CS111 Retrospective

Tuesday, Dec. 11, 2007

CS111 Computer Programming

Department of Computer Science
Wellesley College

What did we know on the first day of class?

September 2007

Sun	Mon	Tue	Wed	Thu	Fri	Sat
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2	3	4	5	6	7	8
9	10	11	12	13	14	15
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30						

Keywords in the Java Programming Language

abstract	assert	boolean	break	byte	case
catch	char	class	const	continue	default
do	double	else	enum	extends	false
final	finally	float	for	goto	if
implements	import	instanceOf	int	interface	long
native	new	null	package	private	protected
public	return	short	static	strictfp	super
switch	synchronized	this	throw	throws	transient
true	try	void	volatile	while	

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public	**return**	**short**	**static**	strictfp	**super**
switch	synchronized	**this**	throw	**throws**	transient
true	try	**void**	volatile	**while**	

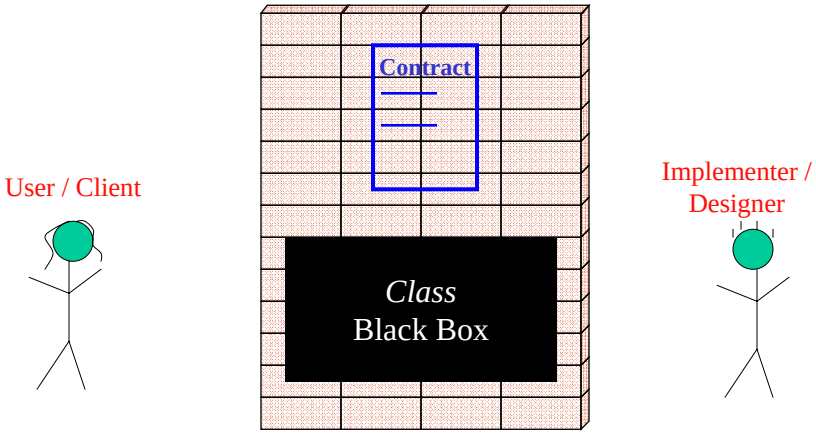
What is Computer Science?

- It's not really about computers.
- It's not really a science.
- It's about imperative ("how to") knowledge as opposed to declarative ("what is") knowledge.
- Imperative knowledge is expressed via algorithms = computational recipes.
- "A computer language … is a novel formal medium for expressing ideas about methodology, not just a way to get a computer to perform operations. Programs are written for people to read, and only incidentally for machines to execute"
  -- Harold Abelson and Gerald J. Sussman

Four big ideas

- Four important concepts are at the core of this course:
  1. Abstraction;
  2. Modularity;
  3. Divide, Conquer and Glue;
  4. Models
- These interrelated ideas are important in almost every discipline, but they're at the core of CS.
- We will illustrate these ideas in several ways.
- Our goal is to help you think about problem solving in new ways.

Big idea number 1: Abstraction



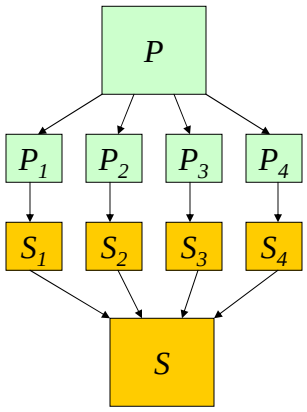
*Visit http://cs.wellesley.edu/~cs111/contracts for some useful Java contracts, which are known as Application Programming Interfaces (APIs).

Big idea number 2: Modularity

- Large systems are built from components called modules.
- The interfaces between modules are designed so they can be put together in a mix-and-match way.
- In Java, goal is to design classes for maximum reusability.

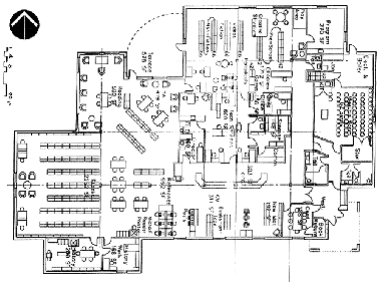
Big idea number 3: Divide, conquer & glue

Divide
problem P into subproblems.
Conquer
each of the subproblems, &
Glue (combine)
the solutions to the subproblems into a solution S for P.



Big idea number 4: Models

- Need simple models to understand complex artifacts and behaviors.



- Throughout this course, we will use a Java Execution Model (JEM) to explain what happens when Java code is executed.

PS0: Account Request Form

Puma Account Request

This form allows you to request an account on the Wellesley CS department server. All fields are required.

Sometimes a student thinks she already has an account on the CS server, either because she has taken another on the CS server, we're going to ask you to fill out this form anyhow, because it gives us an electronic list of

- ○ I don't have an account, please create one for me
- ○ I already have an account, just list me in the class

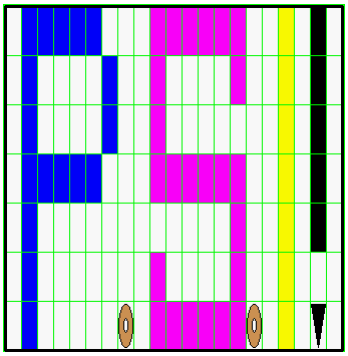
What is your name? We use this information to check your account request against class rolls and to construc

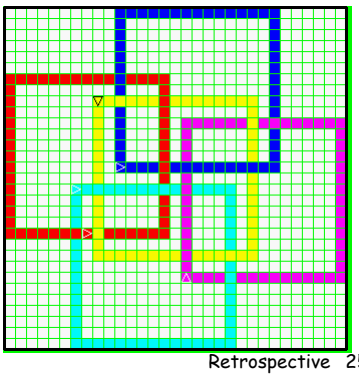
Given (First) Name or Names:

Last Name or Family Name:

PS1: Buggle Writing

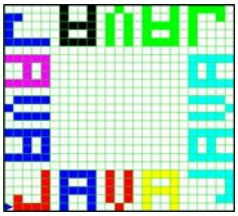
- Writing simple Java code
- Reading contracts
- Extending someone else's code
- Expressions and assignment statements
- Inheritance

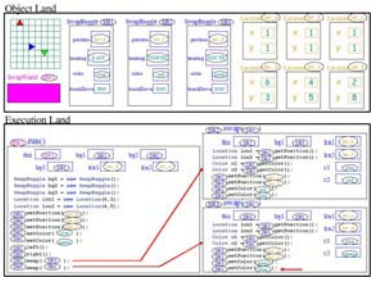


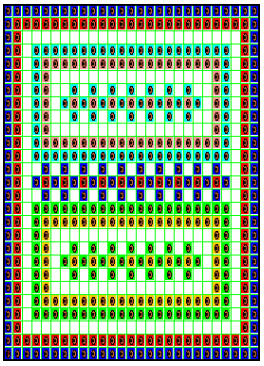


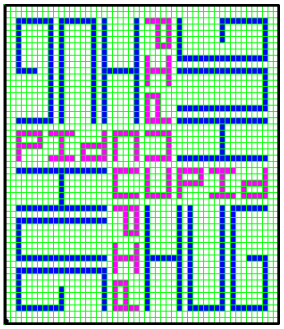
PS2: Buggle Methods

- Writing methods
- Parameters and arguments
- Modularity
- Encapsulation



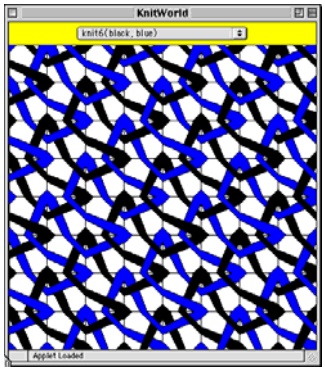


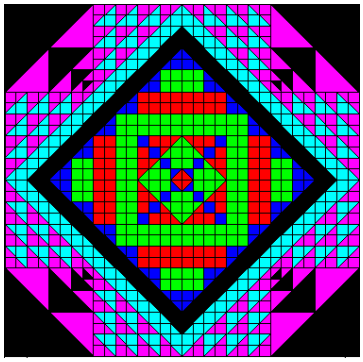




PS3: Fruitful Methods, PictureWorld

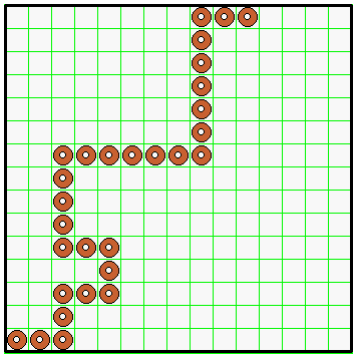
- Fruitful methods
- Divide, conquer, and glue
- Abstraction of patterns

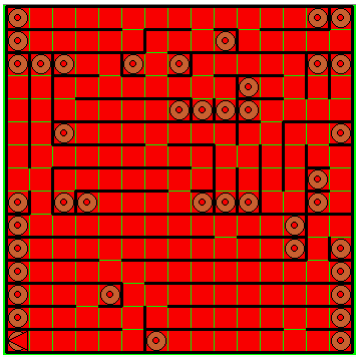




PS4: Conditionals

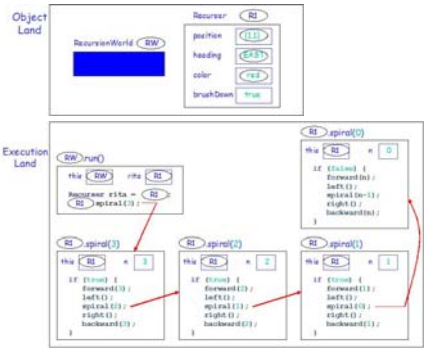
- Conditionals
- Good programming style
- Writing your own class

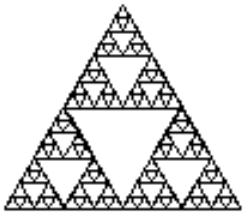




PS5: Recursion

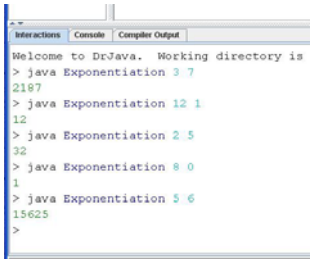
- Recursion
- Models

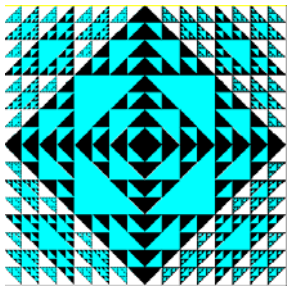


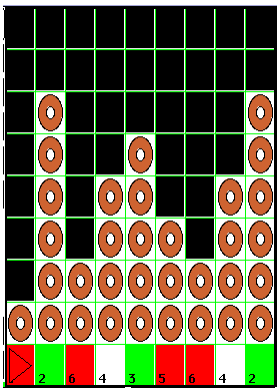


PS6: Fruitful Recursion

- Fruiful recursion
- Applications
- Writing a program from scratch

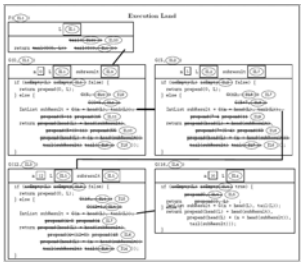


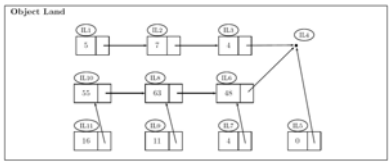




PS7: Strings and Lists

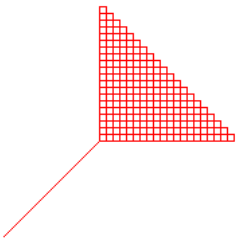
- Lists
- Strings
- Recursive list methods
- Class methods
- Linear collections of data





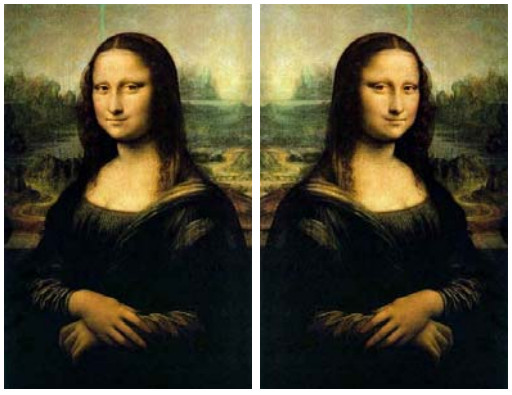
PS8: Iteration

- While loops
- For loops
- Tail recursion



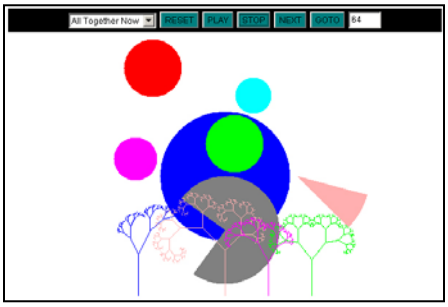
PS9: Arrays, I/O, Objects

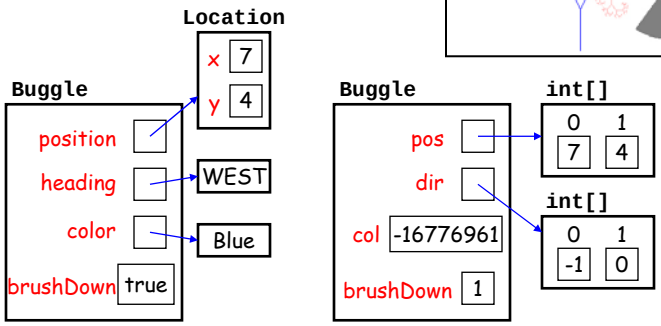
- Arrays
- Instance variables
- Defining classes, working with objects
- File I/O



PS10: Abstraction, Animation

- Abstraction
- Java graphics
- Animations
- Working in pairs





What Else Is There in CS?

- Having taken CS111, you have the tools to solve fundamental problems with computer programs
- In future CS courses, you will investigate increasing complex and creative problems
- For instance,

  CS215: Multimedia Design and Programming

  CS230: Data Structures

CS Department Alumnae Address Book

- Grad school in computer science
- Manager of database administration at Johnson & Johnson
- Director of applications engineering at AirFlash
- Program management for Lotus multilingual products
- Web application development
- Teaching computer science
- Product manager in Silicon Valley
- Senior consultatnt at Cambridge Technology Partners
- Human-computer interaction
- Information technology at Morgan Stanley
- Foreign exchange trading applications for Citi Smith Barney
- GE corporate research and development
- Microsoft
- Ad agency
- Program associate at the Center for Democracy and Technology
- Med school
- Credit Suisse
- Senior program manager
- Architecture
- Teach English
- Software engineer
- Bioinformatics
- Medical system analysis in healthcare industry