CSE8A: Introduction to Programming in Java
Fall 2013

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https://sites.google.com/a/eng.ucsd.edu/cse-8a-fall-2013
What is Computer Science?

1. In a sentence or so, what is computer science? Or, what are some major aspects of CS?

2. Try to describe one thing that you think that a researcher in computer science might study.
CS != \text{programming}

programming : CS ::

"not equal to"
CS != programming

programming : CS ::

surfing : San Diego
machining : engineering
grammar : literature
equations : mathematics

a vehicle, not a destination
Computer Science is...

The science of using and processing large amounts of information to automate useful tasks and learn about the world around us (using a computer)
Why do we like computer science?

• Because computers can do cool things!

http://youtu.be/cdgQpa1pUUE
http://www.youtube.com/watch?v=Thpjk69h9P8

Imaginary Phone

Imaginary Phone is a research project by Sean Gustafson, Christian Holz and Patrik Igeldich. It is part of the larger Imaginary Interfaces project.

http://www.hpi.uni-potsdam.de/?id=6247
Can a computer do… anything?

• Well, there are some limits to what a computer can do:
  – There are some things no machine can do at all, in principle
  – There are some things that are impossible for machines, in practice
IF TV SCIENCE WAS MORE LIKE REAL SCIENCE

Serial Killers would have plenty of time to get away.

Quick, run a PCR DNA analysis on this sample!

Yeah, that's an overnighter.

Special Agents would never figure out who the villain is.

We reconstructed this image from a 4-pixel photo.

Turns out, it's theoretically impossible.

Myth debunking would never get past peer review.

What do you mean one data point is not enough?

What's a "control"?

Robots would never take over the world.

It was working a second ago!
Can a computer do... *anything*?

• Well, there are some limits to what a computer can do:
  – There are some things no machine can do at all, in principle
  – There are some things that are impossible for machines, in practice
  – (more about these limits in CSE 101 and 105)

• However, in CSE 8A our limits are set by
  – our imagination
  – our skill at programming
What are we going to learn in this class?

How to solve problems using a computer

<table>
<thead>
<tr>
<th>Algorithm Development</th>
<th>Programming using Java language</th>
</tr>
</thead>
</table>
/* Draw1: Created by Beth Simon
 * Date: Sept 29, 2008
 */

public class Draw1 {
    
    public static void main(String[] args) {
        World w = new World();
        
        Turtle jose = new Turtle(100, 50, w); //Creates a turtle in w at (x,y) (100,50)
        
        //Make a U shape
        Turtle.forward(55); 
        Turtle.turn(90); 
        Turtle.forward(30); 
        Turtle.turn(90); 
        Turtle.forward(45); 
        Turtle.forward(10); 
        Turtle.turn(90); 
    }
}
Example: The Cake Box

• **Problem:** I want some chocolate cake

• **Break down** the problem based on what we know:
  – **Input:** I have a box of cake mix
  – **Output:** Warm cake to eat

• **Algorithm:** A plan for getting from the Input to the Output
  – conveniently provided on back of box!

• **Implementation:** YOU!
CSE8A WITH DIGITAL MEDIA!

Not so interesting
• Write a program to produce all the odd numbers from X thru Y
  • Input: X=3, Y=19
  • Output: 3,5,7,9,11,13,15,17,19

More interesting
• Write a program to make this picture appear to be taken at sunset
  • Input:
  • Output:
About me

• Ana Murillo
  – PhD University of Zaragoza, Spain (Computer Vision and Robotics)
  – Visiting faculty and researcher at UCSD
My job

• Prepare computing professionals
  – Help you learn concepts, facts, skills
  – Help you develop good intellectual and professional habits

• Prepare you to apply computing in your career
  – Art, Film, Biology, Math, Physics, Medicine, etc.

• Explore and illuminate the hardest concepts

• Answer your questions
Your job

• Start down the road to becoming a professional
  – Be honest with yourself
  – Hold yourself to a professional standard

• Learn HOW to approach Computer Science classes
  – And HOW to learn computing forever…
Learning Goals: 
By the end of CSE8A you will be able to…

1. **Design computational solutions to problems.** This requires applying the following skills to problem statements or code: explain, compare and contrast, argue, diagram a memory model, and design a class.

2. **Code a Java implementation to problems.** This requires applying skills including code writing, code modification (including of others’ code), and explaining what code does.

3. **Analyze and debug Java programs.** This requires applying skills including reading and understanding code, tracing variable values, and debugging.

4. **Communicate professionally about Java programs.** This requires applying skills such as explaining code you wrote, arguing about coding and design decisions, and drawing memory models to explain behavior.

5. **Solve basic problems by applying goals 1-4 as steps in a process to create a Java program.**

6. **Apply goals 1-5 in various media-related contexts** to make interesting applications involving digital images (filters, collages, special effects) and digital audio files (mixing music).
What to expect

• Devoting 8-10 hours a week to this class

• Learning a profession
  – Requires practice and application

• Me to be your guide and mentor in understanding concepts
  – Not a regurgitator of what’s in the book

• You to be actively involved in building and assessing your understanding in class
  – Not sitting and passively copying things down

• Questions
About This Class

You must **attend** class
You must **prepare** for class
You must **participate** in class
iClickers: You must bring them

- Buy an iClicker at the Bookstore
- Register it following instructions in the Syllabus
About This Class: Class sessions

What must you do to prepare for each class?

What happens if you have to miss one class?

What happens if you miss more than 6 classes?

When are the reading quizzes given?

True or False: the reading quiz questions are provided before class
About This Class: Class sessions

What must you do to prepare for each class?

A. Nothing, just make sure to come to class on time
B. Do the reading and make sure you know the answer to the reading quiz questions
C. Make sure you have done the PSA.
About This Class: Class sessions

What happens if you have to miss (only) one class?

A. Nothing, just make sure to get the notes from a friend
B. You will lose participation points from your overall grade
C. Your grade will drop ½ letter grade
About This Class: Class sessions

What happens if you miss more than 6 classes?

A. You will fail the class

B. You will lose a letter grade

C. Nothing as long as you keep up with the material
About This Class: Class sessions

When are the reading quizzes given?

A. During lab
B. At the beginning of class
C. At the end of class
About This Class: Class sessions

True or False: the reading quiz questions are provided before class

A. True
B. False
About this class: PSAs

When are the problem solving assignments (PSAs) due?

What should you do when you finish the PSA?

What are the rules for working with a partner on a PSA?

I need an extension on a PSA. What should I do?

It’s Friday morning and I don’t know where to start on my PSA. What should I do?
About this class: PSAs

When are the problem solving assignments (PSAs) due?

A. Tuesdays at the beginning of class
B. At the beginning of lab
C. Tuesdays at midnight
What should you do when you finish the PSA?

A. Print a copy and turn it in

B. Submit it electronically and then complete a tutor interview ASAP

C. Just submit it electronically
About this class: PSAs

What are the rules for working with a partner on a PSA?

A. You can work alone or with a partner

B. You must work with a partner and you can split up the work.

C. You must work with a partner, and you must do the homework together at the same computer
About this class: PSAs

I need an extension on my PSA. What should I do?

A. Turn it in up to 24-hours late if you and/or your partner have at least one slip day remaining.

B. Ask your professor for an extension.

C. Turn it in on time, even if it is incomplete.
About this class: PSAs

It’s Friday morning and I don’t know where to start on my PSA. What should I do?

A. Go to one of the discussion sections on Friday afternoon
B. Go to the tutor hours
C. Post a message to Piazza
D. Any of the above
About this class: Labs and Exams

Do I have to be registered for both CSE 8A and CSE 8AL?

What happens if I am more than 5 minutes late to lab?

Can exams be made-up or rescheduled?
About this class: Labs and Exams

Do I have to be registered for both CSE 8A and CSE 8AL?

A. Yes
B. No
About this class: Labs and Exams

What happens if I am more than 5 minutes late to lab?

A. You get a 0 for the entire lab

B. You get a 0 for participation, but you may still earn credit for the quiz

C. Nothing, as long as you can still complete the lab in the remaining time.
About this class: Labs and Exams

Can exams be made-up or rescheduled?

A. Yes
B. No
About this class: Academic Integrity

You are working on one of the PSAs with your partner. You are stuck on a tricky problem, so you ask your friend who has taken CSE 8A before for help. Your friend shows you his solution, which you look at, but then put away before going back to your solution. Is this cheating?

You and your partner are working together on a PSA, but she has to go to work. You stay and finish up the assignment without her and then submit it. Is this cheating?
You are working on one of the PSAs with your partner. You are stuck on a tricky problem, so you ask your friend who has taken CSE 8A before for help. Your friend shows you his solution, which you look at, but then put away before going back to your solution. Is this cheating?

A. Yes
B. No
About this class: Academic Integrity

You and your partner are working together on a PSA, but she has to go to work. You stay and finish up the assignment without her and then submit it. Is this cheating?

A. Yes
B. No
About This Class: Getting Help

What are all the resources for getting help in this class?
To Do For Next Class:

• Go to the course web site: https://sites.google.com/a/eng.ucsd.edu/cse-8a-fall-2013

• If you haven’t already: buy a book and a clicker, and register your clicker at iClicker.com (see instructions on the syllabus)

• Do the reading for Tuesday’s class (under Course Material)

• Make sure you know the answers to the reading quiz questions

• BRING YOUR CLICKER TO CLASS