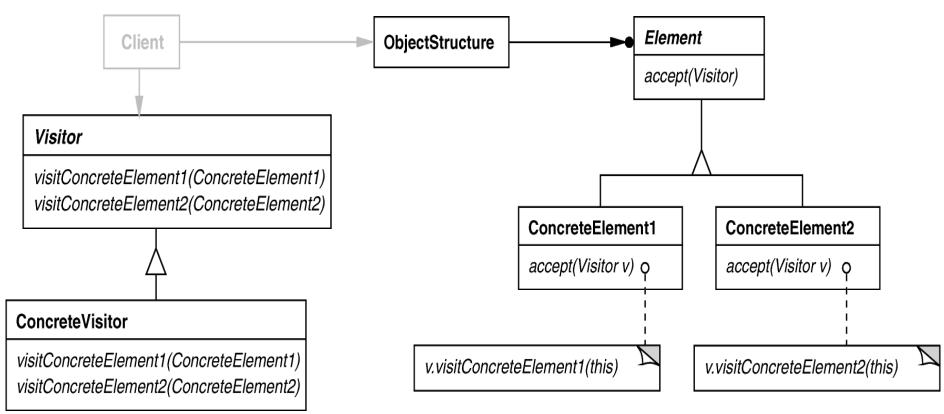
The Visitor Pattern

Structure & Functionality

Douglas C. Schmidt

Learning Objectives in This Lesson

- Recognize how the *Visitor* pattern can be applied to enhance expression tree operation extensibility.
- Understand the Visitor pattern.



Visitor is one of the most complicated GoF patterns (along with State).

Douglas C. Schmidt

Structure & Functionality of the Visitor Pattern

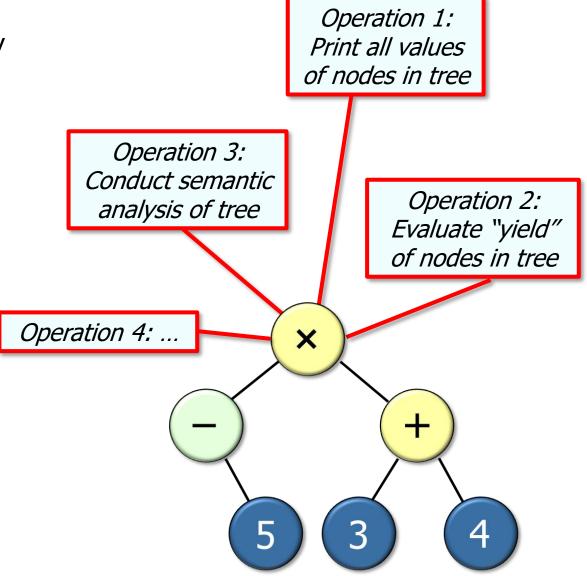
GoF Object Behavioral Visitor Intent Operation 1: Centralize operations on an object structure Print all values so that they can vary independently, but still of nodes in tree behave polymorphically Operation 3: Conduct semantic Operation 2: analysis of tree Evaluate "yield" of nodes in tree Operation 4: ... × +5 3 4

See en.wikipedia.org/wiki/Visitor_pattern

Applicability

• When classes involve many unrelated operations

GoF Object Behavioral



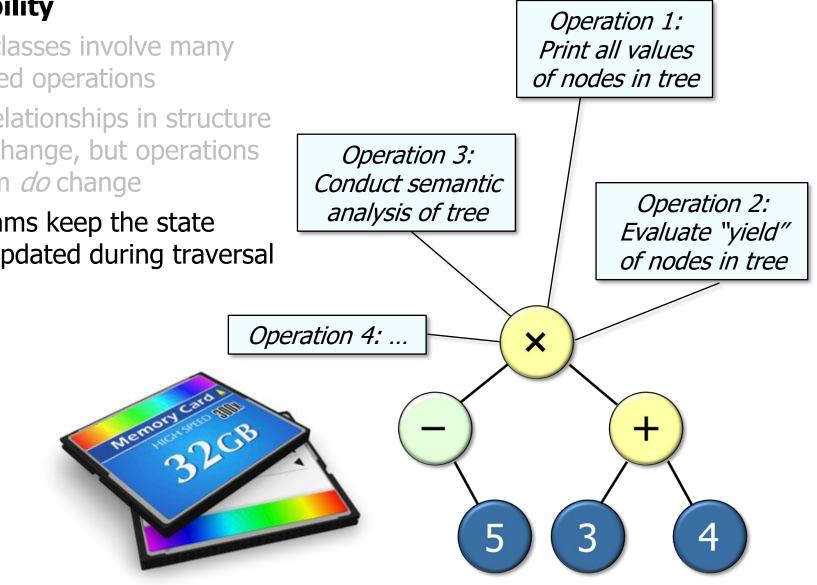
GoF Object Behavioral

Applicability **Operation 1:** When classes involve many Print all values Variable of nodes in tree unrelated operations Class relationships in structure rarely change, but operations **Operation 3:** on them *do* change Conduct semantic Operation 2: analysis of tree Evaluate "yield" of nodes in tree Operation 4: ... × ╋ Stable 5 3 4

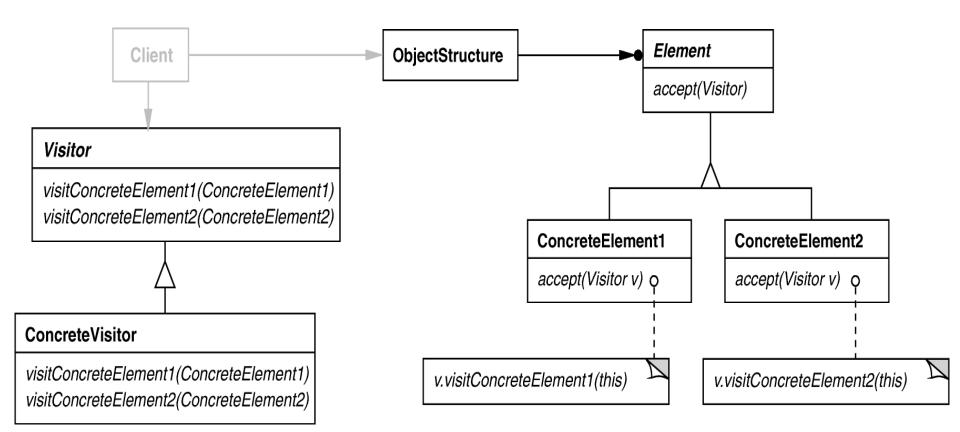
Applicability

- When classes involve many unrelated operations
- Class relationships in structure rarely change, but operations on them *do* change
- Algorithms keep the state that's updated during traversal

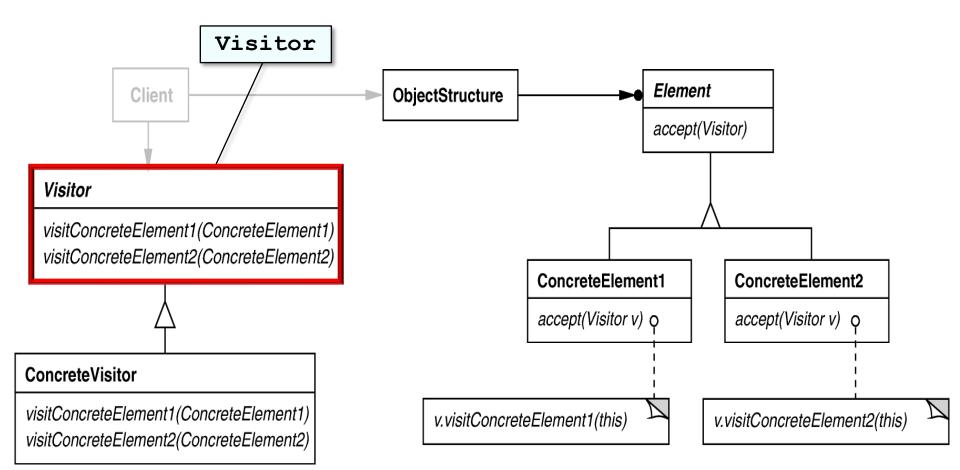
GoF Object Behavioral



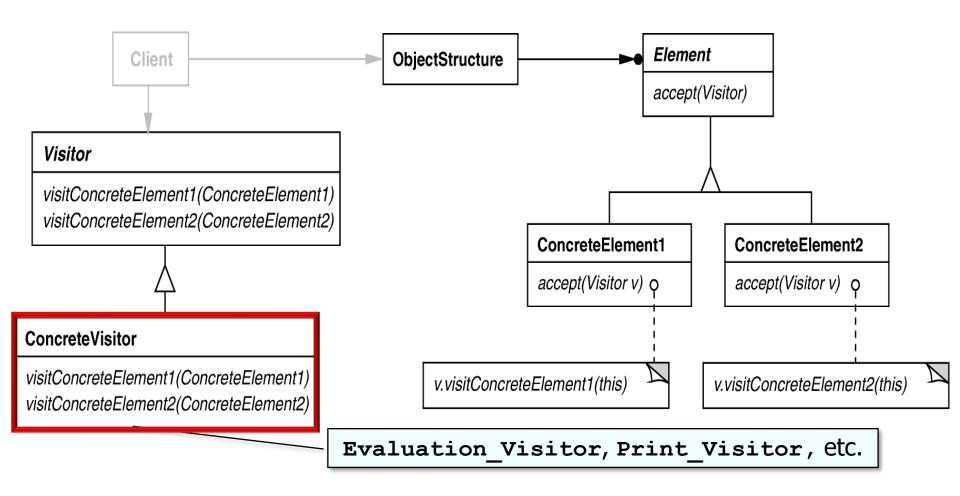
GoF Object Behavioral



GoF Object Behavioral



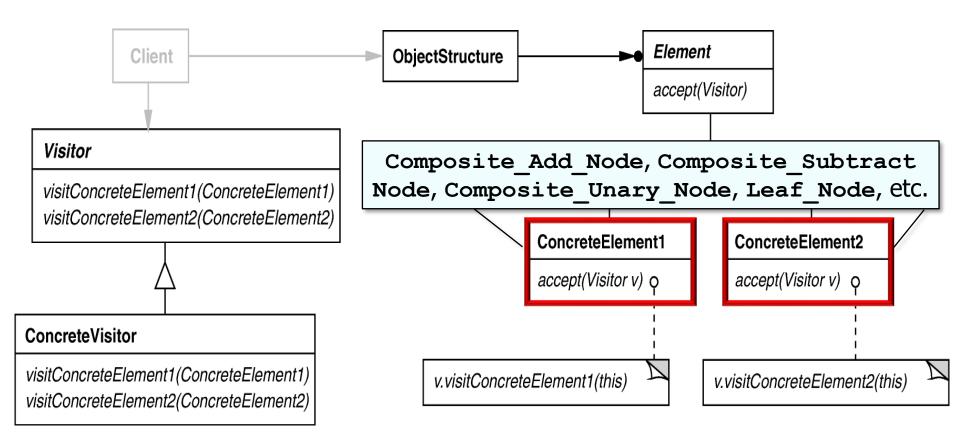
GoF Object Behavioral



GoF Object Behavioral

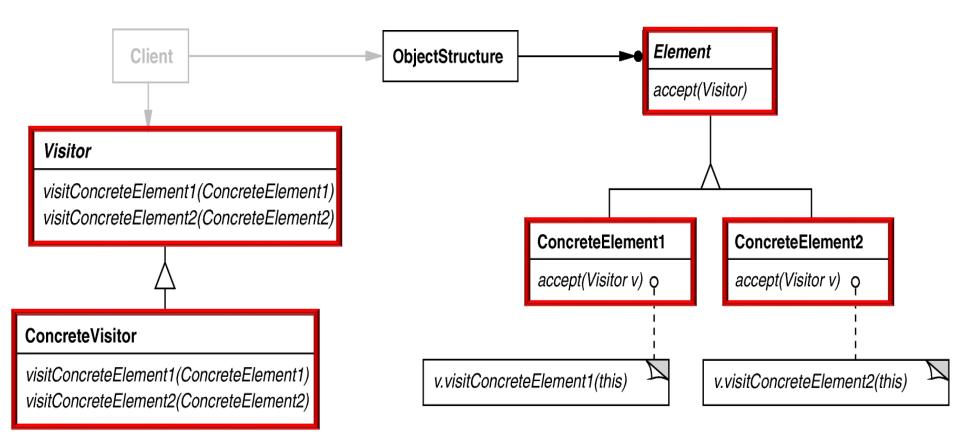
Structure & participants Component Node Element Client **ObjectStructure** accept(Visitor) Visitor visitConcreteElement1(ConcreteElement1) visitConcreteElement2(ConcreteElement2) ConcreteElement1 ConcreteElement2 accept(Visitor v) o accept(Visitor v) o ConcreteVisitor visitConcreteElement1(ConcreteElement1) v.visitConcreteElement1(this) v.visitConcreteElement2(this) visitConcreteElement2(ConcreteElement2)

GoF Object Behavioral



GoF Object Behavioral

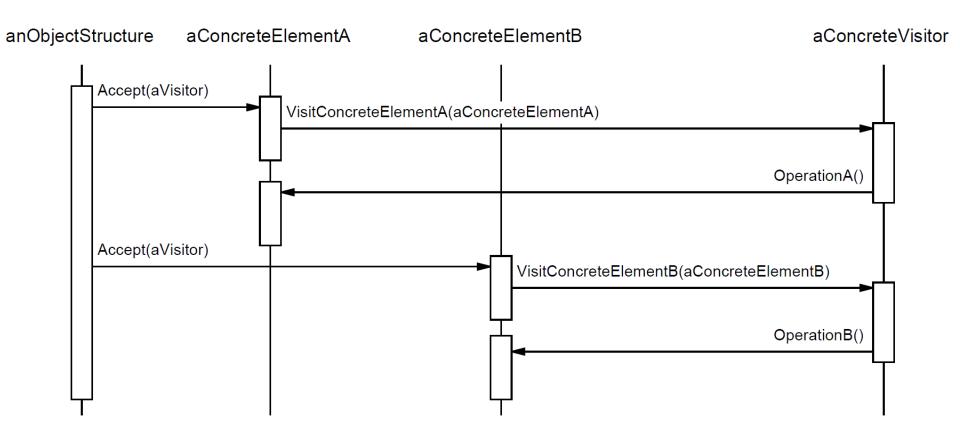
Structure & participants



Visitior's dual inheritance hierarchy + dynamic/static polymorphism is tricky.

GoF Object Behavioral

Collaborations



This generic object interaction diagram doesn't shed much light on *Visitor*!