

# CSE 440: Introduction to HCI

## User Interface Design, Prototyping, and Evaluation!

### Lecture 08: Task Analysis

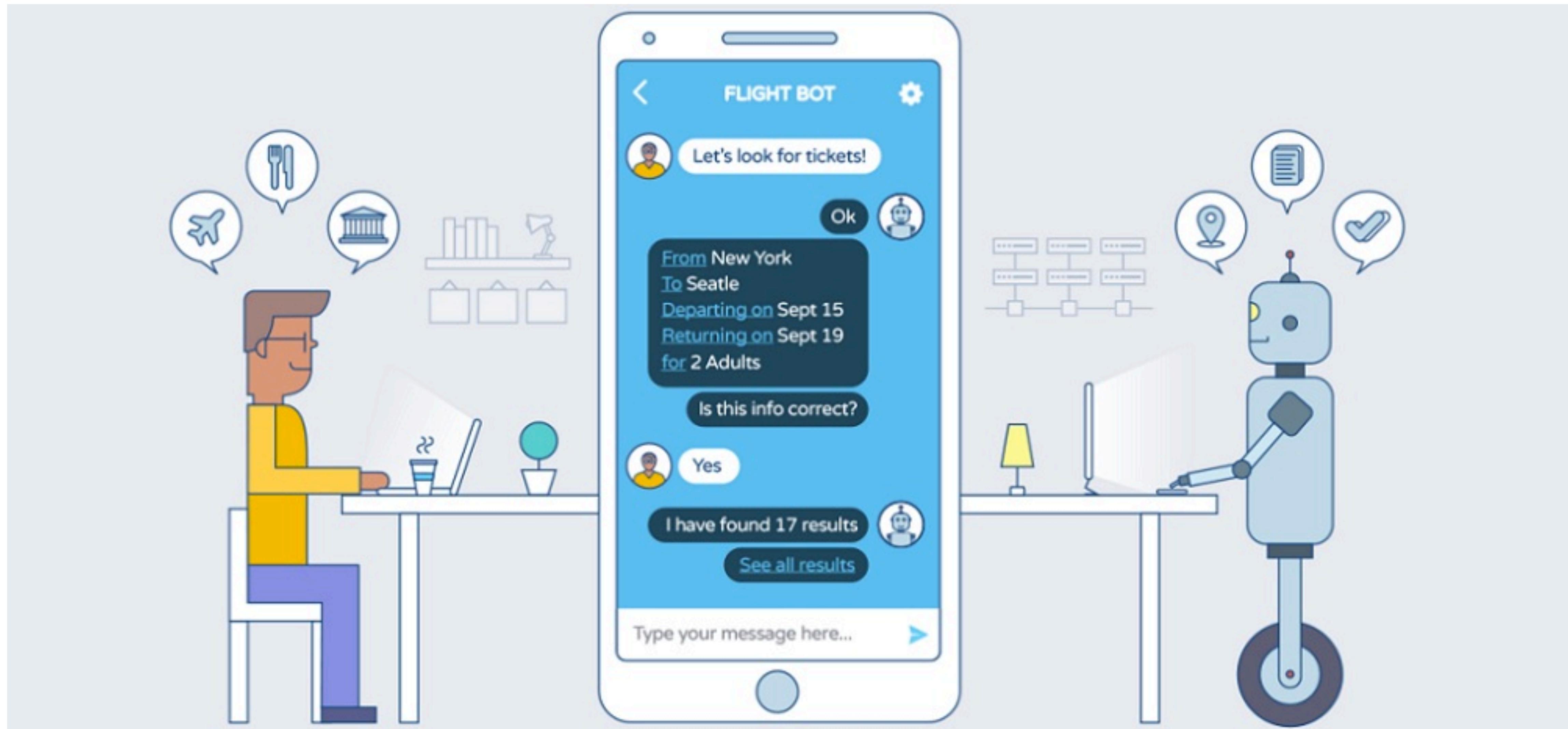
Instructor: Amy Zhang, 10/26/2021

# 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?



How may I help you today?

Hi, are you able to take refillable water bottles into the venue?

We don't have any events at the moment.



Can I help you with anything else?

Can you take water bottles in?

Sorry, we don't accept take away requests.



How else can I be of assistance?

Can I bring my reusable water bottle?

We don't allow dogs on the premises



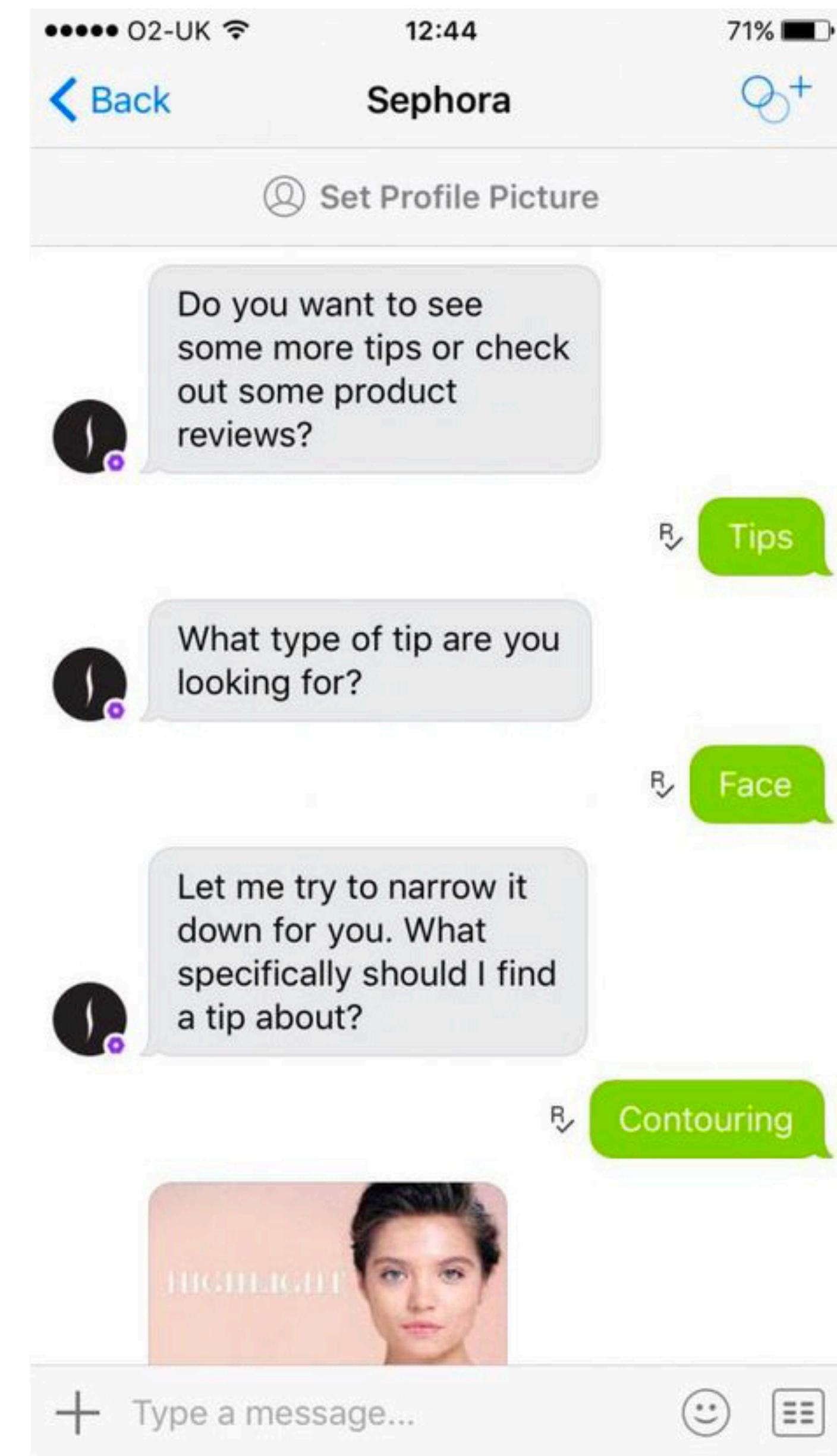
What else can I help you with?

This is useless 🤦

Send a message...

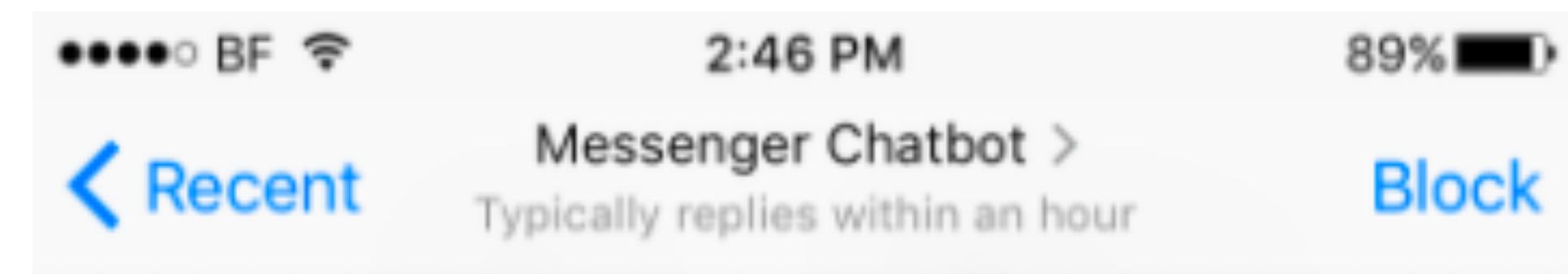
# Efficiency?

- How fast does it take to do what you want if you already know what to do?



## Safety?

- Confirmation dialog vs. undo?



All right. Anything else to add to  
your shopping cart ?



add 4 apples

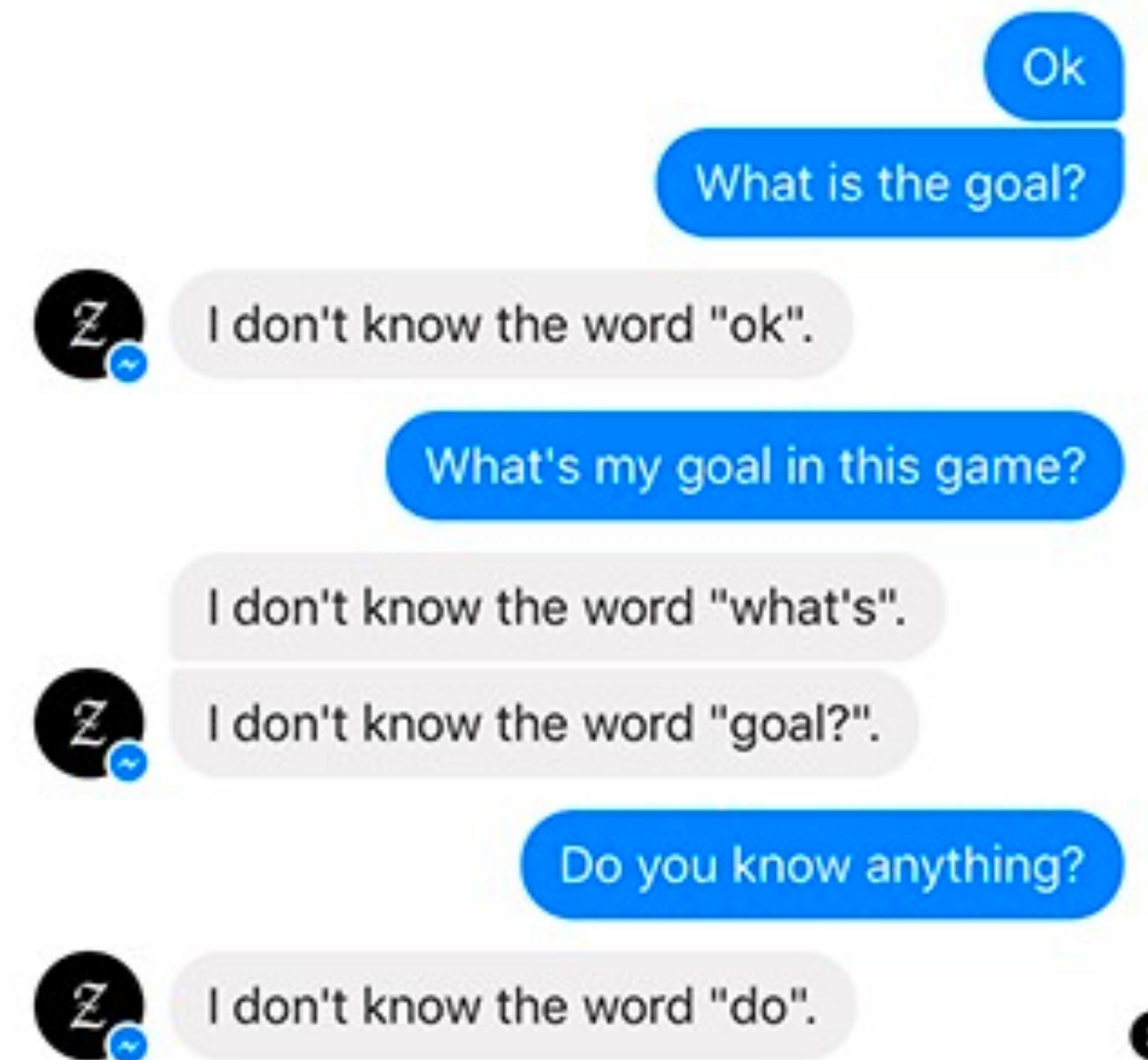
i meant, 4 bananas

OK, I added to your shopping  
cart: 4 apples, 4 bananas



## 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!

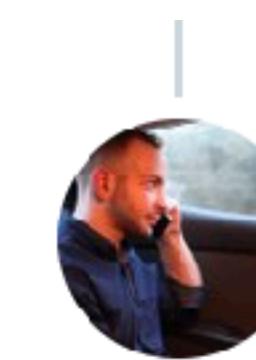
You keep saying that you're an AI, but the things you do seem to only be possible by humans. Are you 100% sure you're AI only, and that humans only train you, but don't actively help you type out responses?

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

Speaking of Facebook, a lot of Facebook internal documents were leaked yesterday (search “Facebook Files” or “Facebook Papers”) on the myriad problems with this platform.

In one document, they present some user research with first-time Instagram Stories users finding they are afraid and overwhelmed by the user interface.

These UX issues are failures related to both Learnability and Safety!



Alex Kantrowitz   
@Kantrowitz

...

## Why teens won't post stories, per Facebook: They fear broadcasting and are overwhelmed by Instagram's user interface.

### TL;DR: Product Barriers for teen and young adult first-time Story producers

Help me understand the rules of making Stories. What all can I do here and why?

Fear of broadcasting while they're exploring functionality prevents them from starting and completing

- Participants were unsure what would happen if they clicked certain buttons (e.g. Your Story on Home, and Done during the creation flow).
- Some participants did not expect “Your Story” in the creation flow to publish, and they inadvertently broadcast stories they were not ready to, which made them feel embarrassed.

The Stickers Tray contains more than participants expect. The misleading icon prevents new producers from discovering the buried treasure within.

- First-time producers were surprised to see interactive elements, GIFs, and music within the Stickers tray. When trying to create a Story with those elements, they quickly dismissed Stickers as the entrypoint to do so.
- Participants don't think it's possible to add music during post-cap because they expect an audio-related icon. They see music as being in the background, not something that goes on top of a Story like a Sticker icon suggests.

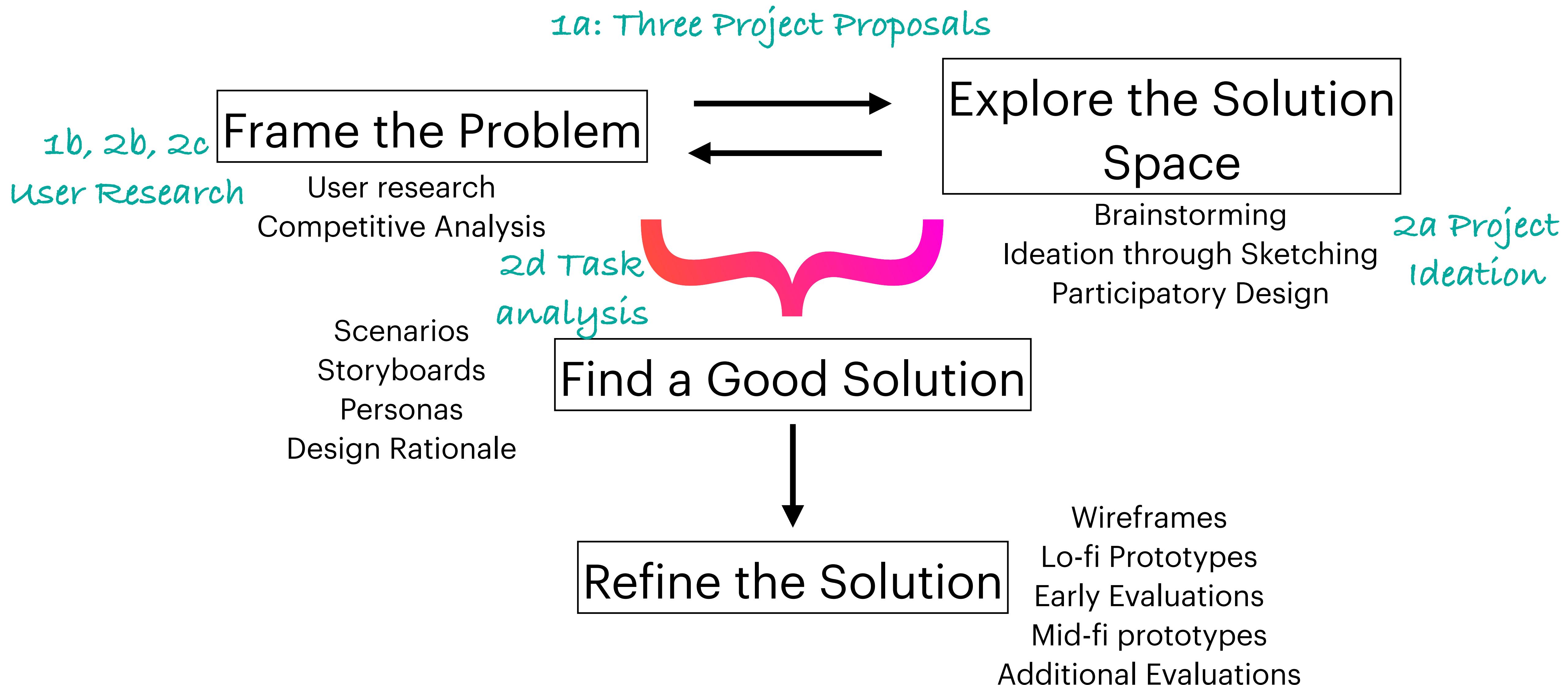
Menus, entry points, and options are overwhelming and cause paralysis for new producers.

- Participants who haven't been on IG when feature changes happened over time feel overwhelmed when they try to produce for the first time.
- Participants resort to Google or asking a friend to learn how to create Stories. They expect it to take a lot of time if they try to learn on their own.
- Unified camera adds more complexity and some participants thought Reels was the only way to do certain things (e.g. use music), but it was too confusing to use so they gave up.

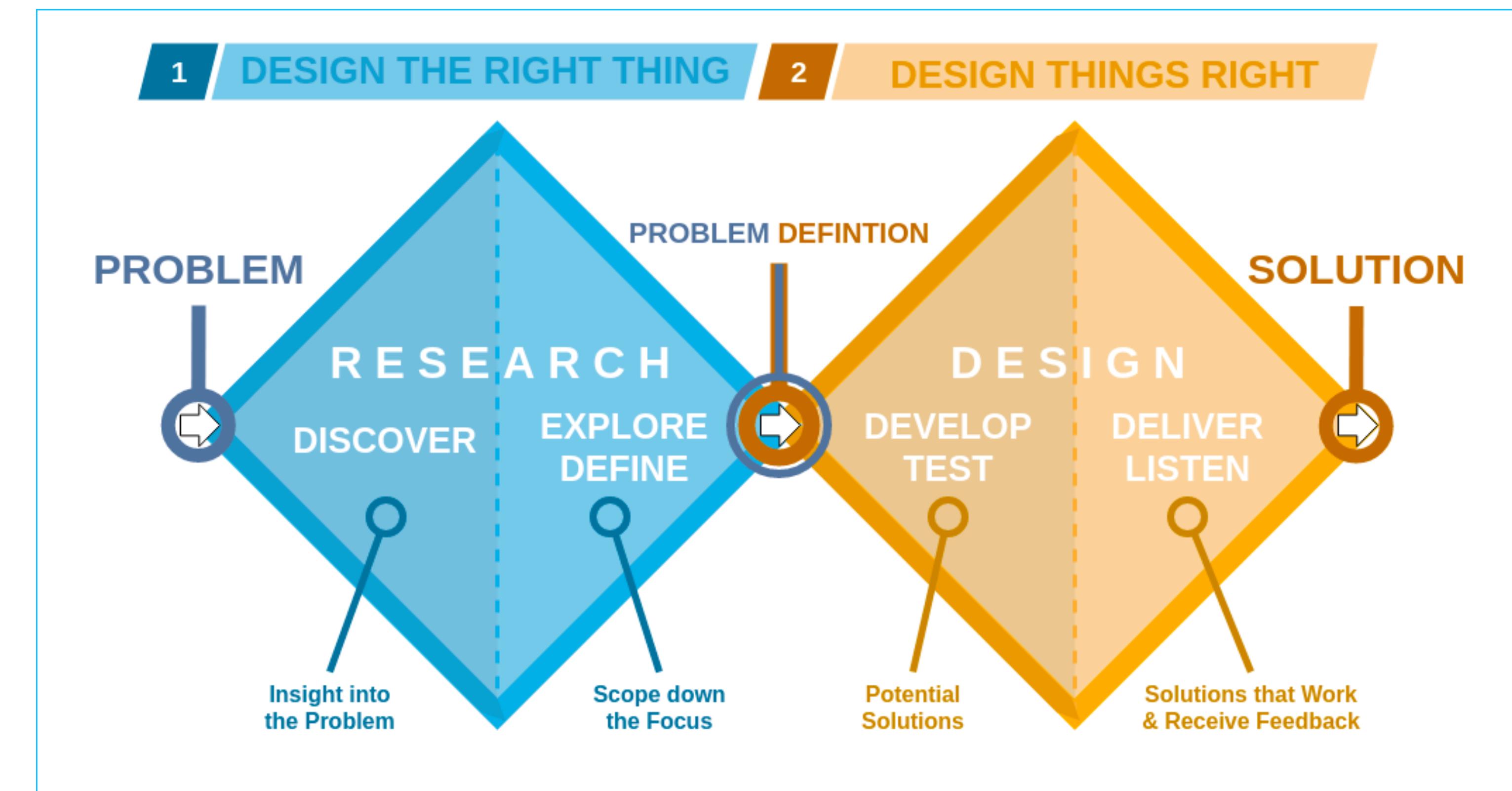
REDACTED FOR CONGRESS

**Where are we now?**

# Where are we now?



- 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've done user research with participants that have either confirmed the issues you've brainstormed or caused you to change directions/go back to the drawing board (totally normal and expected by the way!)
- ...you 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?

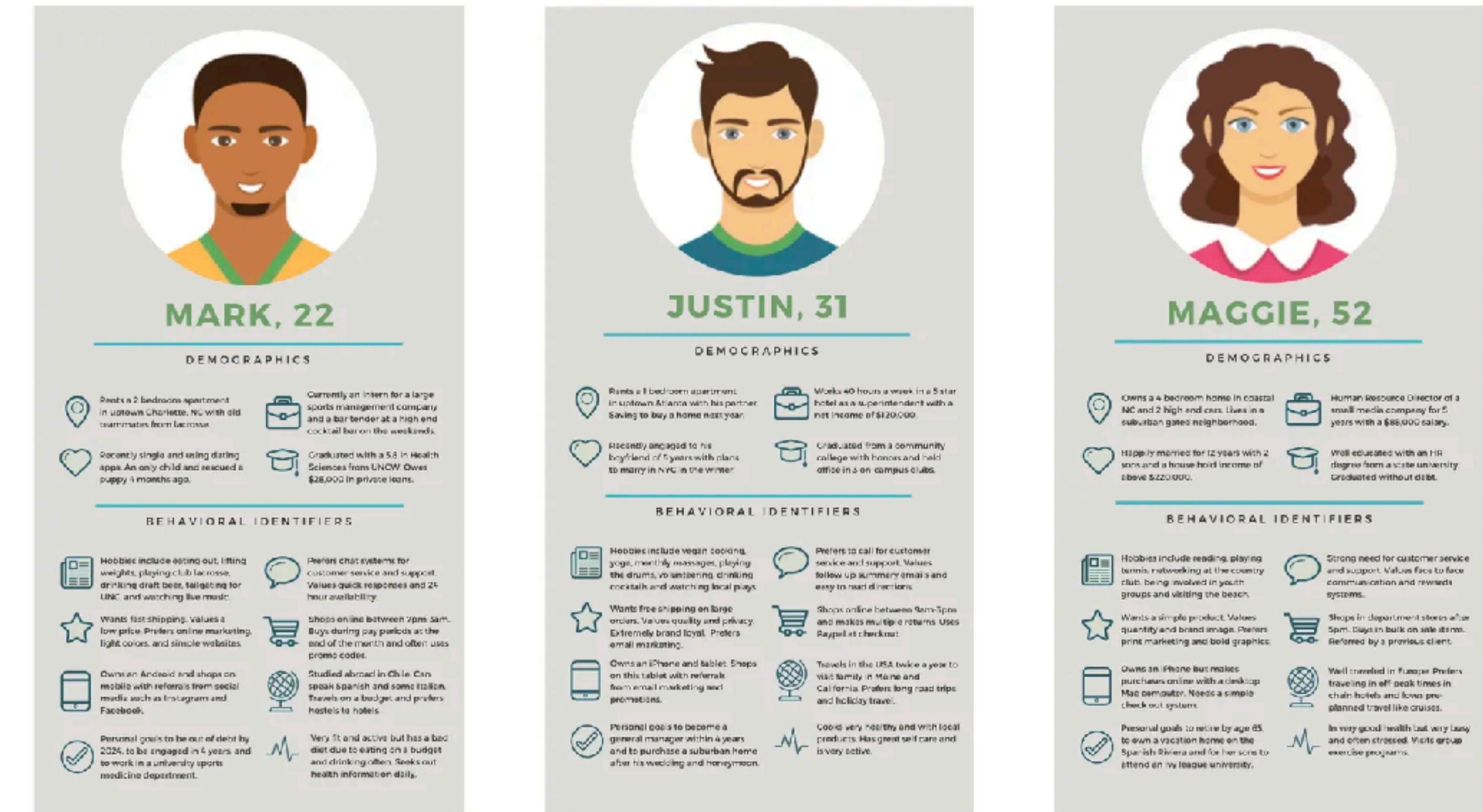
# Class Activity

- <https://tinyurl.com/48yzu8wh>
- As we go over the questions, answer each question the best you can with your own perspective having either encountered this in the past or taking from the IDEO video (in your assignment, you actually built off of your user research to answer these).
- Problem:
  - **[checkout line experience]** I dislike my experience checking out at the grocery store with my shopping cart and want a design to improve this.
    - You can pick either the traditional checkout experience or a newer one like self-checkout
    - You can also pick your own group's target experience/task if you want to revisit your answers to questions from 2c.

# Question 1

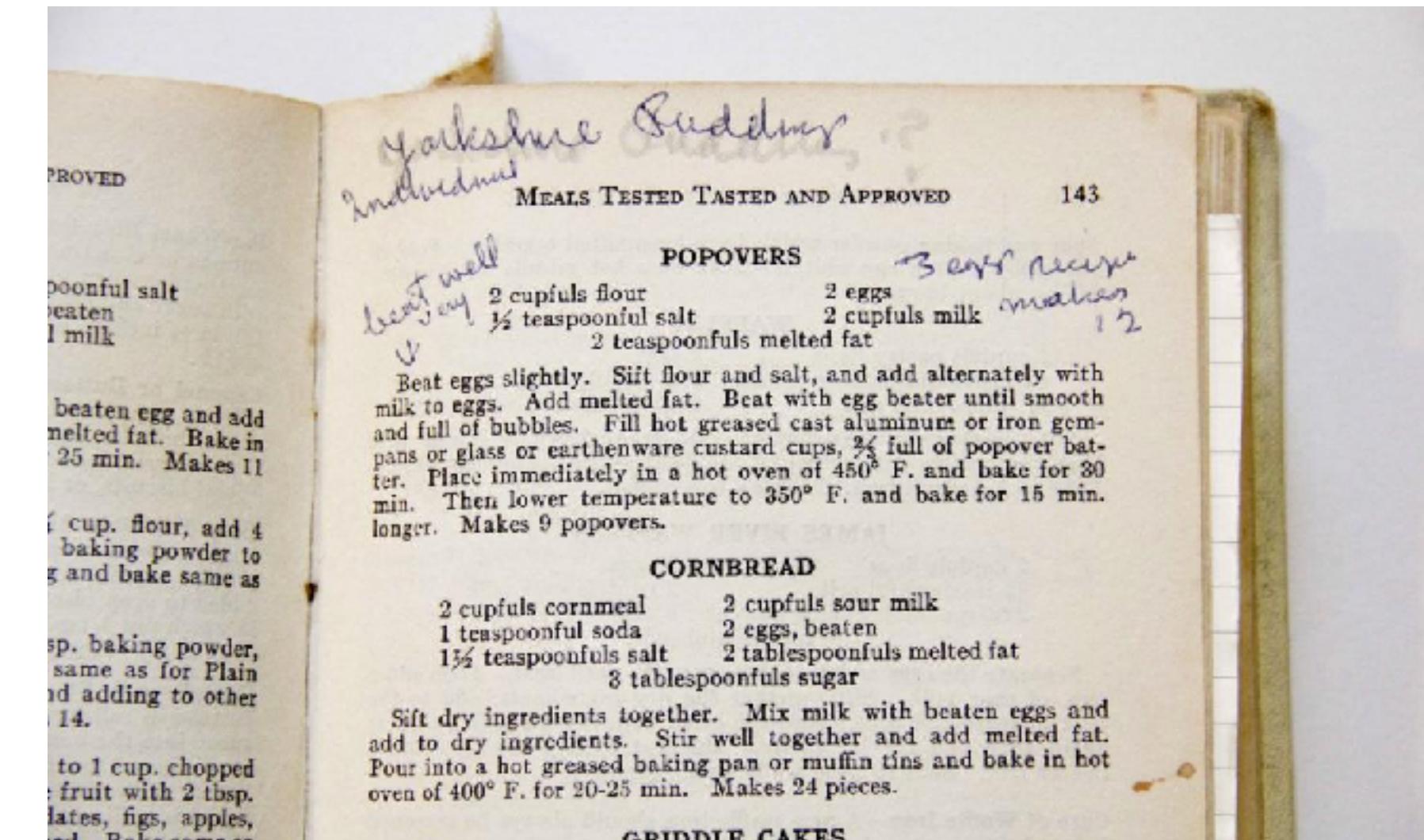
- **Who is going to use the system?**

- Or, who is your main target audience (could possibly split up into several personas)?
- Why personas?
  - Broad products need several “typical” consumers
  - But be careful with personas - they have become criticized lately as a source of stereotyping. Make sure if you do this, you draw from your user research!
- 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 Case Study
  - 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 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 users)

# Using tasks in design

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

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.

# 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.

# Task: Park in a new neighborhood

unknown neighborhood and restaurant facade

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.

# Task: Park in a new neighborhood

unknown neighborhood and restaurant facade

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.

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

# Task: Park in a new neighborhood

unknown neighborhood and restaurant facade

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.

not the best driving conditions, roads might also be busy because weekend

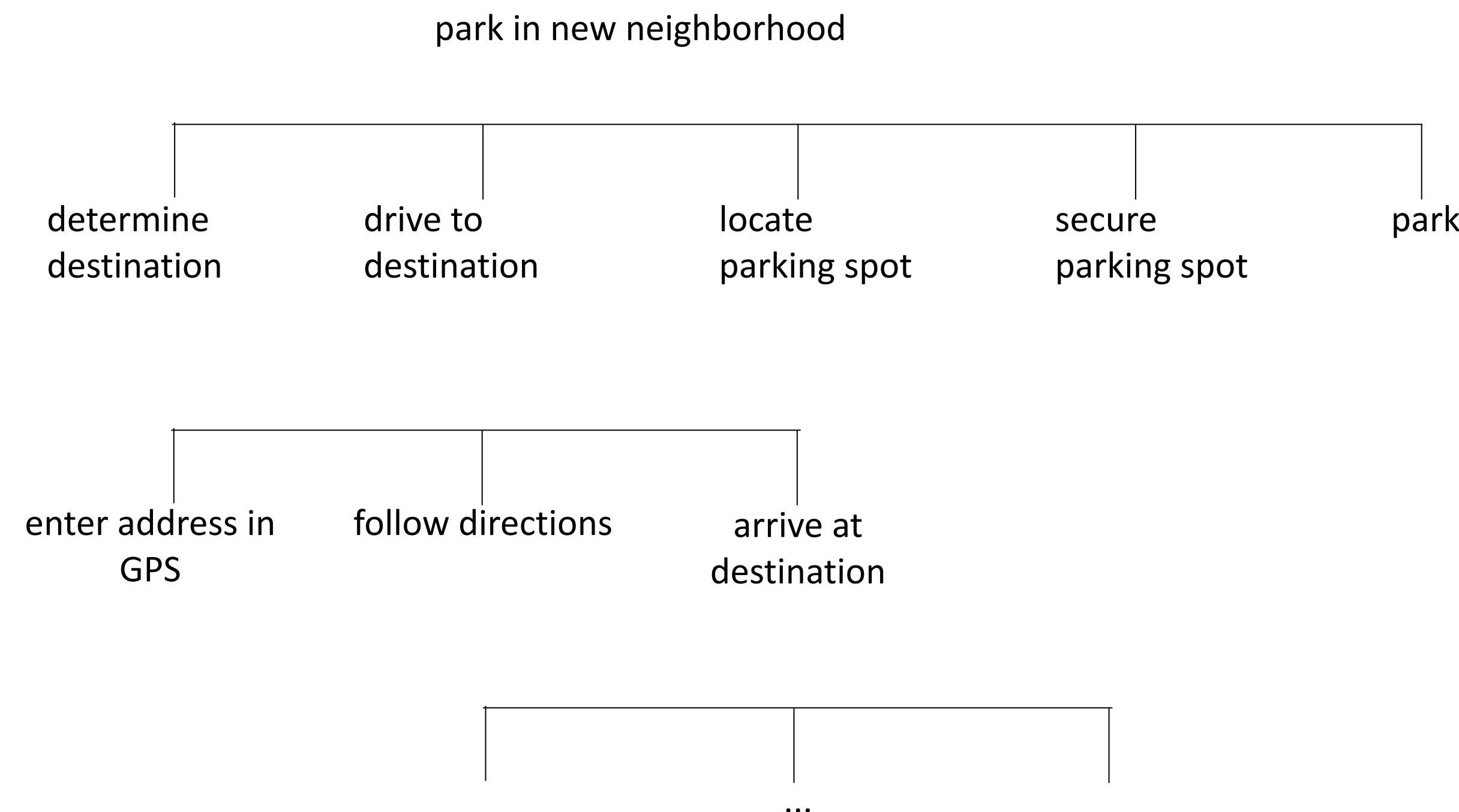
needs to find a parking spot close by so as to not cause further delays

# 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 storyboard for each task (2f)**
  - scenario of what person does and what they see
  - step-by-step performance of task
  - illustrate using storyboards

# Group Work time on 2d

- In your team...
  - Which tasks did you observe when doing your user research with your first few participants?
  - Select the main tasks that you wish to support within the scope of your project.
  - Perform a task analysis. Use the questions presented today and that you filled out for 2c as a starting point.
  - Mark where you need more information, i.e., where you might want to go back to your user research data or ask a few more subjects.
  - Work on converting those to 6 task stories (some easy and some hard, some existing and some new).