Reviewing Object Oriented Programming Principles

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Semester Test

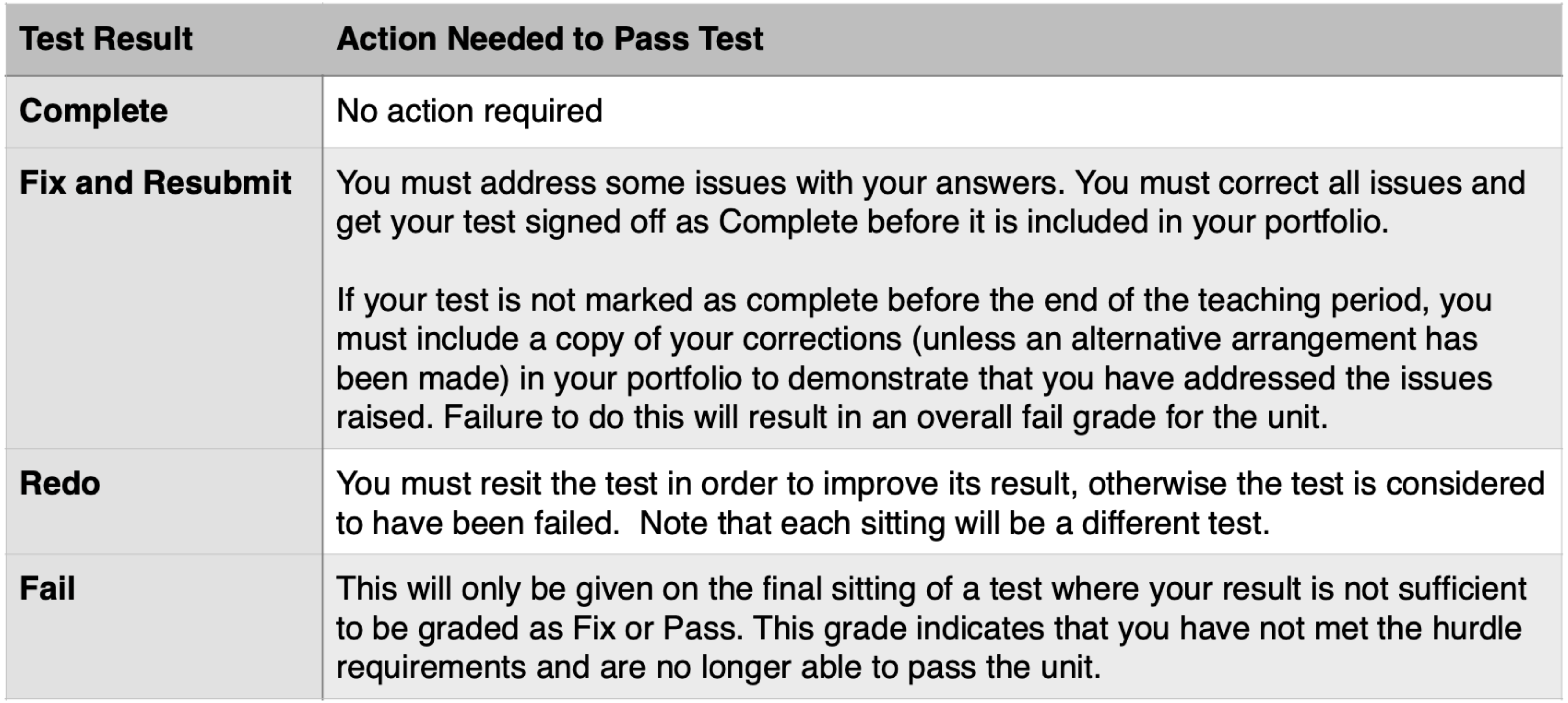
- Expectations:
    - you know the core OO principles, and can apply them in C#
    - you can interpret and possibly modify UML
    - you know C# syntax (you will be writing code)
    - you know the commonly used methods and properties of collection classes like List and Dictionary

The test is a hurdle — you need to reach a “Complete”

Semester Test Outcomes

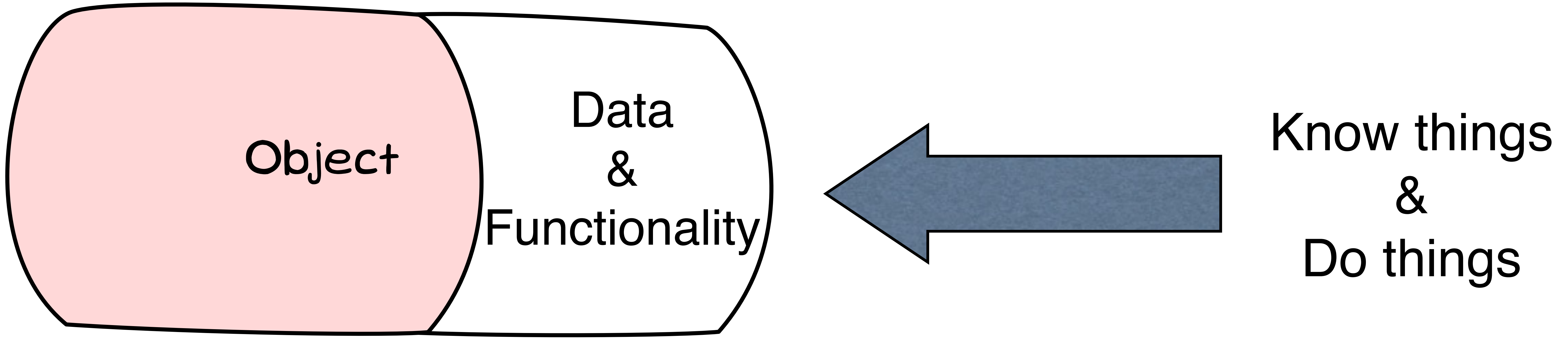
- Complete —> all good; include the test as evidence in your portfolio
- Fix —> some issues; you need to fix these to get upgraded to a Complete
- Redo —> major issues; you need to resit another test in week 12

Check the portfolio format and assessment criteria!

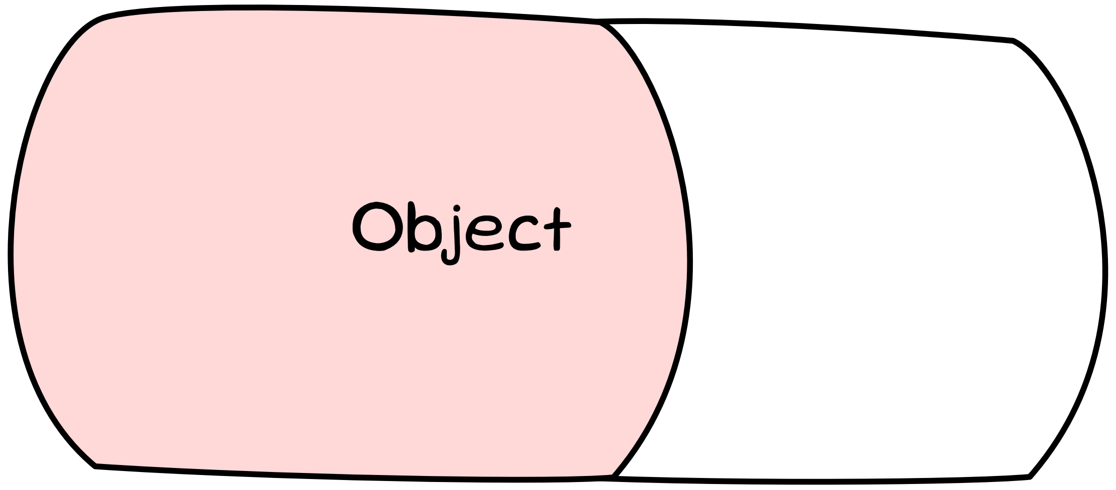


Test Result	Action Needed to Pass Test
Complete	No action required
Fix and Resubmit	You must address some issues with your answers. You must correct all issues and get your test signed off as Complete before it is included in your portfolio. If your test is not marked as complete before the end of the teaching period, you must include a copy of your corrections (unless an alternative arrangement has been made) in your portfolio to demonstrate that you have addressed the issues raised. Failure to do this will result in an overall fail grade for the unit.
Redo	You must resit the test in order to improve its result, otherwise the test is considered to have been failed. Note that each sitting will be a different test.
Fail	This will only be given on the final sitting of a test where your result is not sufficient to be graded as Fix or Pass. This grade indicates that you have not met the hurdle requirements and are no longer able to pass the unit.

Object oriented programming involves creating objects that know and do things



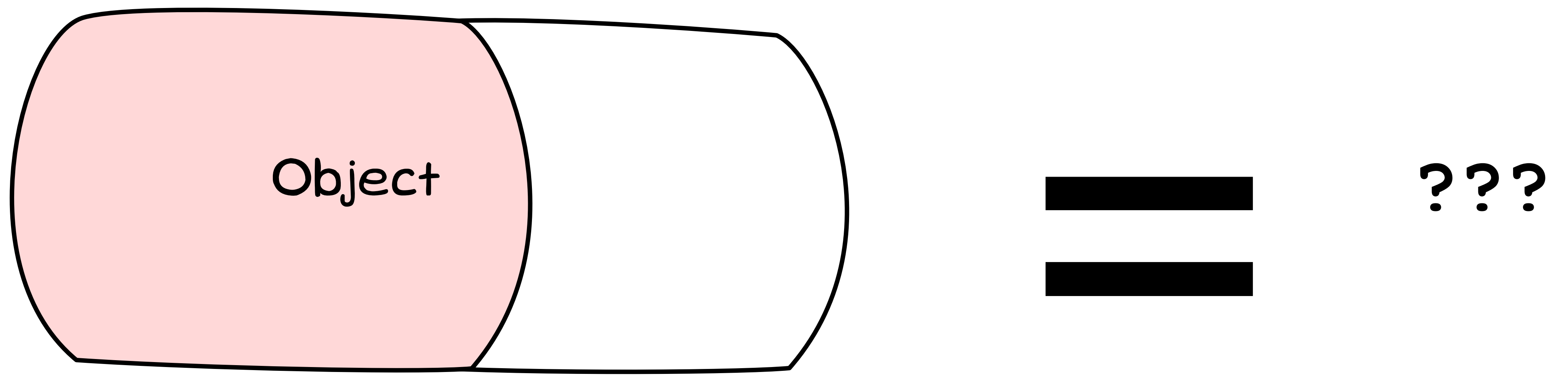
To succeed at OOP, you need to understand objects and how they work



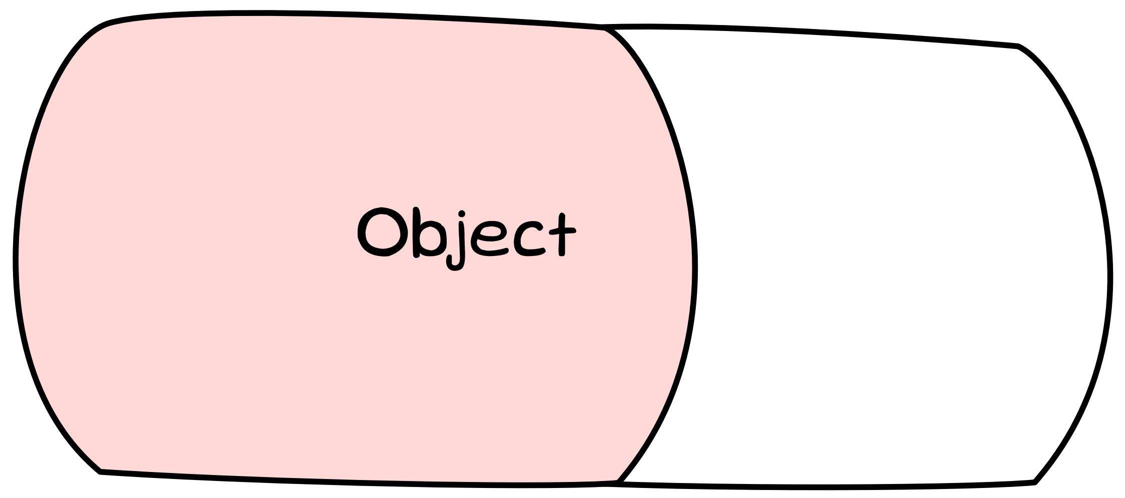
>

```
public class Location
{
  ...
}
```

Without clear understanding, its hard to see how objects work and hard to explain



A clear understanding makes explaining these principles and designing programs easier



=

```
public class Location
{
 … MovePlayer …
 … LongDescription …
 … Locate …
 … Inventory …
}
```

See how profound “objects know and do things” is in relation to the OO principles

Abstraction

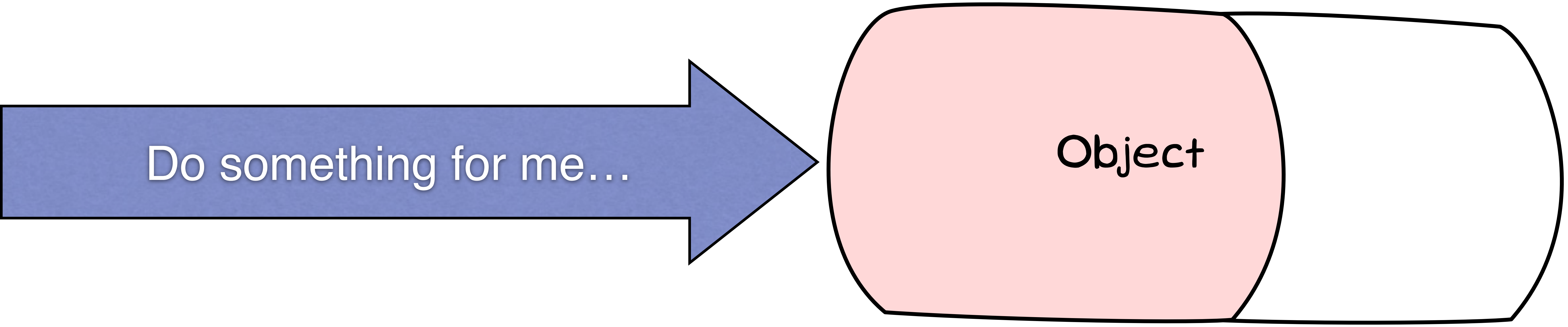
Encapsulation

Inheritance

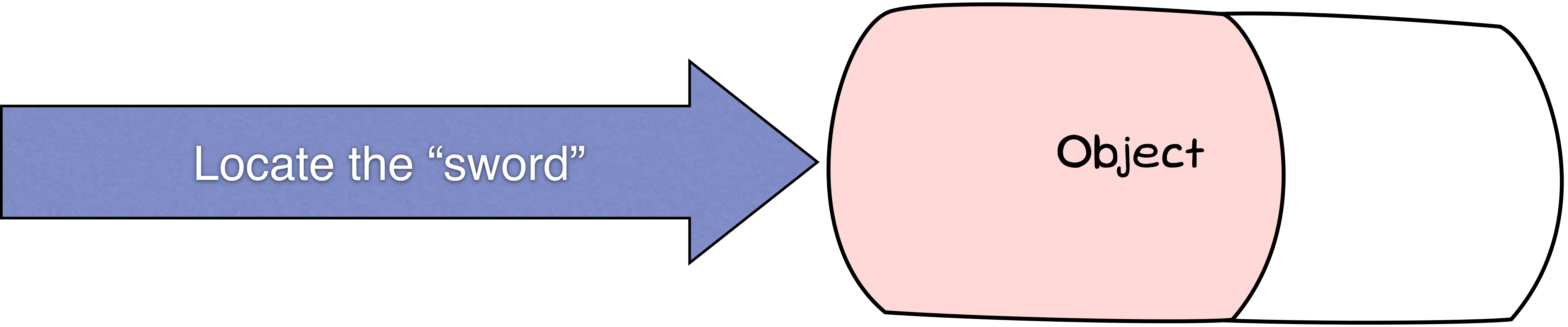
Polymorphism

Objects start with **encapsulation**: things that contain knowledge and functionality

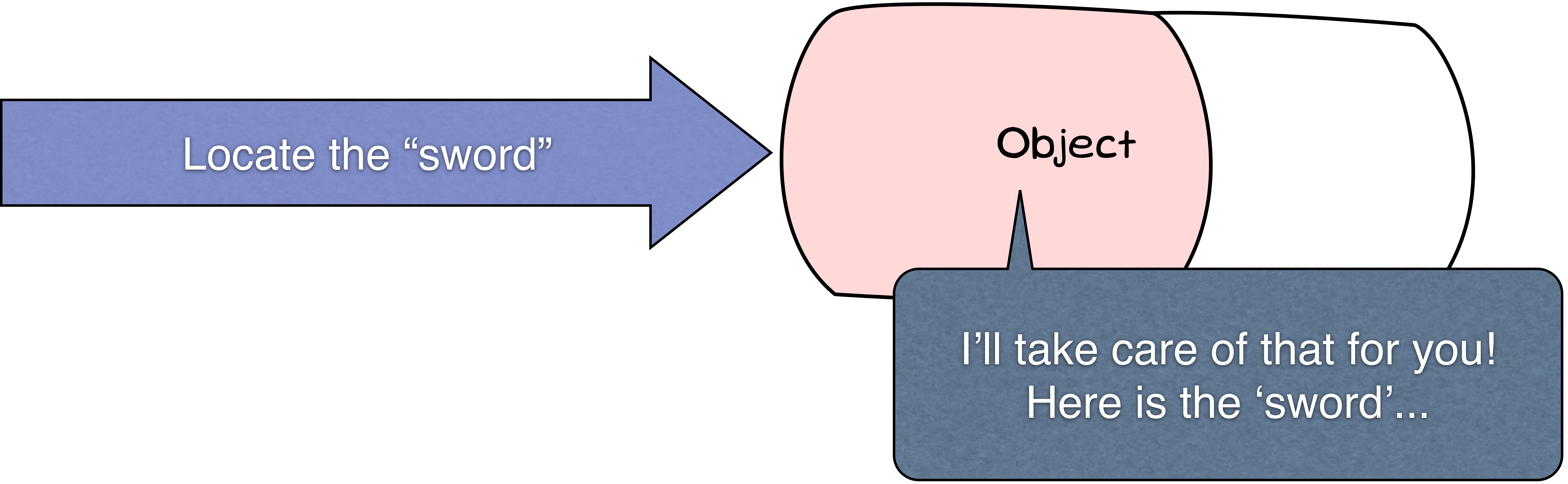
Objects exist as entities that you can interact with



Externally, you don't need to worry about how objects work inside

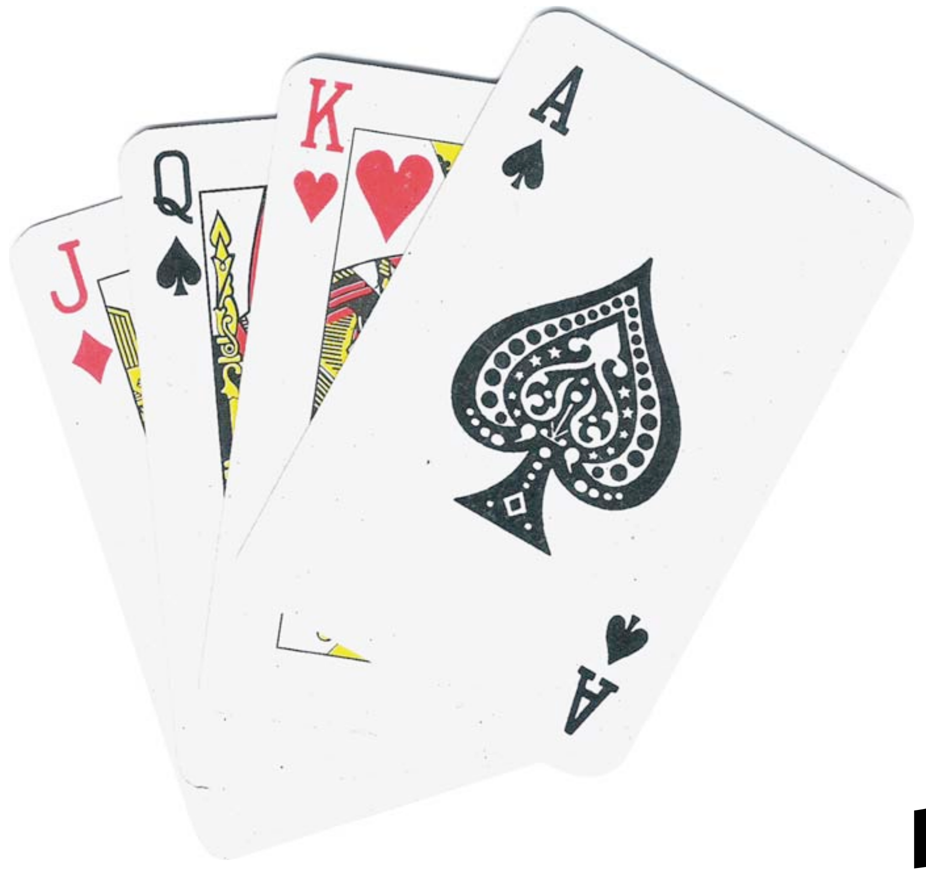


Tell the object what to do, and let it take responsibility for getting it done!



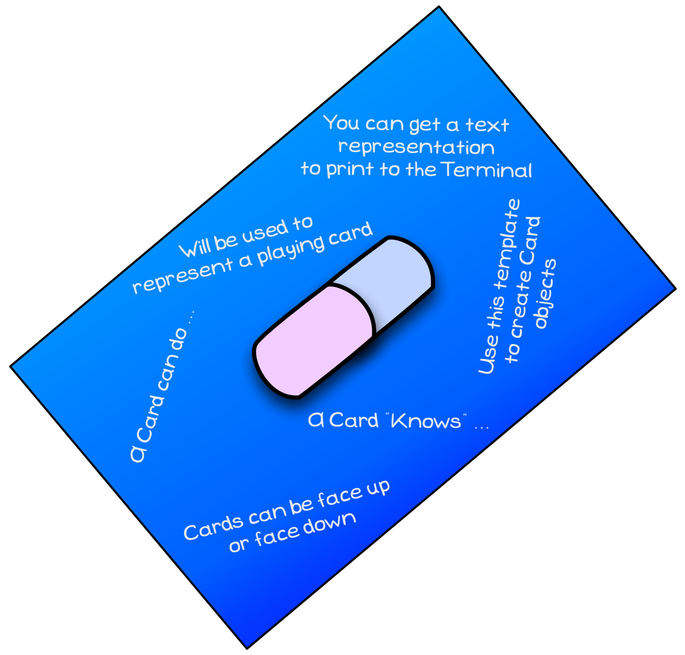
Abstraction helps identify classifications, roles, responsibilities, and collaborations

Build the *things* for your program by abstracting them from the “*real world*”



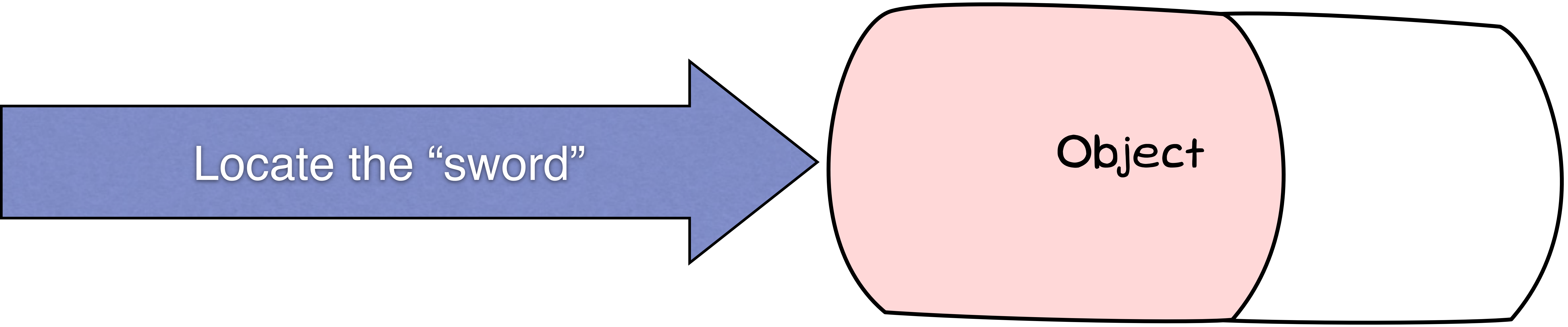
}

Specification for a Card

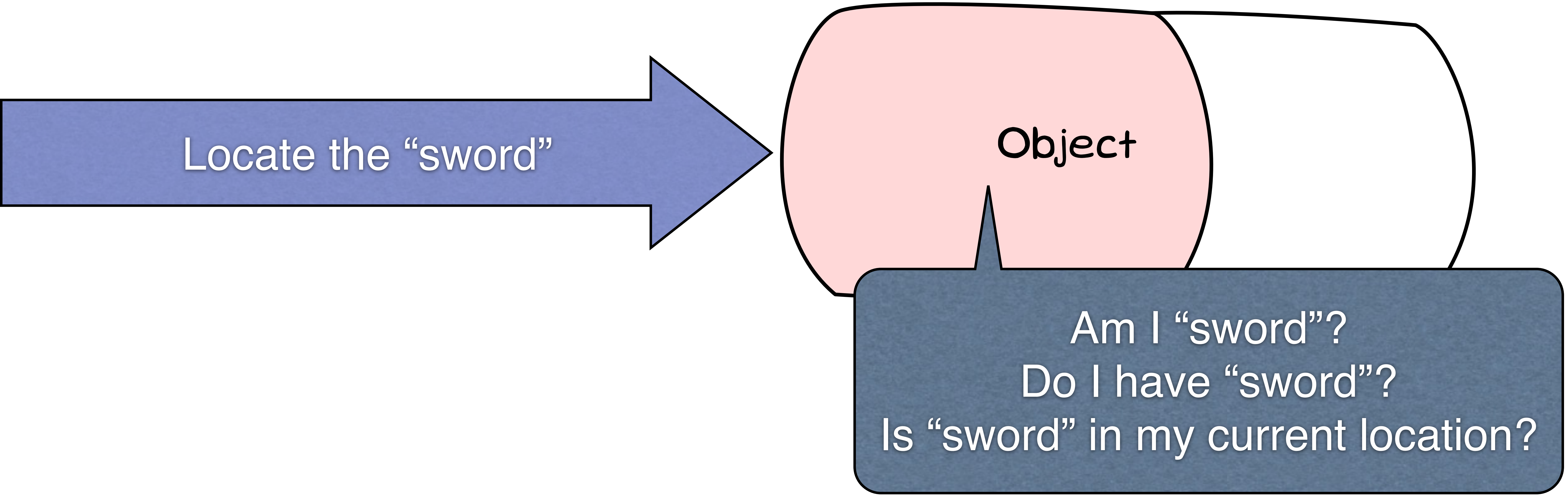

You can get a text representation to print to the Terminal
Will be used to represent a playing card
Use this template to create Card objects
a Card can do ...
a Card "Knows" ...
Cards can be face up or face down

Classification

Determine responsibilities for classes: what messages do these objects respond to?

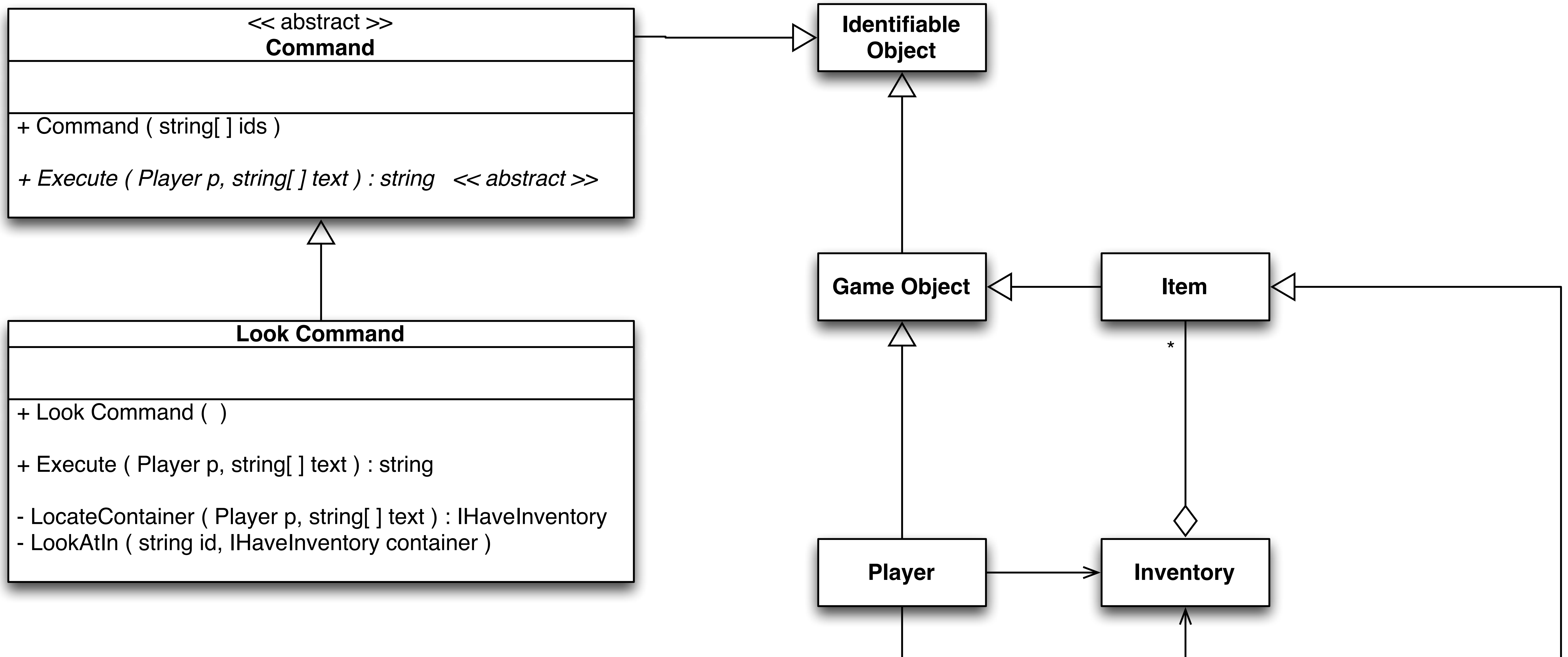


Identify the need for any collaborations with other objects



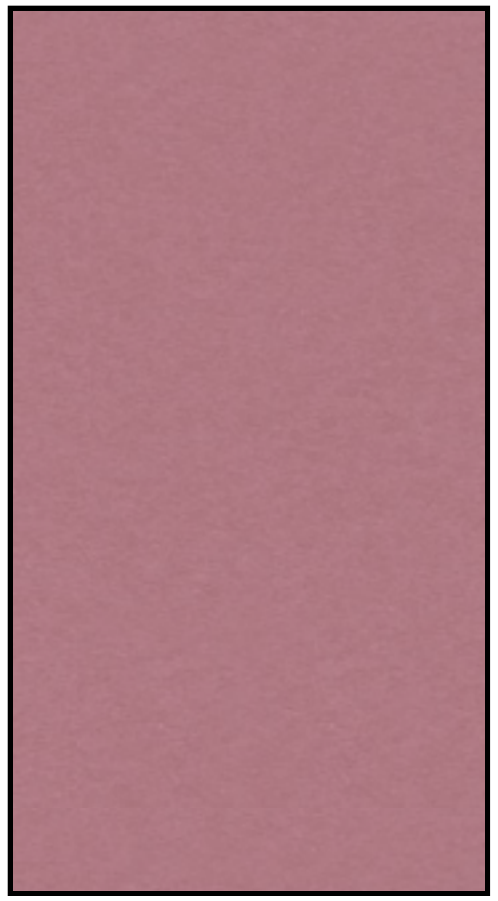
Use **inheritance** to create generalised and specialised families of classes

Create families of related classes, reusing functionality from parent classes



<< abstract >>
Command
+ Command (string[ ] ids)
+ Execute (Player p, string[ ] text) : string << abstract >>
Look Command
+ Look Command ( )
+ Execute (Player p, string[ ] text) : string
- LocateContainer (Player p, string[ ] text) : IHaveInventory
- LookAtIn (string id, IHaveInventory container)
Identifiable Object
Game Object
Item
*
Player
Inventory

Objects encapsulate a combination of features: some inherited, some specific

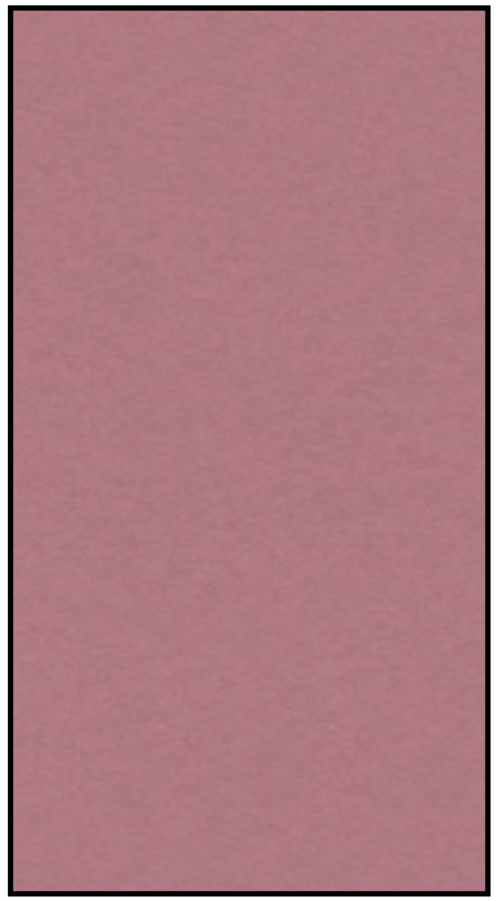


Inherits Object characteristics

Inherits Shape characteristics

Includes Rectangle characteristics

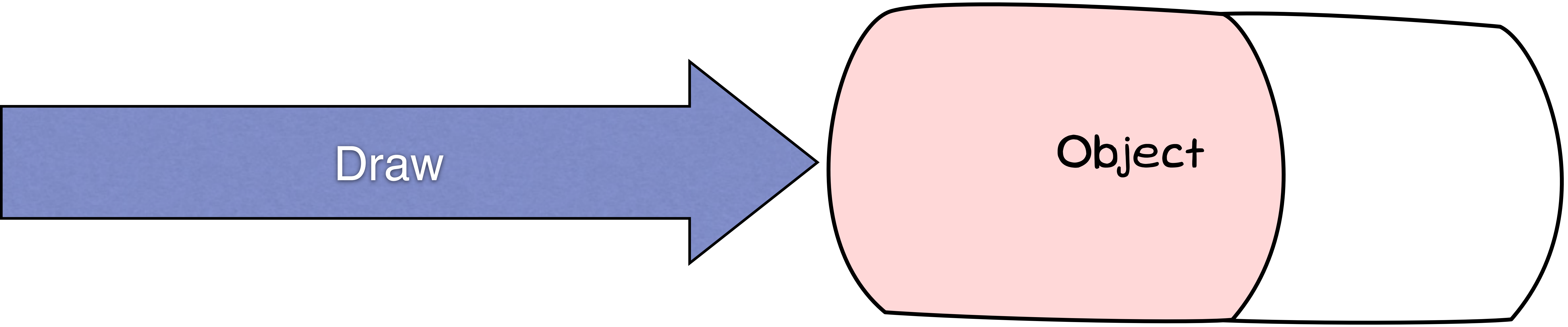
Customise inherited features where differences occur



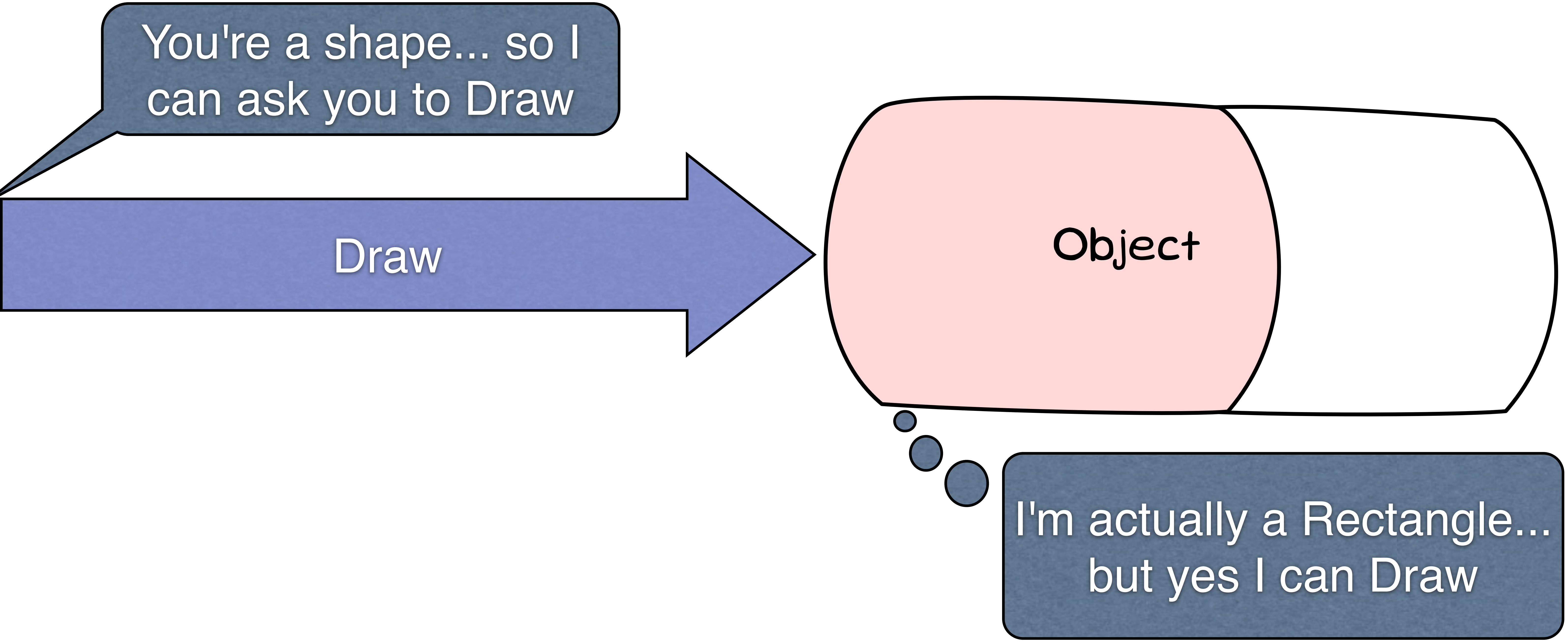
Draws like a Rectangle

Tie it all together, and add flexibility where needed with **polymorphism**

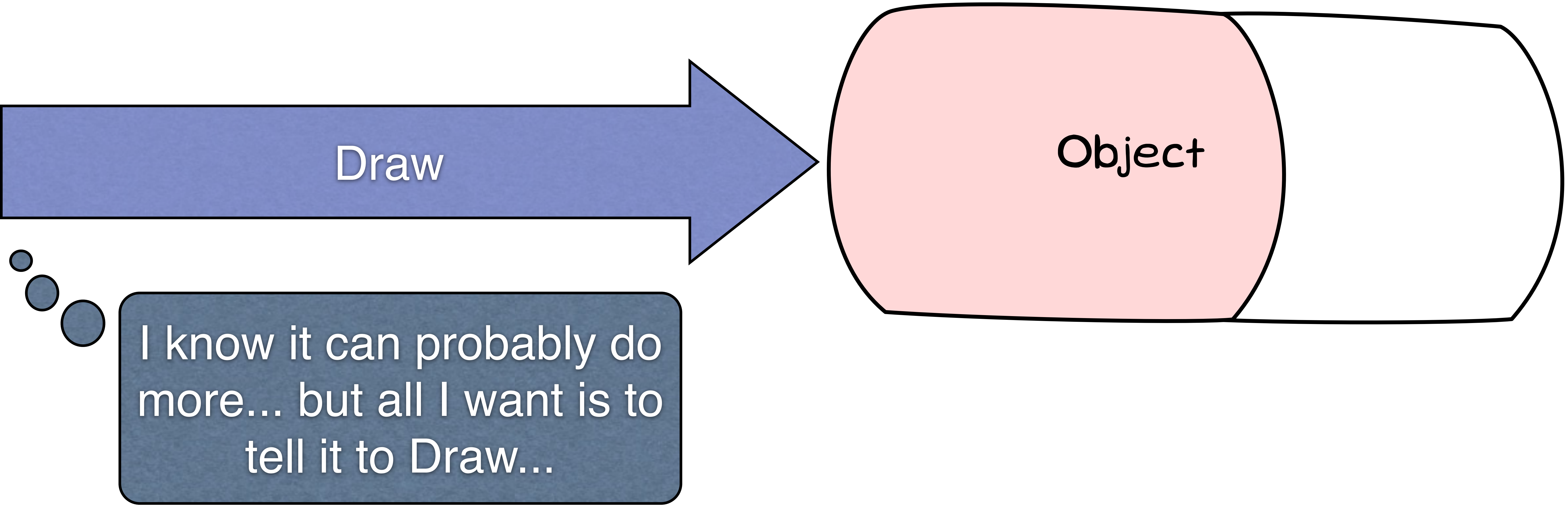
Remember objects encapsulate a range of features: some of which are inherited



A single variable reference can access multiple unique implementations


You're a shape... so I can ask you to Draw
Draw
Object
I'm actually a Rectangle... but yes I can Draw

When selecting a variable type, choose the most general type that will still be suitable


Draw
Object
I know it can probably do more... but all I want is to tell it to Draw...

Will understanding these principles help you create better object oriented programs?

Four principles underly everything in object oriented programming

See how profound “objects know and do things” is in relation to the OO principles

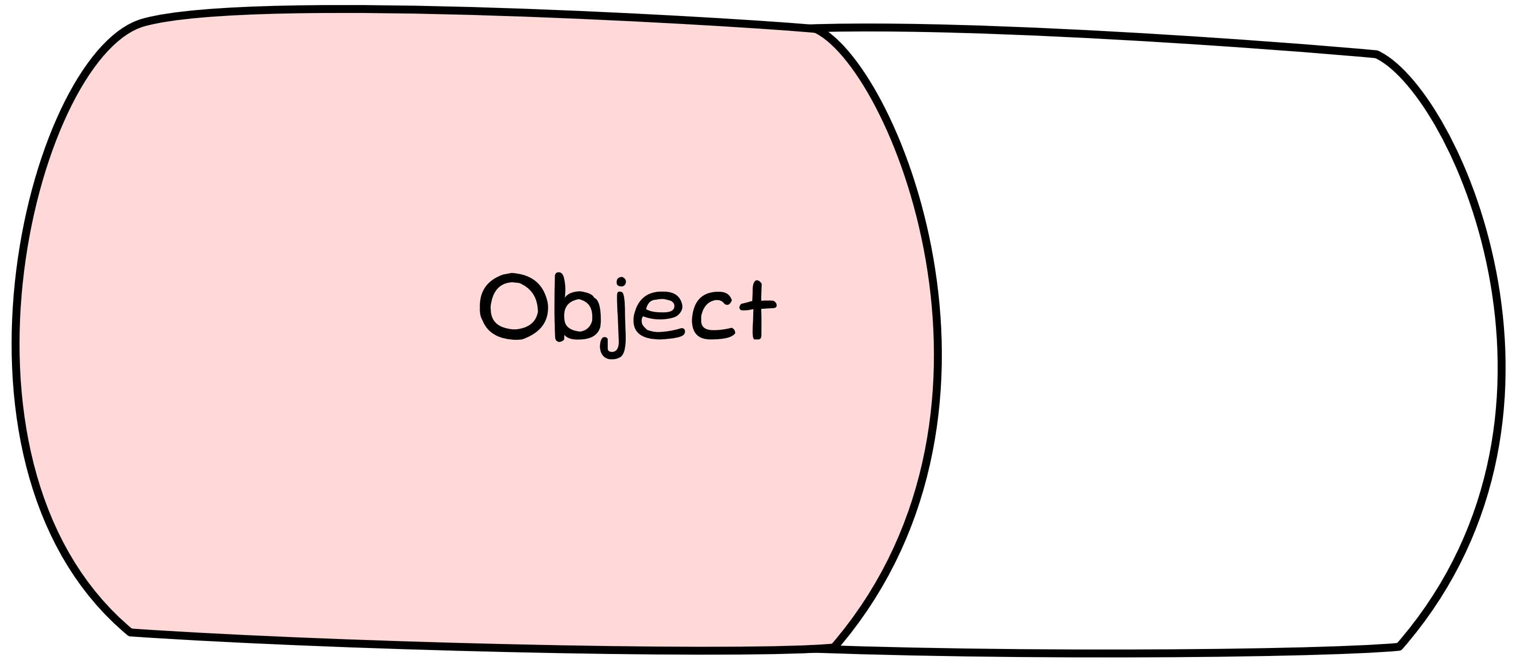
Abstraction

Encapsulation

Inheritance

Polymorphism

Design any program using an understanding of these ideas together with basic control flow logic



Encapsulation, abstraction, inheritance, and polymorphism make OOP possible