

# **IN4MATX 231:**

# **User Interface Design & Evaluation**

**Class 6:**

**Requirement and Task Analysis**

Daniel Epstein

# Today's goals

**By the end of today, you should be able to...**

- Analyze qualitative data from a needfinding study
- Define and describe the relationship between personas, scenarios, and tasks

# Developing design insight is hard

- Qualitative needfinding research yields a lot of data
  - Does not reduce to a statistical test
- Need to get from data to design insight
  - But this is fundamentally difficult

**Goal: start with unstructured  
qualitative data, develop a model  
with it, use model to inform tasks**

# Designing with Tasks

- We will primarily emphasize designing with tasks
- Tasks should build off of your needfinding work

# Why Task Analysis?

- A system will fail if:
  - It is inappropriate for the person
  - It does not meet a person's needs
- Your needfinding will emphasize getting to know people and their needs
- Can you then just make “**good**” interfaces?

# Why Task Analysis?

- “Good” has to be interpreted in the context of use
  - Might be acceptable in an office, 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

# Why Task Analysis?

- Task analysis is a lens on the information you obtain through needfinding
  - Use what you learned in your needfinding to answer the questions in the task analysis

# 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?
- 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
  - Existing systems, training
- Skills, work habits, and preferences
- Physical characteristics and abilities

# LA Parking Meter



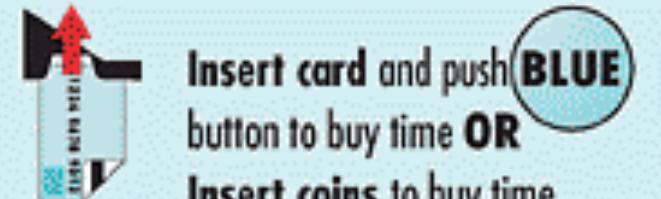
## Who is going to use the system?

- Identity?
- Background?
- Skills, work habits, and preferences?
- Physical characteristics and abilities?



## PARK, PAY & DISPLAY

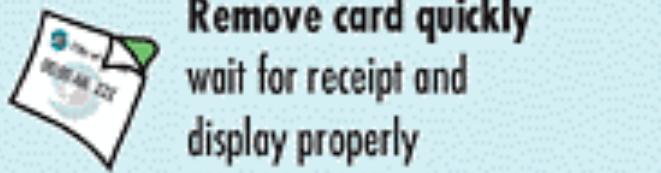
### Parking Pay Station Instructions



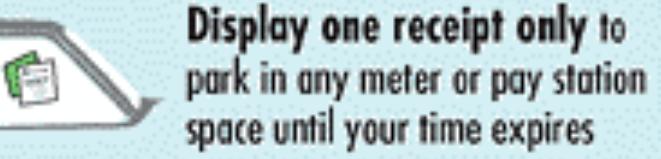
Insert card and push **BLUE**  
button to buy time **OR**  
Insert coins to buy time



Push **GREEN** button  
to print receipt

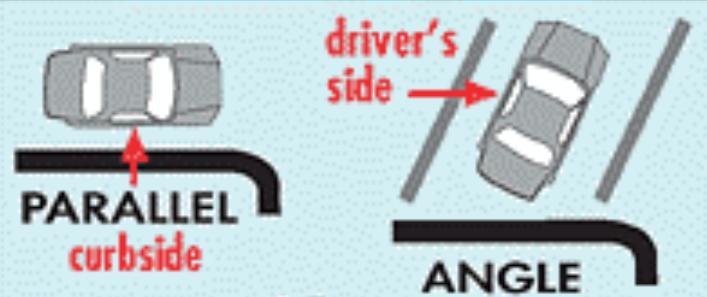


Remove card quickly  
wait for receipt and  
display properly



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

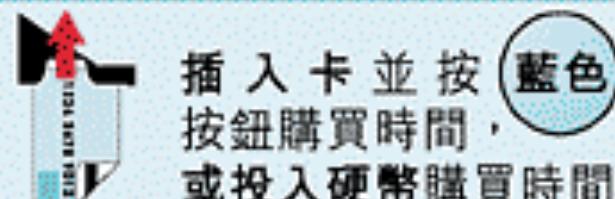


Questions? Call 684-ROAD (7623)  
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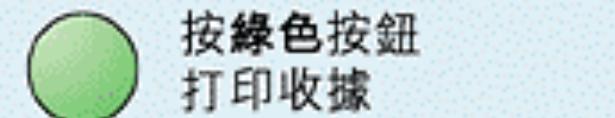


## 泊車、付款並顯示

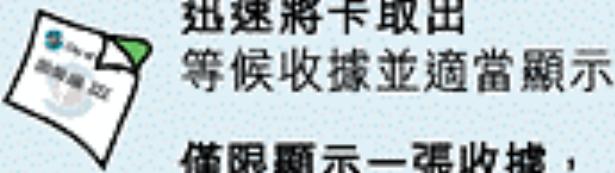
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或投入硬幣購買時間

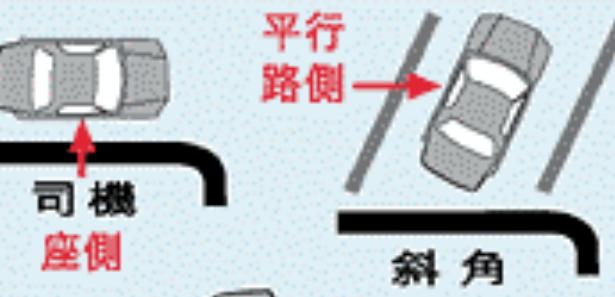


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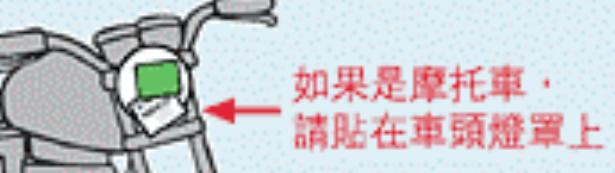


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時間到期

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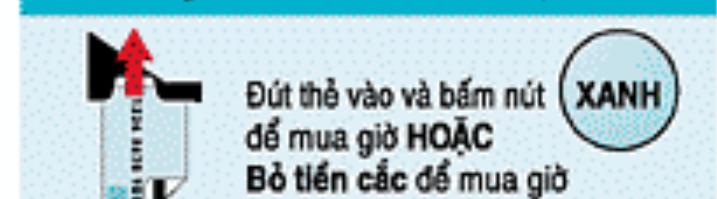
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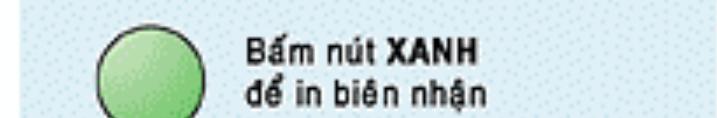


## ĐẬU XE, TRÀ TIỀN & DÁN BIÊN NHẬN

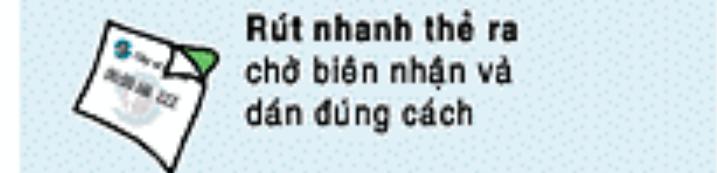
### Hướng Dẫn về Trạm Trà Tiền Đậu Xe



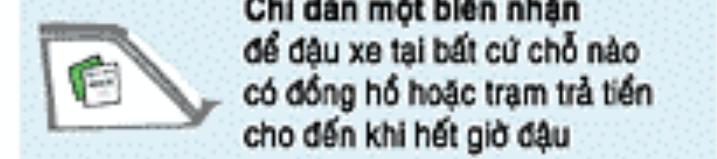
Đút thẻ vào và bấm nút **XANH**  
để mua giờ **HOẶC**  
Bỏ tiền cắc để mua giờ



Bấm nút **XANH**  
để in biên nhận

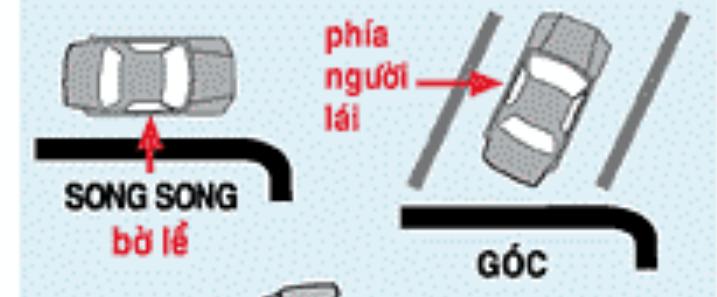


Rút nhanh thẻ ra  
chờ biên nhận và  
dán đúng cách

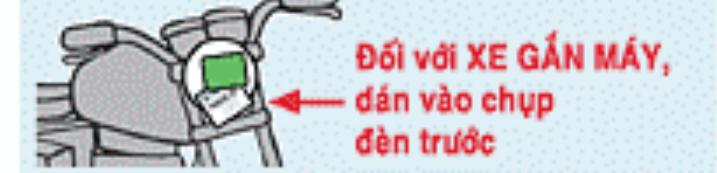


Chỉ dán một biên nhận  
để đậu xe tại bất cứ chỗ nào  
có đồng hồ hoặc trạm trả tiền  
cho đến khi hết giờ đậu

Dùng miếng dán mặt sau có thể gỡ ra  
để dán biên nhận vào MẶT TRONG  
cửa kính băng trước



phiên  
người  
lái



Đối với XE GẦN MÁY,  
dán vào chụp  
đèn trước

Thắc Mắc? Hãy gọi số 684-ROAD (7623)  
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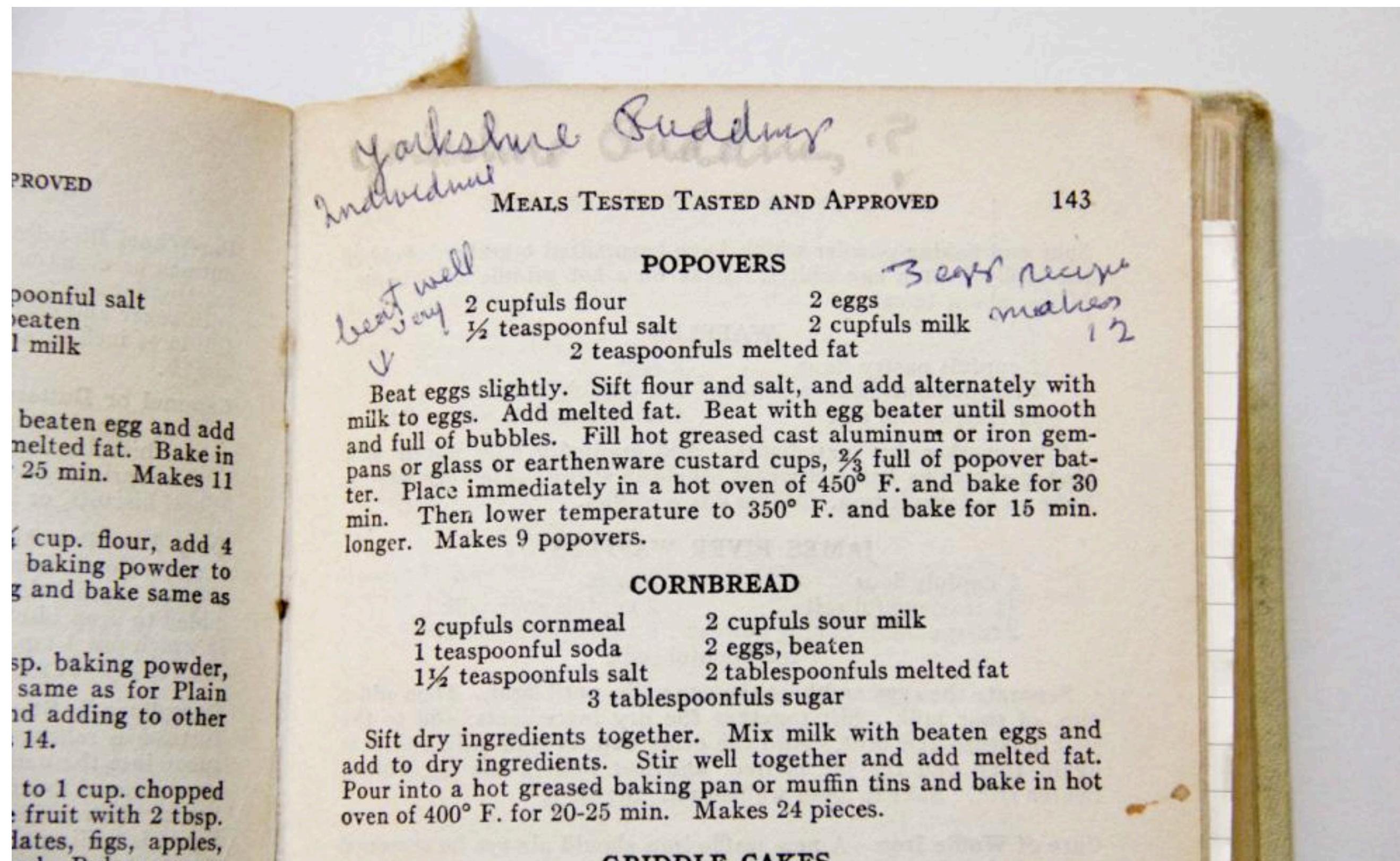
# Questions 2 and 3

**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
  - A small dentists office had billing automated, assistants unhappy with new system
  - Old forms contained hand-written margins,  
e.g., “patient’s insurance takes longer than most”

# Questions 2 and 3

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



# Combining with other methods

- “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**”

# Personas

- Archetypal character meant to represent a group of people in a role who share common **goals**, attitudes, and behaviors when interacting with a particular product or service



*"This is what I need in order to do my job."*



**NAME:** Vivica Parker

**AGE:** 32

**OCCUPATION:** Journalist

**PROFILE:**

Born in Washington, DC  
Lives and works in New York City  
(far from family)  
Lives by herself in a small apartment  
Has a driver's license  
Calls parents and older brother on  
weekends  
Works for an online art magazine and  
is currently in charge of writing a  
blog about graffiti. In order to do  
that she needs to do the following  
tasks:

- Walk/drive around the city
- Take pictures
- Talk with artists and keep record  
of that info (place, time, people)
- Work day/night
- Share the collected information  
with editor and magazine's readers

To do her job, usually carries note-  
books, camera and cell phone to  
keep in touch with her editor.

**INTERESTS:**

Amateur theater actress since she was 23  
Travel and merge in different cultures  
Architecture

**ACTIVITIES:**

Did research on ancient Egyptian architecture  
Member of the Art Society of NY

**TECH EXPERIENCE:**

Basic knowledge about operating systems  
Uses the Internet frequently either for personal or  
business purposes

**TECH ATTITUDE:**

Always open to new technology, but she feels  
annoyed with complex applications and discards  
them very often  
Tends to feel numb using the latest high-tech  
gadgets and needs time to get used to them

**GOALS & SITUATED BLOGGING NEED:**

Needs to keep track of her location and time when  
she (a) finds and photographs graffiti and street  
art for her blog and (b) conducts audio inter-  
views of artists and enthusiasts  
Needs to have a quick way of keeping track of  
content gathered from separate locations in  
order to post articles before editorial deadlines

# Personas

- Purpose
  - Empathy: characters to engage and relate to
  - Focus: can focus on specific people and needs, versus always attempting to design for everybody
  - Communication: conveys range of data, can help make assumptions more explicit
- Multiple types
  - Primary, secondary, supplemental, customer, served, negative

# Personas

## Goals

- Life goals: personal aspirations
  - e.g., to retire before the age of 50
- Experience goals: how to feel with a product
  - e.g., to feel competent while using the product
- End goals: tangible outcomes with a design
  - e.g., to be updated about finances over the last month

# Personas

## Roles

- Personas do not necessarily equal roles
  - e.g., parent, doctor, programmer, actor
- People can have multiple roles
- People in a role can have different needs and goals
  - e.g., a new programmer vs. an experienced programmer
  - e.g., parent of 1 vs. parent of 8
  - e.g., oncologist vs. podiatrist

# Personas

- Critical to avoid using stereotypes as personas
  - “The whole point in creating personas is to get past your personal opinions and presuppositions.” Goodwin, 2002
- Not a substitute for needfinding research, but a tool for summarizing and conveying that research
  - Collect design research data
  - Segment people
  - Create personas for segments



## Parxat Practical

### Primary Motivation to acquire phone:

I got my mobile phone to make calls when I am away from work or home

### Associated motivations:

I got a good price on my phone and mobile phones are cheaper than landlines

## Personal Profile

*"Mobile phones are part of your communications its like eyes and ears"*

For Parxat, mobile phones have provided a key way to stay in contact with work, family and friends.

He owns and manages a small computer game club with eight computers. His club does not yet have internet or a landline; however, he would like to add the internet and more computers when he can afford them.

Currently, Parxat maintains all of the computers but knows he may need help with some computer problems in the future. Other club owners that he has known have had to shut down after two to three years because the equipment has broken down and the owners cannot get the old equipment fixed or afford new. Right now he is not sure who he would ask for help if one of his computers needed maintenance that he could not perform himself.

Parxat has always relied heavily on a system of personal recommendations when looking for professional services. He feels that one should "trust the advice of friends because they are to be trusted."

### Parxat's Goals for MoSoSo Directory

- Would seek recommendations for professional help such as plumbers and computer maintenance
- Would like to create a public recommendation for his computer club
- Groups he would join or create
  - Family
  - Clients from his computer club
  - Friends through work

## Key Significant Differences

Uses the phone for work calls

Bought his mobile phone (not a gift)

Tech savvy compared to other groups

## Personal Information

**Age:** 43 years

**Profession:** Owns and manages computer game club with eight computers

**Lives:** In the capital city of Bishkek

**Home Life:** Lives with his wife and two sons

**Russian:** Can speak and read fluently

**Primary Home Language:** Kyrgyz

**Primary Work Language:** Russian

**Schooling:** He has a degree in economics focused on finance and credit from Kyrgyzstan Slavonic University

**Income:** 5200 soms a month (approx \$140.00)

## Technical Information

**Internet Use:** Yes, at least occasionally

**Length of use:** 36 months

**Use how often:** 1-2 days a week

**Where use:** Most often at a friend's internet cafe

**Computer User:** Yes

**How often:** Several times a day at work

**Cable or Satellite TV:** Yes

**Home Landline:** Yes

## Mobile Phone Use

**Length of use:** 28 months

**How acquired:** Bought his phone new

**Use how often:** Usually a few times a day

**For:** 60% personal calls, 40% work calls

**SMS:** Yes: 70% voice, 30% text

### Feelings and concerns:

Concerned that mobile phone activity is monitored

Would miss his phone very much if he did not have it (rated 4 on a scale of 1-4)

Feels mobile phone access is too expensive

Primary persona: represents 55% of survey respondents who own mobile phones

## Parxat Persona Data Detail

**Parxat Practical**

**Primary Motivation to acquire phone:** I got my mobile phone to make calls when I am away from work or home

**Associated motivations:** I got a good price on my phone and mobile phones are cheaper than landlines

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- Groups he would join or create
  - Family
  - Clients from his computer club
  - Friends through work

**Primary persona:** represents 55% of survey respondents who own mobile phones

**Status:** Parxat represents the most important persona with 55% of the survey respondents with mobile phones in this group.

**Goals:** The father and oldest son from KG\_UF1, the father from KG\_RF1 and the second friend from KG\_RY1 best fit the practically motivated group. These goals were based on stories they conveyed about difficulties they had encountered when looking for professional help especially descriptions given by the male friend in KG\_RY1 from his computer club business.

**Profile:** This profile description was based on one of the male friend participants from Interview KG\_RY1. The last advice quote was a direct quote from the father in the KG\_UF1 interview.

**Mobile Phone description:** 91% of the practical group use their phones for personal calls; 41% for work - the most of any group. This description also reinforces the primary motivation of the group, "I got my phones to make calls when I am away from home or work". It is notable that this primary motivation is significantly negatively associated with the primary motivations in the other two groups.

**Quote:** This is a direct quote from the father participant in Interview KG\_UF1.

- Key Difference:** 41% of the practical motivation group used their phones for work - this was significantly more than the other two groups.
- Key Difference:** 41% of the practical motivation group bought their phones new - more than any other group (most survey respondents received their phones as gifts).
- Key Difference:** The practical group had more experience with computers and internet than any of the other two groups: 49% used computers, 39% owned a computer (significant difference), 29% used the internet.
- Age:** Actual mean age of the group was 35.9. This was the oldest mean age, but was skewed higher here to emphasize the difference with the other groups.
- Profession:** This profession is based on one of the male friends from Interview KG\_RY1. 30% of the practical group was employed which was significantly higher than any other groups.
- Lives:** 66% of practical users live in an urban environment - this is also the urban environment location of the interviews.
- Home Life:** Mean family size was 3.5 people for the practical group.
- Russian:** 89% of the practical group speak and read Russian.
- Primary Home Language:** 50% claimed their primary language at home was Kyrgyz. This was the highest of any language.
- Primary Work Language:** 62% of those employed spoke Russian at work.
- Schooling:** This degree is also based on male friend owned the computer club from Interview KG\_RY1. Also, the practical group had significantly more education (avg.12.5 years) than the replacement group (avg. 11.1 years) and the general population (avg. 10.7 years).
- Income:** This is slightly higher than the average income of 4775 soms (\$137.00) based on August 2008 exchange rate and data from <http://enews.ferghana.ru/news>.
- Internet Use:** 29% of this group used the internet - the highest of any group.
- Length of use, Use how often, Where Use** - All mean numbers based directly on survey data.
- Computer Use:** 49% of this group used computers - the highest of any group.
- How Often:** mean number from the survey data.
- Cable or Satellite TV:** 29% of this group had cable or satellite TV - the second most of any group.
- Home Landline:** 51% have home landlines - the second most of any group.
- Mobile Phone:**
  - Length of Use:** mean number from the survey data
  - How acquired:** 41% of the practical motivation group bought their phones new - more than any other group (most survey respondents received their phones as gifts).
  - Use how often:** mean number from survey data
  - For:** All groups used their phones mostly for personal calls. 41% of the practical motivation group used their phones for work. This was statistically significantly more than the other two groups.
  - SMS:** 27% of the practical group used SMS. This split was based on the numbers given by the older son participant from Interview KG\_UF1.
- Feelings and concerns:**
  - 61% felt mobile activity was monitored. This was statistically significantly higher than any other group (no other group was higher than 45%);
  - 57% claimed they would miss their phones "a lot" - this was the most of any group;
  - 66% felt mobile access was too expensive-



**Shirin Social**

Primary Motivation to acquire phone:  
I like people to reach me at all times

Associated motivations:  
My friends all have mobile phones

### Personal Profile

*"We just talk to our friends....things like did you hear that this or that happened - in our communication rumors are the official news, and gossip works"*

For Shirin, keeping in contact with friends is the most important thing about mobile phones.

She is a full time student (junior) at American University of Central Asia (AUCA), studying business administration. She also works part time as a bartender in a cafe .

Shirin is part of an unregistered student association at school that organizes cultural and historical meetings at a local cafe. She also enjoys arranging parties for her friends.

She is interested in social networking applications on the internet, but has found it boring, stating "*the first time is interesting then you get bored because you already know everybody.*"

#### Shirin's Goals for MoSoSo Directory

- Would use the service most to create groups of friends
- Would like to broadcast messages to particular groups or to tell people where there will be social gatherings
- Would like to retrieve messages from other members of a group
- Groups she would join or create
  - Family
  - Friends from work and school
  - Associations through her unregistered student organization

**Key Significant Differences**

- Uses the phone to primarily to call friends
- Least likely to feel mobile access is too expensive
- Somewhat tech savvy

**Personal Information**

**Age:** 20 years

**Profession:** Student and works part time as a bartender in a local cafe

**Lives:** In the capital city of Bishkek

**Home Life:** Lives with her dad and an older brother. She also has around 30 cousins in towns.

**Russian:** Can speak and read fluently

**Primary Home Language:** Kyrgyz

**Primary Work Language:** Kyrgyz

**Schooling:** She is a full time student (junior) at the American University of Central Asia studying business administration

**Income:** 2000 soms a month (approx \$55.00)

**Technical Information**

**Internet Use:** Yes, at least occasionally

**Length of use:** 33 months

**Use how often:** About once a week

**Where use:** Most often at an internet cafe

**Computer User :** Yes

**How often:** A few times a week at school

**Cable or Satellite TV:** Yes

**Home Landline:** Yes

**Mobile Phone Use**

**Length of use:** 25 months

**How acquired:** Was given the phone by a cousin

**Use how often:** Several times a day

**For:** 80% personal calls, 20% work calls

**SMS:** Yes: 65% voice, 35% text

**Feelings and concerns:**

- The least likely of any group to feel that mobile phones are too expensive
- Feels that mobile phones are important to her future career

Primary persona: represents 32% of survey respondents who own mobile phones

## Shirin Persona Data Detail

**Photo:** Younger female participant from the interview with three urban young friends (KG\_UY1). The participant actually lives in Bishkek, is eighteen years old and is a student at the American University of Central Asia.

**Motivation:** We placed the 460 survey participants with mobile phones in one of three groups based on their responses. We found that 352 of these respondents claimed motivations that fell into one of the three final motivation groups without overlap.

There were 113 individuals in the social motivation group. A majority (85%) wanted people to reach them at all times, 19% of this group got their mobile phone because their friends all had them, and 4% wanted to receive voicemail.

**Name:** Shirin is a somewhat common female name in Kyrgyzstan. It is of Persian origin.

**Status:** Shirin represents the second most important persona with 32% of the survey respondents with mobile phones in this group.

**Goals:** Since the youngest son from the KG\_UF1, and five of the younger participants from KG\_UY1 and KG\_RY1 best fit the socially motivated group, these goals were based on how mobile phone use could have helped them in stories they conveyed about their lives. These stories were also used to create the scenarios for Shirin.

**Profile:** This profile description was on an amalgamation of participants from two interviews: one with a group of three young friends in Bishkek (urban) and the other with a group of three young friends in Kara Balta (rural). The last quote was a direct quote from one of the participants in Bishkek from the KG\_UY1 interview.

**Mobile Phone description:** 93% of the social group use their phones for personal calls - the most of any group; 38% for work.

**Quote:** This is a direct quote from one of the participants in when asked about where they looked for news and information.

- **Key Difference:** 93% of the social motivation group used their phones for work - this slightly more than the other two groups
- **Key Difference:** Only 50% of the social motivation group felt that mobile phone access was too expensive while the other two groups over 64% felt it was too expensive. This was a statistically significant difference.
- **Key Difference:** The social group had the second most experience with computers and internet : 43% used computers, 26% owned a computer, 25% used the internet.
- **Age:** Actual mean age of the group was 33.6. This was the youngest mean age, but was skewed lower here to emphasize the difference with the other groups.
- **Profession:** This profession is based on three interviews that included a total of seven younger people under the age of 27. Four were students. This part time job was based the profile of an urban male student in KG\_UY1.
- **Lives:** 64% of social users live in an urban environment - this is also the urban environment location of the interviews.
- **Home Life:** Mean family size was 3.8 people for the social group. The multiple cousins reference was based on information from a female interview participant.
- **Russian:** 77% of the social group speak and read Russian.
- **Primary Home Language:** 62% claimed their primary language at home was Krygyz.
- **Primary Work Language:** 56% of those employed spoke Krygyz at work.
- **Schooling:** The degree and university are based on the male friend from the KG\_UY1 interview. - the same participant that we based the part-time job upon. Members of the social group on average have 12.6 years of schooling - the most of any group.
- **Income:** This is lower than the average income of 4775 soms (\$137.00) based on August 2008 exchange rate and data from <http://enews.ferghana.ru/news>. Since our persona was a student working part time we assumed a lower than average income.
- **Internet Use:** 26% of this group used the internet - the second highest of any group.
- **Length of use, Use how often, Where Use** - All mean numbers based directly on survey data.
- **Computer Use:** 43% of this group used computers - the second highest of any group.
- **How Often:** mean number from the survey data.
- **Cable or Satellite TV:** 32% of this group had cable or satellite TV - the most of any group.
- **Home Landline:** 54% have home landlines - the most of any group.
- **Mobile Phone:**
- **Length of Use:** mean number from the survey data
- **How acquired:** 42% of the social motivation group received their phones as gifts from family members - this was the most common way to acquire a phone for this group.
- **Use how often:** mean number from survey data
- **For:** While all groups used their phones mostly for personal calls, 93% of the social motivation group used their phones for personal calls - the most of any group.
- **SMS:** 27% of the social group used SMS. This split was based on the numbers given by the young rural participants in KG\_RY1
- **Feelings and concerns:**  
51% felt that mobile phones were too expensive which was significantly less than the other two groups where over 64% felt they were too expensive.  
83% felt mobile phones were important to their future career - the most of any group.

# Selecting Tasks

# Selecting tasks

- Real tasks people have faced or requested
  - As supported by your needfinding research
- Should provide reasonable coverage
- 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 a 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)
- Sometimes describe a complete “accomplishment”
  - Forces us to consider how features work together

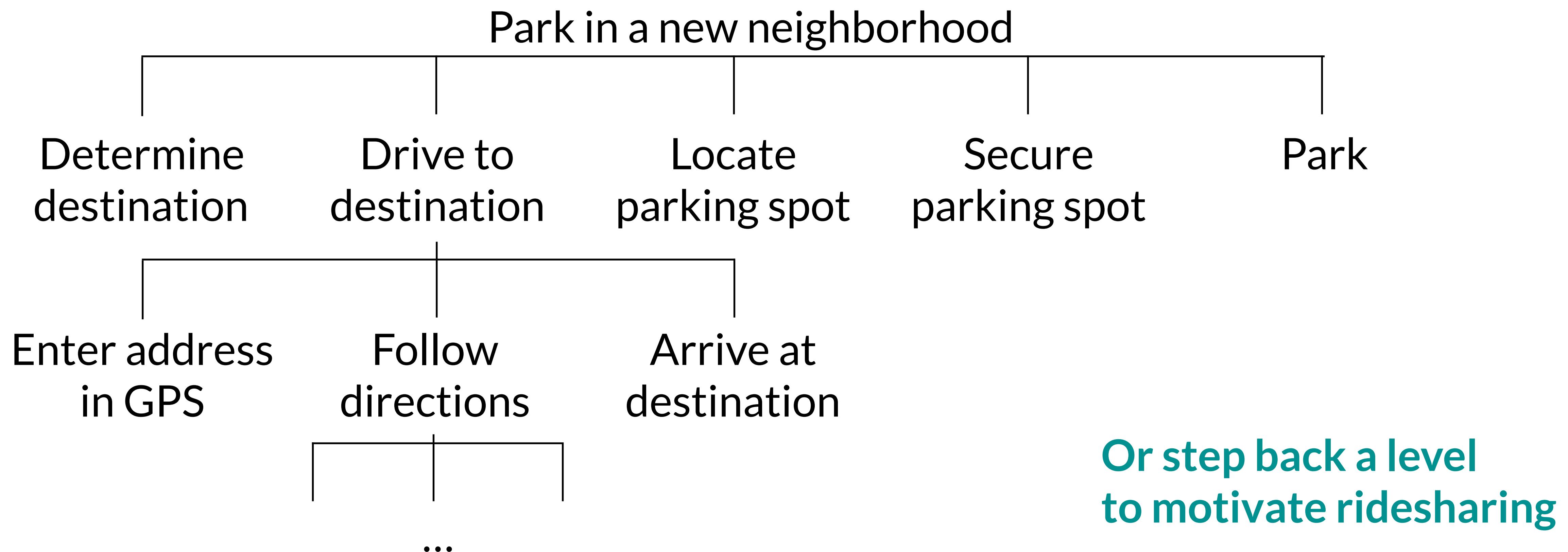
**Filename task example**

# 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 his phone's GPS for directions. He leaves the apartment with his roommates at 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)

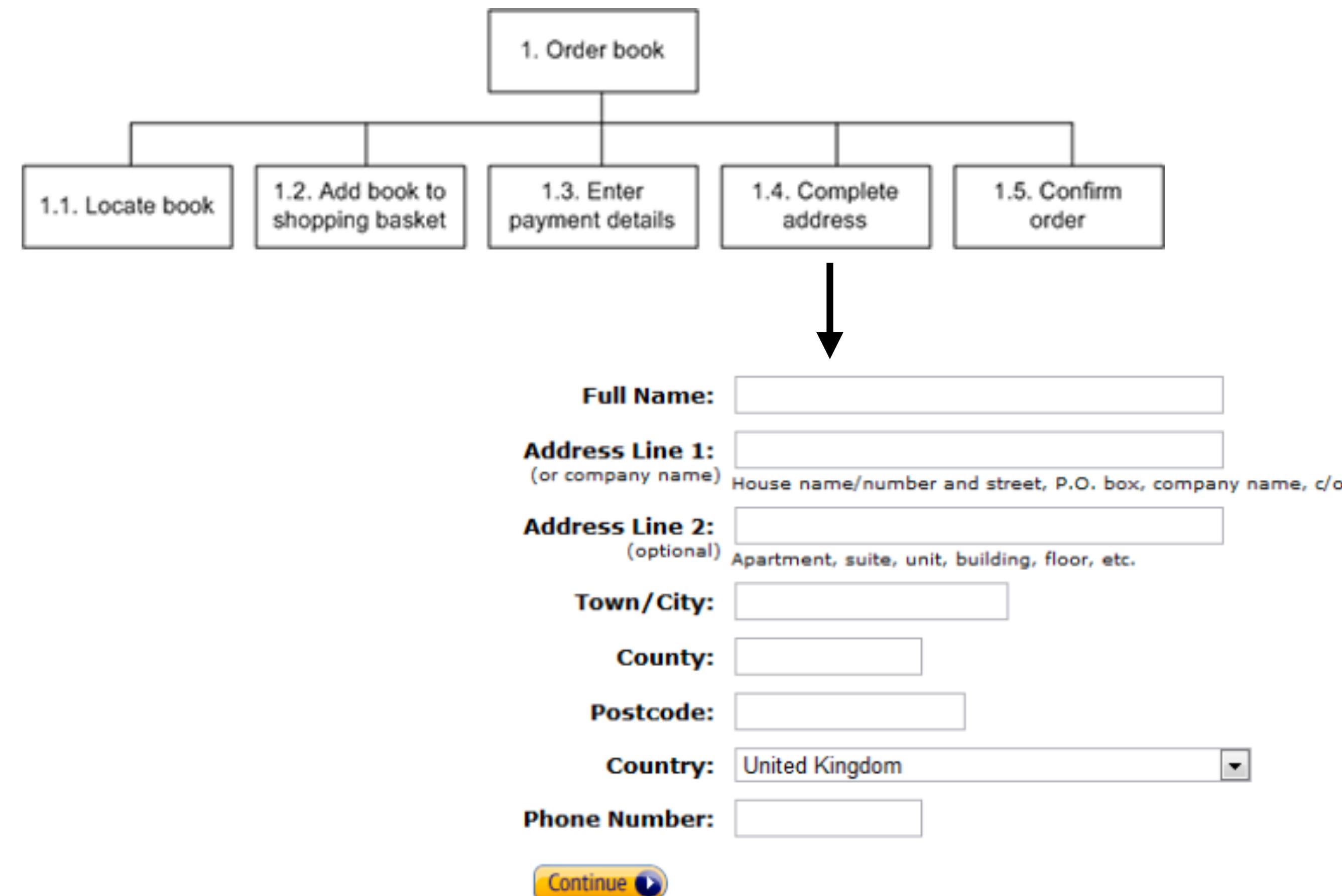


# Hierarchical Task Analysis



- Break down the following task into hierarchical steps:
- Daniel is teaching IN4MATX 231, and so he wants to order a copy of Hanington & Martin's "Universal Methods of Design" book on Amazon to reference in lecture. The lecture is in just a few days, and he's behind in his prep, so he needs the book as soon as possible. He has the credit card he wants to pay with and knows where he wants it to be sent to.

# Hierarchical Task Analysis



# Using Tasks in Design

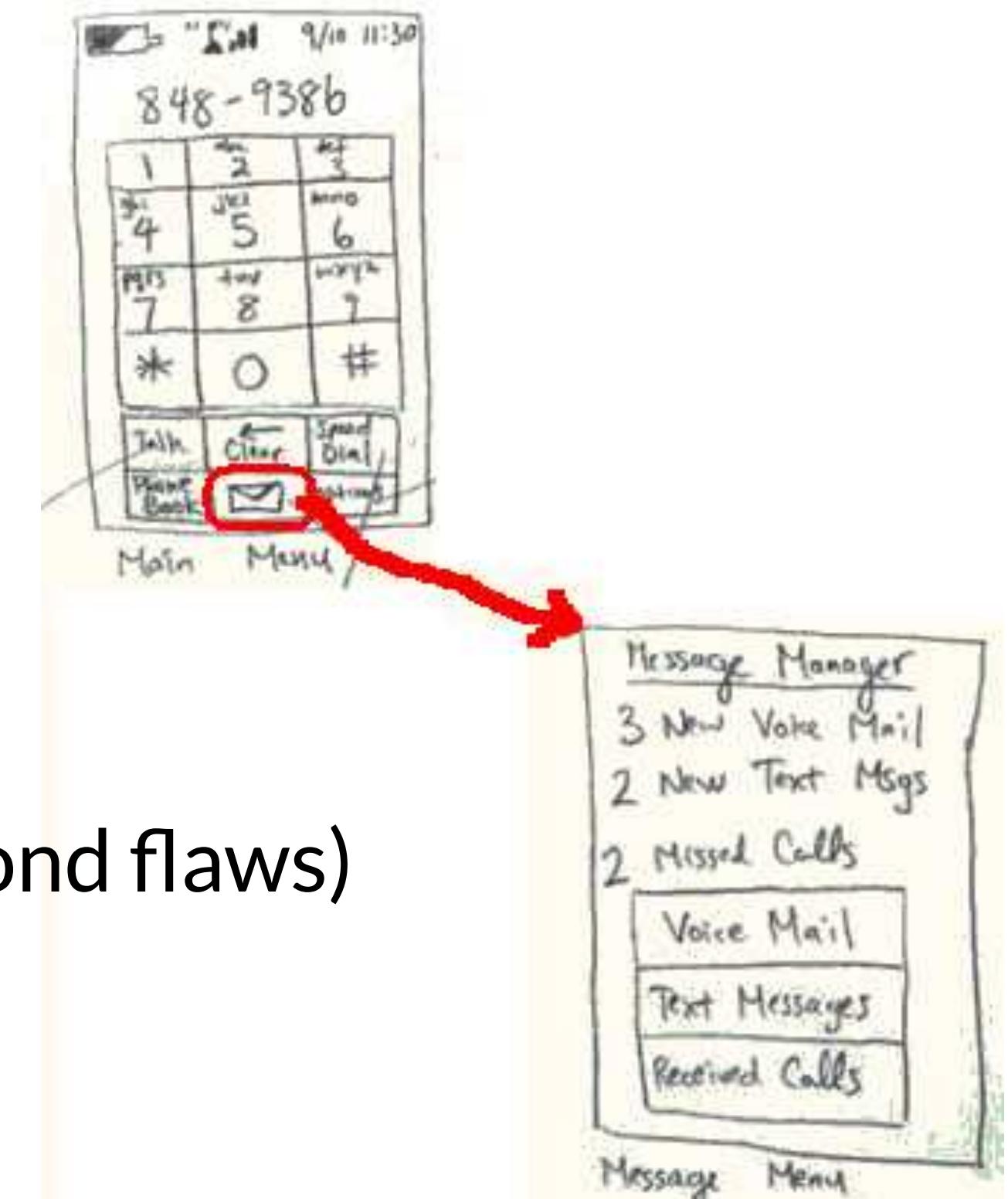
- Write up a description of tasks
  - Formally or informally
  - Run by people and the rest of the design team
  - Get more information where needed

# Using Tasks in Design

- Rough out an interface design
  - Discard features that do not support your tasks (or, add a real task that uses that feature)
  - Major elements and functions, not too detailed
  - Hand sketched
- Produce scenarios for each task
  - What a 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 may need to look beyond flaws)
- Show people storyboards
  - Topic for next week



# 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

<https://softwareengineering.stackexchange.com/questions/347498/difference-between-scenario-and-use-case>

# Today's goals

**By the end of today, you should be able to...**

- Analyze qualitative data from a needfinding study
- Define and describe the relationship between personas, scenarios, and tasks

# **IN4MATX 231:**

# **User Interface Design & Evaluation**

**Class 6:**  
**Requirement and Task Analysis**

Daniel Epstein