CS1110 Classes, stepwise refinement 25 Sep 2008

Miscellaneous points about classes.
More on stepwise refinement.

Prelim 7:30-9:00 Tuesday, 30 Sept., Philips 101

Review session: 1:00-3:00, Sunday, 28 Sept., Philips 101

Rsrecah on spleilng
Aoccdrnig to a rscheearch at Cmabirgde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoetnt tihng is that the frsit and lsat ltteer be at the rghit pclae. The rset can be a total mses and you can sitll raed it wouthit porbelm.Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe.

Help: Get it now if you need it!!

- One-on-one help from TAs. For info, get on the course website and click "Staff-info".
- Call Cindy Pakkala 255-8240 for an appointment with Gries.
- See a consultant in the ACCEL Sun, Mon, Tues, Wed, Thurs 4:00pm to 11:00pm.
- Peer tutoring (free). On http://www.engineering.cornell.edu, click on "student services". On the page that comes up, click on "Engineering Learning Initiatives (ELI.) in the left column, upper part. Then, click on "peer tutoring" in the left column.
- Take an AEW courses. Ask in Olin 167.

Content of this lecture

This lecture contains some final miscellaneous points to round out your knowledge of classes and subclasses. There are a few more things to learn after this, but we will handle them much later.

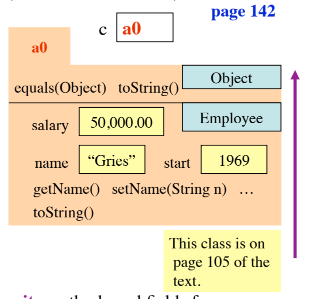
- Inheriting fields and methods and overriding methods. Sec. 4.1 and 4.1.1: pp. 142–145
- Purpose of **super** and **this**. Sec. 4.1.1, pp. 144–145.
- More than one constructor in a class; another use of **this**. Sec. 3.1.3, pp. 110–112.
- Constructors in a subclass —calling a constructor of the super-class. Sec. 4.1.3, pp. 147–148.

Employee c= **new** Employee(“Gries”, 1969, 50000);
c.toString()

Sec. 4.1, page 142

Which method toString() is called?

Overriding rule or bottom-up rule:
To find out which is used, start at the bottom of the class and search upward until a matching one is found.



This class is on page 105 of the text.

Terminology. Employee **inherits** methods and fields from Object. Employee **overrides** function toString.

Purpose of super and this

Sec. 4.1, pages 144-145

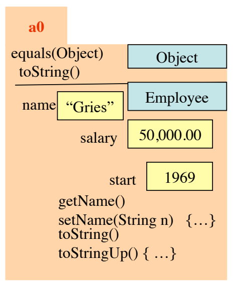
this refers to the name of the object in which it appears.
super is similar but refers only to components in the partitions above.

```
/** = String representation of this
 Employee */
public String toString() {
     return this.getName() + ", year " +
          getStart() + ", salary " + salary;
}
```

ok, but unnecessary

```
/** = toString value from superclass */
public String toStringUp() {
     return super.toString();
}
```

necessary



A second constructor in Employee
Provide flexibility, ease of use, to user

Sec. 3.1.3, page 110

```
/** Constructor: a person with name n, year hired d, salary s */
public Employee(String n, int d, double s) {
      name= n; start= d; salary= s;
}
```

First constructor

```
/** Constructor: a person with name n, year hired d, salary 50,000 */
   public Employee(String n, int d) {
      name= n; start= d; salary= 50000;
}
```

Second constructor; salary is always 50,000

```
/** Constructor: a person with name n, year hired d, salary 50,000 */
   public Employee(String n, int d) {
      this(n, d, 50000);
}
```

Another version of second constructor; calls first constructor

Here, **this** refers to the other constructor.
You HAVE to do it this way

Calling a superclass constructor from the subclass constructor

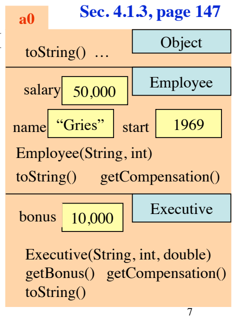
Sec. 4.1.3, page 147

```
public class Executive extends Employee {
  private double bonus;
  /** Constructor: name n, year hired
              d, salary 50,000, bonus b */
  public Executive(String n, int d, double b) {
      super(n, d);
      bonus= b;
  }
}
```

The first (and only the first) statement in a constructor has to be a call to a constructor of the superclass. If you don't put one in, then this one is automatically used:

super();

Principle: Fill in superclass fields first.



Anglicizing an Integer

anglicize("1") is "one"
anglicize("15") is "fifteen"
anglicize("123") is "one hundred twenty three"
anglicize("10570") is "ten thousand five hundred seventy"

```
/** = the anglicization of n.
        Precondition: 0 < n < 1,000,000 */
public static String anglicize(int n) {

}
```

Principles and strategies

Develop algorithm step by step, using principles and strategies embodied in "stepwise refinement" or "top-down programming. READ Sec. 2.5 and Plive p. 2-5.

- Take small steps.
- Replace an English statement (what to do) by a sequence of statements –in English or Java— to do it (how to do).
- Compile often.
- Intersperse programming and testing.
- Write a method spec. before writing the method body.
- Mañana Principle: Write the method spec. and put something in the body so that can be compiled and produces something that allows further development. Put off its complete development until later. (Mañana means tomorrow, or an indefinite time in the future.)