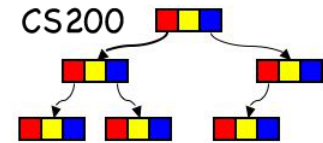


CS200 Fall 2015

Data Structures and Algorithms



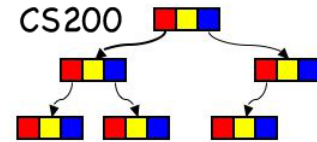
We live in the information age – fueled by computers.
An unprecedented amount of information is freely available.
How many of you have smart phones?
What apps/information do you store, manage and use
on a daily basis on that phone.

**This course is about the fundamentals of how that information
is stored, managed and used
-- the theory and practice of
representing and manipulating information**

*“scientia est potentia”
(knowledge is power)*

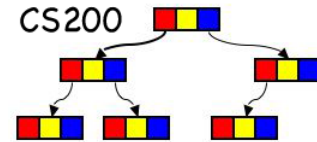
Sir Francis Bacon or Thomas Hobbes

Class meetings



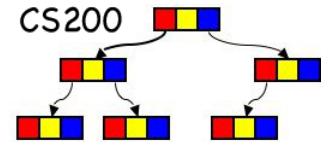
- Lectures
 - Concepts, programming assignment introduction, quizzes, tests.
- Recitation
 - Help with programming and written assignments, practice skills, reinforce/supplement material from lecture, a few programming quizzes.
 - Credit for attending and participating in recitations

Difference from CS160/161



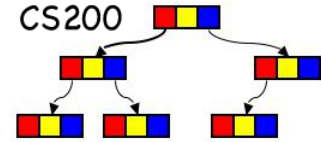
- Data structures and algorithms oriented
 - Complexity and efficiency (Orders of Magnitude) come into play
- Larger program developed incrementally over a number of assignments
 - More freedom in how to structure your program

Grading



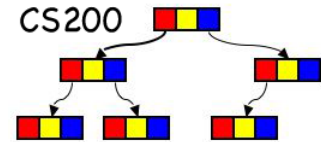
Programming assignments	20%
Written assignments	10%
Quizzes	10%
Recitations	10%
Midterm	25%
Final	25%

More Grading Specifics



- Exams:
 - Make-ups or reschedules for extreme circumstances only
 - Written component in lecture on specified date
 - Closed book
 - Preparation for exam:
 - lectures notes
 - recitations
 - quizzes
 - written home works

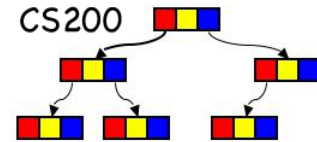
Policies



Be professional. Read the web site on this.

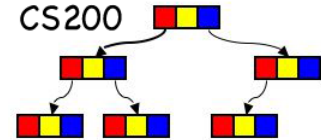
Let's talk about cheating

Cheating



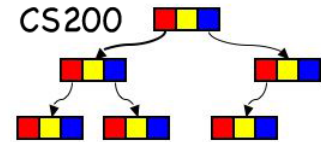
- What is cheating? What is not?
 - Where would you find a definition?
- What is gained / lost when cheating?
- What are the consequences?
- When / how does it happen?
 - How can cheating be avoided?

Late Policy



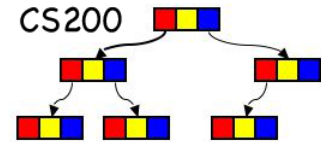
- Programming and Written Assignments
 - By due date/time: full credit
 - Within 48 hours after the deadline: 10% penalty
 - After 48 hours: 0

Distractions in the classroom



- Cell phones
 - Turn off (first choice) or on vibrate
 - If expecting an important call, sit close to the door and step out.
- Laptops & Smart Phones
 - Sit where you will not distract others (back rows)
 - Do try to limit non-class related activities. Psychological evidence shows that we do not multi-task as well as we think we do.

Communication

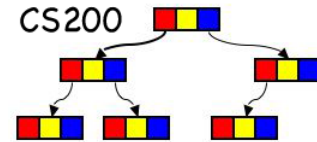


- Check course website often:
<http://www.cs.colostate.edu/~cs200>

- Let's go check it out

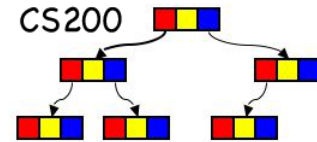
- Canvas will be used minimally
 - to post grades

Course Goals



- CS160: mostly procedural programming, using objects, logic
- CS161: objects, linear data structures, inheritance, induction, counting
- CS200
 - Logical view
 - Program = Algorithms + Data Structures
 - Understand their relationship and use them correctly, efficiently
 - Implementation
 - Program = Objects + Methods
 - Practice design and implementation of object-oriented programs in Java
 - Connect theory to programming concepts, complexity

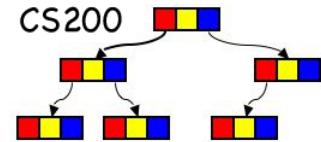
Course Goals



- An understanding of a variety of common data structures
- A practical understanding of where they are applicable
- Understanding the complexity of programs
 - Time complexity: what is the Order of Magnitude time this algorithm takes given an input of size n
 - Space complexity: what is the Order of Magnitude space this algorithm takes given an input of size n

What does order of magnitude mean?

Programming Assignments



- **warm up: stacks**

- 1: Implementing recursion using an explicit run time stack

- **expressions and assignments**

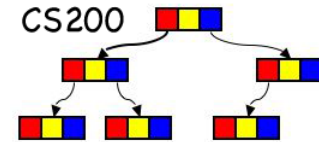
- 2: Postfix expressions and evaluation

- 3: Infix expressions, parsing, representation, evaluation

- 4: Assignments, symbol tables

- 5: Analysis: dependences

Design for Change Principle



- Anticipate how systems will evolve and design to accommodate change.
 - Lack of attention to this principle can result in changes that make system unstructured and difficult to understand and maintain.