

Command Pattern – Behavioural

- Intent
 - » **Encapsulate a request as an object**
 - » **Parameterize clients with different requests**
 - » **Queue or log requests**
 - » **Support undoable operations**

- Alternate names
 - Action, Transaction**

Command – Motivation

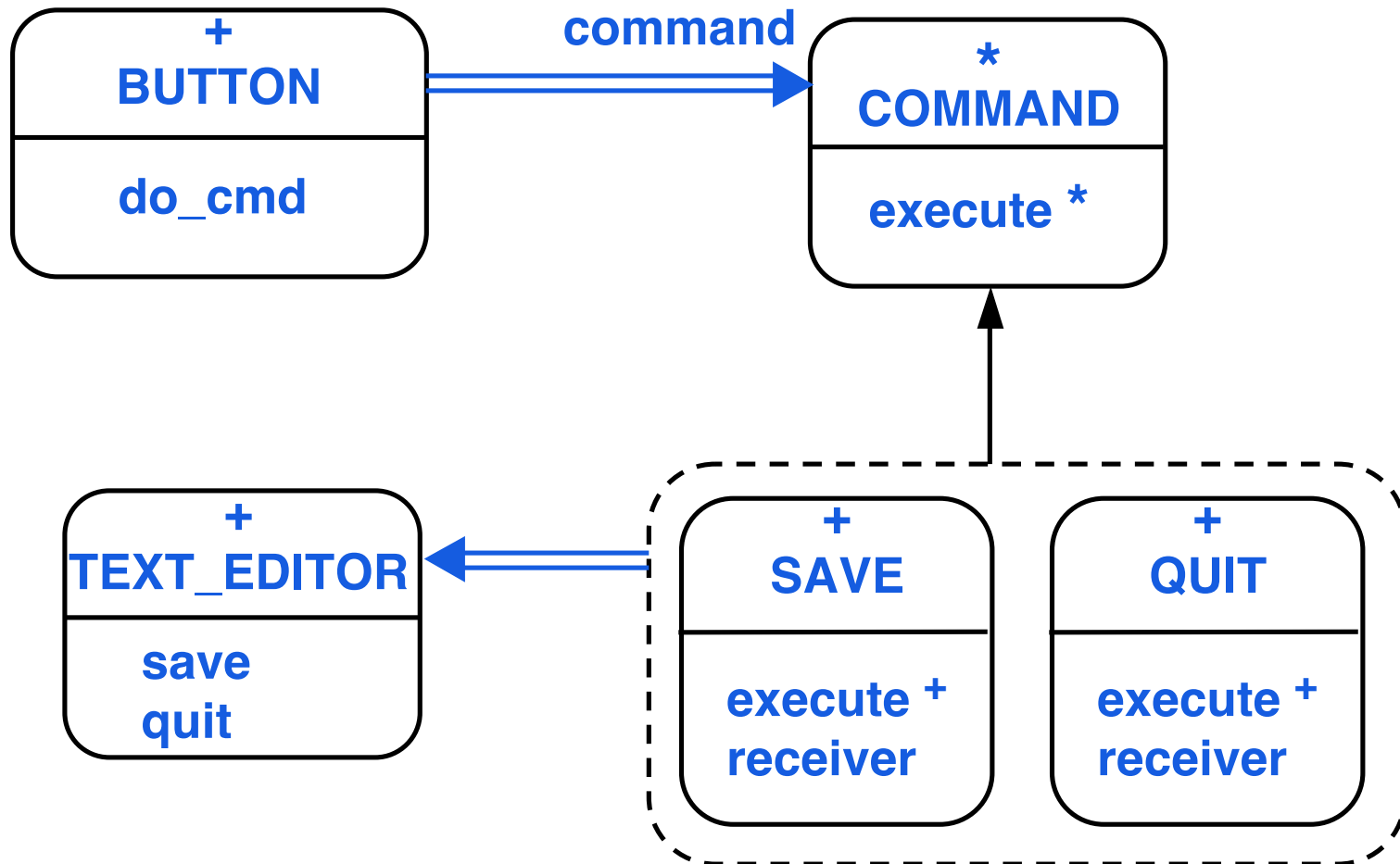
- Need to issue requests to objects without knowing anything about the operation or the receiver of the request

Buttons and menus

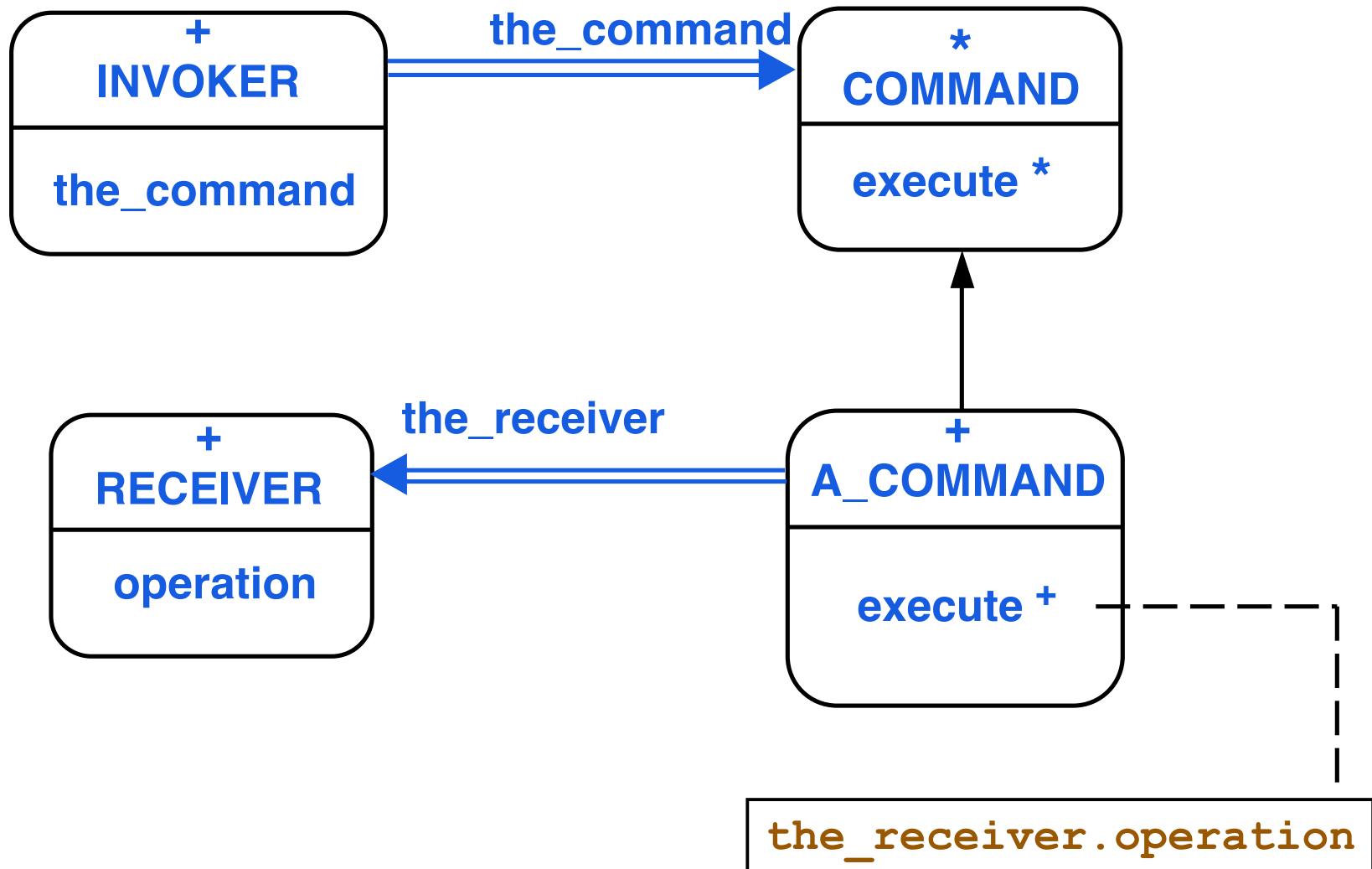
Operation is not implemented in them

- Command pattern is the OO language equivalent of a callback in a procedural language

Command – Example Structure



Command – Abstract Structure



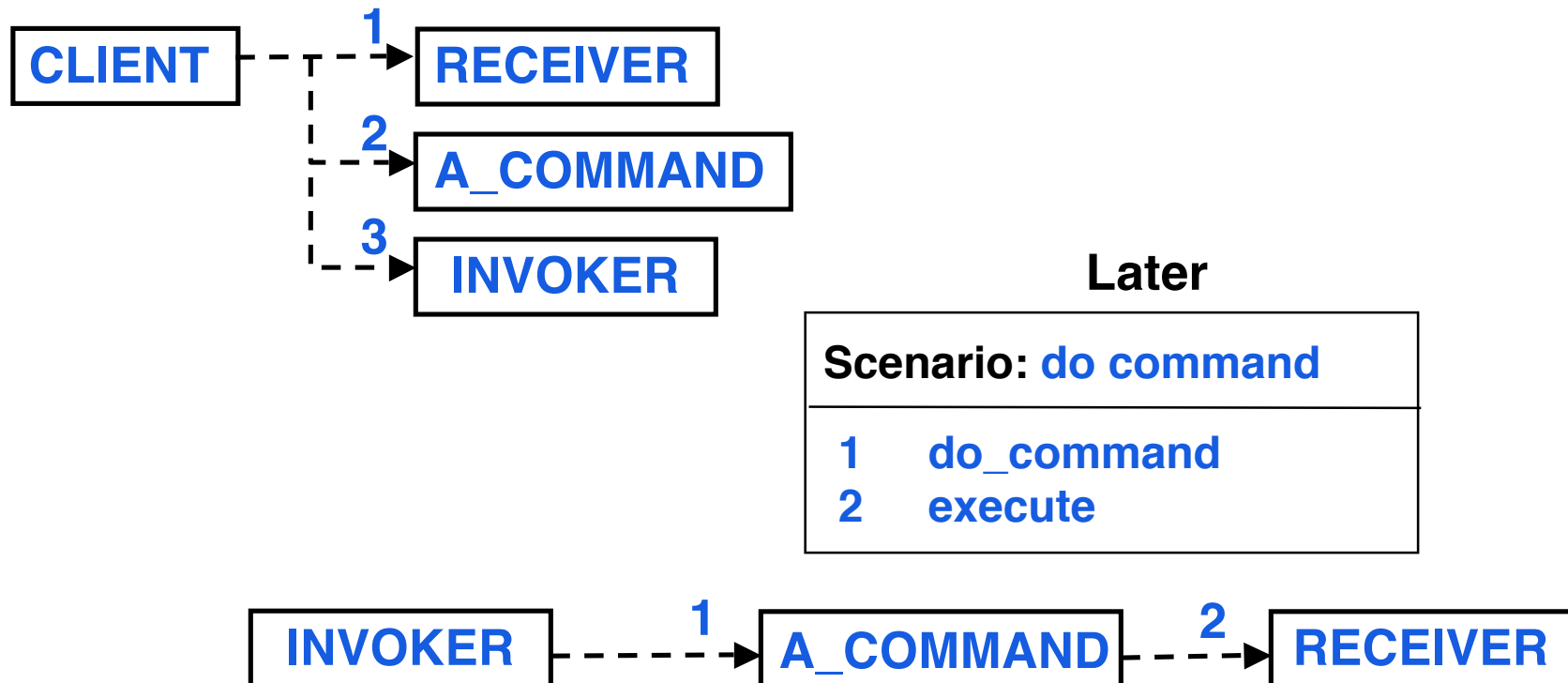
Command – Participants

- Command
 - Declares interface for command execution**
- A_Command
 - **Has binding between a receiver and an operation**
 - **Defines execute to do corresponding operation on receiver**
- Invoker
 - Asks Command to execute the command**
- Receiver
 - Does the real work for the command**
- Client
 - Creates command object, sets Receiver and Invoker**

Command – Scenario

Scenario: Set things up

- 1 Create the_receiver
- 2 Create a command object and set the receiver
- 3 Create an invoker and set the command object



Command – Applicability – 1

- Want to parameterize objects by an action to perform
- Specify, queue and execute requests at different times
 - » **Command object has a life time independent of the request**
 - » **Provided requests are represented in an address-space independent way, then requests can be executed in a different process than the original process**
- Want to support undo
 - » **Execute operation stores state**

Command – Applicability – 2

- Want logging of changes to recover in case of a crash
- Command pattern can model transaction systems
 - » **Transaction systems are structured around high-level operations build on primitive operations**
 - » **Easy to extend with new transactions**

Command – Related Patterns

- Composite can be used to implement macro commands
- Memento can hold the state a command requires to undo its effect
- Commands that are copied before being placed on a history list act as Prototypes