Intro to Coding with Python– Prototyping

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Slides based off slides courtesy of Jordan Crouser (https://jcrouser.github.io/)

Plan for Today

- User-centered design
  - What it is
  - Why do it
  - Ways to do it
- Life skill #1: paper prototypes
- Life skill #2: architecture diagrams

Hypothetical example

“Advising Assistant”

Hypothetical example

- **Overview:** over 100 majors and minors in DCIS

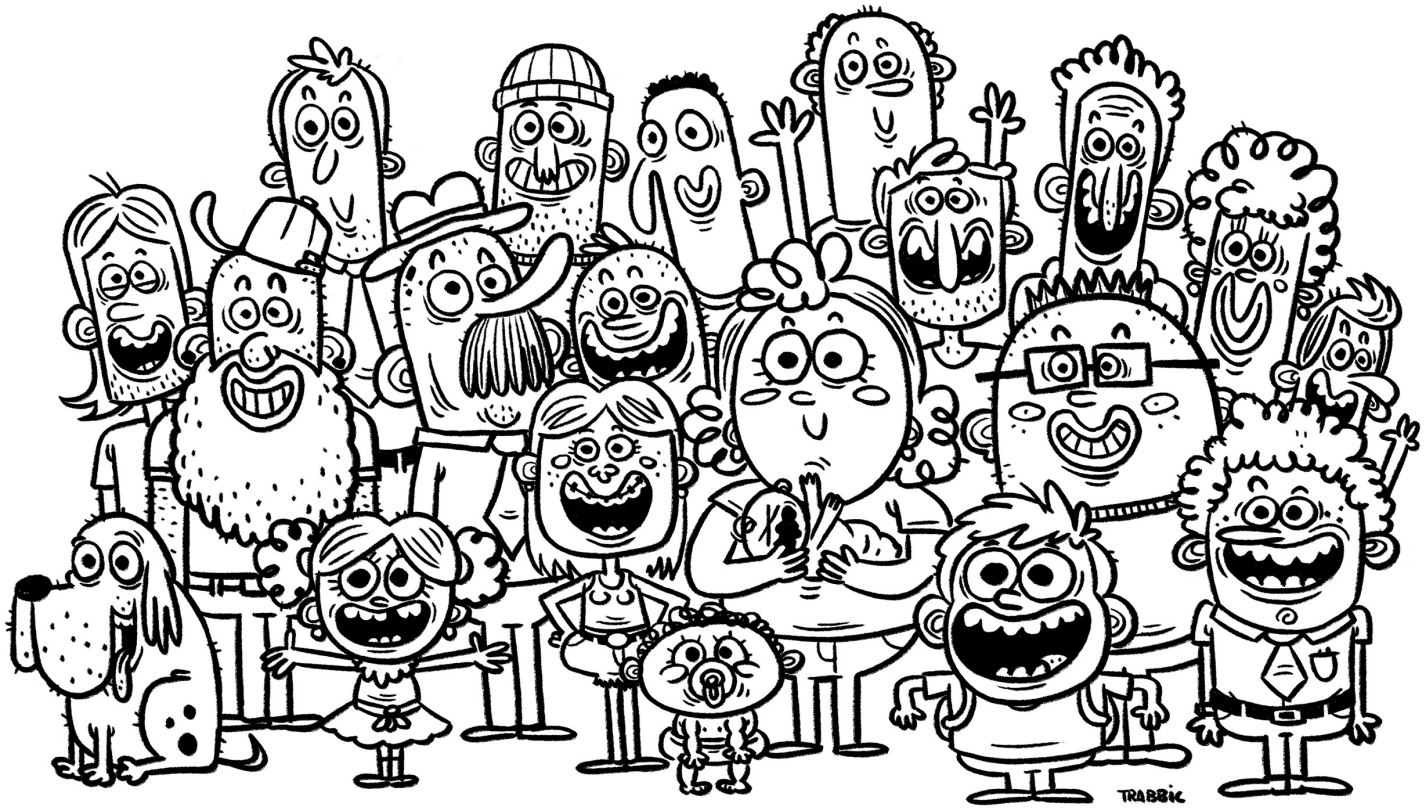


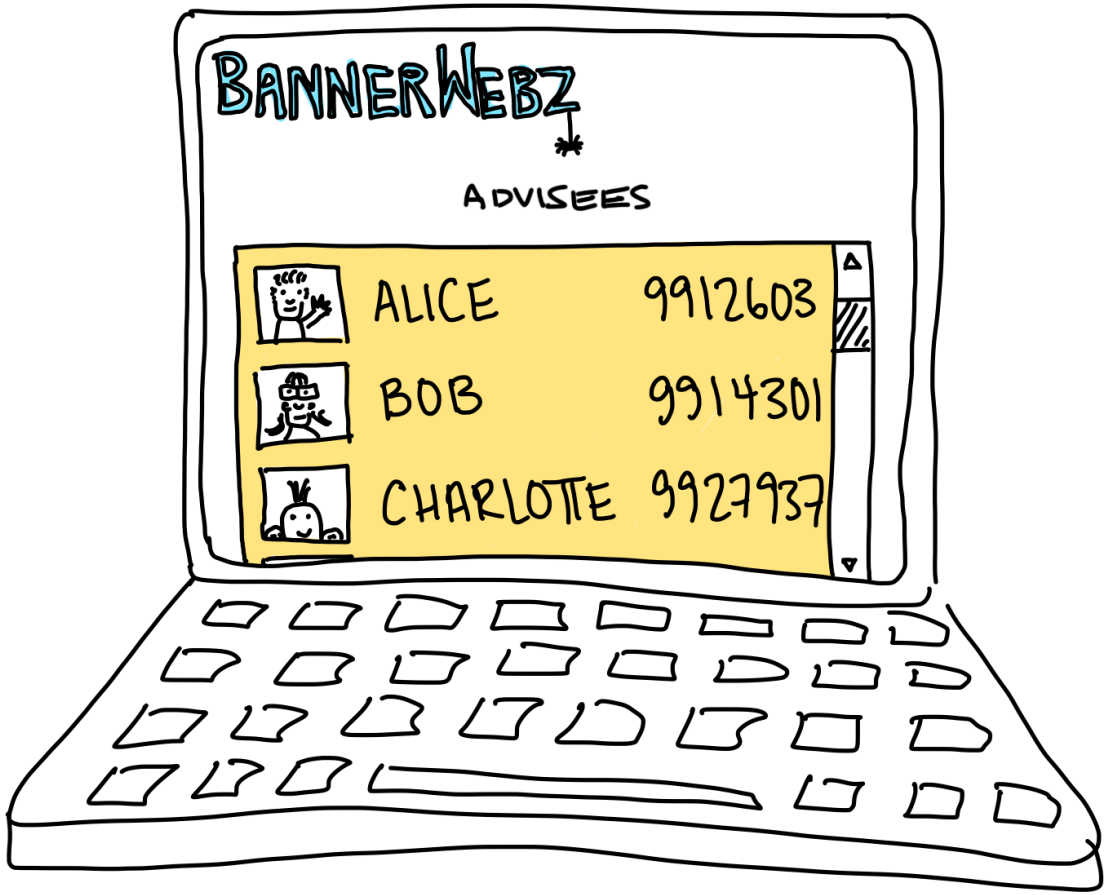
Image © JOHN TRABBIC III, Storyboard Artist / Cartoonist

Hypothetical example

- **Overview:** three advising faculty

Hypothetical example

- **Overview**: BannerWeb not hugely helpful…



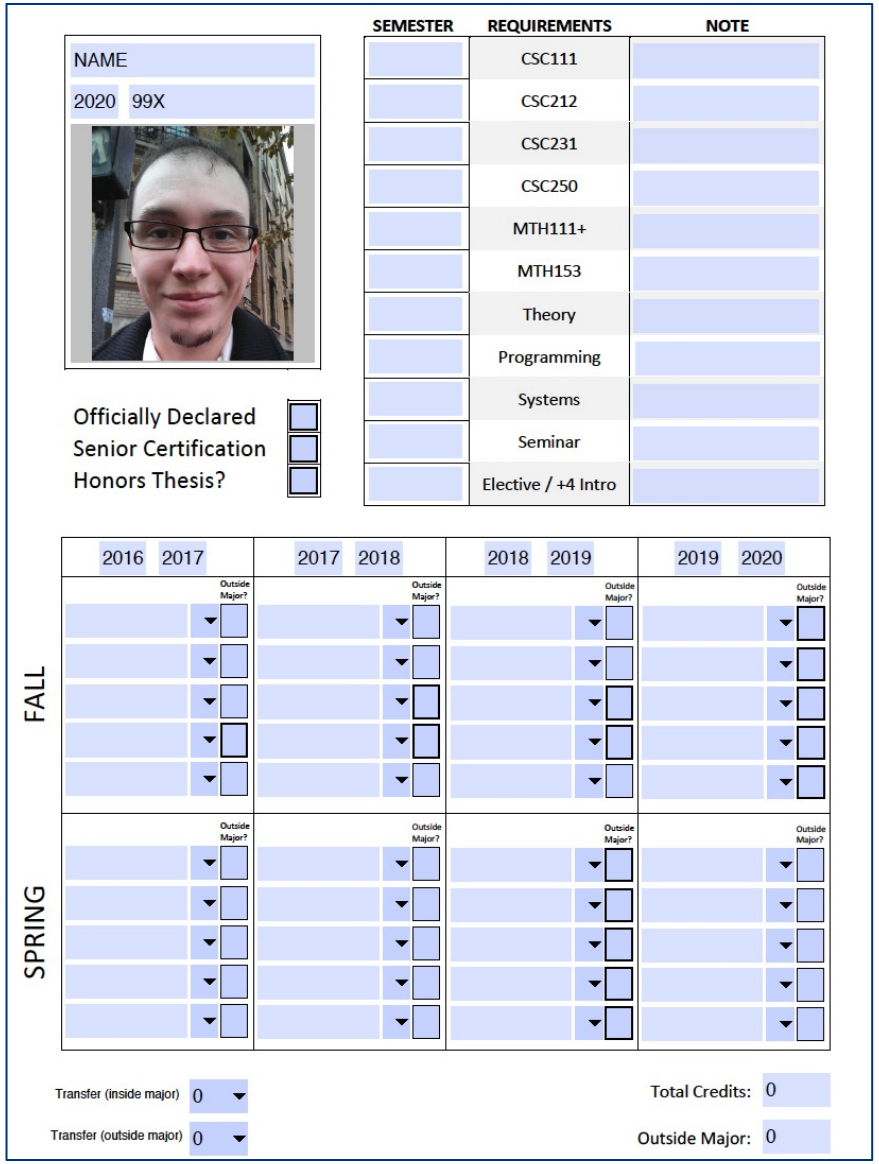
Hypothetical example

- **Overview**:

current process is **manual**

Goal 1:
detect which courses a student has taken that count toward the major

Goal 2:
give adviser an overview of all advisees



Hypothetical example

- **Ideal:** we would like to build a plugin that sits on top of Banner and does everything for us, but that won't work because of FERPA concerns (can't alter Banner)

- **Actual strategy:**
  - Define **mapping** from course numbers to major/minor designation
  - **Export** CSV of all advisees from Banner
  - Build a **parser** that extracts data from unofficial transcript (i.e. courses taken) and joins with mapping, majors/minors
  - Build **authenticated frontend** for adviser to track student progress, as well as (maybe) send messages / schedule appointments

Hypothetical example

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- **Actual strategy:**
  - Define **mapping** from course numbers to major/minor designation (core, T|S|P, seminar, etc.)
  - **Export** CSV of all advisees from Banner
  - Build a **parser** that extracts data from unofficial transcript (i.e. courses taken) and joins with mapping, majors/minors
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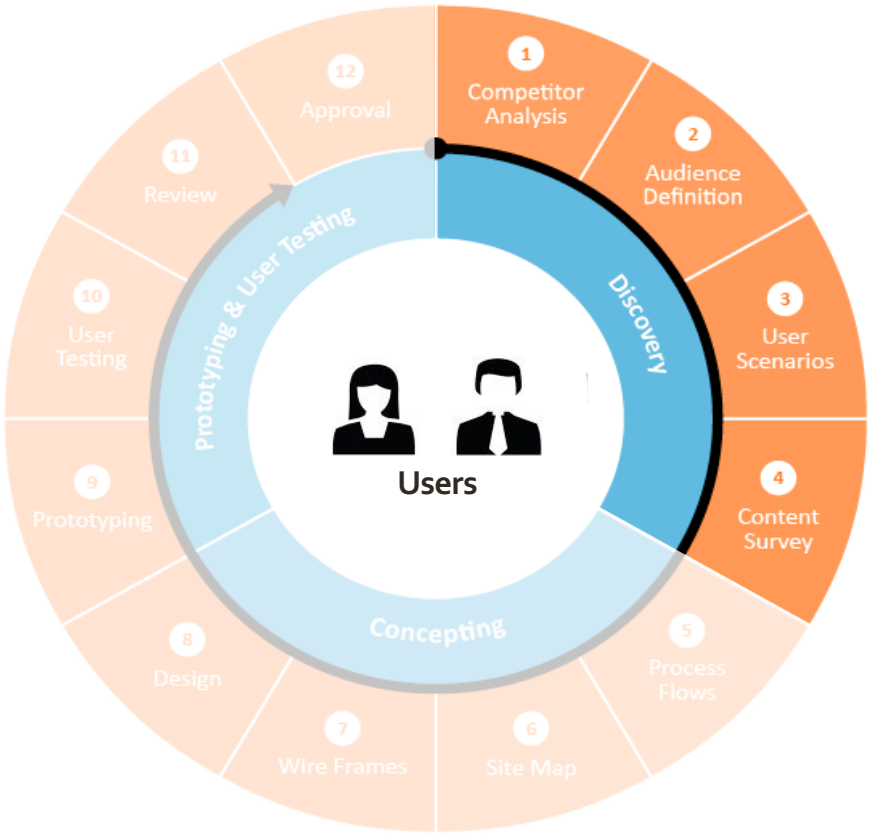
Discussion

Let's say you wanted to actally implement this;

where do you start?

User-centered design framework



1) Discovery

- Learning about your users
- Modeling your users
- Analyzing your users' tasks
- Eliciting and defining clear product requirements

2) Concepting Phase

- Developing conceptual models
- Solving design problems through ideation
- Detailed design activities

3) Prototyping + User Testing

- Delivery of a high-quality product that meets users' needs and is easy to learn and use

http://www.uxmatters.com/mt/archives/2010/07/design-is-a-process-not-a-methodology.php

Competitive review

- **Why?**
  - If you look at what already exists, you might be able to identify potential issues in advance
  - Also helps establish your unique contribution
- **How?**
  - Literature or product review
  - Analysis
    - What are the existing tools?
    - What is their purpose?
    - **What audience are they aiming for?**
    - What kinds of strategies are they using?
    - What functionality do they contain?
    - What are their strengths and shortcomings?
  - Identify opportunities and design constraints

Defining your audience

- Learning about their problem
  - Semi-structured interview
- Analyzing their tasks
  - Hierarchical task analysis
- Modeling users
  - Personas

Semi-structured interviews

- **Why?**
  - gather qualitative data about users to understand the problem
  - can help identify key differences between designer and target user
- **How?**
  - ask open-ended questions
  - bring along a "cheat sheet" to ensure that you gather all the information you need

- **Some tips**:
  - establish trust at the beginning
  - participant engagement will vary
  - be flexible, but make sure you get what you came for
  - consider recording or note-taking to help with recall

Wood, L. E. (1997). Semi-structured interviewing for user-centered design. *interactions*, 4(2), 48-61.

Defining your audience

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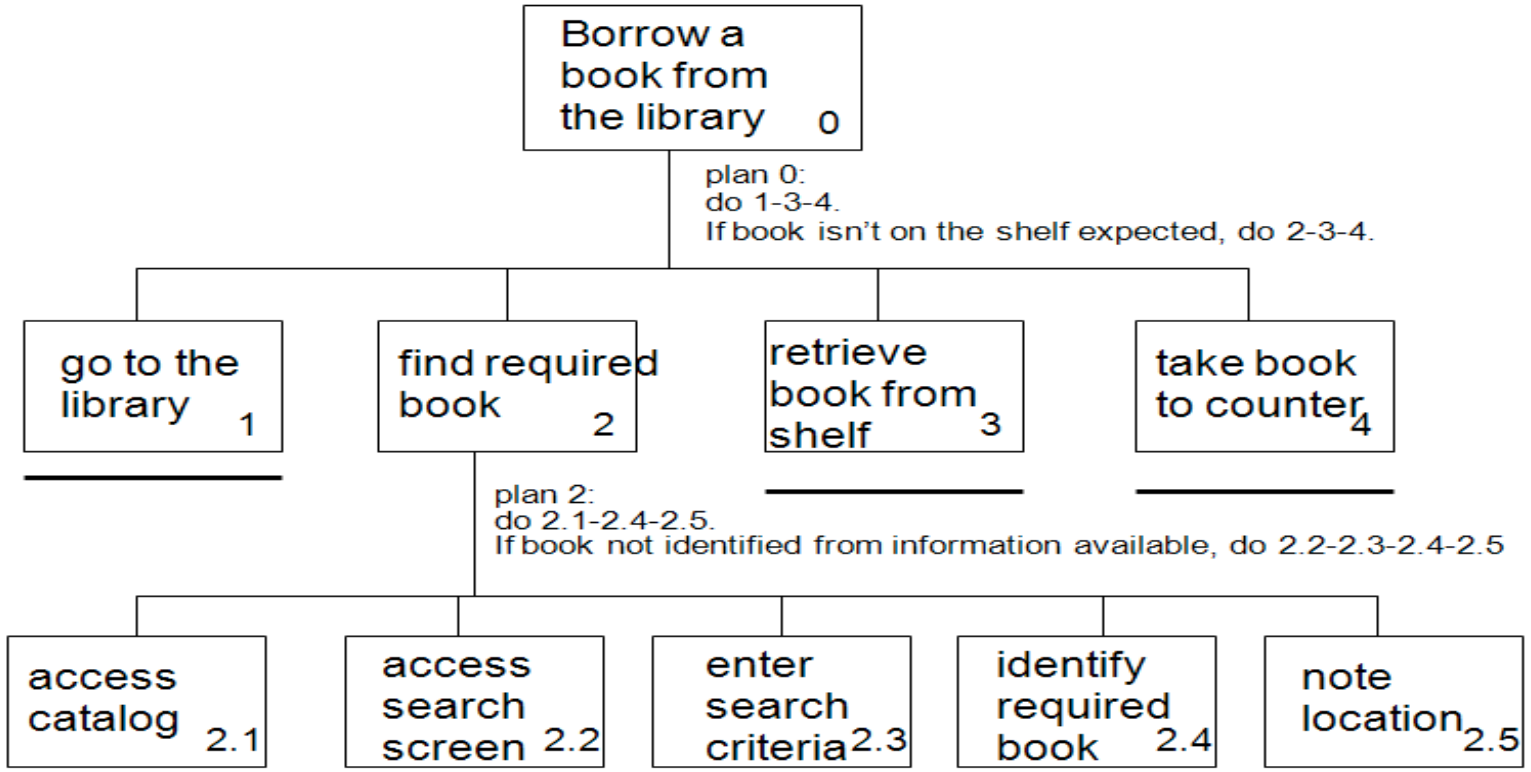
Hierarchical task analysis

- **Why?**
  - Understand user workflow
  - Identify pain points and areas for optimization
- **How?**
  - Decompose tasks into 4-8 sequential steps
  - Identify patterns, sequences and skips in the tasks
  - An example:

Hackos, J. & Redish, J. (1998). User and Task Analysis for *Interface* Design. Chichester: Wiley.

Task analysis example



http://i1206241.blogspot.com/2013/01/task-descriptions-hierarchical-task.html

Defining your audience

- Learning about your users
  - Semi-structured interview
  - Contextual inquiry
- Analyzing users' tasks
  - Hierarchical task analysis
- Modeling users
  - Personas

Personas

- **Why**?
  - mechanism for reasoning about user needs
  - model behavioral characteristics of target users
  - doesn't require access to ACTUAL users
- **How?**
  - fictionalization
  - narrative, goals, needs, "pain points"
  - attributes specific to the problem space
  - data-driven method* using info from interviews
  - mapping persona to software features

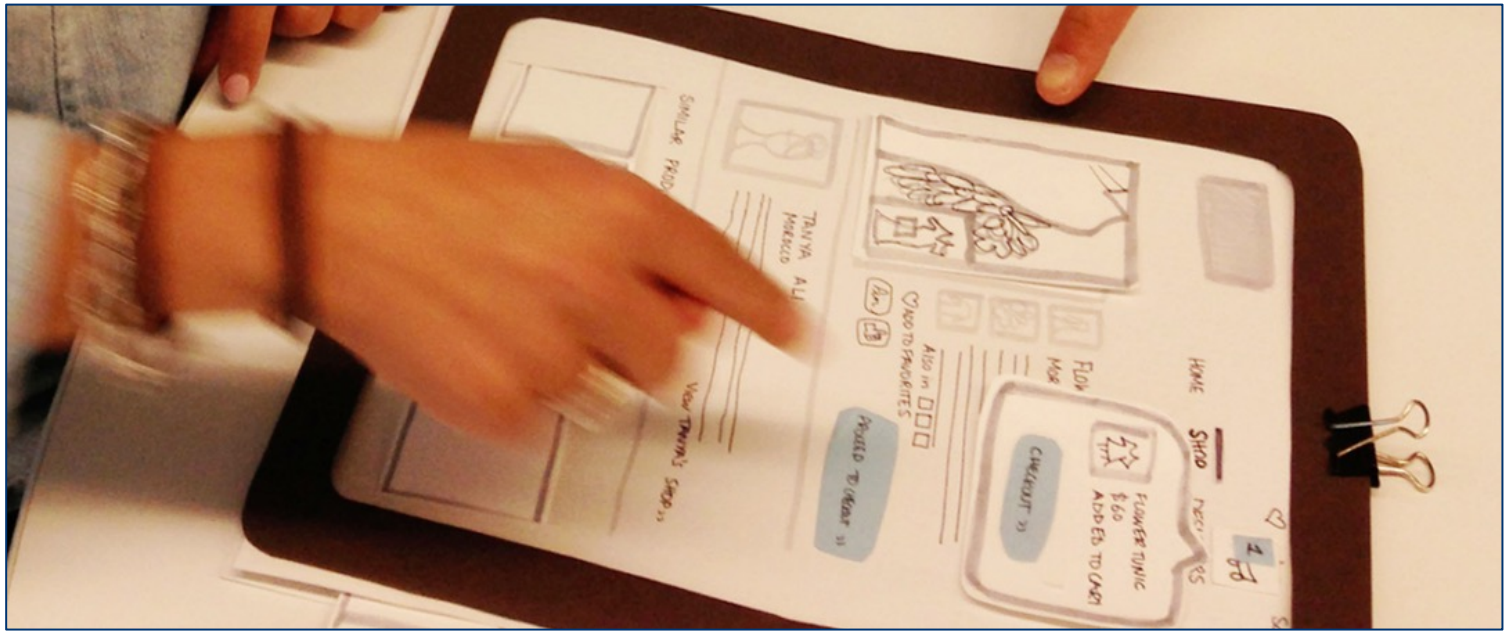
Activity: personas

Goal: come up with **3 personas** that characterize people who might be interested in a public transit app

Now that we've got some end users in mind, what would a **prototype** look like?

CS Life Skill #1: “Paper prototyping”

- **Big idea:**
  - Not sure yet whether or not an **idea** will work?
  - Making a **paper version** of an interface is a lot faster and easier than coding a working prototype – start there!



"Paper prototyping" goals

- Generate **lots of ideas**
- Engage **other people** in the design process
- Identify **potential problems** before you waste time coding
- Get **feedback** quickly, from lots of different people
- Some tips:
  - Focus on the **big picture**, don't worry about the details
  - **Think about what you want it to do,** rather than what you know how to implement (we'll worry about that later)
  - Not so into arts and crafts? It doesn't have to be **actual paper**… Whiteboard / PowerPoint / Keynote will also do the trick!

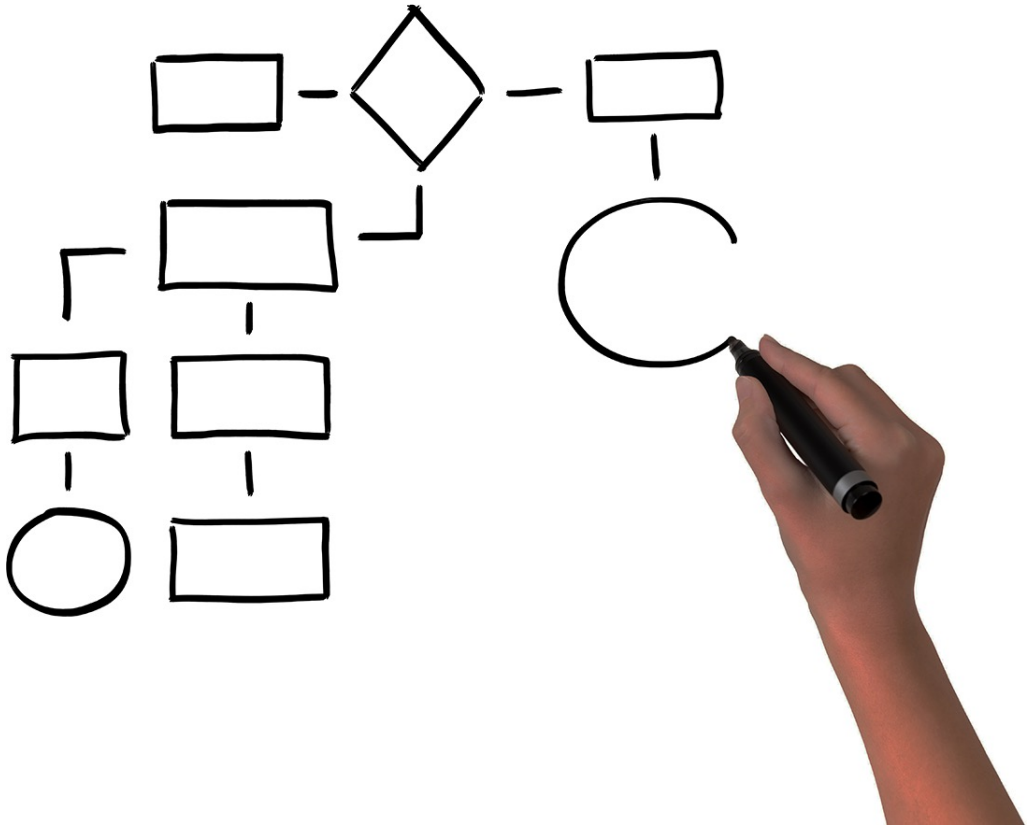
Discussion

How did it go?

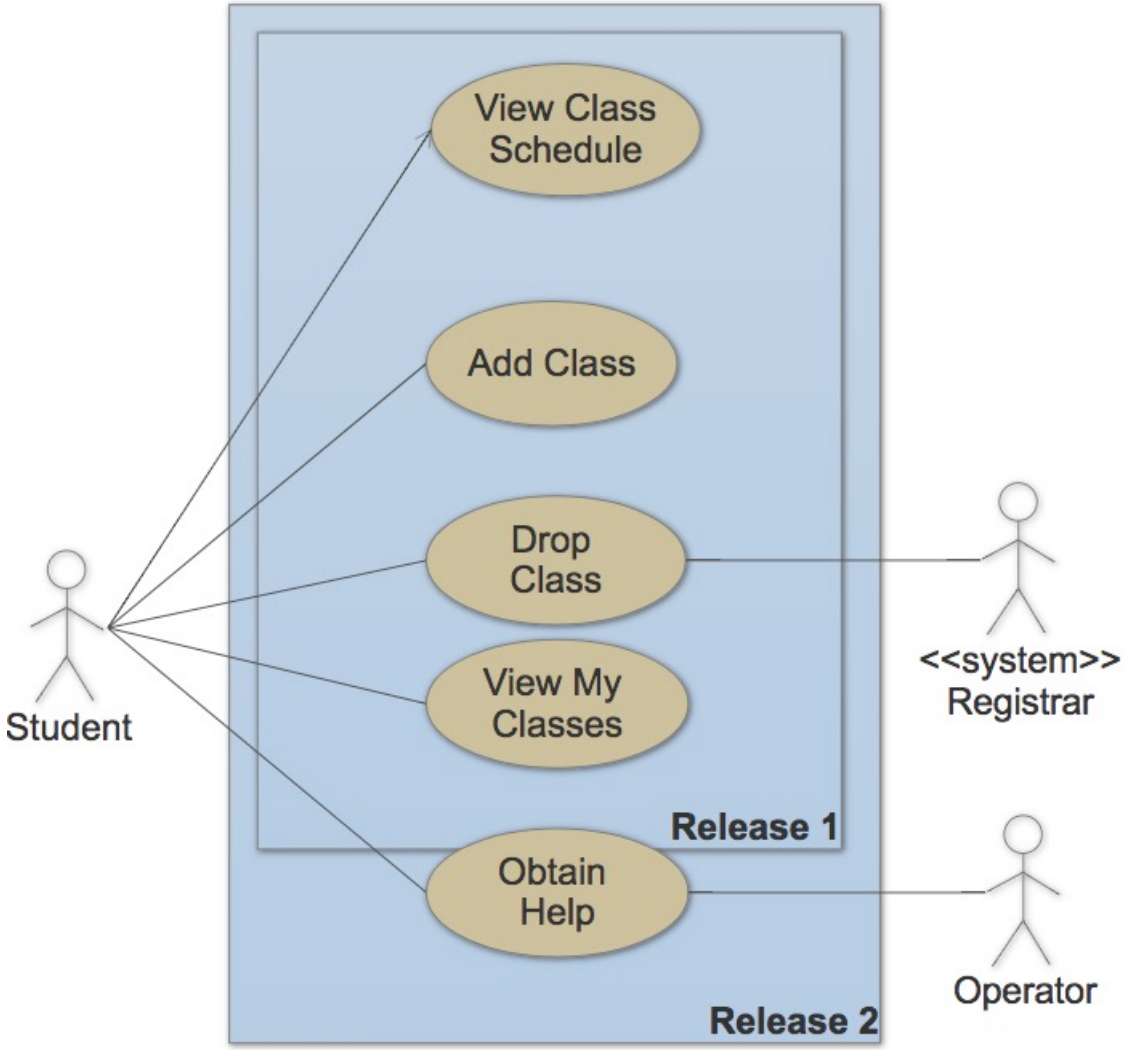
What did you **notice**?

CS Life Skill #2: "Architecture diagrams"

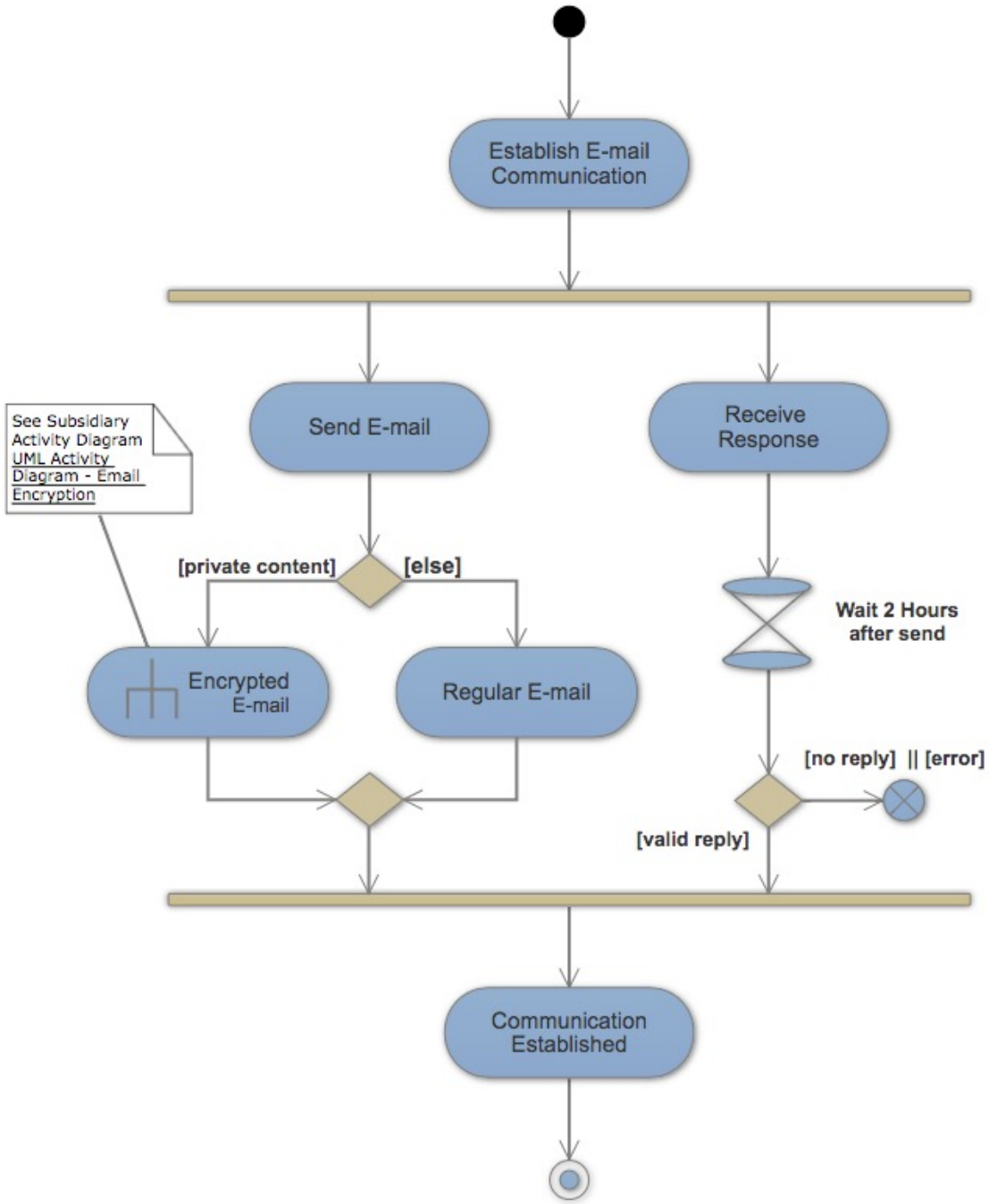
- **Big idea:**
  - Now that you've got an idea of what your interface might look like, break that down into **manageable pieces** so you can get started
  - This can happen at **several levels of detail**



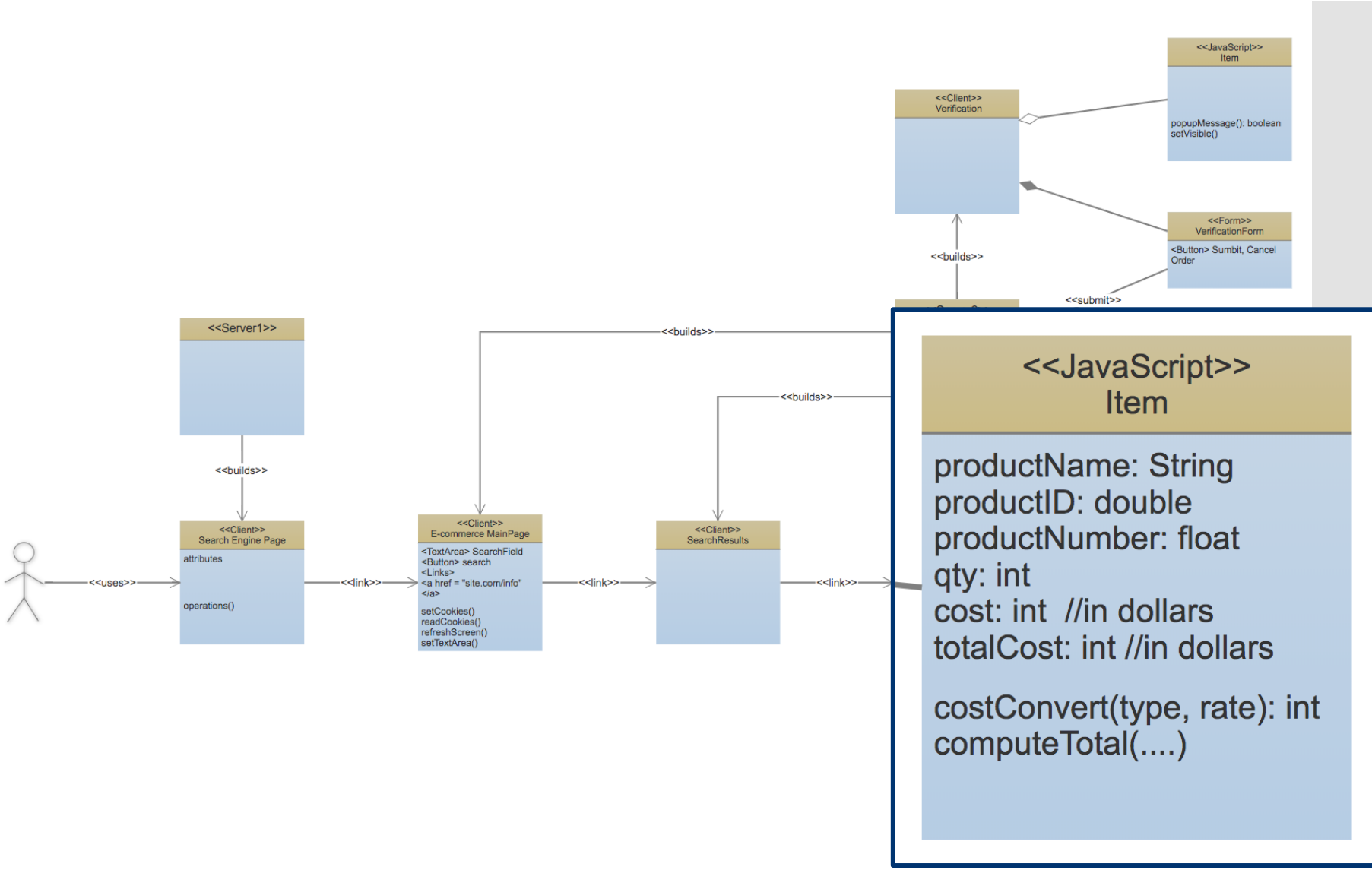
Example: use case diagram (high level)



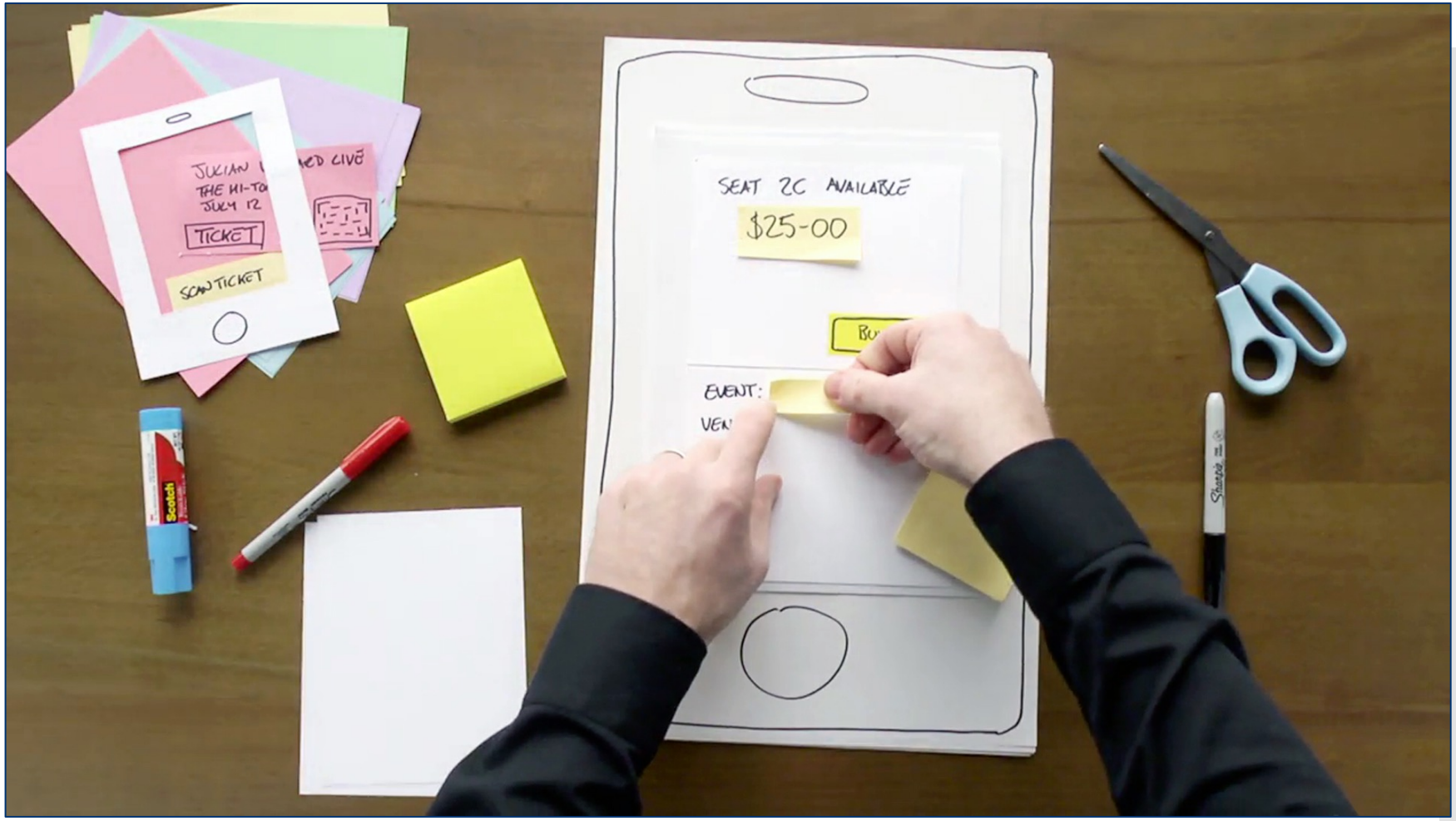
Example: activity diagram (mid level)



Example: class diagram (low level)



Your turn!



Work with a partner to create a paper prototype for a transit app. Take a picture of your prototype to turn in on PLATO.

Takeaways

- Thinking about your end user early → you're more likely to **build something that actually solves the problem**
- **"Low-fidelity" prototyping** saves time and energy by helping identify problems before you commit to code
- **Architecture diagrams** help you plan out your implementation so you don't run out of time
- Also, the process is **kinda fun**…