CS1110 16 February 2010

Today: Pick up: A2
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
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A1 – A3 – Q2

A1:
Please turn around in 24 hours!!!

A2: Simple, 15 minute homework: draw some objects.

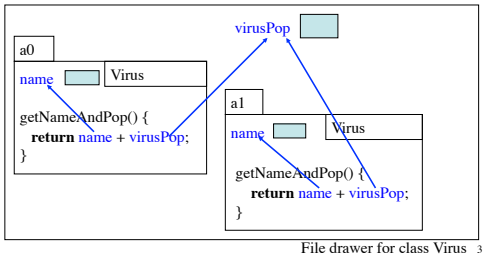
A3: Adding functionality to A1
- Keeping class invariant true
- Use already-written functions
- Boolean expressions
- Use of null and testing for it
- Use of static variables

Due Monday, 22 February

quiz 2:

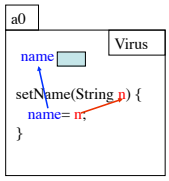
Remember frame boxes and figuring out variable references?
The *inside-out rule* (see p. 83)

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.)

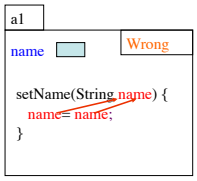


File drawer for class Virus

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



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



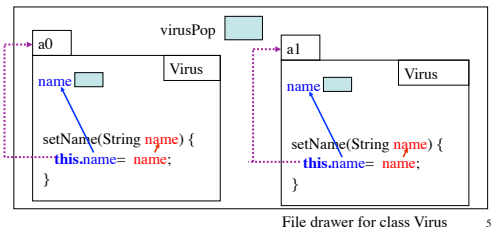
Parameter name "blocks" the reference to the field name.

A solution: **this** and **super**

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

In folder a0, **this** refers to a0

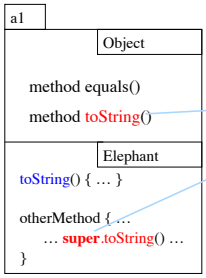
In folder a1, **this** refers to a1



File drawer for class Virus

About super

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



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
```

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)

DO NOT USE == TO TEST STRING EQUALITY!

s == t tests whether s and t contain the name of the same object, not whether the objects contain the same string.

Use s.equals(t)

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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

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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.

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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).

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