CS21: INTRODUCTION TO COMPUTER SCIENCE

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Fall 2017
Swarthmore College
Outline Dec 8:

• Go over Quiz 5 (+ hand back Lab 8)
• Merge sort (recursive sorting)
• Fractal trees (recursive graphics)

Notes

• Office hours today! (3-4:30pm, need to leave early)
• Ninja session tonight
• Office hours next week: Wed 2-4pm
• Let me know if you would like to meet next week
Final Exam
Studying for the final

- Exam time: **Friday Dec 15** (week from today), **7-10pm**, Science Center 101
- We will post **study guide and review problems** today
- Go through all notes, code, and practice problems
- Write out as many problems as you can **on paper** (then check in atom)
- Go back over old quizzes and their study guides
- Create a **“cheat-sheet”** for yourself of important concepts and examples (even though you can’t use it)
- Come to office hours on **Wed! 2-4pm**
Email me:

• If you would like a grade estimate before the final
• If you have any cool graphics recursion screenshots
• If there are any practice problem solutions you would like to see
• If you would like to meet before the final
Merge Sort
Sort

\[ n = 8 \]

\[ 2^3 = 8 \]

split: \( O(\log n) \)

\[ \rightarrow 8 \rightarrow 2 \rightarrow 8 \rightarrow 2 \rightarrow \text{merge} \]

\[ \text{Call sort half1} \rightarrow \text{call sort half2} \]

\[ 8 \rightarrow 2 \rightarrow 5 \rightarrow 7 \rightarrow 3 \rightarrow 1 \rightarrow 6 \rightarrow 4 \rightarrow 3 \]

merge

\[ \text{merge sort: } O(n \log n) \]
Recursive Trees
How to get the end point of a branch

\[(x, y, \cos(a)) \quad l \cos(a) \quad l \sin(a) \quad (x_{-end}, y_{-end})\]
draw_tree(win, 0, 400, 750, 210, -math.pi/2)
draw_tree(win, 0, 400, 400, 210, -math.pi/4)
draw_tree(win, 1, 400, 400, 210, -math.pi/4)
draw_tree(win, 1, 400, 750, 210, -math.pi/2)
draw_tree(win, 2, 400, 750, 210, -math.pi/2)
draw_tree(win, 7, 400, 750, 210, -math.pi/2)
Order = 10
Example with oranges and leaves at the base case
Example with falling flowers

flwr = Flower(x,y)
flwr.draw(window)
Example with falling flowers
Digital Humanities
Lab 8 (digital humanities) observations

Claudia
I learned that in most novels the word 'love' occurs more often than the word 'hate.'

Skylar
...Mary Shelley really liked the word "abhorred"... (: 

Talia
It was interesting to see how many words with negative connotations were repeated in Frankenstein-- "repugnance" was used three times, for example, and "violence" eight. "Dead" occurs more than twice as many times as "alive."

Bayliss
Mary Shelley LOVES the words "misery" and "sad."

Kyle
"Love" is used often in Mary Shelley's Frankenstein.