Chapter 3

Three kinds of classes
- Instantiable classes model program-domain entities.
- Application classes contain a main method, create and manipulate instances.
- Tester classes exercise the public interfaces of instantiable classes.
- You'll want at least one tester class for each instantiable class.

How to design a class
- First: decide on behavior
  - What does this kind of object need to do?
  - What does it need to know?
  - How will other classes interact with it?
- Later: consider implementation
  - Why is this order?

Abstraction
- What does abstraction mean?
  - Capturing essential properties
  - Taking "high-level" view
  - Insulation from "accidental" properties
  - How does the process of abstraction work?

"Black-box"
- We can treat an abstract object like a "black box"
  - We may know how to interact with it, but can't see inside it
  - Why is this desirable?

Abstraction examples
- What abstractions do each of the following people deal with:
  - A computer user?
  - A computer programmer?
  - A systems or compiler programmer?
  - A chip designer?
  - An electronic engineer?
Object-oriented programming

- When we abstract program-domain entities, our goal is to find objects that interact.
- OOP provides a way of thinking about complex problems.
- Encapsulation (data hiding) forces object users to deal with abstractions and not implementations.

Why OOP?

- Isolates individual components for ease of program understanding, maintenance.
- Provides "direct" way to model program behavior.
- Allows code reuse.

Designing a program

- Decide on the concepts involved in the problem (find classes)
- Decide on the responsibilities of each class
- Decide how classes will interact

Example: Coffee maker

- Concepts: water pot, coffee pot, heater, ground storage
- What does each need to know?
- What are the interactions?

Exercise

- Design the classes for a vending machine application
- Tracks inventory, interacts with customer; takes money, and dispenses product
- What are the concepts involved? What are the responsibilities of each class? How do they interact?