Summer Semester 2015

Software Engineering Design & Construction

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Interface Segregation Principle

***I**nterface **S**egregation **P**rinciple*

Clients should not be forced to depend on methods that they do not use.

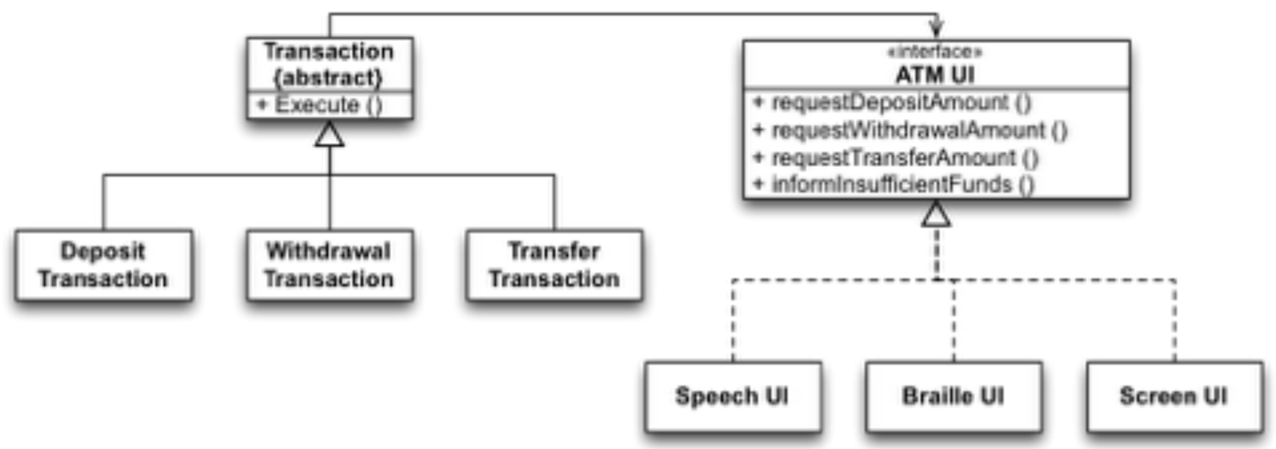
–Agile Software Development; Robert C. Martin; Prentice Hall, 2003

Introduction by Example

- Consider the development of software for an automatic teller machine (ATM):
  - Support for the following types of transactions is required: **withdraw**, **deposit**, and **transfer**.
  - Support for different **languages** and support for different **kinds of UIs** is also required
  - Each transaction class needs to call methods on the GUI
    E.g., to ask for the amount to deposit, withdraw, transfer.

Introduction by Example

- Initial design of a software for an automatic teller machine (ATM):



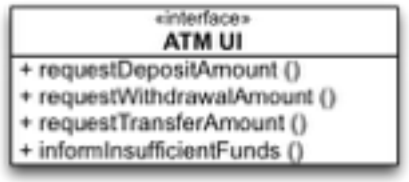
What do you think?

ISP tells us to avoid this. Each transaction class uses a part of the interface, but depends on all others. Any change affects all transactions.

A Polluted Interface

ATM UI is a polluted interface!

- It declares methods that do not belong together.
- It forces classes to depend on unused methods and therefore depend on changes that should not affect them.
- ISP states that such interfaces should be split.

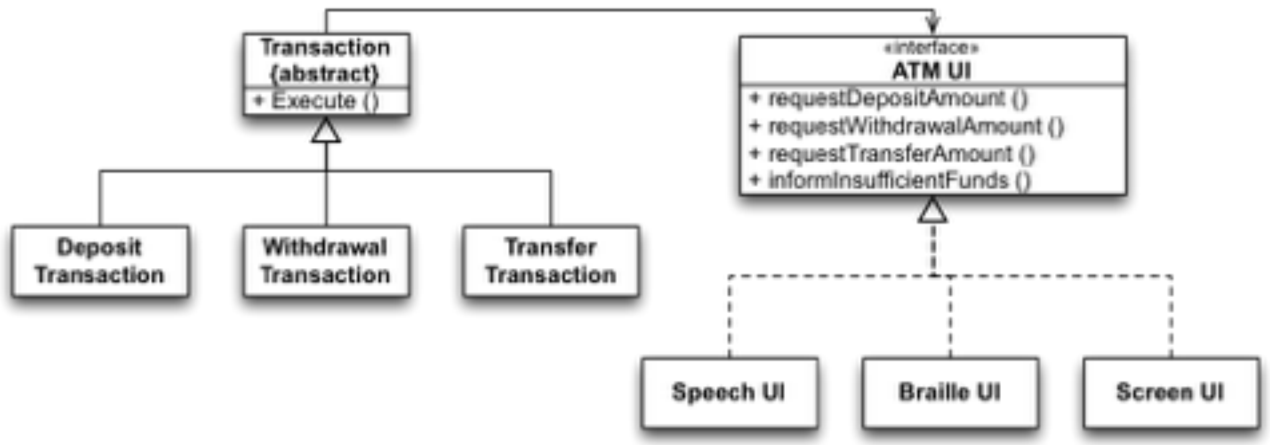

«interface»
ATM UI
+ requestDepositAmount ()
+ requestWithdrawalAmount ()
+ requestTransferAmount ()
+ informInsufficientFunds ()

The Rationale Behind ISP

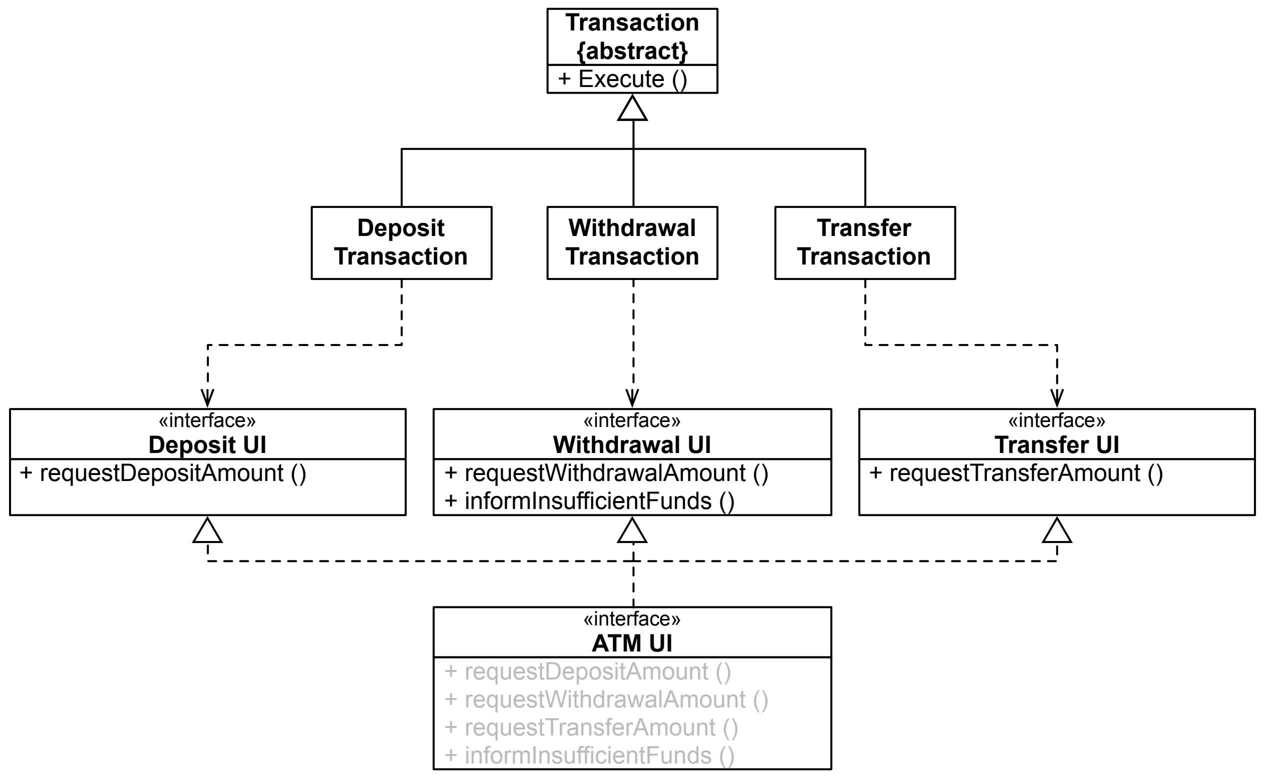
When clients depend on methods they do not use, they **become subject to changes forced upon these methods** by other clients.

This causes coupling between all clients!

How does an ISP compliant solution look like?



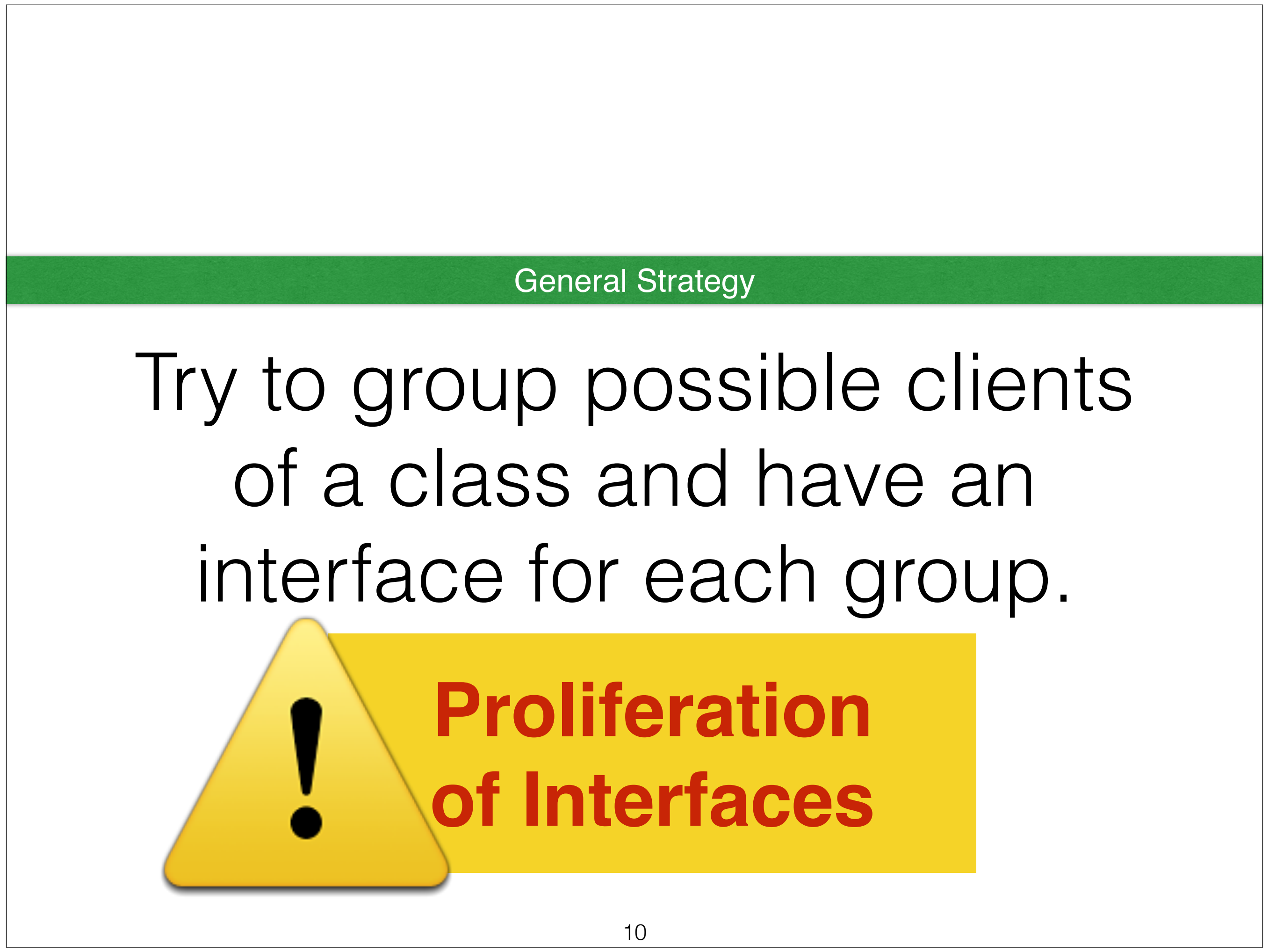
An ISP Compliant Solution



Transaction {abstract}
+ Execute ()
Deposit Transaction
Withdrawal Transaction
Transfer Transaction
«interface» Deposit UI
+ requestDepositAmount ()
«interface» Withdrawal UI
+ requestWithdrawalAmount ()
+ informInsufficientFunds ()
«interface» Transfer UI
+ requestTransferAmount ()
«interface» ATM UI
+ requestDepositAmount ()
+ requestWithdrawalAmount ()
+ requestTransferAmount ()
+ informInsufficientFunds ()

General Strategy

Try to group possible clients of a class and have an interface for each group.



General Strategy

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Proliferation of Interfaces

Segregating interfaces should not be overdone!

If you overdue the application of the interface segregation principle, you will end up with 2n-1 interfaces for a class with n methods.

Recall that, in general, a class implementing many interfaces may be a sign of a violation of the single-responsibility principle.

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