Overview

- Admin.
- A brief introduction to objects.
- A few tricks.
- Standard object methods.
- An exercise: Fractions.
- An exercise: Counters.
- About HW4

Admin

- Note: I seem to be pushing you harder than I’d like on the assignments.
  - Please don’t spend much more than six hours on an assignment. If you’re spending more than that, something is going seriously wrong.
  - We’ll do a demo of how not to approach these assignments.
- Note: I feel like a Grinnell student. I seem to have more work than I can physically do.
  - HW4 is in rough shape. We’ll discuss it in the last ten minutes of class.
  - I also expect to have the reading available late today.
- Reading for Wednesday: Inheritance
- SACNAS Ice Cream Social: Thursday, September 19th at 8:00PM in the Biology Commons
- EC Opportunities
  - Convocation noon, Wednesday.
  - Learning from Alumni Thursday @ 2:15 Sam Tape and company.
  - CS Extras Thursday @ 4:30: Kim Spasaro on Linguistics Programming
  - CS Table Friday (pair programming)
  - Other?

A brief introduction to objects

- Core of OOP: Objects
  - Group related things together
    - Data
    - Methods
  - Protect from outside world
In Java, we describe objects with template classes

- Data are in fields - looks like a variable, but associated with individual objects.

```java
public class Counter {
    int value;
}
```

- Methods are methods.
- Constructors look like methods, but with a specified name and no return type

```java
public class Counter {
    int value;
    int increment;

    /**
     * Create a new counter with the value zero.
     */
    public Counter() {
        this.value = 0;
        this.increment = 1;
    } // Counter()

    /**
     * Create a counter initialized to value.
     */
    public Counter(int value) {
        this.value = value;
        this.increment = 1;
    } // Counter(int)

} // class Counter
```

A few tricks

- Sometimes you have the wrong type of object, you can cast objects.
  - Throws ClassCastException
- Can also ask thing instanceof Class

Standard object methods

- You are expected to provide some methods. (They will be available for every object, whether or not you define them.)
  - String toString()
  - boolean equals(Object other)
  - int hashCode()
- Also nice
  - clone() - make a copy
  - compareTo(Thing other) - neg, zero, positive
An exercise: Fractions

An exercise: Counters

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