

# Classes and Objects

CSE 142, Summer 2003  
Computer Programming 1

<http://www.cs.washington.edu/education/courses/142/03su/>

## Outline for Today

- Short review of objects
- Discussion of classes and objects
- Major concepts
  - » Objects are *instances* of classes
  - » Classes are templates or blueprints for objects
  - » Objects properties can be simple values or other objects

## Object Review

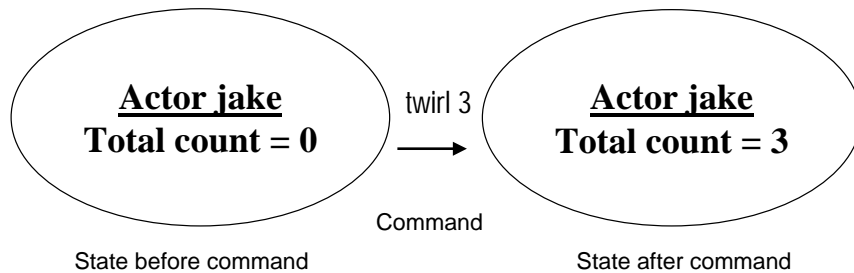
- Objects have properties and responsibilities
- We can send messages to objects
  - » Commands - Instruct an object to do something
    - May cause a change in state
  - » Query - Find out value associated with property
- Acrobat Example
  - » clap and twirl are commands
    - the object does something for the caller
  - » count is a query
    - the object returns some information to the caller

Acrobat	sean = new Acrobat()	AcrobatWithBuddy	linh
Acrobat	laura	AcrobatWithBuddy	doug
Acrobat	andrew	Choreographer	dan
Actor	jake	Curmudgeon	shirley

```
sean.clap(2);  
jake.twirl(3);  
dan.twirl(4);  
doug.clap(5);  
jake.count
```

## State of an object



What is the state after another query "count"?

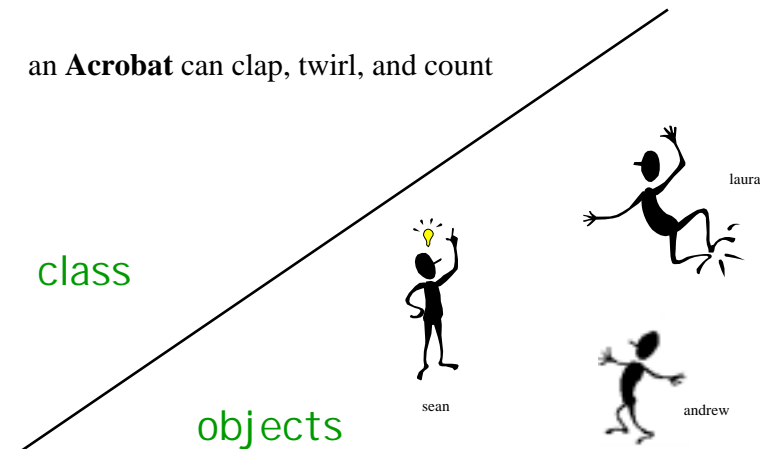
What is the state after another command "twirl 2"?

## Classes

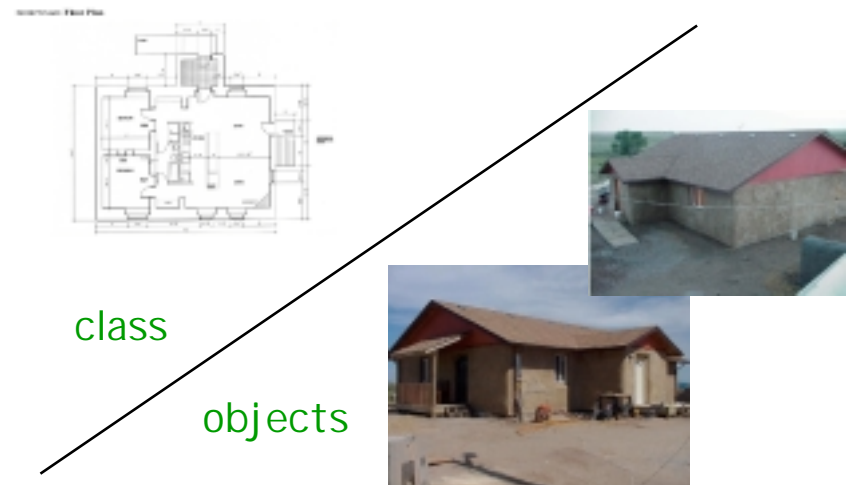
- *Classes* serve as templates/patterns for creating objects
- Every object is an *instance* of a class
- Objects of a particular class have the same list of responsibilities and property types
  - » Each object is distinct
  - » Each object probably has unique values for some or all of the properties

## Individuals are instances of class “Acrobat”

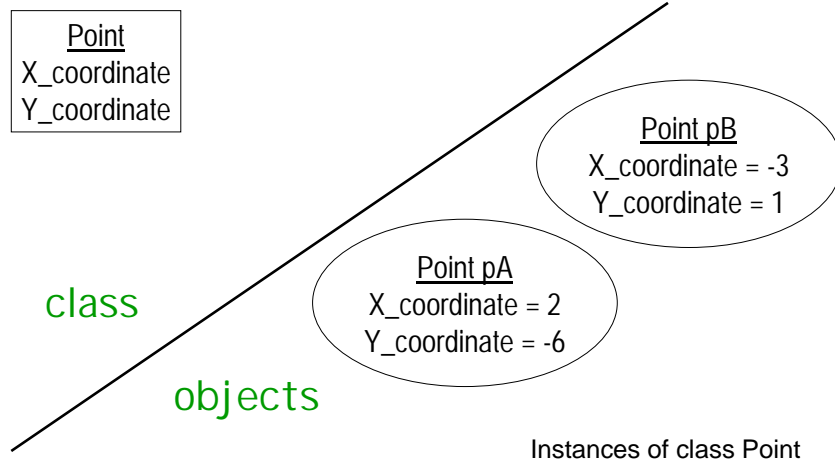
an **Acrobat** can clap, twirl, and count



## Houses are instances of blueprints



## Specific points are instances of class Point

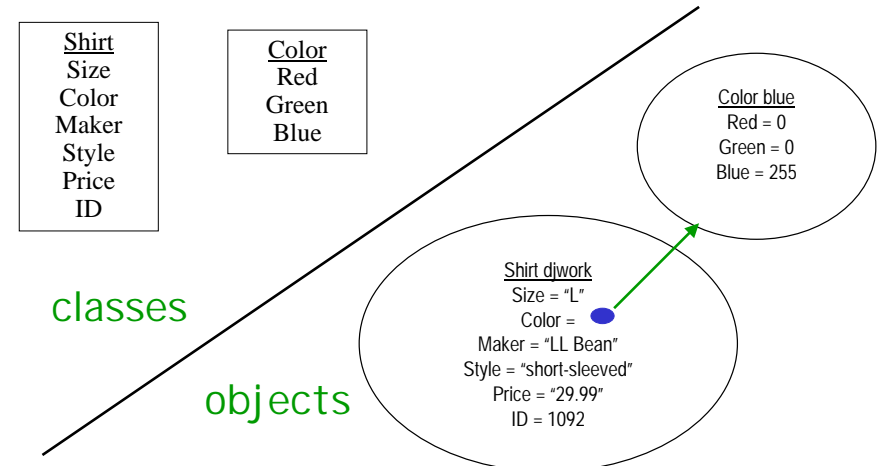


27-June-2003

cse142-04-classes © 2003 University of Washington

9

## Properties can be references to objects



27-June-2003

cse142-04-classes © 2003 University of Washington

10

## Type Review

- What is a type?

<u>Shirt Property</u>	<u>Value</u>	<u>Type</u>
Size	"L"	
Color	Reference value	
Maker	"LL Bean"	
Style	"short-sleeved"	
Price	29.99	
ID	1092	

27-June-2003

cse142-04-classes © 2003 University of Washington

11

## Student Class

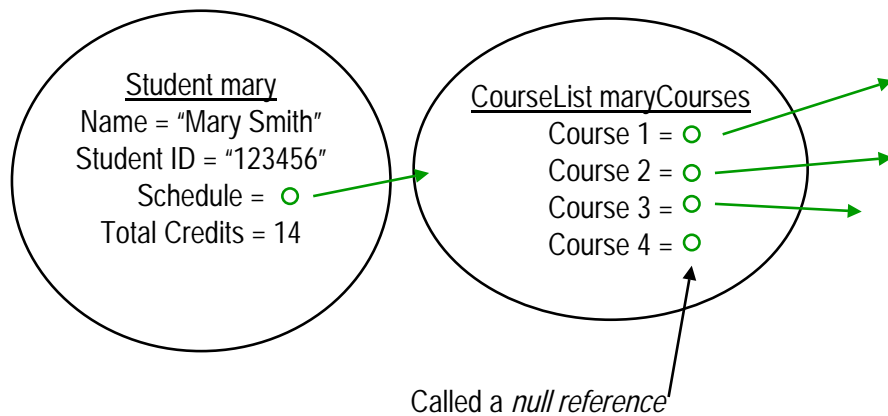
- Properties
  - » Student ID
  - » Name
  - » Address
  - » Phone Number
  - » Course List
  - » GPA
  - » Transcript
  - » Total credits
  - » Full-time?
- Responsibilities
  - » Add course
  - » Drop course
  - » Update address
  - » Get GPA
  - » Get transcript
  - » Get schedule
  - » Get student ID
  - » Get total credits
  - » Get full-time status

27-June-2003

cse142-04-classes © 2003 University of Washington

12

## Student Object Example



## Object oriented terminology

- *Classes* serve as templates for creating objects
  - » Objects of a particular class share the same list of responsibilities and property types
- *Objects* are instances of classes
  - » Objects of a particular class can have different values for their properties
- Object properties can be simple values or references to other objects

## Classes and Objects in Java

- Preview of what's to come:
  - » Objects have properties
    - In Java, we'll call these *instance variables*
  - » Objects have responsibilities
    - In Java, we'll call these *methods*
  - » Next week: we'll start Java
    - Now you have a solid foundation of concepts we'll use throughout the quarter