

CS1110 Wrapper classes, stepwise refinement 22 Feb

Thursday's lecture: no reading. *Be there or be square (or lost)!*
 •Recursion can be a difficult topic, but we'll make it easy.

Prelim: Tuesday, 8 March, 7:30–9:00PM

Conflict? Complete "assignment P1 conflicts" by end of 24 Feb.

Cornell's Learning Strategies Center posts a lot of great information on study skills, taking exams, time & stress management, etc.
lsc.sas.cornell.edu/Sidebars/Study_Skills_Resources/SKRResources.html

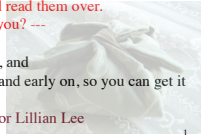
Every day after classes, retrieve your notes and read them over.

--- you do take notes, don't you? ---

This takes very little time, and yet:

1. really makes material "stick" in one's mind, and
2. helps you figure out what you don't understand early on, so you can get it straightened out faster.

This was a real game-changer for me. Professor Lillian Lee



Wrapper classes.

Read Section 5.1

a0 ??? 5 Integer
 Integer(int) Integer(String)
 toString() equals(Object) intValue()
 Static components:
 MIN_VALUE MAX_VALUE
 toBinary(int) toBinary(String)
 valueOf(String) parseInt(String)

Soon, we'll wish to deal with an **int** value as an object.

"Wrapper class" Integer provides this capability.

An instance of class Integer contains, or "wraps", one **int** value.

Can't change the value. *immutable*.

Instance methods: constructors, toString(), equals, intValue.

Static components provide important extra help.



Each primitive type has a corresponding wrapper class. When you want to treat a primitive value of that type as an object, then just wrap the primitive value in an object of the wrapper class!

Primitive type	Wrapper class
int	Integer
long	Long
float	Float
double	Double
char	Character
boolean	Boolean

Each wrapper class has:

- Instance methods, e.g. equals, constructors, toString,
- Useful static constants and methods.

Integer k = new Integer(63); int j = k.intValue();

You don't have to memorize the methods of the wrapper classes. But be aware of them and look them up when necessary. Use Gries/ Gries, Section 5.1, and ProgramLive, 5-1 and 5-2, as references.

Class Vector

An instance of class Vector maintains an expandable/ shrinkable list of objects. Use it whenever you need to maintain a list of things.

Values of primitive types cannot be placed directly into the list of a Vector. That's why we have the wrapper classes. In the interactions pane, we will do a few things, like these:

```
import java.util.*;
Vector v = new Vector();
v
v.add(new Integer(2));
v.add(3);
v.add('c');
```

In newer versions of Java, v.add(1) is allowed; the 1 is wrapped in an Integer object and the name of that object is added to v.
 Doesn't work in older versions.

Example of a program that deals with Strings
 Creating a web page giving liberal studies courses
<http://www.cs.cornell.edu/gries/ccgb/index.html>

Java program reads the online Courses of Study webpages and extracts the courses that are liberal studies courses in A&S and CALS.

It builds tables of A&S, CALS, CA, HA, KCM, LA, and SBA courses and produces the liberal studies course website



String manipulation is key concern of this lecture. But OO structure of the program will also be discussed

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 Creating a web page giving liberal studies courses
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CA: cultural analysis
 HA: historical analysis
 etc.

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Class Webpage


Fields contain:

- url, as a String
- url, as an object of class
- set of links on the page
- ...

Methods:

- Webpage(String url) (constructor)
- isHtmlPage()
- getLinks()
- getReader() = an object that lets one read the webpage line by line


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Courses of Study 2009-2010

Courses of Study contains information primarily concerned with academic procedures, college and department programs, interdisciplinary undergraduate and graduate course offerings of the university. Not a publication is information concerning the Medical College and the College of Veterinary Medicine, located in New York City.


General information on the College of Arts & Sciences

Search course descriptions General information on the College of Arts & Sciences Course Descriptions Sorted by Department

Colleges and Units

- Agriculture and Life Sciences, College of
- Architecture, Art, and Planning, College of
- Arts and Sciences, College of
- Biological Sciences
- Computing and Information Science
- Engineering, College of

- Africana Studies and Research Center
- American Studies
- Anthropology
- Archaeology
- Asian American Studies Program


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Class DeptLink

Fields contain:

- dept name
- link to its webpage in CoS
- Vector of all its courses

Courses of Study 2009-2010

General information on the College of Arts & Sciences

Course Descriptions Sorted by Department

- Africana Studies and Research Center
- American Studies
- Anthropology
- Archaeology
- Asian American Studies Program

```

</li>
<a href="CoScourses.php?college=AS&dept=American+Studies">
American Studies</a>
</li>

```

```

</li>
<a href="CoScourses.php?college=AS&dept=American+Studies">
American Studies</a>
</li>

```

The form is: ... dept name ...

```


/** Constructor: an instance who dept name and link are
contained in s. s has the form
... <a href="xxx">dept name</a> ...
where the xxx is a relative URL in directory LibStudies.prefix
Note: if s is not proper, dept name and link will be null.
*/

```

```

/** Constructor: an instance who dept name and link are
contained in s. s has the form
... <a href="xxx">dept name</a> ...
where the xxx is a relative URL in directory LibStudies.prefix
Note: if s is not proper, dept name and link will be null.
*/
public DeptLink(String s) {
    Remove ... <a href=" from s;
    Set k to index of "> of the a tag;
    Store the link xxx in local variable lk;
    s= s.substring(k+2);
    Set k to index of </a>;
    Store dept name and lk in dept and link.
}

```


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Class Courses

Fields contain:

- course
- e.g. ANTHR 1200
- title
- everything else you see to the left
- category
- HA-AS, HA
- CA-AS, CA
- SBA-AS, SBA
- etc.

Courses of Study 2009-2010

Anthropology

I. Introductory Courses

- ANTHR 1200 Ancient Peoples and Places @ # (HA-AS)
- ANTHR 1200 Human Evolution: Genes, Behavior, and the Fossil Record (PBS Supp)
- ANTHR 1400 The Comparison of Cultures @ (CA-AS)
- ANTHR 1401 The Scope of Anthropology
- ANTHR 2400 Cultural Diversity and Contemporary Issues @ (SBA-AS)

II. Sociocultural Anthropology

- ANTHR 1400 The Comparison of Cultures @ (CA-AS)
- ANTHR 1401 The Scope of Anthropology
- ANTHR 2400 Cultural Diversity and Contemporary Issues @ (SBA-AS)
- ANTHR 2428 Slavery and Human Trafficking # (CA-AS) -- Not Offered This Year

```

<tr><td nowrap>
<a href="CoSdetail.php college=AS&number=1400&prefix=ANTHR&
title=The+Comparison+of+Cultures+%40+%28CA-AS%29">
ANTHR&nbsp;1400</a><td>The Comparison of Cultures @
(CA-AS)</td></tr>

```

```

/** Constructor: instance for course given by s, in form:
... <a href="xxx">course</a> <a href="xxx">title</td></tr>
cat contains the category.
If s not proper, course, title, category will be null. */
public Course (String s, String cat) {
}

```