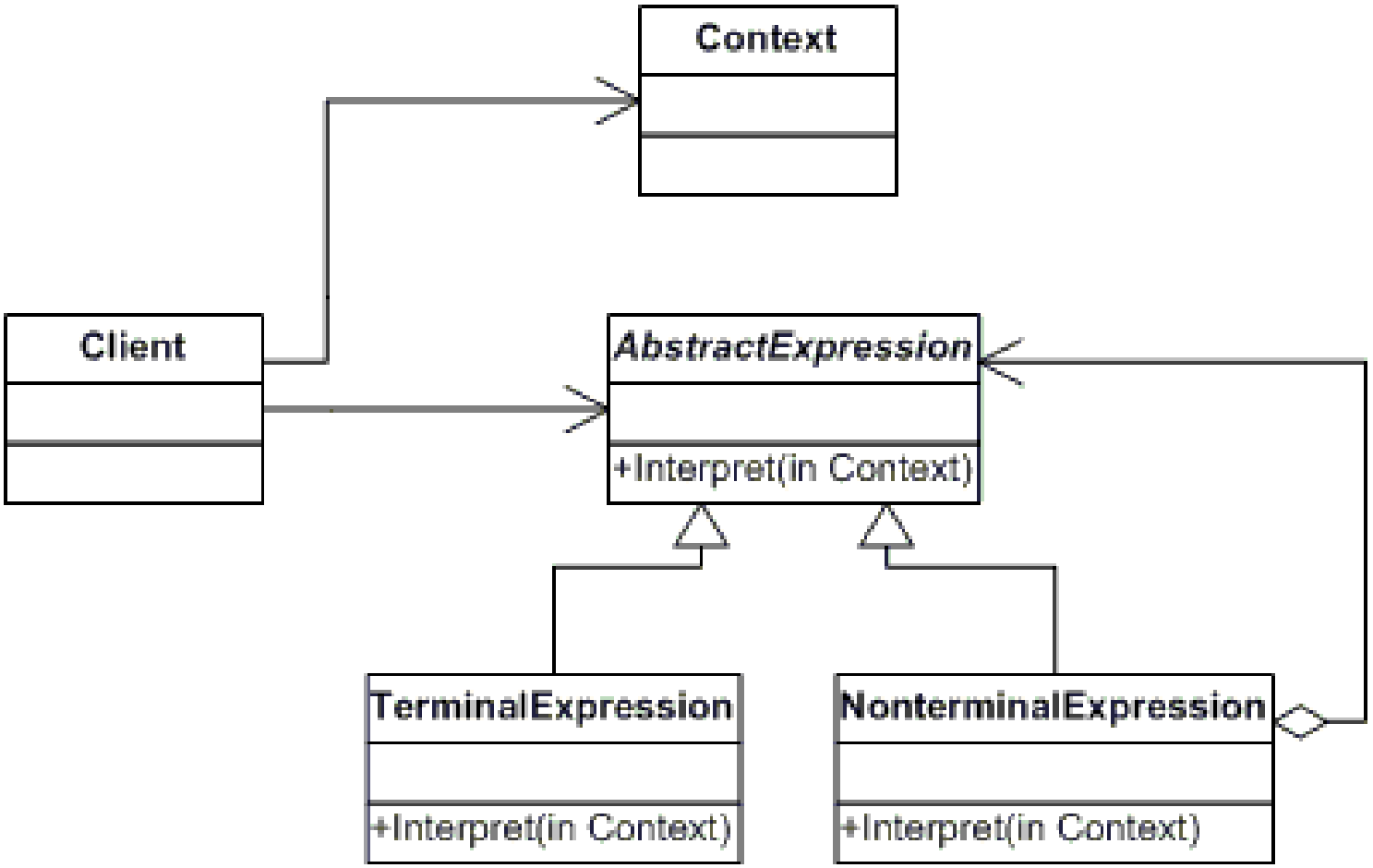
Tecniche di Progettazione: Design Patterns

GoF: Interpreter

Intent

Given a language, define a representation for its grammar along with an interpreter that uses the representation to interpret sentences in the language.

Structure of Interpreter



Flow of Interpreter

- Take the Abstract Syntax Tree
- Interpret the tree (in a given Context)
  - Each non-terminal node will interpret its children and return a result from that.
  - Terminal nodes return actual values for non-terminal nodes to use.
  - The context serves as a global data for interpreting the entire tree

Consequences

Good

- It's easy to change and extend the grammar
- Implementing the grammar is easy
- Easy to evaluate an expression in a new way

Bad

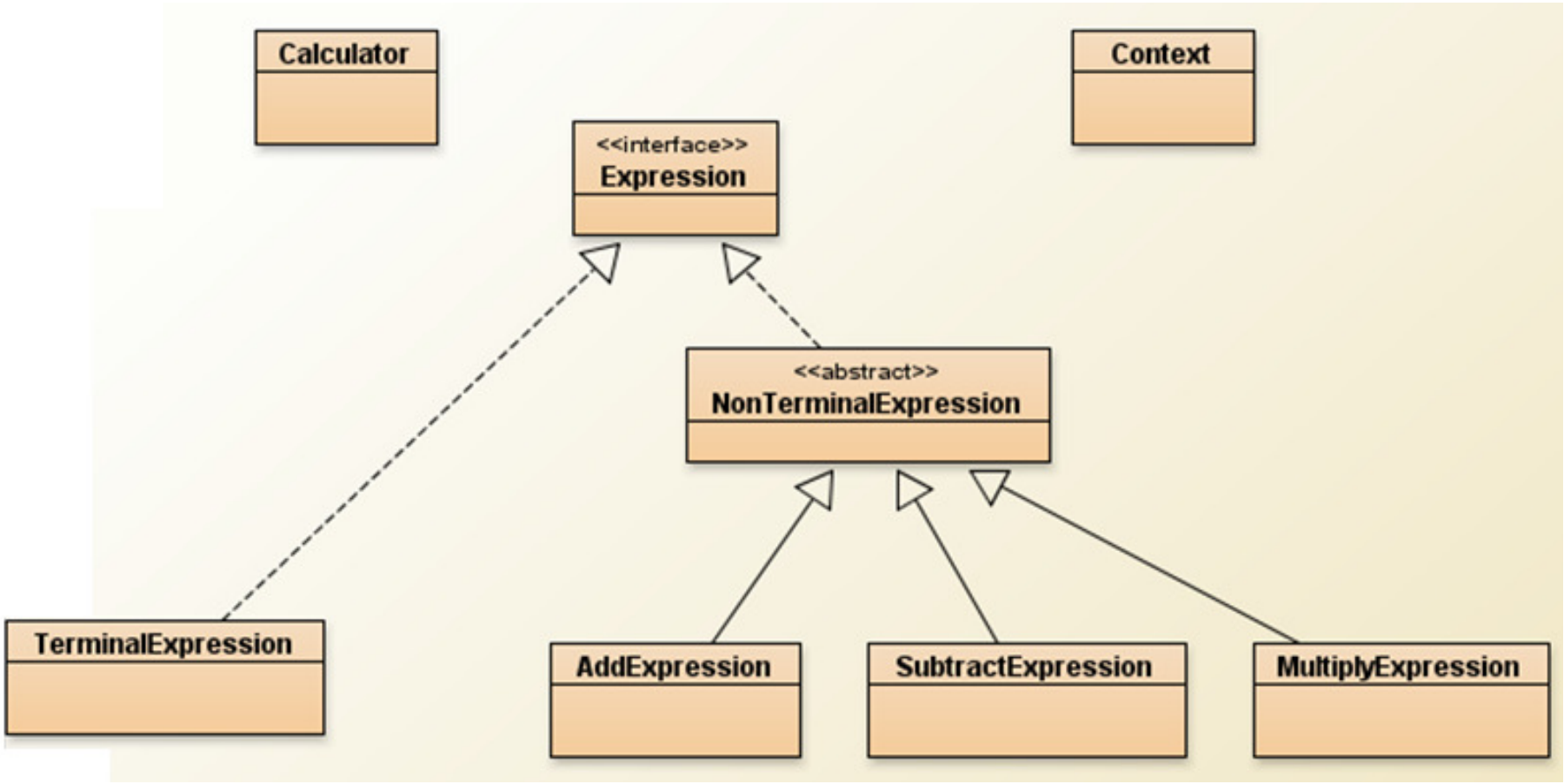
- Complex grammars are hard to maintain
  - One class for each rule

Example: Calculator

- http://www.java2s.com/Code/Java/Design-Pattern/InterpreterPatternCalculator.htm
  - ill-defined because it also performs parsing and syntactic tree construction.
  - The interpreter starts from the tree.
  - Redefined in NewCalculator (InterpreterCalculator)

- Another example in: http://www.dofactory.com/Patterns/PatternInterpreter.aspx#_self2

Interpreter: Calculator



Related Patterns

- Composite
  - Abstract syntax tree is an instance of Composite Pattern
- Flyweight
  - Shows how to share terminal symbols within the abstract syntax tree
- Iterator
  - The interpreter can use an iterator to traverse the structure
- Visitor
  - Can be used to implement the method interpret: the interpreter is in a separate Visitor object.

Homework: Boolean

- Define an interpreter for boolean expressions.
- The interpretation must be an integer: "1" for true a "0" for false.
- E ::= true || false || E and E || E or E || not E || (E)