

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 05:
Task Analysis

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Alex Fiannaca
Lauren Milne
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Tuesday/Thursday
12:00 to 1:20



Today's Plan

Things To Talk About

Groups vs. Teams

Task Analysis

Plantr Task Analysis

Tasks in Design

Course Notes and Reminders

Room Switch

1:30 section now in MGH 254

Reading 2 for Tomorrow

Project Progression

Context Inquiries Should Be In Progress

At Least 1 inquiries due Tomorrow

At Least 3 inquiries due Tuesday, with analysis
(first of your “larger” milestones)

Then we switch to tasks and design ideas

6 tasks due Friday 10/23

3x4 designs x tasks due Tuesday 10/27

1x2 design x tasks due Friday 10/30

Look at prior projects for where we are going

Aways and Team Responsibility

Many of us have legitimate times to be away

We pay attention to participation

It is an element of your grade

We will gather peer feedback

But your real commitment is to your team

Be sure you communicate your aways

Be sure you manage your commitments

Let us know if there are issues

Structure of Section

Sections focus on critique

Bring your artifacts, be ready to present them

Bring paper, keep the laptops put away

Rotation of 2 staff and 3 teams in each section

For some random assignment of teams A, B, C:

Time: 0 15 30

Staff 1: Ac Ba Cb

Staff 2: Bc' Ca' Ab'

Themes in Questions and Feedback

You are not doing science

You seek innovative insight, not knowledge or truth

Do the best design work you can

May need additional inquiries

May be using other methods

May find that self-tracking is not the opportunity

We designed this project sequence, but be flexible

Capture and keep your raw work products

Our collection is minimal, but you will want them

Structure to Ease Observation / Diaries

Time	Stage 1	Stage 2	Stage 3
0:00			
0:15			
0:30			
0:45			
1:00			
1:15			
1:30			
1:45			

Need							
Mon	Tue	Wed	Thu	Fri	Sat	Sun	
12am-3am	3am-6am	6am-9am	9am-12pm	12pm-3pm	3pm-6pm	6pm-9pm	9pm-12am
You needed: <input checked="" type="checkbox"/> Info. <input checked="" type="checkbox"/> Assist. <input type="checkbox"/> Other							
What did you need? <u>to know if stroller could be used on Duvvally Trail</u>							
Why did you need it? <u>wanted to take baby to park in trail but it must be ice-free</u>							
Where were you? <u>at home</u>							
What were you doing? <u>planning activity</u>							
When did you need it? <u>5-10 mins</u>							
What I needed was very important.							
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree			

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The Discipline of Teams

Teams produce both **individual contributions** and **collective work-products**

Teams establish a social contract that relates to their purpose and guides and obligates how they must work together

“We hold ourselves accountable” is a strict requirement, whether or not a “boss” does

Groups vs. Teams

There is a place for groups:

Working groups are both prevalent and effective in large organizations where individual accountability is most important. The best working groups come together to share information, perspectives, and insights; to make decisions that help each person do his or her job better; and to reinforce individual performance standards. But the focus is always on individual goals and accountabilities.

Groups vs. Teams

Teams differ fundamentally from working groups

... they require both individual and mutual accountability. Teams rely on more than group discussion, debate, and decision; on more than sharing information and best practice performance standards. Teams produce discrete work-products through the joint contributions of their members. This is what makes possible performance levels greater than the sum of all the individual bests of team members.

A team is more than the sum of its parts.

Groups vs. Teams

Groups

strong leader

individual accountability

organizational purpose

individual work products

efficient meetings

measures performance

by influence on others

delegates work

Teams

shared leadership

individual & mutual
accountability

specific team purpose

collective work products

open-ended meetings

measures performance

from work products

does real work together

Examples we have seen?

Keys to Team Success

Common commitment

requires a purpose in which team members believe

Specific performance goals

comes directly from the common purpose

helps maintain focus, starts with something achievable

A right mix of skills

technical/functional expertise (e.g., writing/visual/coding)

problem-solving & decision-making skills

interpersonal skills

Agreement and mutual accountability

who will do particular jobs, when to meet & work, schedules

Why this Reading?

School has taught you to succeed as an individual

Too many projects are done in groups

Drawing boundaries between code responsibilities

This class requires you to work as teams

Do not try to divide it up and stitch it together

Use complementary skills, be mutually accountable

Have faith in your teammates and their execution

The “real world” requires this too

Why this Reading?

As you read, think about prior groups and teams

In this class, you are a “team that does things”

Pay attention to “teams that recommend things”

HCI is often a minority interest

Need to work to ensure the impact of your work

Involve stakeholders early, not just at the end

Organize as a team:

Get to know each other

Figure out strengths of team members

Consider assigning each person a primary role

Responsible for seeing work is organized and done

Not responsible for doing it themselves

Be proud, include names/roles in artifacts

Group Manager (coordinate big picture)

Documentation (coordinate writing)

Design (coordinate visual/interaction design)

Testing (coordinate iterative testing)

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Tasks Matter

System will fail if:

It is inappropriate for the customer

It does not meet customer needs

Your contextual inquiries will emphasize getting to know your customers and their needs

Can't you then just make 'good' interfaces?

Why Task Analysis?

‘Good’ has to be interpreted in the context of use

Might be acceptable for office work, but not for play

Infinite variety of tasks and customers

Guidelines are too vague to be generative

e.g., “give adequate feedback”

Can be used to critique, but not to generate

Design is often about tradeoffs

Examples we have seen?

Why Task Analysis?

Task analysis is a lens on the information you obtain through methods like contextual inquiry

Use what you learned in your inquiry to answer the questions in the task analysis

Your assignments order the two, but in practice you should iteratively decide how to best draw upon all relevant methods throughout a process

11 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?

Question 1

Who is going to use the system?

Identity

In-house or specific customer is more defined

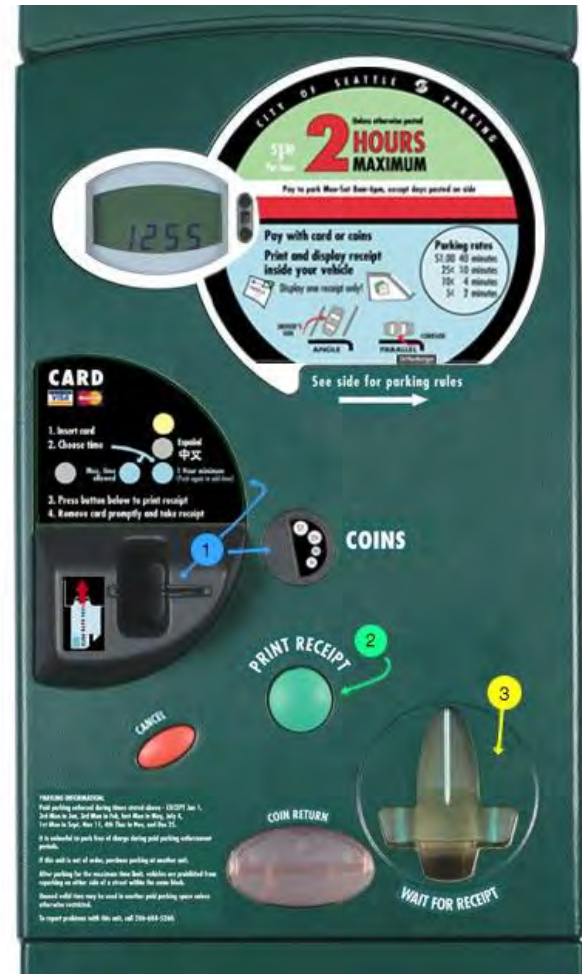
Broad products need several typical consumers

Background

Skills

Work habits and preferences

Physical characteristics and abilities



Seattle Parking Meter

Who is going to use the system?

Identity?

People who park in Seattle

Business people, students, elderly, tourists

Background?

Have used parking meters before

May have an ATM or credit card

Have used other fare machines before

Seattle Parking Meter

Who is going to use the system?

Skills?

May know how to put cards into ATM

Work habits and preferences?

Park several times a week, a month, a year

Physical characteristics and abilities?

Varying heights, do not make it too high or too low

Anything else?

PARK, PAY & DISPLAY

Parking Pay Station Instructions



Insert card and push **BLUE** button to buy time **OR** Insert coins to buy time



Push **GREEN** button to print receipt

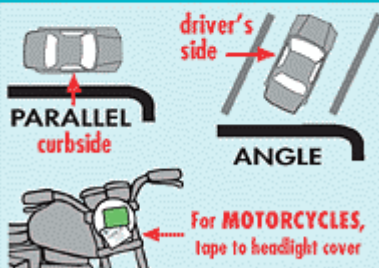


Remove card quickly wait for receipt and display properly



Display one receipt only to park in any meter or pay station space until your time expires

Use the removable backing to tape receipt to **INSIDE** of a front-seat side window



Questions? Call 684-ROAD (7623)
paystations@seattle.gov



泊車、付款並顯示

泊車付費站使用說明



插入卡並按 **藍色** 按鈕購買時間，或投入硬幣購買時間



按綠色按鈕打印收據

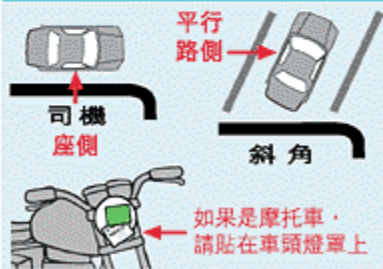


迅速將卡取出等候收據並適當顯示



僅限顯示一張收據，以便在任何咪表或付費站的車位泊車，直到您的時間到期

請使用可剝離的背面，將收據貼在前座側車窗內側



有問題嗎？請致電 684-ROAD (7623)
paystations@seattle.gov



ĐẬU XE, TRẢ TIỀN & DÁN BIÊN NHẬN

Hướng Dẫn về Trạm Trả Tiền Đậu Xe



Đút thẻ vào và bấm nút **XANH** để mua giờ **HOẶC** Bỏ tiền cắc để mua giờ



Bấm nút **XANH** để in biên nhận

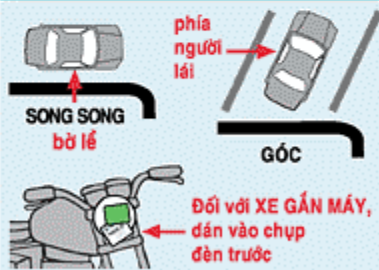


Rút nhanh thẻ ra chờ biên nhận và dán đúng cách



Chỉ dán một biên nhận để đậu xe tại bất cứ chỗ nào có đồng hồ hoặc trạm trả tiền cho đến khi hết giờ đậu

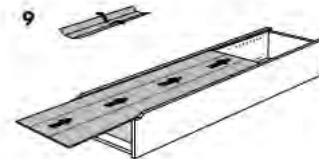
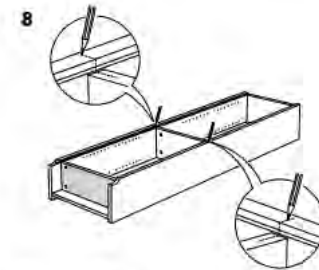
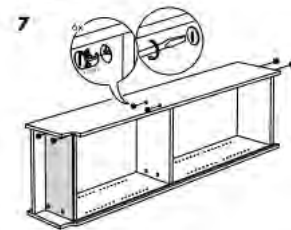
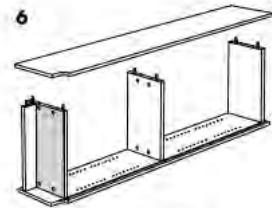
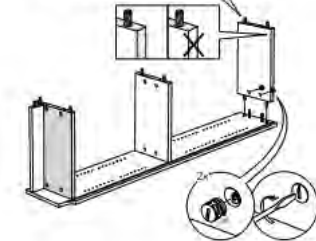
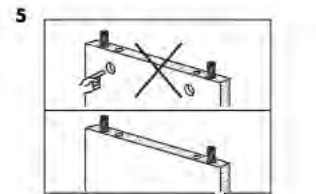
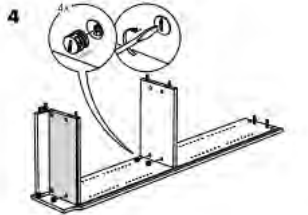
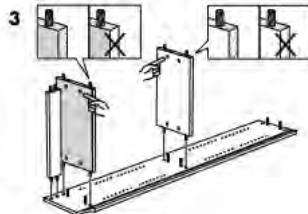
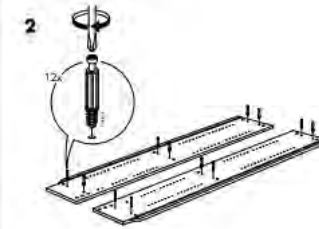
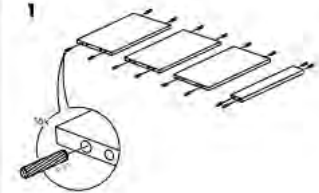
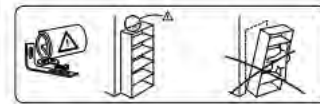
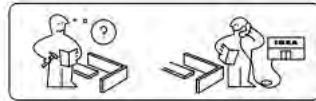
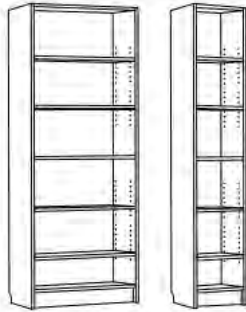
Dùng miếng dán mặt sau có thể gỡ ra để dán biên nhận vào **MẶT TRONG** của kính bên trước



Thắc Mắc? Hãy gọi số 684-ROAD (7623)
paystations@seattle.gov



BILLY





365x

94
Pu
(244)

90,000,000x

1.21gw

45,000x

1x

20,000x

HÖUSS

Design and Quality
90% of Sweden

4x 1x 4x 7,450x

1x 1x

✓

✗

Question 2 and Question 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 had billing automated

assistants were unhappy with new system

old forms contained hand-written margin notes

e.g., patient's insurance takes longer than most

Yorkshire Pudding
Individual

POPOVERS

beat well
1/2 cup
↓

3 egg recipe
makes
12

- 2 cupfuls flour
- 2 eggs
- 1/2 teaspoonful salt
- 2 cupfuls milk
- 2 teaspoonfuls melted fat

Beat eggs slightly. Sift flour and salt, and add alternately with milk to eggs. Add melted fat. Beat with egg beater until smooth and full of bubbles. Fill hot greased cast aluminum or iron gempans or glass or earthenware custard cups, 2/3 full of popover batter. Place immediately in a hot oven of 450° F. and bake for 30 min. Then lower temperature to 350° F. and bake for 15 min. longer. Makes 9 popovers.

CORNBREAD

- 2 cupfuls cornmeal
- 2 cupfuls sour milk
- 1 teaspoonful soda
- 2 eggs, beaten
- 1 1/2 teaspoonfuls salt
- 2 tablespoonfuls melted fat
- 3 tablespoonfuls sugar

Sift dry ingredients together. Mix milk with beaten eggs and add to dry ingredients. Stir well together and add melted fat. Pour into a hot greased baking pan or muffin tins and bake in hot oven of 400° F. for 20-25 min. Makes 24 pieces.

CRIDDLE CAKES

Question 4

How are the tasks learned?

What does a person need to know?

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 customers?

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?

Who communicates with whom?

About what?

Follow lines 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?

e.g., pregnancy in web search

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 Tasks

Real tasks people have faced or requested

collect any necessary materials

Should provide reasonable coverage

compare check list of functions to tasks

Mixture of simple and complex tasks

easy tasks (common or introductory)

moderate tasks

difficult tasks (infrequent or for power use)

What Should Tasks Look Like?

Say what person wants to do, but not how

allows comparing different design alternatives

Be specific, stories based in concrete facts

say who person is (e.g., using personas or profiles)

design can really differ depending on who

give names (allows referring back with more info later)

characteristics of person (e.g., job, expertise)

story forces us to fill in description with relevant details

Sometimes describe a complete “accomplishment”

forces us to consider how features work together

Using Tasks in Design

Write up a description of tasks

formally or informally

run by people and rest of the design team

get more information where needed

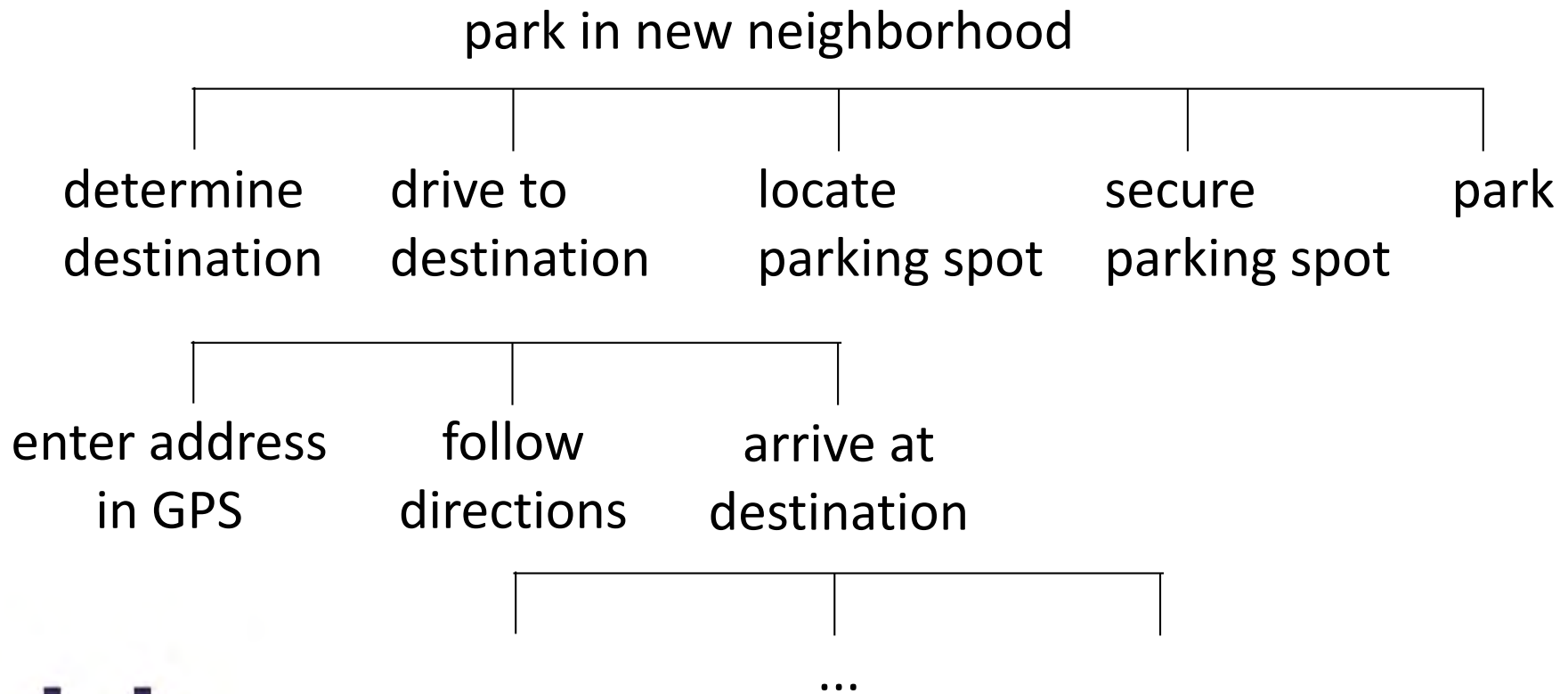
Manny is in the city at a restaurant and would like to call his friend Sherry to see when she will be arriving. She called from a **friend's** house while he was in the bus tunnel, so he missed her call. He would like to check his missed calls and find the number to call her back.

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.

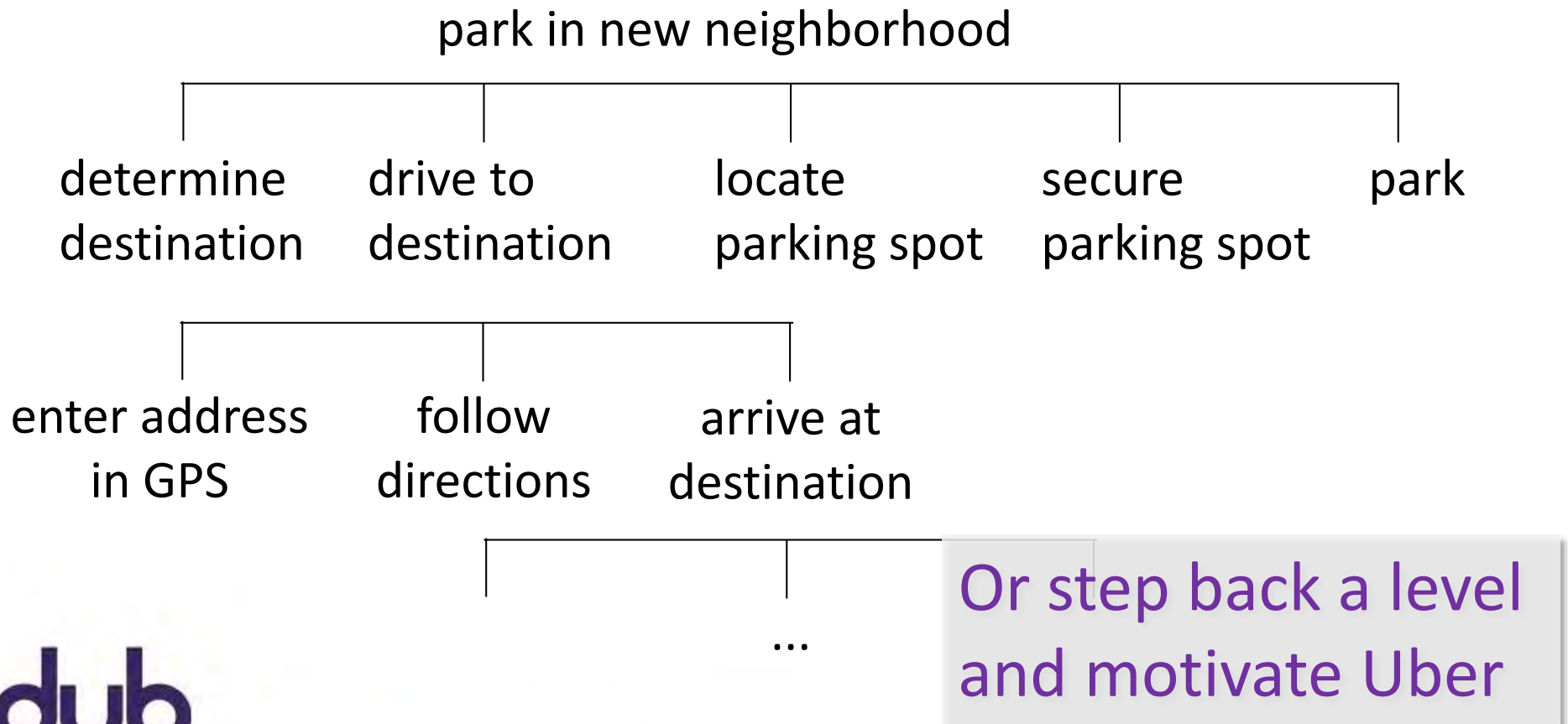
Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)



Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)



Or step back a level and motivate Uber

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Plantr Task Analysis

Tasks in Design

Plantr Task Analysis

1. Who is going to use the system?

Anyone who owns indoor plants is a potential user of Plantr. All of the plant owners that we interviewed forgot to water their plants at some point regardless of age, experience, and background. Even Lucy, who spent most of her time at home because she worked from home, struggled with timely watering.

Plant Task Analysis

2. What are the currently possible tasks?

When people purchase a plant, they often look up information about the proper lighting and temperature conditions for their plants. Additionally, people must find out how much and how frequently to water and fertilize their plants.

Plantr Task Analysis

3. What are currently unavailable, desired tasks?

People want a way to remember to water and care for their plants. Forgetting to water plants was the most cited reason for plant death, and the only task that participants in our inquiries mentioned completing on a regular basis.

Plantr Task Analysis

4.How are tasks learned?

Most people learned how to take care of their plants through trial and error. Some consulted the Internet, nursery staff, or friends for more information on plant care.

Plantr Task Analysis

5. Where are the tasks performed?

Tasks like watering and fertilizing are performed at the plant's location. People keep plants in their workplace, like Jack, or at home, like Lucy and Caroline. Getting information about plant care was performed in a variety of places. People who consult the Internet could be anywhere with a platform that supports web browsing and Internet access. Those who go to the nursery to talk to plant experts are required to go to a specific location to talk to someone in person.

Plant Task Analysis

6. What is the relationship between a person and data?

We identified three different types of data: a plant's current state, information about plants, and data that reflects the person's plant care history. A plant's current state is data on the moisture level of its soil and the general appearance of the plant (e.g., color, stiffness/limpness of leaves, etc.). People use this information to determine the plant's needs. Caroline and Lucy watered their plants when the soil felt dry or the leaves began to droop.

Plant Task Analysis

6. What is the relationship between a person and data?

People consulted various plant care information databases when they wanted to know how to care for their plants. People used their personal history of plant care to determine how to take care of plants. Caroline said that she used to underwater plants, but she learned from her mistake and now tries to water them more often. People also base their buying decisions based upon their plant care history. Caroline noted that she tries to buy plants that require minimal water.

Plantr Task Analysis

7. What other tools do people have?

Caroline, Lucy, Jack, and Kacy all have smart phones and computers. People also have a water source, pots, and soil for their plants. Most people probably have access to a nursery or library.

Plantr Task Analysis

8.How do people communicate with each other?

Plant owners communicate on online forums and message boards. People who happen to be in the nursery at the same time might talk to each other about plant care. Likewise, people who have friends with indoor plants may share plant care tips.

Plantr Task Analysis

9. How often are the tasks performed?

Watering is performed with a frequency between twice a week (Jack) and twice a month (Caroline). Fertilizing is performed less frequently, between once every two weeks to once every three months. Plants do not become sick often enough to make a good estimate about how often people try to get help.

Plant Task Analysis

10. What are time constraints on the tasks?

Plants must be watered with some regularity, so if people do not water their plants for long enough, the plants will start to die. Likewise, if plants are in need of attention for other reasons - pH imbalance, environment too dry - and they do not receive attention within some amount of time, they will die. Watering, caring, and learning how to care for a plant takes time. People who are very busy might not have the time or attention required for plant care.

Plant Task Analysis

11. What happens when things go wrong?

When plants become "sick", people take action, seek help, or ignore the problem until the plant dies. When people forget to water plants, they usually notice that the plant needs water and give it water. Sometimes people may not realize that a plant needs water until it is too late.

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Tasks in Design

Using Tasks in Design

Rough out an interface design

discard features that do not support your tasks
or add a real task that exercises that feature
major elements and functions, not too detailed
hand sketched

Produce scenarios for each task

what person does and what they see
step-by-step performance of task
illustrate using storyboards

Scenarios

Scenarios are design specific, tasks are not

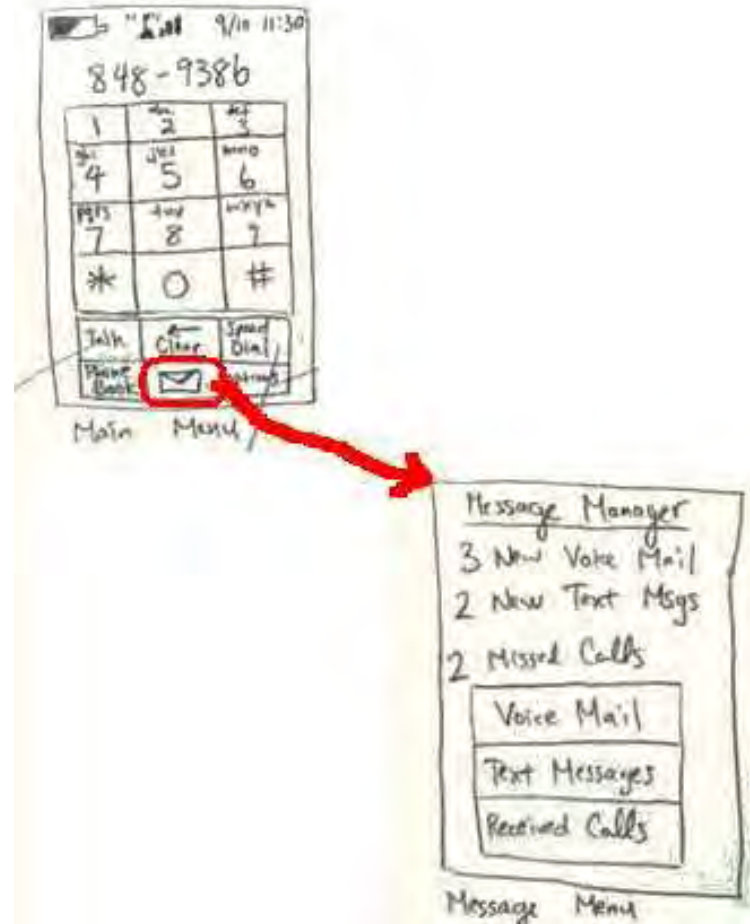
Scenarios force us to

show how things work together
settle arguments with examples

but these are only examples, and
sometimes need to look beyond flaws

Show people storyboards

nice mechanism for feedback



Tasks in Your Projects

Say what is accomplished, not how

Real tasks that people currently encounter,
or new tasks your design will enable

Reasonable coverage of the interesting aspects
of your problem and your design space

Range of difficulty and complexity

Park at the zoo, Friday night in Ballard, at the airport

Tasks, Personas, and Scenarios

Task: a design-agnostic objective

Persona: a fictional person with a backstory

Scenario: narrative that demonstrates a persona completing a task using a particular design

Use Case: in software engineering, describes requirements using one or more scenarios

Combine with Other Methods

Personas

Brainstorming

Affinity Diagramming

Concept Mapping

Competitive Analysis

“If you want to create a product that satisfies a broad audience ..., logic will tell you to make it as broad in its functionality as possible to accommodate the most people. Logic is Wrong.”



Combine with Other Methods

Personas

Brainstorming

Affinity Diagramming

Concept Mapping

Competitive Analysis

Example Personae:

Parent concerned about safety

Carpenter transporting tools

Executive wants a sporty car

More specific is effective

Give the person detail

Give them a name

Make it believable

Careful of stereotyping

Web littered with examples

Combine with Other Methods

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Combine with Other Methods

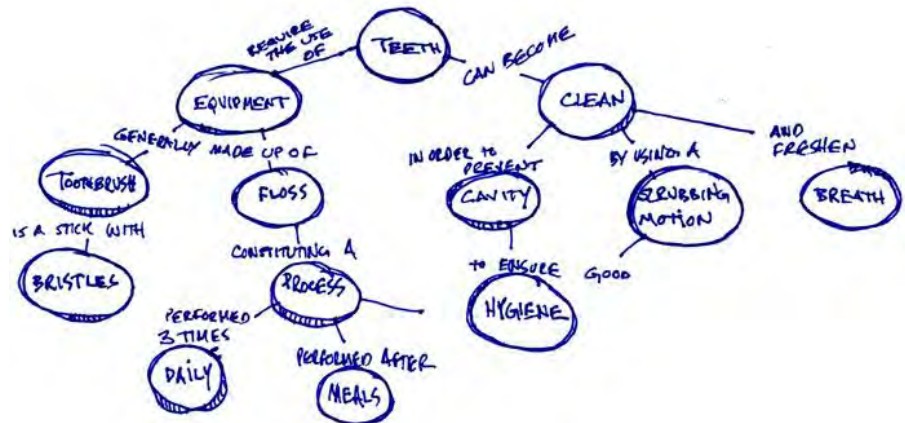
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Combine with Other Methods

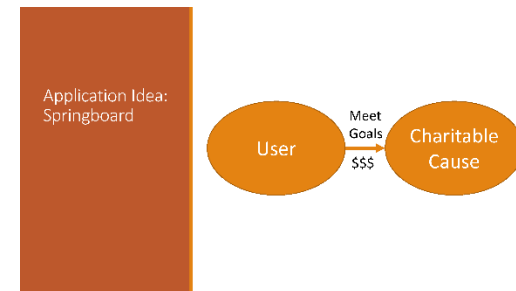
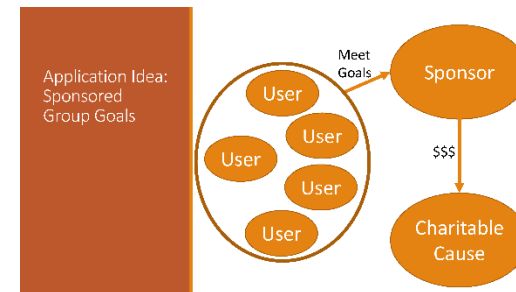
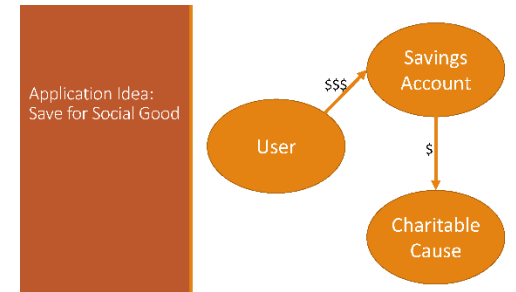
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Combine with Other Methods

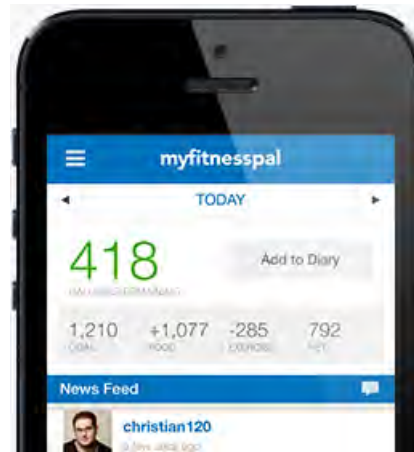
Personas

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CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

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Alex Fiannaca
Lauren Milne
Saba Kawas
Kelsey Munsell

Tuesday/Thursday
12:00 to 1:20

