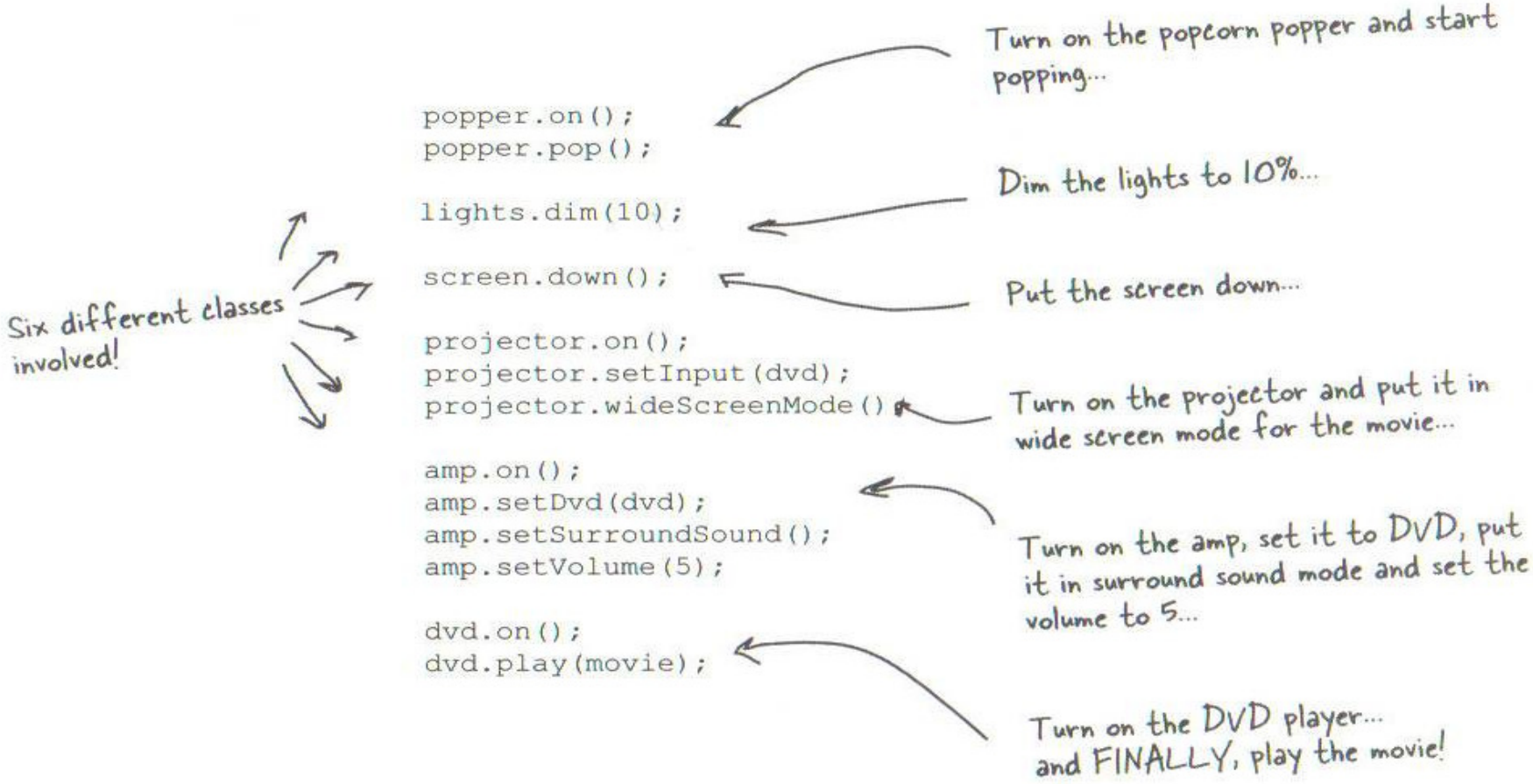
Tecniche di Progettazione: Design Patterns

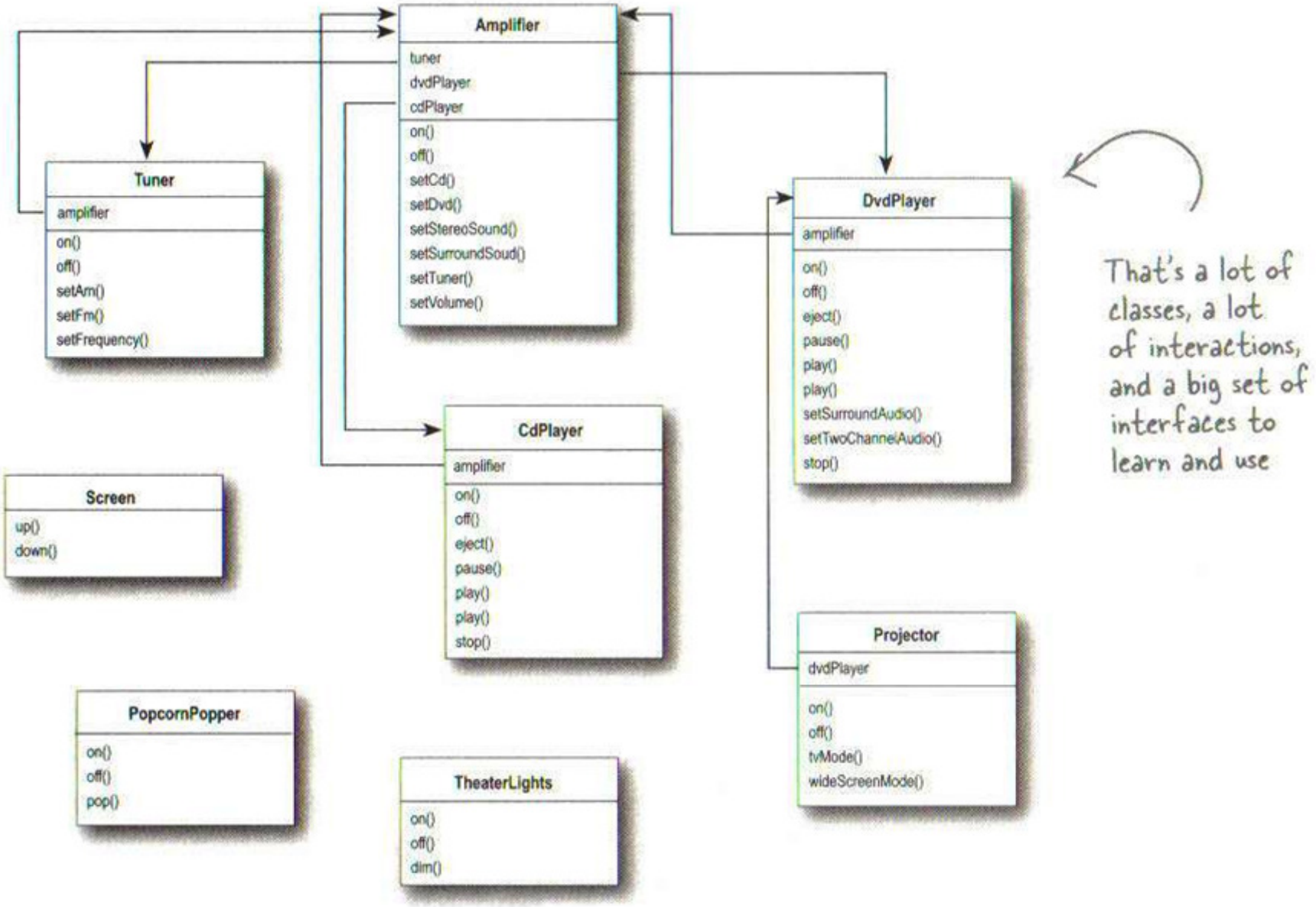
GoF: Façade

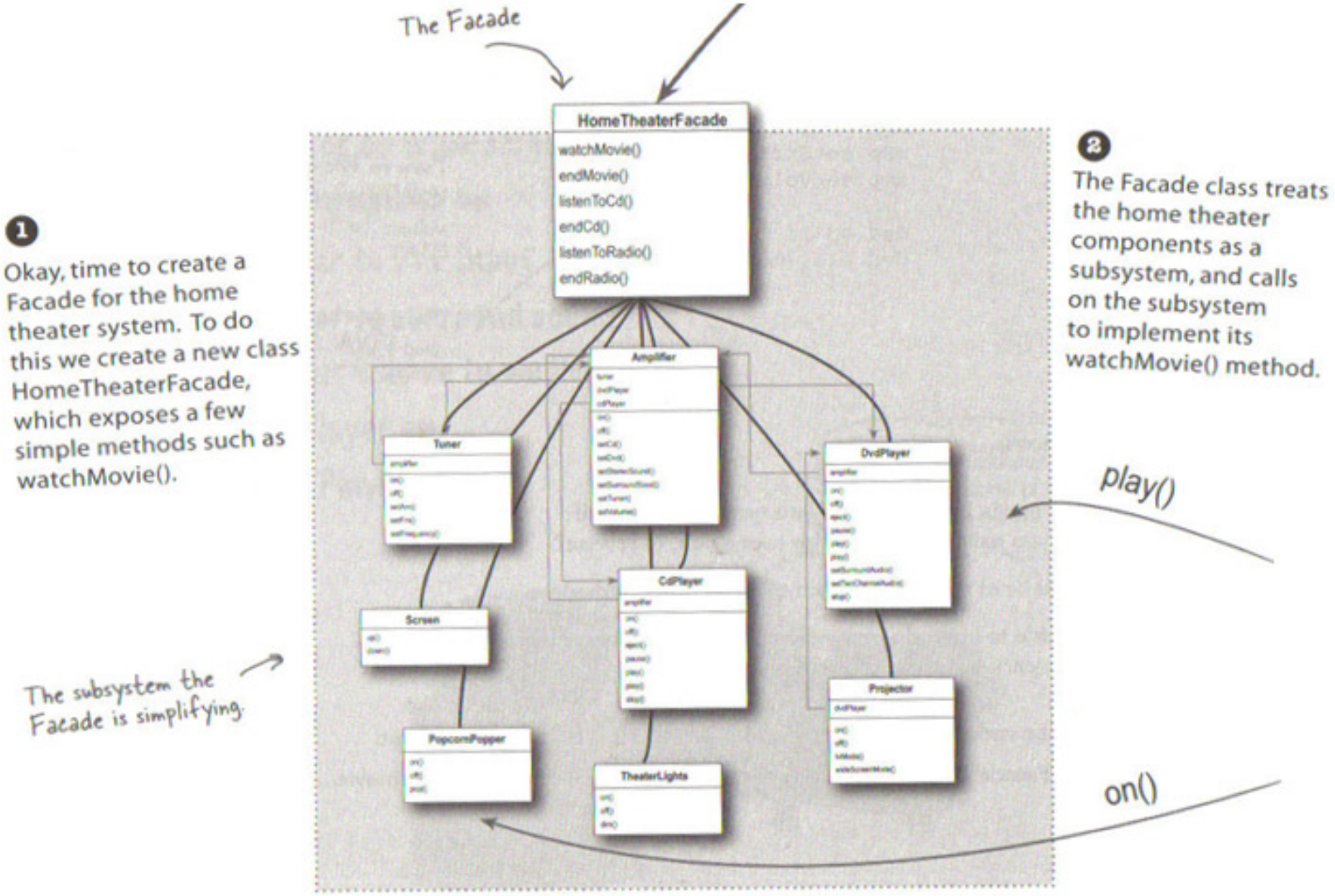
Watching a movie the hard way….

1. Turn on the popcorn popper
2. Start the popper popping
3. Dim the lights
4. Put the screen down
5. Turn the projector on
6. Set the projector input to DVD
7. Put the projector on wide-screen mode
8. Turn the sound amplifier on
9. Set the amplifier to DVD input
10. Set the amplifier to surround sound
11. Set the amplifier volume to medium (5)
12. Turn the DVD Player on
13. Start the DVD Player playing

What needs to be done to watch a movie….



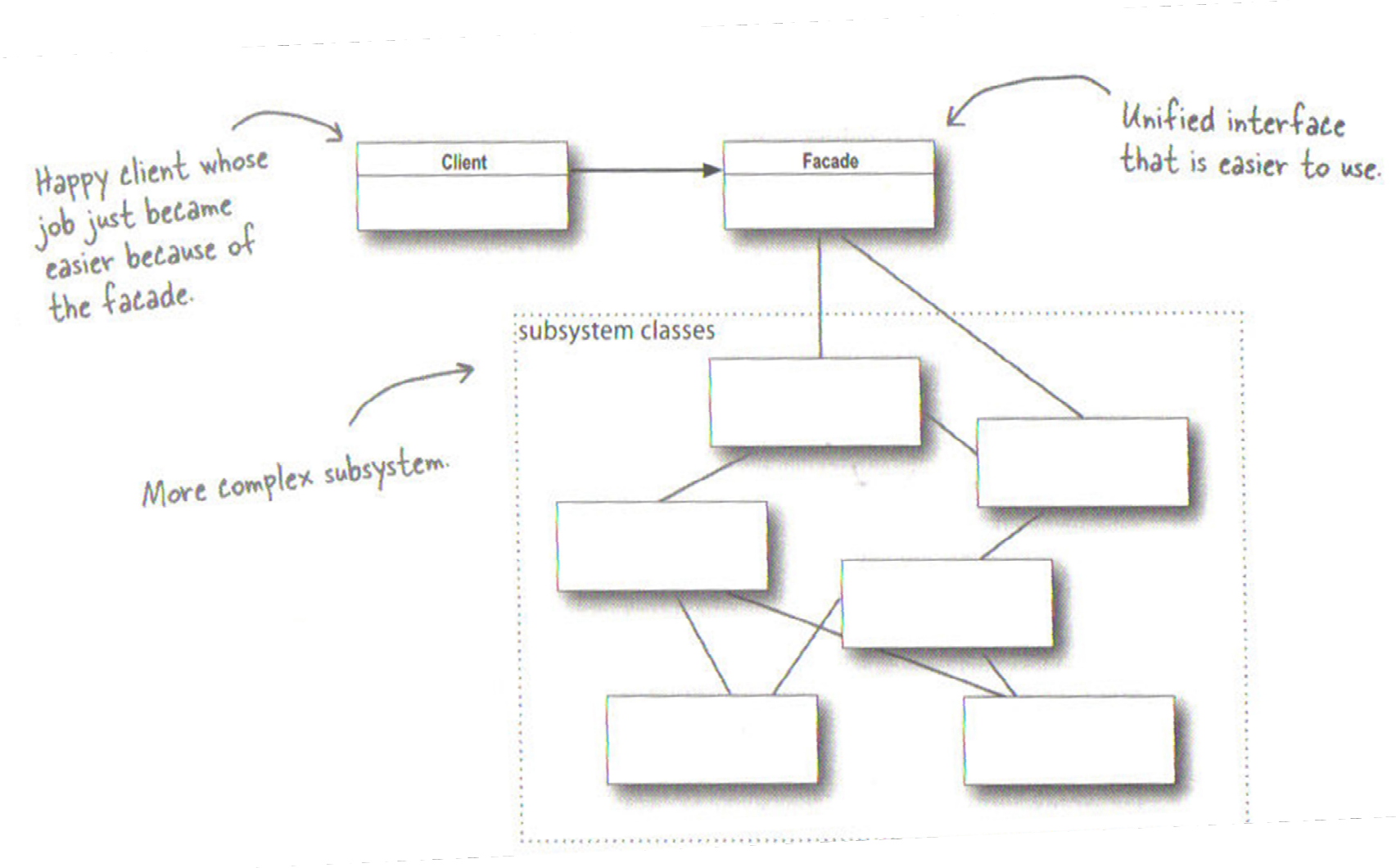

Amplifier
tuner
dvdPlayer
cdPlayer
on()
off()
setCd()
setDvd()
setStereoSound()
setSurroundSoud()
setTuner()
setVolume()
Tuner
amplifier
on()
off()
setAm()
setFm()
setFrequency()
DvdPlayer
amplifier
on()
off()
eject()
pause()
play()
play()
setSurroundAudio()
setTwoChannelAudio()
stop()
That's a lot of classes, a lot of interactions, and a big set of interfaces to learn and use
CdPlayer
amplifier
on()
off()
eject()
pause()
play()
play()
stop()
Screen
up()
down()
Projector
dvdPlayer
on()
off()
tvMode()
wideScreenMode()
PopcornPopper
on()
off()
pop()
TheaterLights
on()
off()
dim()


The Facade
HomeTheaterFacade
watchMovie()
endMovie()
listenToCd()
endCd()
listenToRadio()
endRadio()
1
Okay, time to create a Facade for the home theater system. To do this we create a new class HomeTheaterFacade, which exposes a few simple methods such as watchMovie().
2
The Facade class treats the home theater components as a subsystem, and calls on the subsystem to implement its watchMovie() method.
Amplifier
Tuner
DvdPlayer
CdPlayer
Screen
PopcornPopper
TheaterLights
Projector
play()
on()
The subsystem the Facade is simplifying

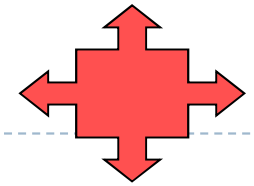
Façade Pattern defined

The Façade Pattern provides a unified interface to a set of interfaces in a subsystem. Façade defines a higher level interface that makes the subsystem easier to use.

Façade pattern – Class Diagram



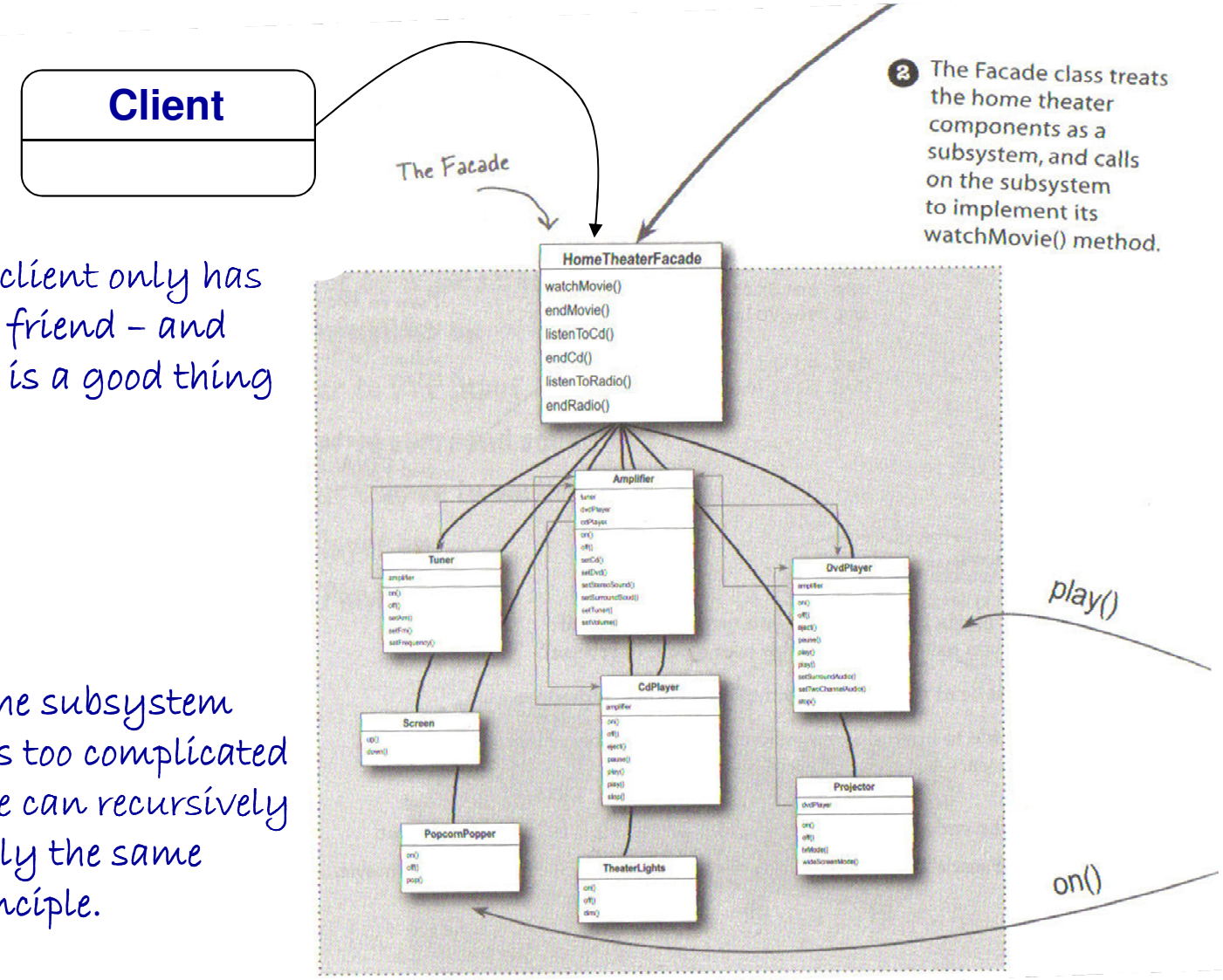
Design Principle



Principle of Least Knowledge

talk only to your immediate friends

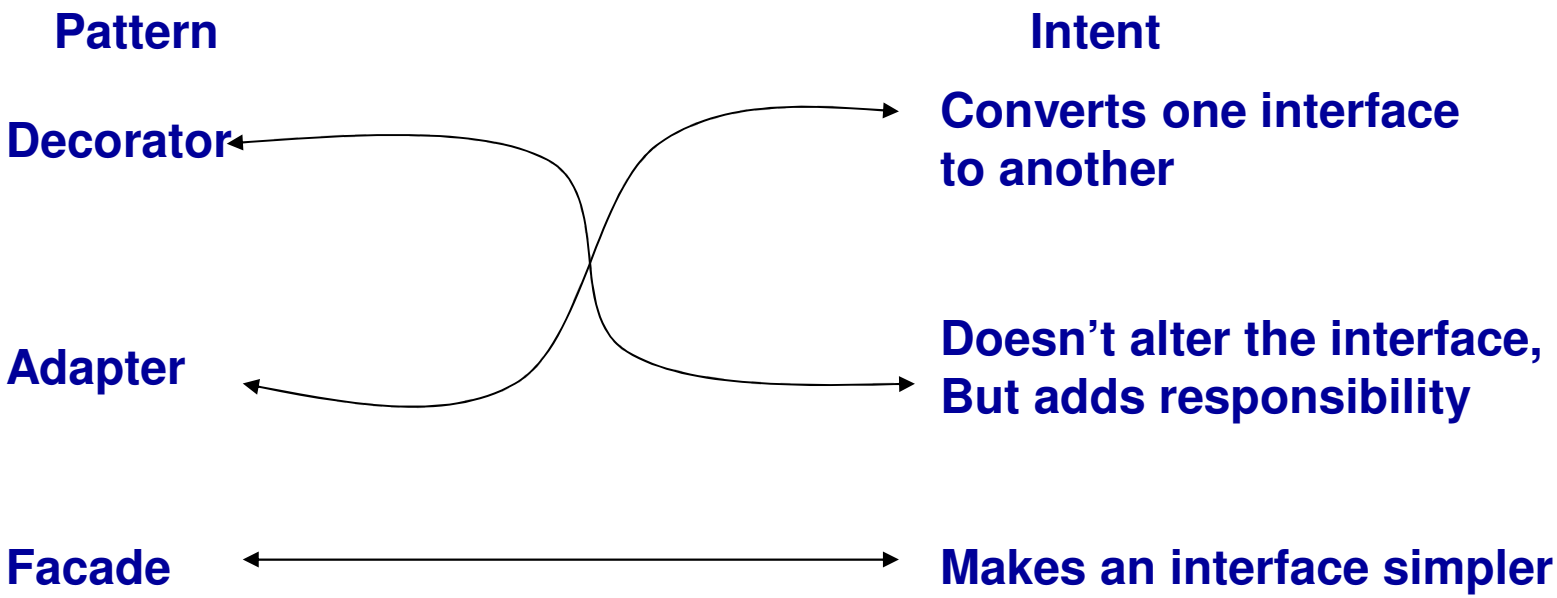
Basically this says minimize your dependencies



The client only has one friend – and that is a good thing

If the subsystem gets too complicated One can recursively apply the same principle.

A little comparison



Homework

1. See homework for Adapter
2. Redesign the example of the movie, with different requirements:
   - the façade provides uniform interface
     - On/off
     - Volume up/donw
     - Light up/down
     - …
   - And the various devices have different ones (e.g. different language)