

Design Defects and Restructuring

LECTURE 11

SAT, NOV 21, 2020

Structural Patterns

Adapter

Bridge

Composite

Decorator

Façade

Flyweight

Proxy

Proxy

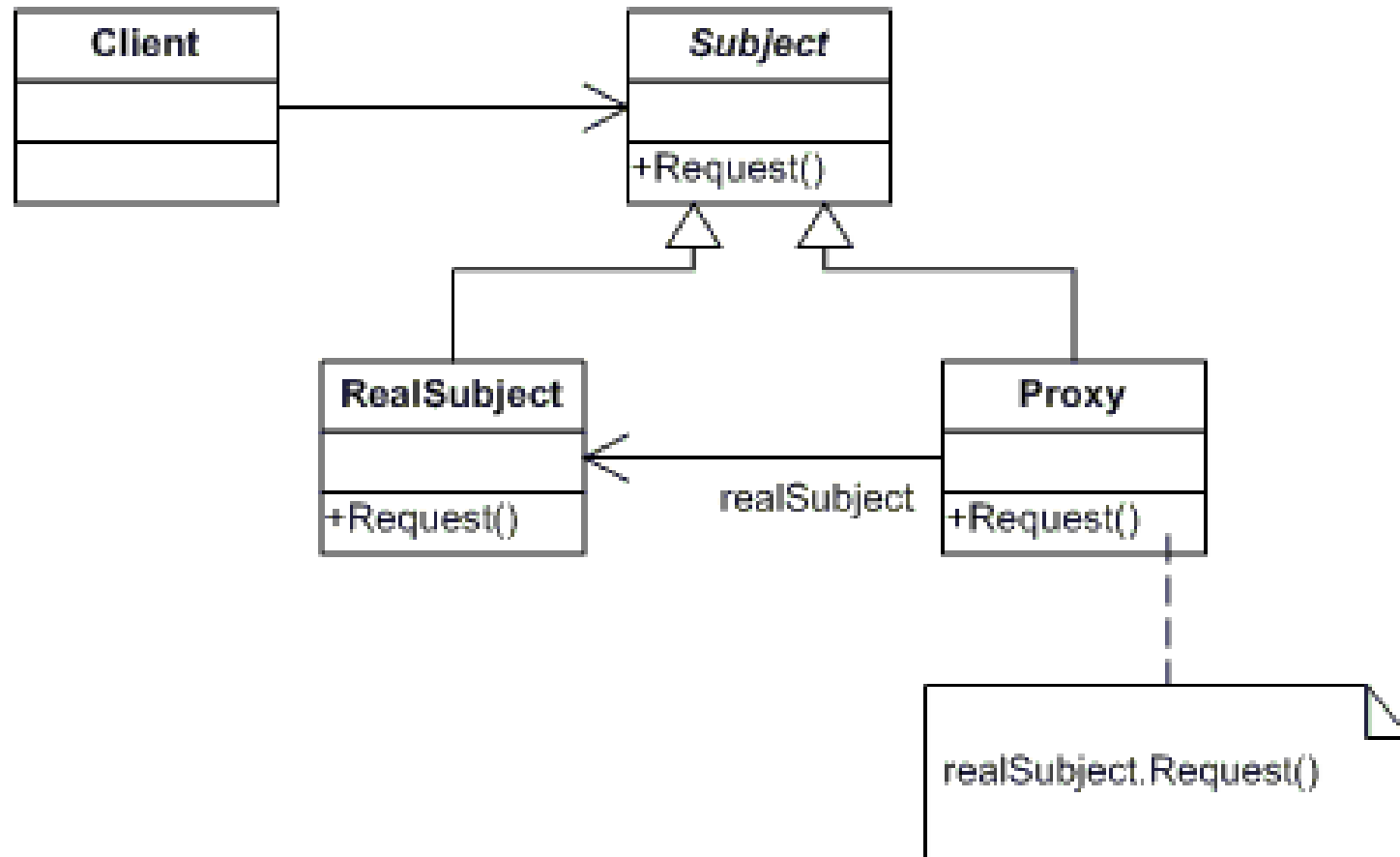
Intent

- Provide a surrogate or placeholder for another object to control access to it

Applicability

- A remote proxy provides a local representative for an object in a different address space
- A virtual proxy creates expensive objects on demand
- A protection proxy controls access to the original object
- A smart reference is a replacement for a bare pointer that performs additional actions when an object is accessed

Proxy



Behavioral Patterns

Chain of Responsibility

Command

Interpreter

Iterator

Mediator

Memento

Observer

State

Strategy

Template Method

Visitor

Chain of Responsibility

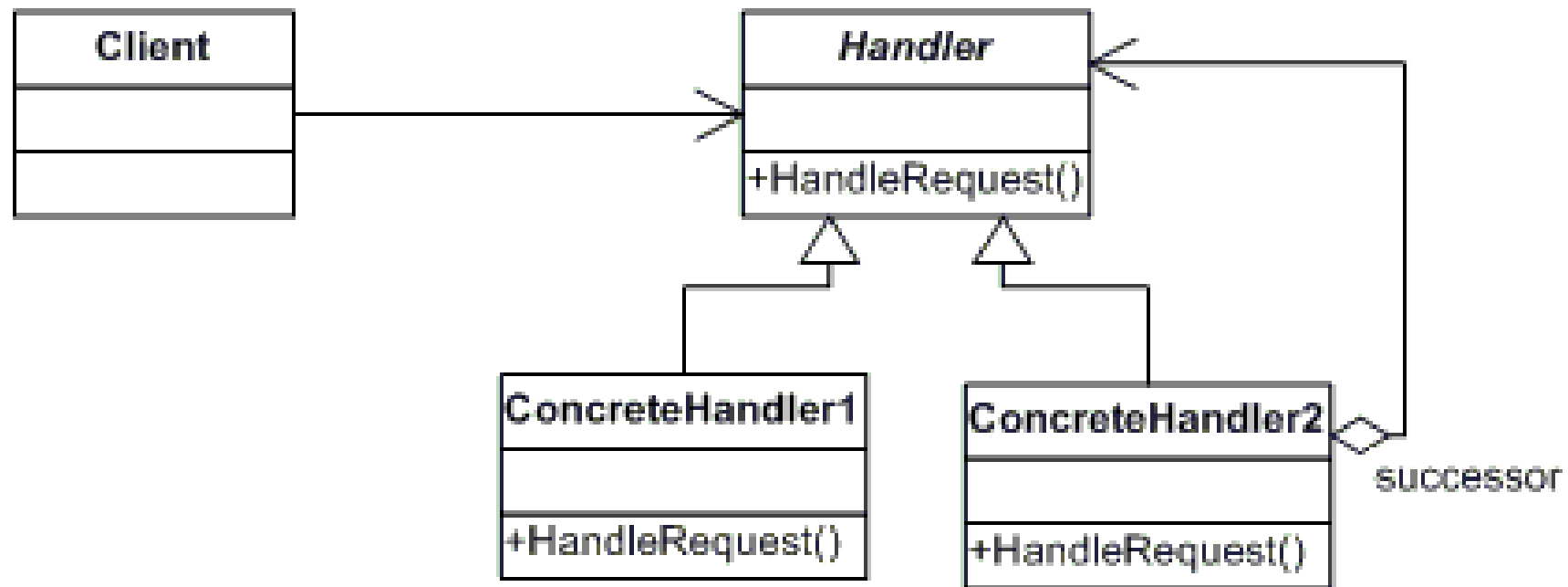
Intent

- Avoid coupling the sender of a request to its receiver by giving more than one object a chance to handle the request
- Chain the receiving objects and pass the request along the chain until an object handles it

Applicability

- More than one object may handle a request, and the handler isn't known a priori
 - The handler should be ascertained automatically
- You want to issue a request to one of several objects without specifying the receiver explicitly
- The set of objects that can handle a request should be specified dynamically

Chain of Responsibility



Command

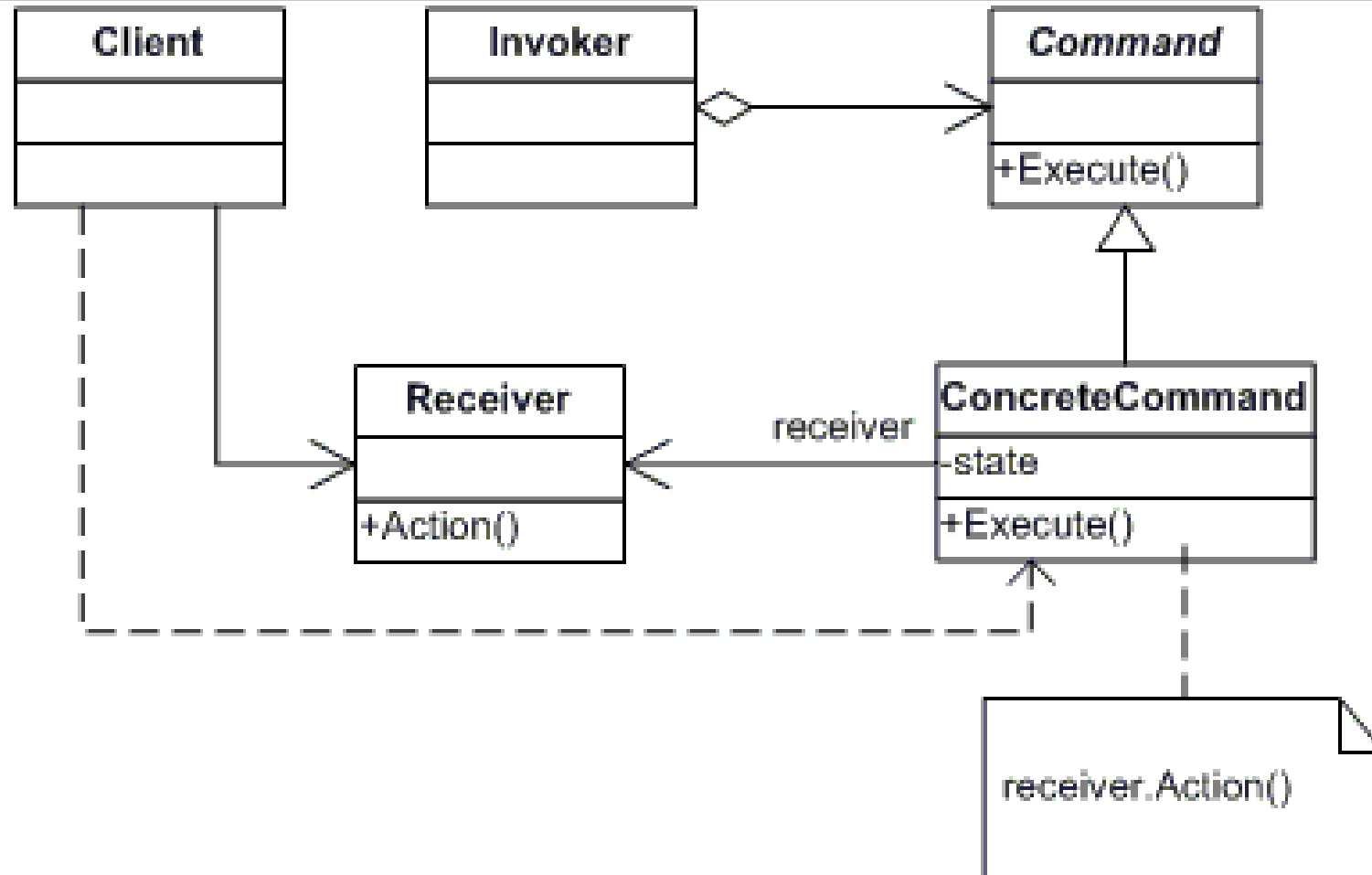
Intent

- Encapsulate a request as an object, thereby letting you parameterize clients with different requests, queue or log requests, and support undoable operations

Applicability

- Parameterize objects by an action to perform
 - Commands are an object-oriented replacement for callbacks
- Specify, queue, and execute requests at different times
- Support undo
- Support logging changes so that they can be reapplied in case of a system crash
- Structure a system around high-level operations built on primitives operations

Command



Interpreter

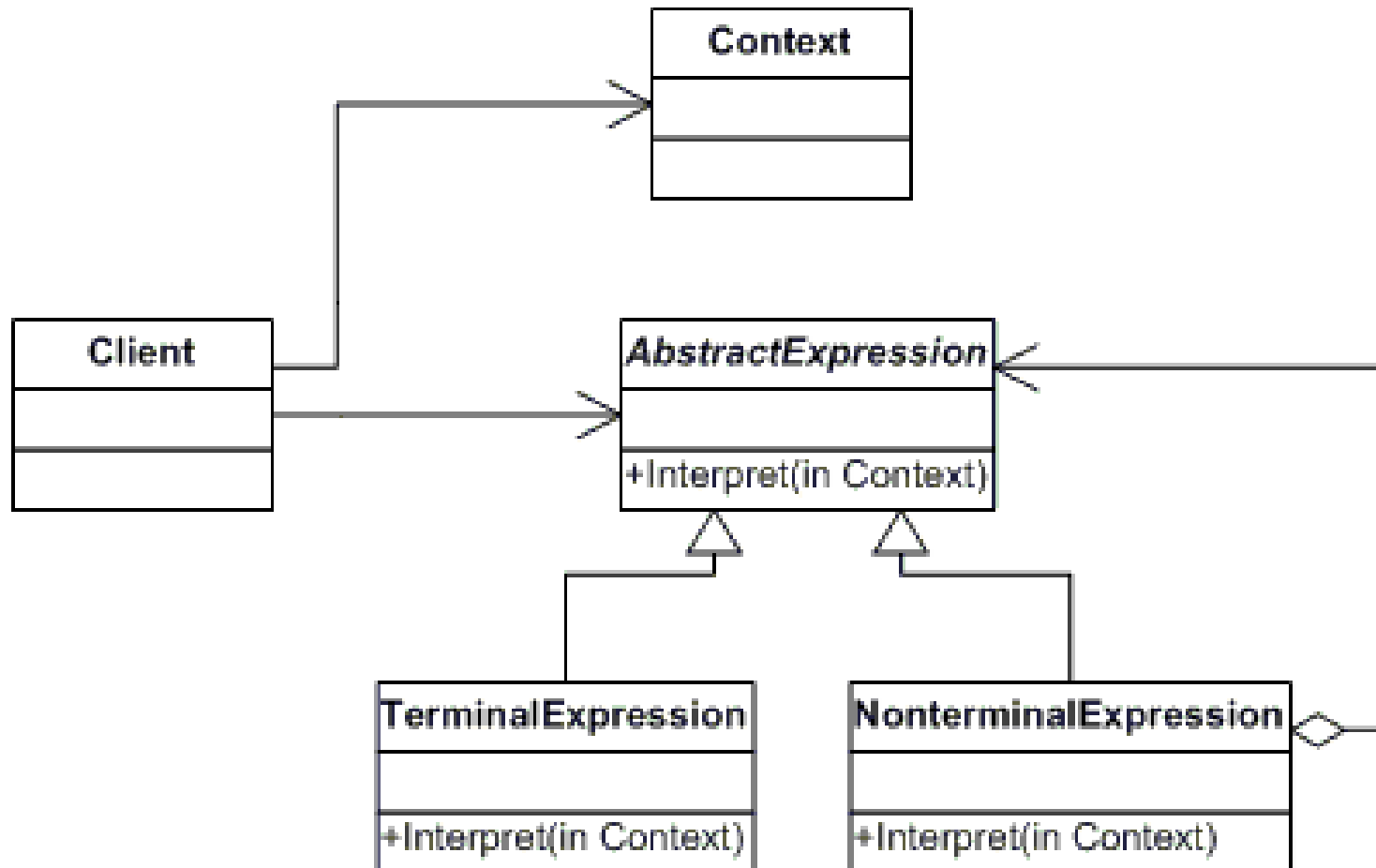
Intent

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

Applicability

- The grammar is simple
- Efficiency is not a critical concern

Interpreter



Iterator

Intent

- Provide a way to access the elements of an aggregate object sequentially without exposing its underlying representation

Applicability

- To access an aggregate object's contents without exposing its internal representation
- To support multiple traversals of aggregate objects
- To provide a uniform interface for traversing different aggregate structures (to support polymorphic iteration)

Iterator

