LEC 14

CSE 122

Victory Lap

Questions during Class?

Raise hand or send here

sli.do #cse122

BEFORE WE START

Talk to your neighbors:

What's the first thing you'll do after finals are over? (Sleep is obvious…)

Instructor Ido Avnon

TAs Abby Williams
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Lecture Outline

- Announcements
- C3 Overview
- YAY!
- Victory Lap
- Looking Forward
- AMA

Announcements

- Creative Project 3 (C3) out later today
  - Due ***Thursday***, August 15th by 11:59 PM
- Resubmission Cycle 4 (R4) is open!
  - Due Tuesday, August 13 by 11:59 PM
  - Open to P1, P2, P3
- Provide feedback!
  - Course evaluations: https://uw.iasystem.org/survey/290992
    - Due Sunday 8/11!
  - TA evaluations

FILL OUT COURSE EVALS

https://uw.iasystem.org/survey/290992

- Currently at 16% … sad ☹
- If we reach 80% by Sunday….FREE BUMP S -> E

Finals Week (next week)

- Monday: Review Session 3pm in
- Tuesday: Review in Section
- Wednesday: Review in Lecture
- Thursday: **Final Part 1 – Presentation in section**
  - **C3 Due 11:59**
- Friday: **Final Part 2 – Exam in Lecture**

Review Resources

- Pre-Class Materials + Lectures
- Section Handouts
- Quizzes so Far
- Your Notes!
  - Helpful for contextualizing what you learned
- Practice final exams
- Practice it

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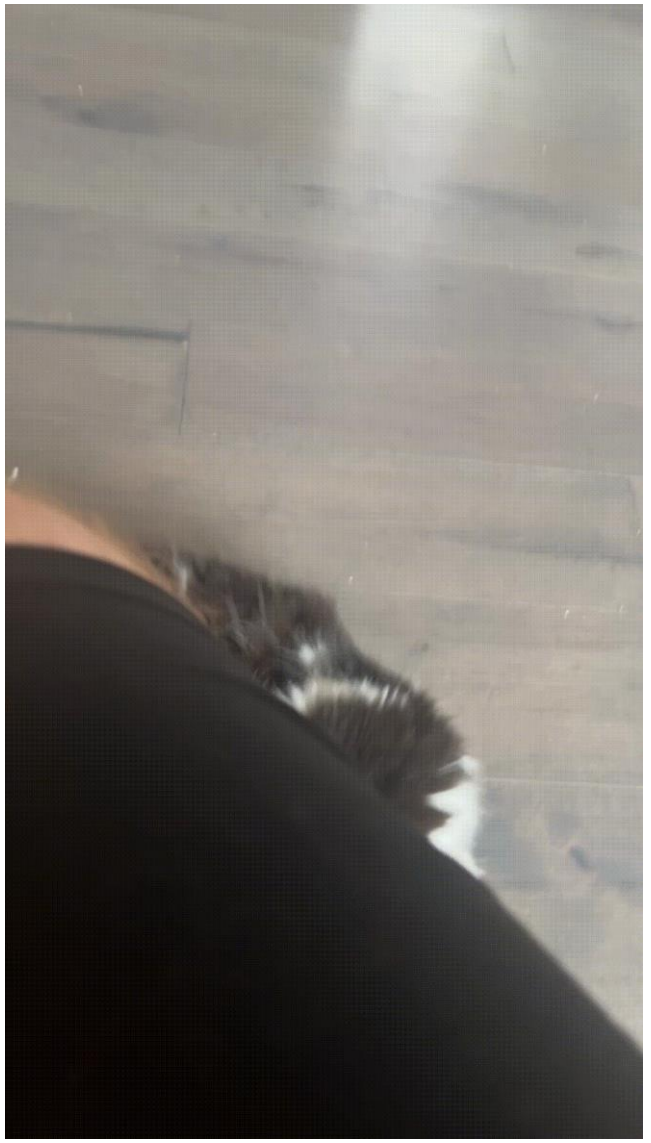
You Made It!



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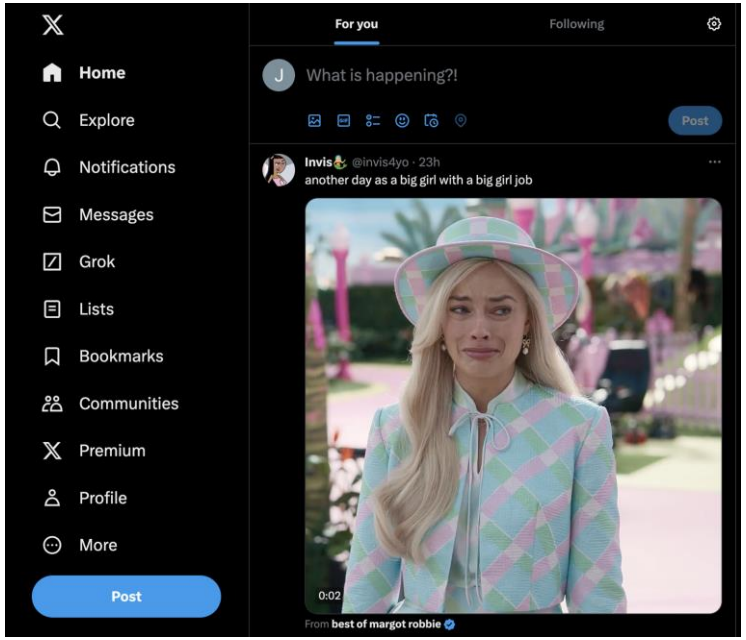
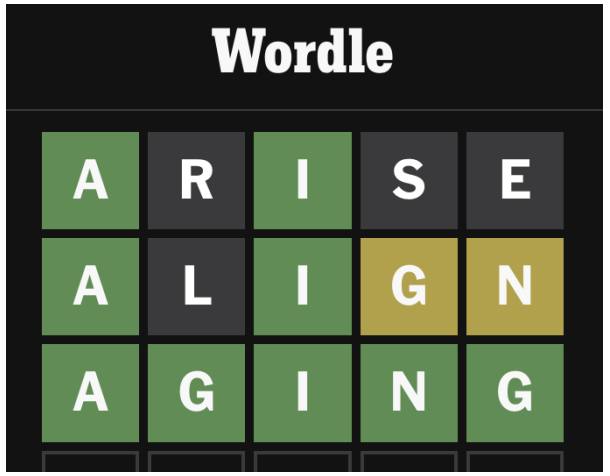
Part 1 ish

1. Build a strong foundation of data structures that will let you tackle the biggest problems in computing



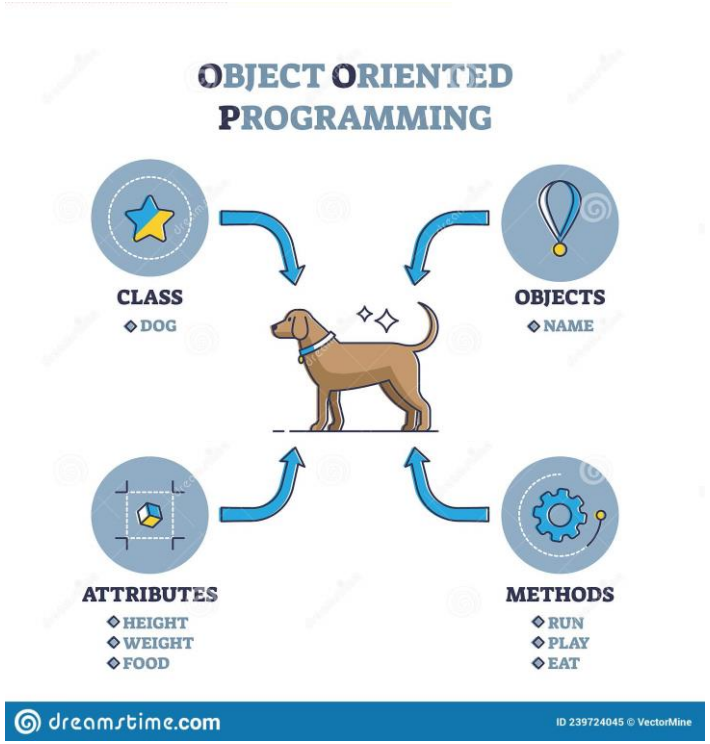
122 Data Structures



Part 2 ish

Learn an important structural pattern for representing **objects** in code to make our code more **reusable** and **maintainable** and **easier to understand.**

- Java is designed around this idea of objects. We haven't been leveraging that yet!
- Used in almost every real-world software project.



What we have done!

CS Concepts

- Problem Solving
- Functional Decomposition
- Debugging
- Testing
- Third Party Libraries*

Java Language

- File I/O
- Iterators and For-each Loops
- Exceptions
- Reference Semantics
- JUnit*

Data Structures

- ADTs
- Lists
- Stacks
- Queues
- Sets
- Maps

Java Collections

- Arrays / 2D Arrays
- ArrayList
- LinkedList
- Stack
- TreeSet / TreeMap
- HashSet / HashMap
- Interfaces for Collections

Object Oriented

- Instance variables
- Instance methods
- Interfaces
- Abstraction
- Encapsulation
- Client/Implementer

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What Can Come Next?

- Some ideas
  - Work on a project
  - Learn a new language
  - Learn a new library
  - Take more courses
  - Explore CS beyond programming
- The general idea though is… whatever you want!
  - You've learned an extremely powerful set of skills, use it on what you are most interested in pursuing!

What Project?

- Add a Graphical User Interface (GUI) to an assignment
- Automate some boring tasks in your life
  - Maybe even automate writing code with good style?
- Organize and process data from your life (favorite quotes, your calendar, etc.)
- What are you currently doing that a computer could do?
- List of some project ideas (UW CSE alum)

What Language?

- Expanding your Java knowledge with a project is valuable. Or use a project to learn a new language!
- Pick a project, see what similar projects use! No wrong language to learn, certain tasks favor certain languages
  - iOS: Swift
  - Android: Java, Kotlin
  - Client-side web: Javascript (many frameworks to choose from)
  - Beautiful visuals: Processing
  - Data Processing + Machine Learning: Python
  - Data Management: SQL
  - Embedded systems: C / C++ / Rust
- Learn a new programming paradigm
  - Functional languages: Racket, Haskell, Scala, (now, Java 8!)

What Library?

Here are just a FEW examples. There is so much more!

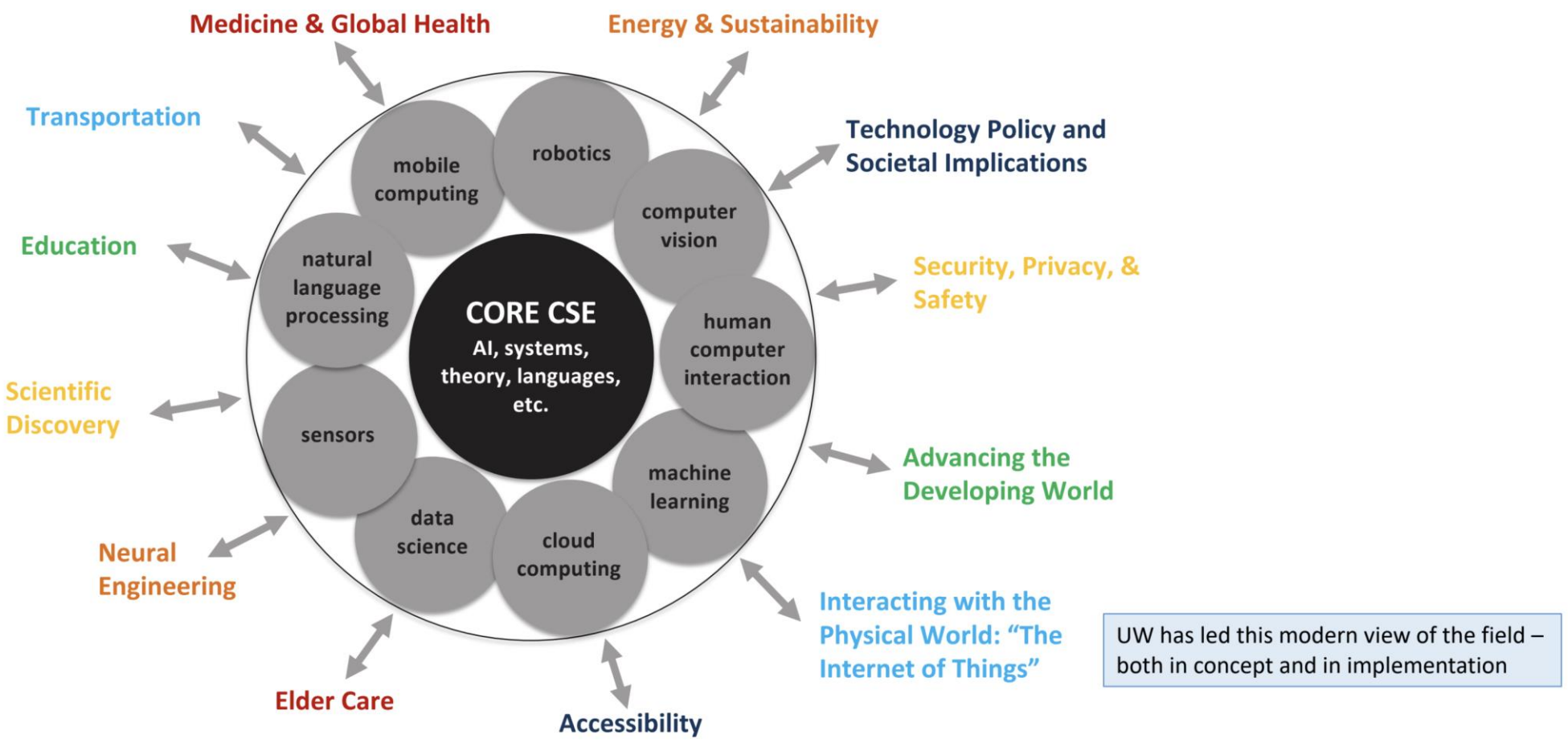
- Processing language
  - http://nlp.stanford.edu/software/
- Building games
  - http://lwjgl.org/
  - http://jbox2d.org/ (with physics!)
- Processing biological data
  - http://biojava.org/wiki/Main_Page
- Accessing Facebook data
  - http://restfb.com/
- Make a website backed by Java
  - https://www.jetbrains.com/help/idea/your-first-spring-application.html
- And more!

What Classes?

- CSE 123 is the most common next class. Continue the story, learn how data structures are implemented
- Other courses
  - CSE 154: Web Programming (HTML/CSS/Javascript)
  - CSE 163: Intermediate Data Programming (Python)
- **Large** set of CSE courses for *both* Allen School majors and students from all over UW campus. Many exciting courses, many (but not all) require CSE 123.
  - Allen School Majors
  - All UW Students
- Courses in Tech Related Majors: INFO, AMATH, HCDE, DXARTS, ...

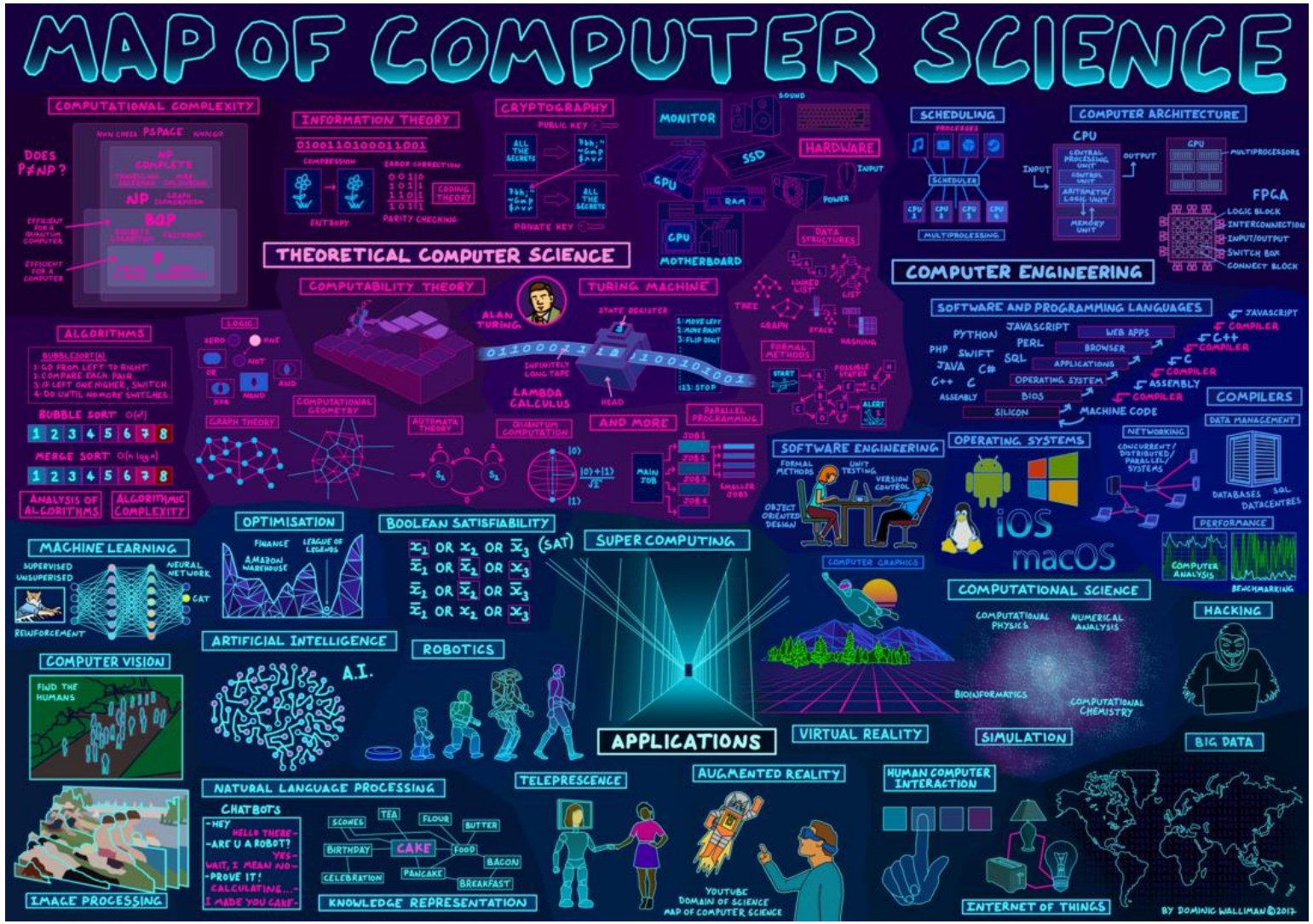
What is CSE?

The changing nature of the field: From smaller/faster/cheaper to tackling societal challenges



UW has led this modern view of the field – both in concept and in implementation

What is CSE?


MAP OF COMPUTER SCIENCE
THEORETICAL COMPUTER SCIENCE
COMPUTATIONAL COMPLEXITY
DOES P≠NP?
PSPACE
NP
P
BQP
INFORMATION THEORY
CRYPTOGRAPHY
COMPUTABILITY THEORY
TURING MACHINE
ALAN TURING
LAMBDA CALCULUS
AND MORE
ALGORITHMS
BUBBLE SORT
MERGE SORT
ANALYSIS OF ALGORITHMS
ALGORITHMIC COMPLEXITY
COMPUTATIONAL GEOMETRY
GRAPH THEORY
AUTOMATA THEORY
QUANTUM COMPUTATION
PARALLEL PROGRAMMING
COMPUTER ENGINEERING
HARDWARE
MONITOR
GPU
SSD
RAM
CPU
MOTHERBOARD
SCHEDULING
COMPUTER ARCHITECTURE
MULTIPROCESSING
FPGA
SOFTWARE AND PROGRAMMING LANGUAGES
PYTHON
JAVASCRIPT
PHP
SWIFT
JAVA
C#
C++
C
SQL
ASSEMBLY
BIOS
SILICON
MACHINE CODE
COMPILERS
SOFTWARE ENGINEERING
FORMAL METHODS
UNIT TESTING
VERSION CONTROL
OBJECT ORIENTED DESIGN
OPERATING SYSTEMS
iOS
macOS
NETWORKING
DATA MANAGEMENT
DATABASES
SQL
DATACENTRES
PERFORMANCE
COMPUTER ANALYSIS
BENCHMARKING
COMPUTER GRAPHICS
COMPUTATIONAL SCIENCE
COMPUTATIONAL PHYSICS
NUMERICAL ANALYSIS
BIOINFORMATICS
COMPUTATIONAL CHEMISTRY
HACKING
MACHINE LEARNING
SUPERVISED
UNSUPERVISED
NEURAL NETWORK
REINFORCEMENT
CAT
OPTIMISATION
FINANCE
LEAGUE OF LEGENDS
AMAZON WAREHOUSE
BOOLEAN SATISFIABILITY
SUPER COMPUTING
ARTIFICIAL INTELLIGENCE
A.I.
ROBOTICS
COMPUTER VISION
FIND THE HUMANS
IMAGE PROCESSING
APPLICATIONS
VIRTUAL REALITY
SIMULATION
BIG DATA
NATURAL LANGUAGE PROCESSING
CHATBOTS
KNOWLEDGE REPRESENTATION
TELEPRESCENCE
AUGMENTED REALITY
YOUTUBE DOMAIN OF SCIENCE MAP OF COMPUTER SCIENCE
HUMAN COMPUTER INTERACTION
INTERNET OF THINGS
BY DOMINIC WALLIMAN ©2017

Research Beyond Programming

Learn a new CS Topic

- Investigate how to best distribute relief funds
- Digitize basketball players
- Help deaf/hard-of-hearing people identify sounds
- Detect and prevent toxicity online
- Recognize disinformation online
- Make movies
- Improve digital collaboration
- Design algorithms that are more fair and better respect privacy
- Fix Olympic badminton
- And so much more!

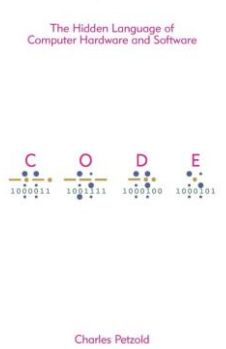
Attend Weekly Meetings

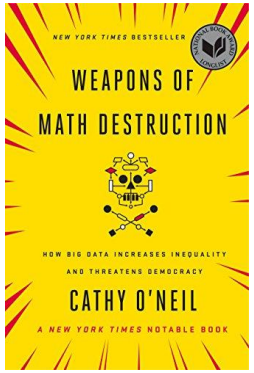
- Change – technologies for low-income regions
- Dub – human-computer interaction and design
- ComputingEd@UW – computer science education

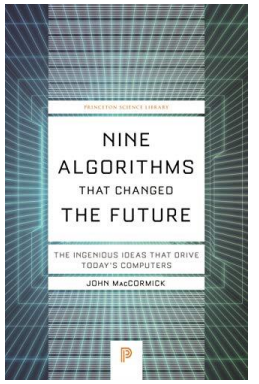
Registered Student Organizations (RSOs)

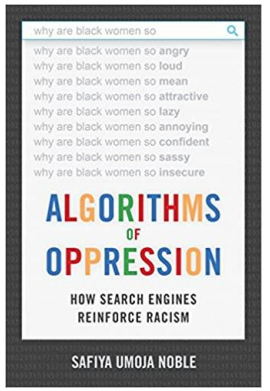
- Husky Coding Project – group projects, internship simulation
- DubHacks – student-run tech and entrepreneurship non-profit
- UW Game Dev Club – indie game development group
- Husky Robotics – robotics

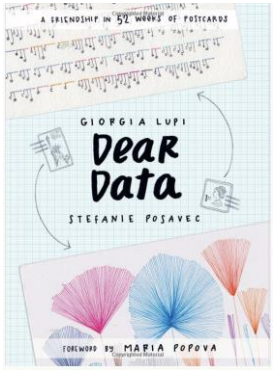
Read a Book! (links on pictures)











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Thank You! (Students)

- This is still a very new course! We are always looking for feedback on how to improve the class for you and for future students! Thank you for your patience and understanding as we develop everything. ☺
  - We really value your feedback!
  - Let us know what's working and what isn't working for you
  - Something that went well in another course? Tell us about it!
- **Please fill out the Course Evaluation by Sunday June 2 at 11:59 PM** to provide feedback about the course!

Thank You! (TAs)

Thanks to them for running the course!!!!!







Ask Us Anything

AMA

sli.do #cse122