CSE 331
Software Design & Implementation
Topic: Ethics + Accessibility (half lecture)

💬 Discussion: What are your big takeaways from this course?
Reminders

• Will not accept any work after Aug. 19 (Friday) at 11pm
• Please fill out course evals ASAP
  • Very valuable to me as a new instructor!

Upcoming Deadlines

• HW9 due Thursday (8/17)
Last Time...

• End-of-quarter timeline
  • Lectures
  • Final Grades
• Some Systems Stuff

Today’s Agenda

• Short discussion
Lecture Timeline

Last few lectures will be content-sparse. Will have lots of work time during class.

• Today's lecture is about the high-level ideas needed to build massive systems

• Next lecture will include information on ethics in CS and a class discussion on related topics

• Friday's lecture will start with student demos and end with a course wrap-up
Grading Timeline

- All work needs to be submitted to us by **Friday** at 11pm

- Course staff will finish grading HW9 and regrades by **Sunday evening**

- Grades will be posted on Canvas on late **Sunday night**
  - You should check that these are consistent with what you expected!

- Soham will calculate final GPA based on these grades on **Monday**
  - This is when I will account for extra credit and special circumstances

- Grades due to the university on **Tuesday at noon**
What’s still missing

CSE 331 is about how to design and implement software

It’s not about the important topic of what to build and for whom

- Even before the well-understood steps like requirements analysis (CSE 403 topic)

This is about our effect on humans and societies

- Implicit decisions you don’t notice you’re making are still decisions
- Good decision-making benefits from explicit understanding of ethics, values, differences among people/peoples, ...
- [Leaders of our field (e.g., faculty 😊) care a lot about this, but aren’t always good at showing it 😞]
- See also: CSE 492E
The big stuff you hear about

- Black-box algorithm to assign length of prison sentences??
- Facial recognition technology for job screening??
- Bugs in self-driving cars
- Cameras that only see light-skinned people
- ...

But it is not just the news items – software, like an engineered system – is full of value judgements
Is software inherently amoral?

- Dijkstra’s algorithm can help the elderly complete errands or a thief complete robberies
- Encryption can shield “good” people” or “bad” people
- Surveillance technology can prevent human trafficking or find political enemies
- ...
Is this your problem?

• Old [?] view: We’re trained to be engineers – others have to decide proper use
  – Ethicists, politicians, doctors, ...
  – Provocative quotation: “My job is to make sure the missiles go up; somebody else decides where they come down”

• But our understanding of the technology is unique – we have an essential role to play in the conversation
  – Which requires understanding not just the technology, but the people it affects and the tradeoffs
  – Can you communicate your technical choices to decision-makers?
  – Can others communicate their needs to you?
A familiar example

- Consider a simple graphical web app for giving walking directions on the UW campus
  - You know, just hypothetically 😊

- What assumptions that favor some people/peoples over others in your application?
  - Did you notice as you were doing your assignment?
  - What could/should/would you do about it?

- If you’re stuck: *When might someone not prefer the shortest path and why?*
Some of your instructor’s answers

1. Directions may include steps, which excludes people in wheelchairs.

2. Directions do not favor well-lit paths, which is important for safety after dark, particularly for statistically-targeted groups (e.g. women or minorities).

3. Your website is not usable by blind users even though the underlying data is text-based.

4. Any instructions only in English?

5. Other?
Fixable?

• Some of these issues are unfixable given the underlying data
  – Key idea behind the phrase “data is biased”
  – What you don’t collect is full of value judgments/assumptions!

• Others are fixable but should we require that?
  – The assignment was already difficult
  – There are features and tools for accessible websites
    • See also: CSE340
  – Regulation is an important check on economic incentive but can impede innovation
    • Cell phones didn’t used to support 911
Be explicit about inclusion

- If you don’t spend the time to think about who your software includes, you will exclude more people
  - Diverse teams have an inherent advantage here!

- Embarrassing [?] fact: CSE 331 had “GUI for walking directions on the UW campus” for ten years before someone noticed that the course should include this short lecture
  - Ask your managers in your future projects
  - Ask your instructors in your future courses
  - Most importantly, ask yourself

- You’re going to have a lot of impact on the world
  - Make it positive
```java
public class Person {

    public String first;
    public String last;

    public Person(String a, String b) {
        if (first.length() <= 3 || last.length() <= 3) {
            throw new Exception("Please provide your full name");
        }
        first = a;
        last = b;
    }

    public String getFirst() { return first; }
    public String getLast() { return last; }
}
```
public class Person {

    public char[] first;
    public char[] last;

    public Person(String a, String b) {
        if (first.length() <= 3 || last.length() <= 3) {
            throw new Exception("Please provide your full name");
        }
        first = a.toCharArray();
        last = b.toCharArray();
    }

    public String getFirst() { return new String(first); }
    public String getLast() { return new String(last); }
}
Before next class...

1. Work on **HW9**
   - Let me know if you want to demo extra credit
     - Can be small things like a slightly different layout
     - Can be big things like adding a whole new feature

2. Wrap-up any regrades for **HW1-8**
   - Won’t accept late work after the last day of class

3. Please fill out **course evaluations** before they close on Friday!