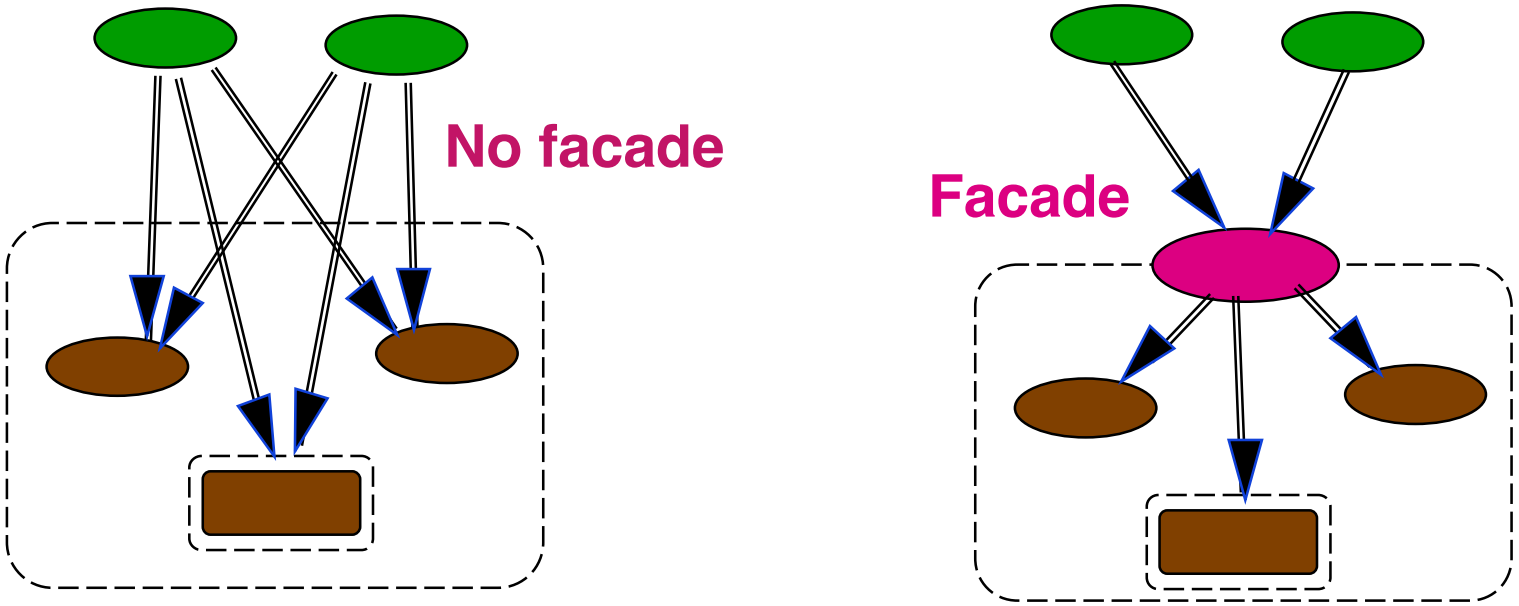
Facade Pattern – Structural

- Intent
  - » **Provide common interface to a set of interfaces within system**
  - » **Define a higher level interface that makes the system easier to use for most common tasks**
- Motivation
  - » **Design goal is to minimize communication between client and subsystems of a system**
  - » **Facade provides a simplified interface to the more general facilities of a system**

Facade Pattern – Diagram

Clients



Facade – Applicability

- Need to provide a simple interface to set of complex subsystems
- Provide a simple default view

  As systems grow, classes become smaller more refined

  > **Better for reuse**

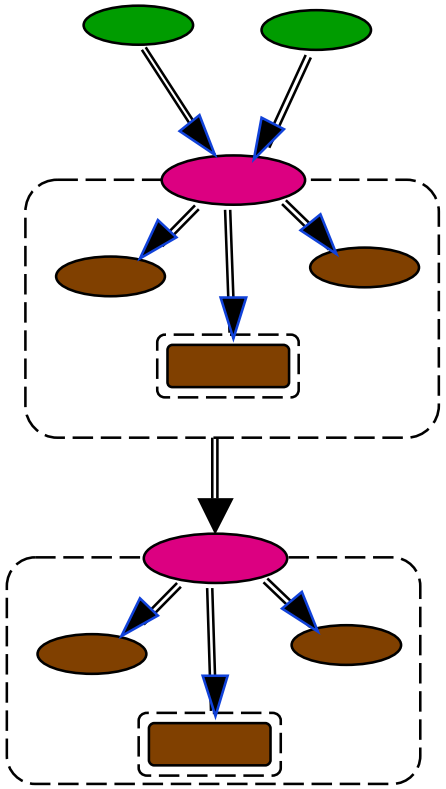
  > **More difficult for clients to use**

- Decouple subsystems from clients

  Reduce implementation dependencies

Facade – Applicability – 2

- Layer subsystems
  - » **Each layer has a single entry point**
  - » **Layers communicate only through Facade interface**



Facade – Compiler Example – Pseudocode

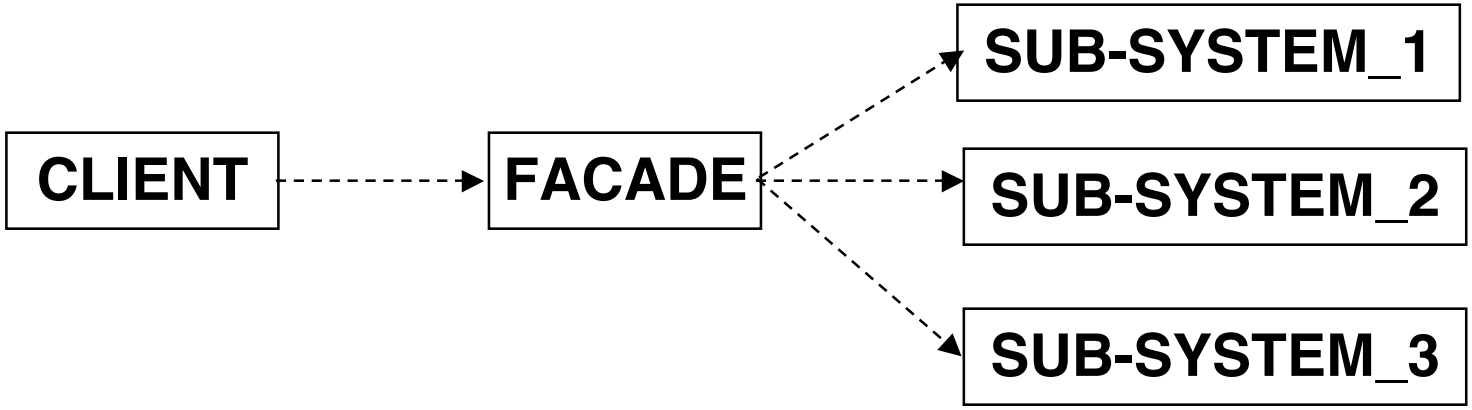
```
class COMPILER
    feature { NONE }
        nodeTree : NODE
        scanner : SCANNER   -- Individual subsystems
        parser : PARSER
        emitter : EMITTER
    feature
        compile do
            nodeTREE ← parser.parse ( scanner )
            emitter.output ( nodeTree )
        end
    end
end
```

Facade – Compiler Participants

- Facade
  - » **Compiler**
    - > **Knows which subsystem classes are responsible for a request**
    - > **Delegates client requests to appropriate subsystem objects**
- Subsystems
  - » **Scanner, Parser, StatementTypeNode(s), etc.**
    - > **Implement system functionality**
    - > **Handle work assigned by Facade object**
    - > **Have no knowledge of the facade**
      - – **Keep no references to it**

Facade – Collaborations

- Clients communicate with the subsystem by sending requests to Facade
- Facade forwards requests to subsystem
  - » **Facade may have to translate its interface to subsystem interface (use Adapter)**
- Clients that use facade don't have direct access to the subsystems



Facade – Consequences

- Benefits

  Shields clients from subsystem components

  Reducing number of objects clients deal with

  » **Promotes weak coupling between subsystems and clients**

  Can vary components of subsystem without affecting clients

  » **Doesn't prevent expert clients from direct access to subsystems**

  Choice between ease of use and generality

Façade – Related Patterns

- Abstract Factory is used with Façade to provide an interface of creating subsystems independent fo the subsytems.
- Mediator abstracts arbitrary communication between objects by centralizing functionality that does not properly belong to either of them. Instead of direct communication, objects go through the mediator
- Facade objects are often Singletons