CS1110 15 Feb 2010

Today: Pick up: A3
Today's slides

Inside-out rule; use of **this**, **super**
Developing methods (using Strings).
Read sec. 2.5, stepwise refinement
Listen to Plive, 2.5.1–2.5.4.

You can do A3 in groups of 2,
BUT GROUP EARLY ON
CMS

Reading for next lecture:
the same

Office hours
are being held

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.

A3: Adding functionality to A1
Due Tuesday, 22 February

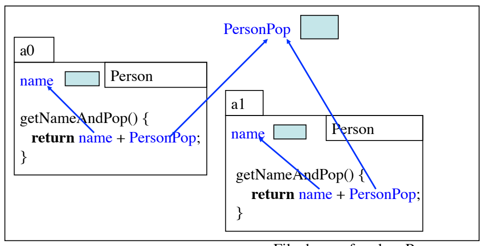
- Keeping class invariant true
- Use already-written functions
- Boolean expressions
- Use of null and testing for it
- Use of static variables

Form groups on the CMS early, well before you submit.

A3: graded in conventional way. Submit once and get a grade.

The *inside-out rule* (see p. 83)

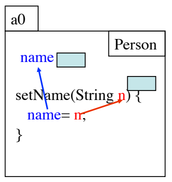
Code in a construct can reference any of the names declared or defined in that construct, as well as names that appear in enclosing constructs. (If a name is declared twice, the closer one prevails.)



```
getNameAndPop() {
  return name + PersonPop;
}
```

File drawer for class Person

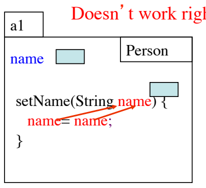
Method parameters participate in the inside-out rule: remember the frame.



```
setName(String n) {
  name= n;
}
```

Parameter n would be found in the frame for the method call.

Doesn't work right



```
setName(String name) {
  name= name;
}
```

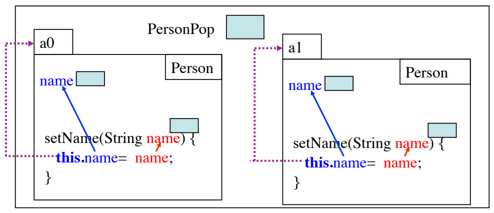
Parameter name "blocks" the reference to the field name.

A solution: this and super

Memorize: Within an object, this evaluates to the name of the object.

In folder a0,
this refers to a0

In folder a1,
this refers to a1

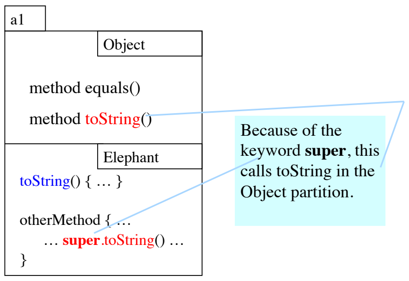


```
setName(String name) {
  this.name= name;
}
```

File drawer for class Person

About super

Within a subclass object, super refers to the partition above the one that contains super.



```
method equals()
method toString()

toString() { … }

otherMethod { …
    … super.toString() …
}
```

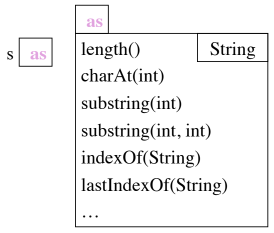
Because of the keyword **super**, this calls toString in the Object partition.

Strings are (important) objects that come with useful methods.

String s= "abc d";

Note the "index (number) from 0" scheme:

```
01234
abc d
```



s.length() is 5
s.charAt(2) is 'c'
s.substring(2) is "c d"
s.substring(1,3) is "bc"

To find specs of methods in String:
1. Visit course website
2. Click Links
3. Click Specs for version 1.6
4. Click String in lower left pane

Strings are (important) objects that come with useful methods.

String s= "abc d";

Note the "index (number) from 0" scheme:

```
01234
abc d
```

Text pp. 175–181 discusses Strings
Look in CD ProgramLive
Look at API specs for String

s.length() is 5 (number of chars)
s.charAt(2) is 'c' (char at index 2)
s.substring(2,4) is "c " (NOT "c d")
s.substring(2) is "c d"
" bcd ".trim() is "bcd" (trim beginning and ending blanks)
s.indexOf(s1) –index or position of first occurrence of s1 in s (-1 if none)

Principles and strategies embodied in stepwise refinement

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. Do a little at a time
- Refine. Replace an English statement (what to do) by a sequence of statements to do it (how to do it).
- Refine. Introduce a local variable —but only with a reason
- Compile often
- Intersperse programming and testing
- Write a method specification —before writing its body
- Separate concerns: focus on one issue at a time
- Mañana principle: next slide

Principles and strategies

- Mañana Principle.

During programming, you may see the need for a new method. A good way to proceed in many cases is to:

1. Write the specification of the method.

2. Write just enough of the body so that the program can be compiled and so that the method body does something reasonable, but no the complete task. So you *put off* completing this method until another time —mañana (tomorrow) —but you have a good spec for it.

3. Return to what you were doing and continue developing at that place, presumably writing a call on the method that was just "stubbed in", as we say.

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) {

}
```

We develop this function, in DrJava, using the principles and strategies of stepwise refinement (also called top-down programming).