Announcements:

LRC now open for business Su-Wed 5-10,(M 4-10) 10th floor, main library (rm 1067). Also, SI sessions: Monday 8:45 to 10:00 and Wednesday 7:15-8:30 eve both in 1085

Ch 4 Embedded problems due next Thursday, 9 AM

Programming Assignment 2 due Friday at 4 PM

Third OWL assignment up, due Monday, 5 PM
Files and Programming Assignment Two

Banking.java

Banking.java Banking.class

Banking.java Banking.class BDriver.java

Banking.java Banking.class BDriver.class

All in directory Users/moll/CS121
A beanshell sample:

def class Alphabetical
first : “icy”
second : “klunky”
third : “aardvark”

alpha - an Alphabetical object
The cube sum problem - a math puzzle

Which 3 digit numbers equal the sum of the cubes of their digits?

Examples:

241 = 2^3 + 4^3 + 1^3 = 8 + 64 + 1 = 73 (≠ 241) (no)

153 = 1^3 + 5^3 + 3^3 = 1 + 125 + 27 = 153! (yes!)

Are there others??
Issues

• How do I generate each number from 100 to 999 without writing 900 separate statements?
• How do I get at a number’s digits, so that I can cube and add them?
• How can I perform the “am I equal to my cube sum” test?
• How can I conditionally say “yes!”, make a report, if I pass the test, above?
for(<start>, <stop?>,<stepsize>){
    do stuff
}

for(int n = 100; n < 1000; n = n + 1){
    System.out.println(n);
}
How math works

$9/2 = 4, \ r = 1$

$12/7 = 1, \ r = 5$

$12/3 = 4, \ 4 = 0$

How Java works

$9/2 = 4$  $\ 9\%2 = 1$

$12/7 = 1$  $\ 12\%7 = 5$

$12/3 = 4$  $\ 12\%4 = 0$

$(a \% b == 0) \ means \ "a \ is \ evenly \ divisible \ by \ b"$

== means "are ints (or chars) actually equal"
How about 456?

456 % 10 =
456 / 10 =
How about 456?

456 \% 10 = 6

456 / 10 = 45

45 \% 10 = 5

Etc: repeated /, \%, allows me to pull off the digits..
```plaintext
k = 365;

cur = k; // cur = 365
ones = cur % 10; // ones = 5
cur = cur / 10; // cur = 36
tens = cur % 10; // tens = 6
cur = cur / 10; // cur = 3
hundreds = cur; // hundreds = 3
```
CubeTester

main

SumOfCubes
public class CubeTester{
    public static void main(String[] args){
        SumOfCubes c = new SumOfCubes();
        for(int j = 100; j < 1000; j++)
            if (c.cubeSum(j) == j){
                System.out.println(j);
            }
    }
}

What is cubeSum?
What class does it belong to?
What's its return type?
class SumOfCubes{
  public int cubeSum(int k){
    int sum, cur, ones, tens, hundreds;
    cur = k;
    ones = cur % 10; // one's place
    cur = cur / 10;
    tens = cur % 10;
    cur = cur / 10;
    hundreds = cur;
    return (cube(ones) + cube(tens) + cube(hundreds));
  }

  public int cube(int k){ return (k*k*k); }
}

--- attributes? constructor?
Looping Patterns

Generate and test

List nums between 220 & 320 divisible by 37
Arithmetic and Operator Precedence

1) +, -, * behave in standard way. Division / different

2) 5/3 = 1 (but 5.0/3 = 5/3.0 = 1.6666), 10/4 = ?

3) In the absence of parentheses, *, /, have higher precedence than +,-
   So: (3 + 5 * 2) =13, (7 - 4 / 2) = ?

4) mod (remainder) operator %: 10 % 3 = 1, 10 % 7 = ?
   (3 + (7/2)) = ?
   (2 * 3 - 1 + 5 / 3) = ?
   (20 % (9 % 4)) = ?
   (5 % 0) = ?
What is 365 % 10

What is 365 / 10

What is (365 / 10) % 10

What is (365 / 100)