CS 2334: Programming Structures and Abstractions (aka Java 2)

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Teaching assistants:

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Many of the lecture materials used in this course are derived from the work of Dr. Amy McGovern and Dr. Deborah Trytten

Top Hat

Top Hat intro/signup (before we proceed)

- Use your university email address and ID#
- Today's attendance matters
- If you are not at either of the first two classes, I will drop you from the class

- https://app.tophat.com/e/462617

Top Hat

We will use for:

- Interactive exercises
- Graded quizzes
- One way to ask questions during class

I expect all interaction on Top Hat (and the class, in general) to be professional

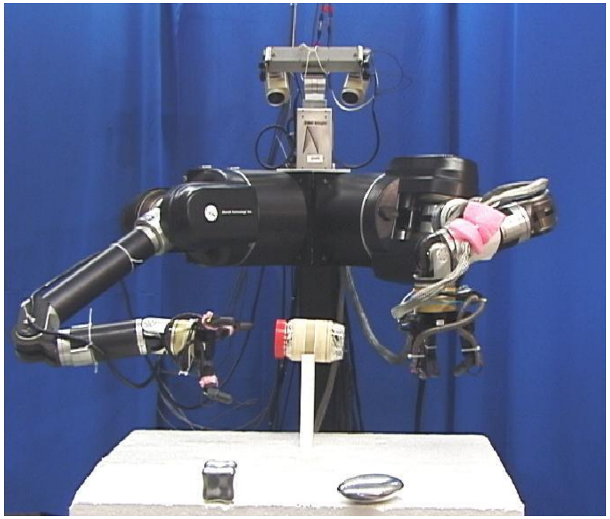
What do you want to do with your CS degree?

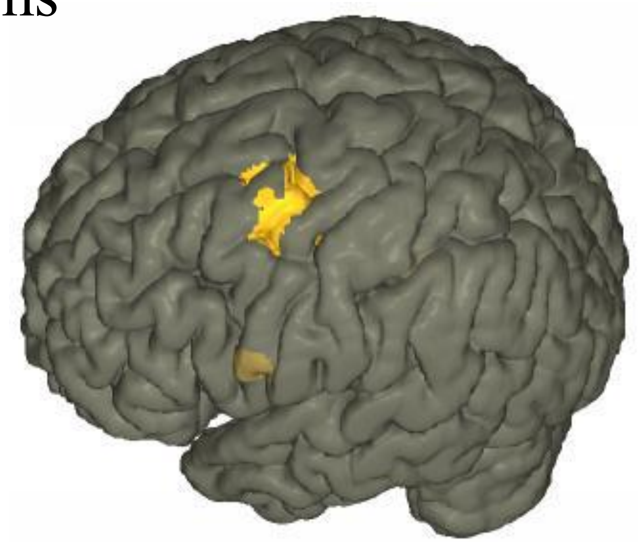
Some Motivation …

- Driverless cars:
  - http://www.youtube.com/watch?v=bp9KBrH8H04
- Coding, the new literacy:
  - https://www.youtube.com/watch?v=nKIu9yen5nc#t=25

Why CS is fun (for me)

- Research areas: robotics, computational neuroscience, machine learning, interactive art
- Interacting with individuals from different disciplines to solve hard problems





This software stuff is hard …
Why?

This software stuff is hard … Why?

Complexity due to:

- Different types of data
- Users are diverse!
- Different use cases
- Different needs
- Code base gets large
- Multiple programmers
- Coordinating many activities at once

http://www.extremetech.com/extreme/118863-nevada-embraces-the-future-approves-self-driving-cars

Why Should We Care?

and does it matter that we get it right?

Why Should We Care?

Does it matter that we get it right?

- Correct and efficient implementation is important to our customers & employers
- Resources are often precious: e.g., data, people, and CPU
- Lives can be at stake (literally)
- We can change the world

Helping children at risk for Cerebral Palsy learn how to crawl

Photo credit: Hugh Scott

This software stuff is hard …

How do we get a handle on it?

Abstraction

Abstraction

- Abstraction: the process of simplifying the representation or description of some entity
  - Keep the key pieces
  - Throw away the extraneous details
- In software development: we use abstraction to temporarily hide details so that we can "get our mind" around the "big picture"

Abstraction

Not just one level of abstraction possible: we can imagine multiple levels of abstraction, depending on what we are working on and what we need to communicate

Course Coverage

- Abstraction!
- Software development
  - Design
  - Implementation
  - Testing
  - Debugging
- Ethics in computer science

Design

Design: the process of assessing the requirements of a software system and planning a solution

- What are the inputs and outputs?
- What happens in between and how?
- How do we know when our implementation is correct?

- Abstraction is key for many of these steps

Implementation

- Connecting our design and our implementation
- Maintaining a separation of the logic of our solution from the implementation
- Tools that help us to manage our abstractions

Testing and Debugging

- Testing procedures are designed (often ahead of time)
- Testing procedures for different pieces of the code base
- Tools that allow us to analyze what our code is doing and what it is “thinking”
- Isolation of “buggy” code

Ethics in Computer Science

- Processes for detecting and analyzing ethical questions that can arise
- Privacy
- Intellectual property

My Assumptions About You

- TopHat

My Assumptions About You

- At least one introductory course in programming
- Experience with java, including:
  - Control structures: if-then-else, while, for, case
  - Basic data types: integers, floats, chars, strings
  - Exposure to java objects

My Assumptions About You

- Laptop for lab and project work
  - COE requirement
  - Need at least 2 hours of battery life under moderate use
- Top Hat access
  - Can use laptop or phone

ABET outcomes

- B: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- C: An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- K: An ability to apply design and development principles in the construction of software systems of varying complexity
- E: An understanding of professional, ethical, legal, security, and social issues and responsibilities.

Course Details

Course Information

- Instructor: Dr. Andrew H. Fagg
- Class Location: Dale Hall 206
- Required Resources:
  - Zyante Java programming
  - The **Fourth** Edition of *A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet*
  - *Top Hat*
- Prerequisites: 1323 and Mathematics 1523 or higher, both with a grade of C or higher
- Course web page:

  http://www.cs.ou.edu/~fagg/classes/cs2334/

How to Find Me

- Office: DEH 243
- Office Hours:
  - Monday 3-4
  - Wednesday 11-12
  - Also by appointment
- Contact information: andrewhfagg@gmail.com

How to find the TAs

All office hours in DEH 115 (computer lab)

Daniel Brigance	brigance@ou.edu	W 9-11
Richa Saraswat	richas@ou.edu	T 3-5
Megan Pinkston	Megan.L.Pinkston-1@ou.edu	M 11:30-12:30 T 10:30-11:30
Femi Fashanu	femifash@ou.edu	F 12-2

Appointments can also be made

Course policies

Due Dates:

- Homework (Zyante exercises): start of class on the day assigned
- Projects: start of class on the due date
- Labs: end of the day on Friday

Course policies

Late policy:

- Homework and labs cannot be turned in late for credit
- A project may be turned in late for a penalty:
  - 0 - 24 hours:10%;
  - 24 - 48 hours: 20%
- Quizzes (Top Hat) and exams must be completed in class

Laptop Policy

- Labs: laptops are required
- Class:
  - May be used to program along with the rest of the class or to take notes
  - May want to use for Top Hat

If you are using your laptop to in a way to distract people around you in class, you will be asked to leave.

Grading

- Projects: 25%
- Labs: 15%
- Exams: 40% (two midterms and a final)
- Homework: 10% (exercises in the Zyante readings)
- Quizzes: 10% (Top Hat)

- Official grades will be posted on D2L

Projects

- 5 two-week long projects over the semester
- You will need this time
- Projects are done in assigned pairs

- Grading:
  - Sign up for a code review time slot
  - Both group members must be present at the review
  - Both must be ready to answer any questions about the code

Grading questions

- The item should be first brought to the person who graded it
- All grading questions must be brought to our attention within one week of when the item was returned
- Check your grades on D2L
- Once the exam leaves the room that I am in, the grade is final

Getting the most out of class

- Read materials ahead of time
- Ask questions (in person or in Top Hat)
- Learn names of your fellow students (and use them)
- Participate in class discussions
- Participate in your group discussions
- Attend class regularly
- At the end of the semester, I should know your name

Appropriate Classroom Conduct

One rule: Respect

- Yourself
- Your peers
- The teaching team
  - Keep in mind: we are human, too, and we have many obligations

Inappropriate Classroom Conduct

- Allowing a cell phone or pager to repeatedly beep audibly.
- Playing music or computer games during class in such a way that they are visible or audible to other class members.
- Exhibiting erratic or irrational behavior.
- Behavior that distracts the class from the subject matter or discussion.
- Making physical or verbal threats to a faculty member, teaching assistant, or class member.
- Refusal to comply with faculty direction.

Classroom Conduct

- In the case of disruptive behavior, we will ask that you leave the classroom and I may charge you with a violation of the Student Code of Responsibilities and Conduct.
- If you have repeated disruptive issues, I will seek to withdraw you from the class.

Proper Academic Conduct

Laboratory assignments, homework assignments, quizzes and exams:

- All work must be your own: no looking at or copying solutions from other students or from the net
- General discussion is OK (e.g., the fundamental skills that we are learning)
- When in doubt: ask me or a TA

Proper Academic Conduct

Projects:

- All work must be that of your group: no looking at, discussing or copying solutions from other groups or from the net
- General discussion is (again) OK
- Group members must contribute equally to each project

Proper Academic Conduct

- Sharing solutions is punished to the same degree as receiving solutions
- Make sure that your computer and account are properly protected. Use a good password
- Do not give out access to your account or your computer system
- Do not leave printouts or mobile drives around a laboratory where others might access them

Proper Academic Conduct

Programming projects will be checked by software designed to detect collaboration. This software is extremely effective and has withstood repeated reviews by the campus judicial processes.

What happens if you cheat…

- Upon the first documented occurrence of collaborative work, I will report the academic misconduct to the Campus Judicial Coordinator. The procedure to be followed is documented in the University of Oklahoma Academic Misconduct Code
  - http://integrity.ou.edu/files/Academic_Misconduct_Code.pdf
- In the unlikely event that I elect to admonish the student, the appeals process is described at:
  - http://integrity.ou.edu/

This Week…

- Homework: complete Catme survey no later than Friday evening (you should have received email)
- Next time: 1323 review
- Lab: JDK, Compiling, Javadoc, Eclipse, Strings
  - Exercise is due on Friday evening