

# **CSE 440: Introduction to HCI**

## **User Interface Design, Prototyping, and Evaluation!**

### **Lecture 08: Task Analysis**

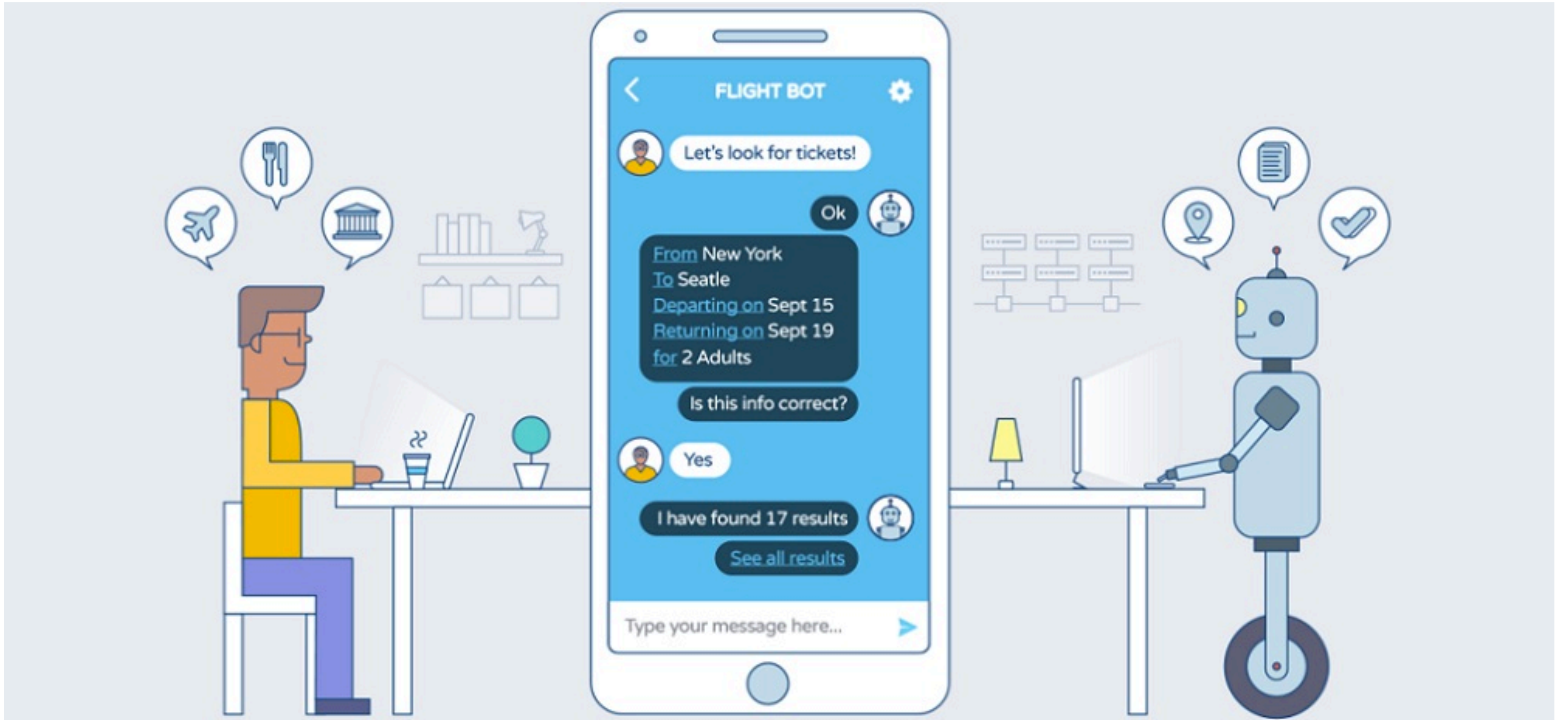
Instructor: Amy Zhang, 1/28/2021

# Today's Topics

- UI Hall of Fame and Shame
- Where are we now?
- Task Analysis
  - Task analysis questions
  - Selecting and describing tasks
- Team work time on task analysis questions and 2d

# UI Hall of Fame and Shame

# Chatbots!



## Learnability?

- Knowledge in the head vs knowledge in the world?



Please select an option above.

Let me see main menu



Please select an option above.

See original options



Please select an option above.

Go back to all choices



Please select an option above.

This bot is stupid



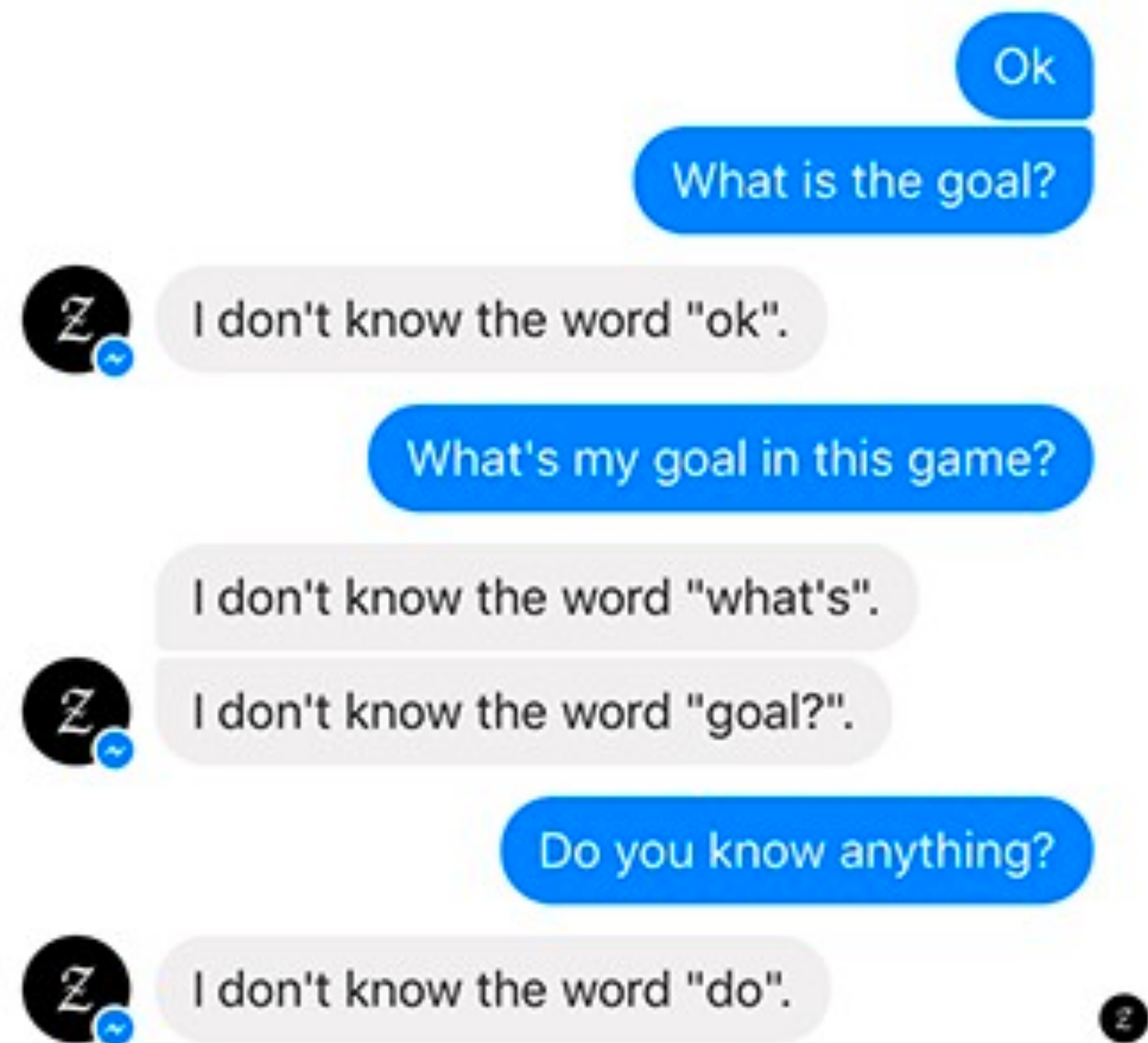
## Safety?

- Confirmation dialog vs. undo?



## Conceptual Models

- User mental model vs. interface model vs. system model



WED 7:18PM

Hi! I'm M, your personal assistant in Messenger. You can reach me here anytime!

I can help you with lots of things, like figuring out where to go to dinner, finding a great gift for someone, or planning your weekend. Just ask!



where should I get dinner tomorrow?

I'd be happy to help you find something to eat! What city are you located and what's some of your favorite types of food?



I work in Palo Alto

wait. Are you a real person, or an AI?


I use artificial intelligence, but people help train me!

I'll find some restaurant options for you in Palo Alto!







Do you possess a physical manifestation?

 I live right here in Messenger!

how old are you, M?

 I'm AI I don't have an age!

oh, and are you male or female?

 I'm just M! Is there a type of food you had in mind for dinner tomorrow?

I was thinking perhaps Italian? Btw, would you mind if I corrected your grammar? I think AIs with faulty English skills are absolutely outrageous – no offense.

 Sure thing!

what languages do you speak?

what's your Facebook profile ID?

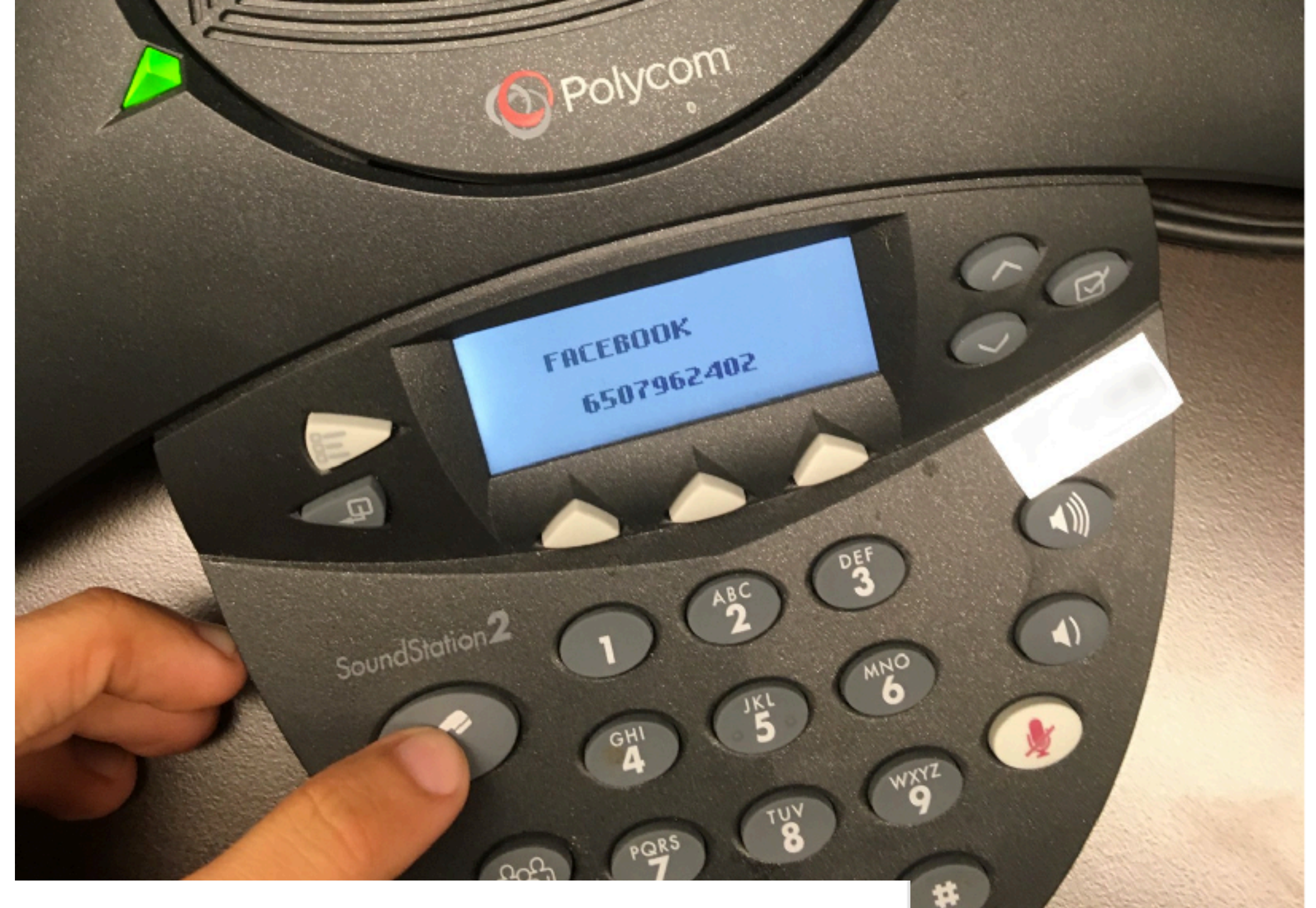
who is the lead engineer on your team?

how many people were involved in programming you?

do you own any Bitcoin?

do you ever feel like there's more to existence than residing in a chat app?





It looks like you gave me a mobile number, do you have the business number or address so I can find it? Alternatively, I'd be happy to find a repair shop open near you!

You keep saying that you're an AI, but the things you do seem to only be possible by humans. Are you 100% sure you're AI only, and that humans only train you, but don't actively help you type out responses?



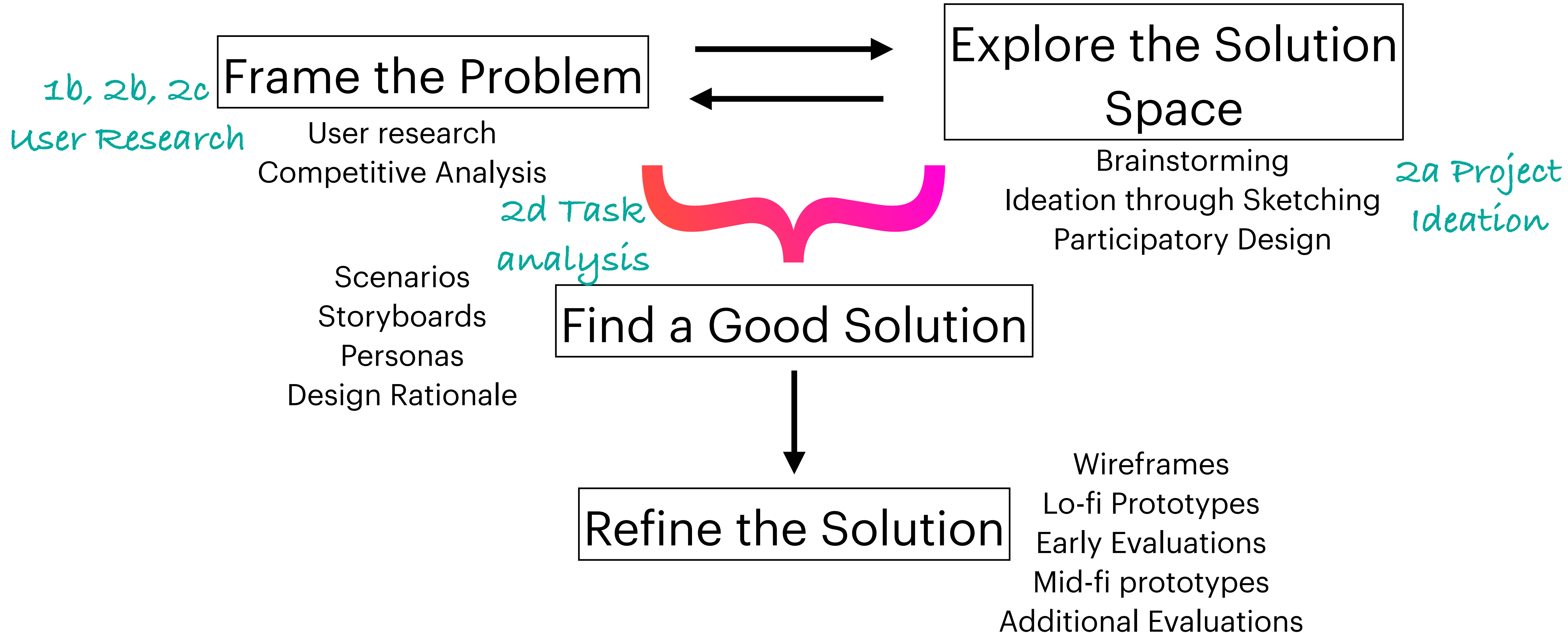
I'm M! I use artificial intelligence, but people help train me so I'll get better and better over time.



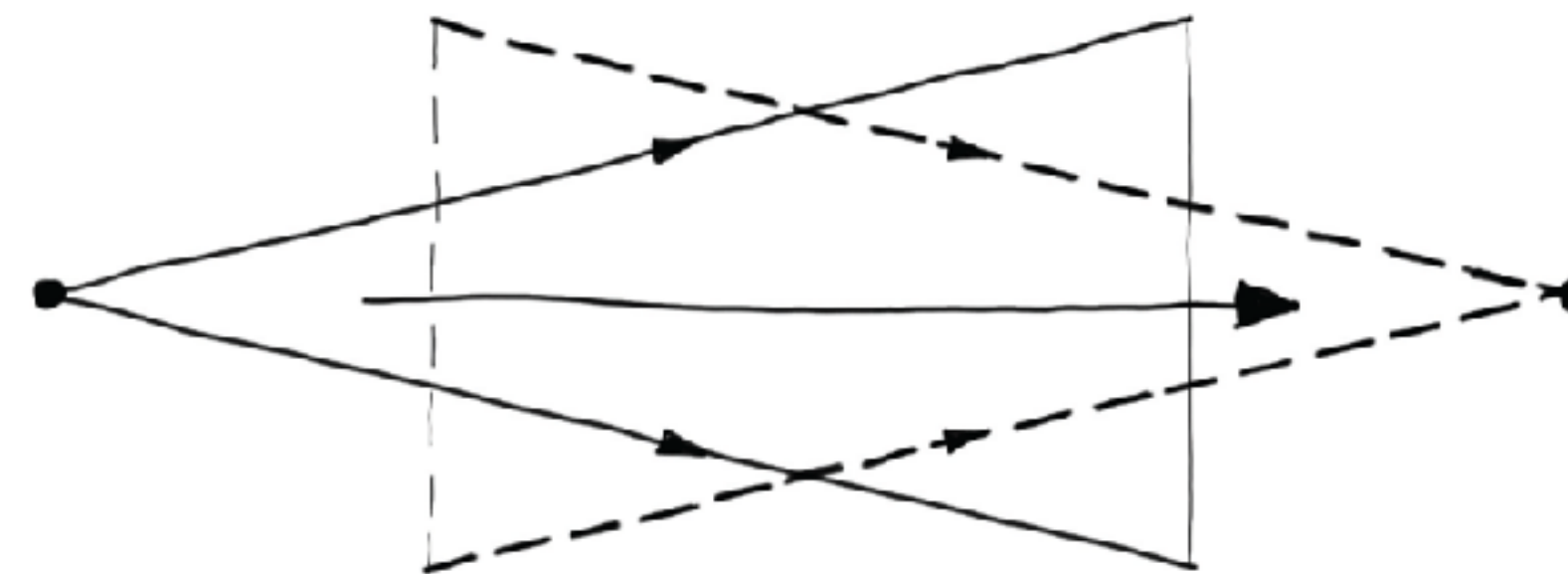
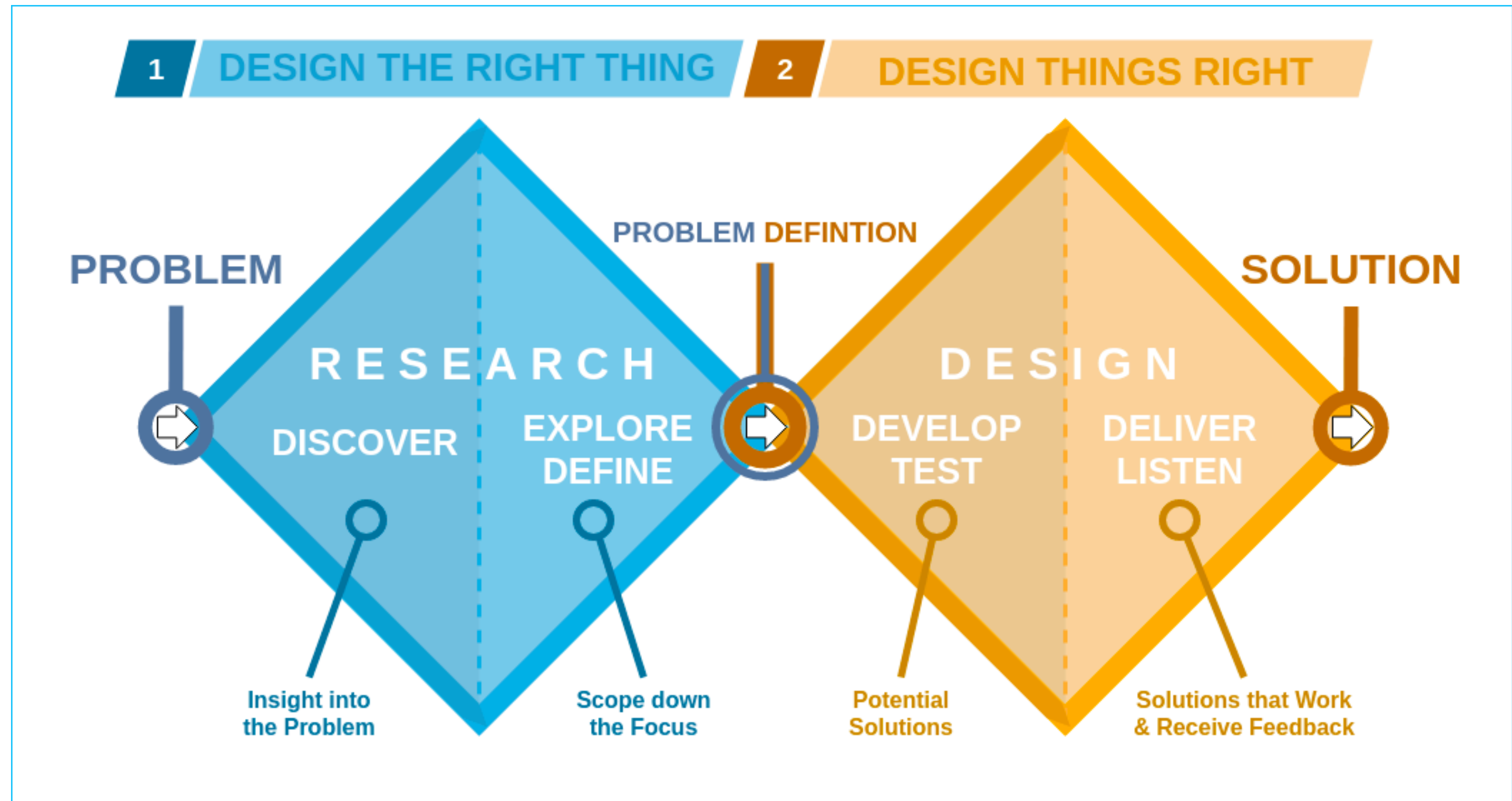
**Where are we now?**

# Where are we now?

1a: Three Project Proposals



- Assignment 2: Getting the Right Design
- Assignment 3: Getting the Design Right
- Focusing on solutions too early may mean you're missing the problem
- Focusing on solutions too late may mean finding a problem that cannot be tackled (in a few weeks)





# At this point...

- ...you have identified a potential target group
- ...you have brainstormed potential issues this target group may have and whether they can be solved by technology (this is ongoing)
- ...you planned your user research
- ...you started doing user research with a few participants, and are now revising, narrowing, and filling in the details of the issue you will address
- Remember that this is the most difficult part! Once you know the problem and are homing in on a potential solution, the rest is “easy” :)

# Task Analysis

# Task Analysis

- **How do people accomplish a specific task?**
  - Helps identify the tasks that your solution must support
  - Helps to find the simplest, most effective way of accomplishing a task
- Use in combination with other user research methods
  - Task Analysis is a **lens** on the information you obtain through other user research methods
  - Your assignments order the two, but in practice you should iteratively decide how to best draw upon all relevant methods throughout a process

# Task Analysis

- ...gathers both declarative and procedural knowledge
- **Declarative Knowledge**
  - Objects and Relationships
- **Procedural Knowledge**
  - Task sequences, goals, subgoals
  - Dependencies and constraints

# Task Analysis Questions



- Who is going to use the system?
- What tasks do they now perform?
- What tasks are desired?
- How are the tasks learned?
- Where are the tasks performed?
- What is the relationship between people & data?
- What other tools do people have?
- How do people communicate with each other?
- How often are the tasks performed?
- What are the time constraints on the tasks?
- What happens when things go wrong?

# Class Activity

- <https://www.yellkey.com/simple>
- Pick one of the following problems, and as we go over the questions, answer each question the best you can with your own perspective having encountered this in the past or taking from the IDEO video (in your assignment, you'll actually build off of user research to answer).
  - **[crowded]** I dislike using a shopping cart at the grocery store when it's crowded and want something to make it easier to get what I need.
  - **[unsafe]** I dislike using a shopping cart at the grocery store with my kids because it's unsafe and want a safer cart for them.
  - **[checkout]** I dislike waiting in line to check out at the grocery store with my shopping cart and want a design to avoid this.
  - If you want, you can pick some other problem.

# Question 1

- **Who is going to use the system?**
- Or, who is your main target audience (maybe split up into several personas)?
- Why personas?
  - Broad products need several “typical” consumers
- Some potentially important characteristics:
  - Background skills
  - Work habits and preferences
  - Physical characteristics and abilities

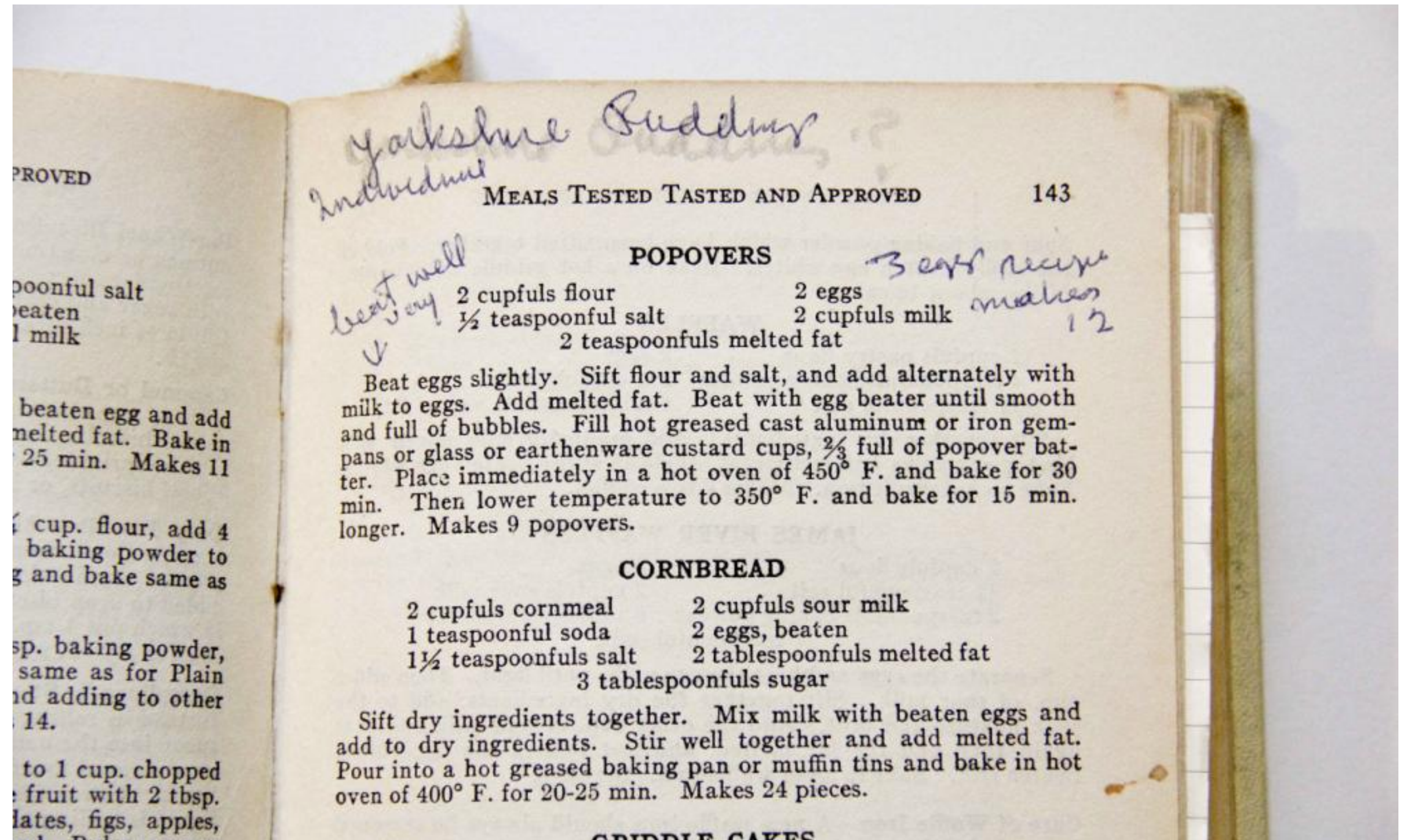
# Question 2 and 3

- **What tasks do they now perform?**
- **What tasks are desired?**
- Important for both automation and new functionality
- Relative importance of tasks
- Observe people, see it from their perspective
- Automated Billing Example
  - small dentists office changed the billing so that it was automated
  - assistants were unhappy with new system
  - old forms contained hand-written margin notes, e.g., “this patient’s insurance takes longer than most places”



# Question 2 and 3

- What tasks do they now perform?
- What tasks are desired?





# Question 4

- **How are the tasks learned?**
- What does a person need to know to perform the task?
- Do they need training?
  - academic
  - general knowledge / skills
  - special instruction / training

# Question 5

- **Where are the tasks performed?**
  - Office, laboratory, point of sale?
  - Effects of environment on people?
  - Are people under stress?
  - Confidentiality required?
  - Do they have wet, dirty, or slippery hands?
  - Soft drinks?
  - Lighting?
  - Noise?

# Question 6

- **What is the relationship between people & data?**
- Personal data
  - Always accessed at same machine?
  - Do people move between machines?
- Common data
  - Used concurrently?
  - Passed sequentially between customers?
  - Remote access required?
  - Access to data restricted?
  - Does this relationship change over time?

# Question 7

- **What other tools does a person have?**
- More than just compatibility
- How customer works with collection of tools
- Automating lab data collection example:
  - how is data collected now?
  - by what instruments and manual procedures?
  - how is the information analyzed?
  - are the results transcribed for records or publication?
  - what media/forms are used and how are they handled?

# Question 8

- **How do people communicate with each other?**
- Are the tasks collaborative? How do the people communicate, if so?
- Who communicates with whom?
- About what?
- Is there a “chain-of-command”? Does people follow the hierarchy of the organization? Against it?



# Question 9

- **How often are the tasks performed?**
- Frequent use likely remember more details
- Infrequent use may need more help
  - Even for simple operations
  - Make these tasks possible to accomplish
- Which function is performed
  - Most frequently?
  - By which people?
  - Optimizing for these will improve perception of performance
  - Careful about initial use scenario

# Question 10

- **What are the time constraints on the tasks?**
- What functions will people be in a hurry for?
- Which can wait?
- Is there a timing relationship between tasks?

# Question 11

- **What happens when things go wrong?**
- How do people deal with
  - task-related errors?
  - practical difficulties?
  - catastrophes?
- Is there a backup strategy?
- What are the consequences?

# Selecting and Describing Tasks

# Selecting Tasks

- Real tasks people have faced or requested in your user research
- Should provide reasonable coverage of things people experience
- Mixture of simple and complex tasks
  - easy tasks (common or introductory)
  - moderate tasks
  - difficult tasks (infrequent or for power use)

# Using tasks in design

- Write up a description of tasks
- Formally or informally, run by people and rest of the design team and get more information where needed

Manny is in the city at a restaurant and would like to call his friend Sherry to see when she will be arriving. She called from a friend's house while he was in the bus tunnel, so he missed her call. He would like to check his missed calls and find the number to call her back.

# Task: Park in a new neighborhood

Peter is going to brunch on a Sunday with his roommates. He is trying a new place he found on Yelp. He has the address for the place and he is using a smartphone GPS for directions. He leaves the apartment with his roommates at around 8:30am and he wants to beat the crowd so they won't have to wait in line. He is driving a Toyota Corolla that he has owned for five years. It is a rainy day and he doesn't have an umbrella.



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unknown neighborhood and restaurant facade

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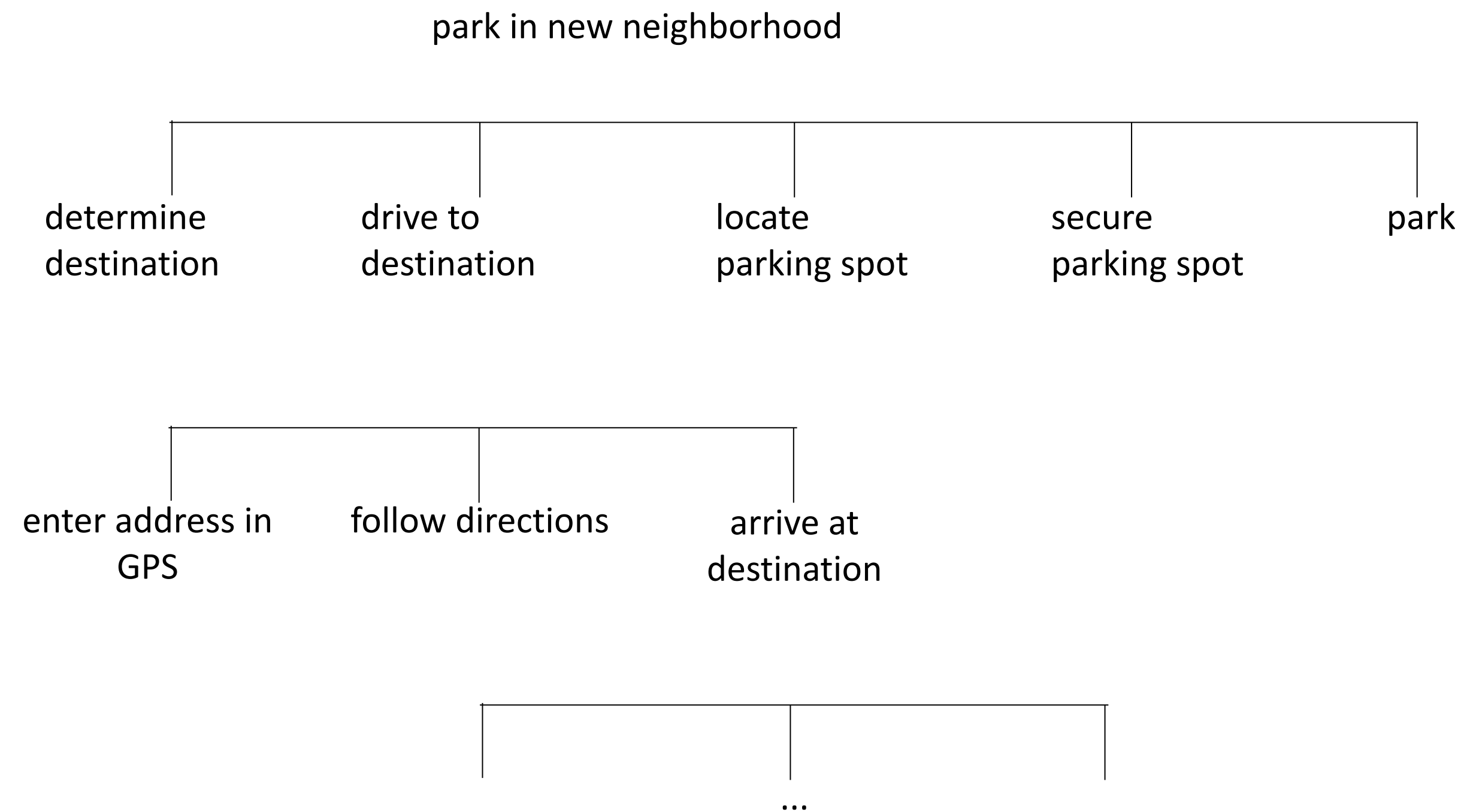
needs to find a parking spot close by so as to not cause further delays

# Types of task analysis

- Cognitive Task Analysis
  - focused on understanding tasks that require decision-making, problem-solving, memory, attention, and judgement
- Hierarchical Task Analysis
  - focused on decomposing a high-level task into subtasks

# Task: Park in a new neighborhood

Steps of the task execution (detailed in a hierarchy)



# Using Tasks in Design

- **Rough outline of an interface design (2e)**
  - discard features that do not support your tasks
  - major elements and functions, not too detailed
  - hand sketched
- **Produce scenarios for each task (2f)**
  - what person does and what they see
  - step-by-step performance of task
  - illustrate using storyboards

# Work on Task Analysis Questions and 2d

- In your team...
  - Which tasks did you observe when doing your user research with your first few participants?
  - Select a main task that you wish to support within the scope of your project.
  - Perform a task analysis. Use the questions presented today to guide your analysis. Copy the 11 questions into your Class Google doc and work on filling it out.
  - Mark where you need more information, i.e., where your user research will be particularly useful! This will help you focus your final user research sessions.
  - You can also start working on 2d (writing up 6 tasks).