Design Thinking
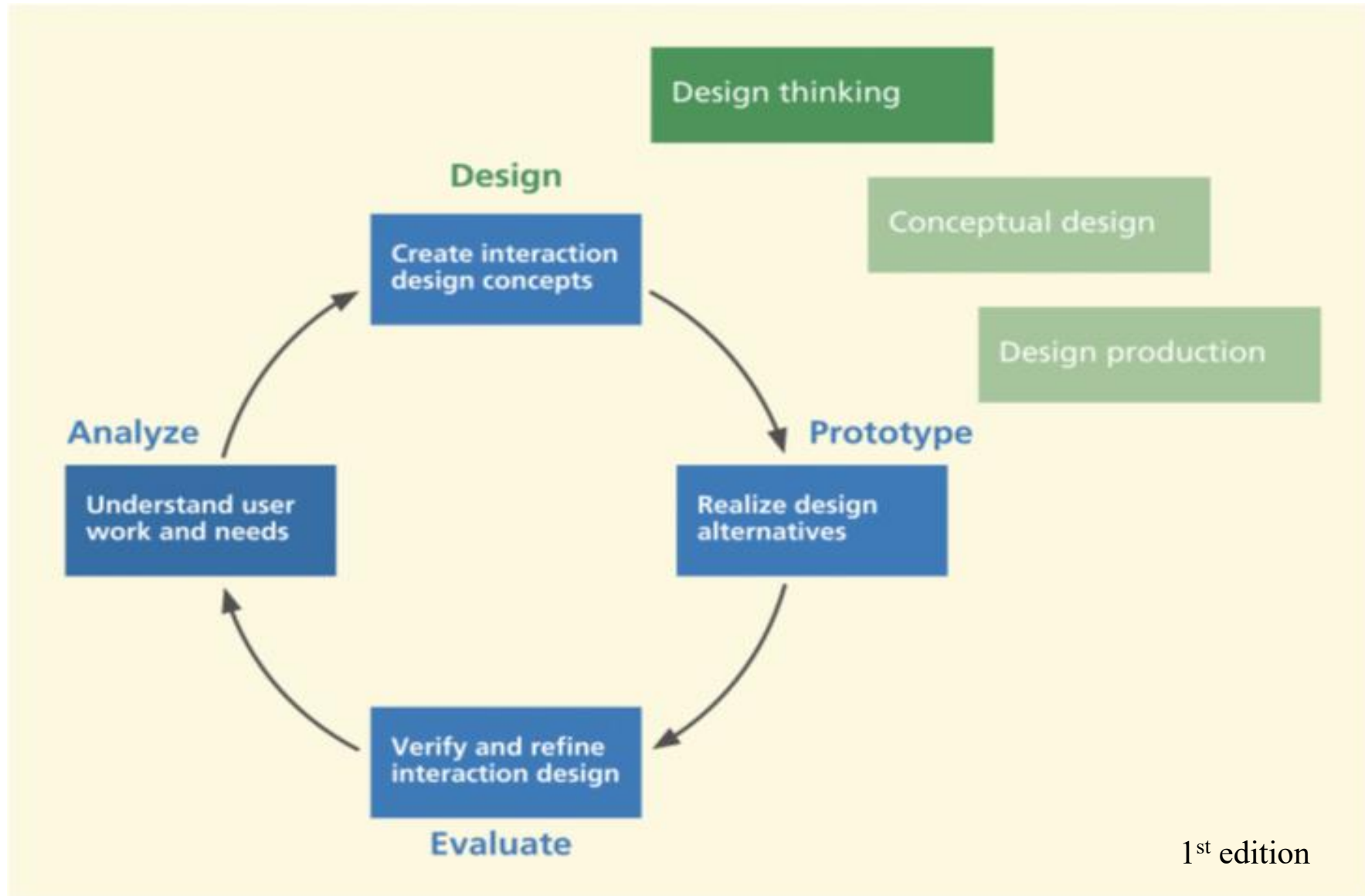
Synthesize and combine new ideas to create the design

SWEN-444

Selected material from *The UX Book*, Hartson & Pyla

Design thinking

Conceptual design

Design production

Design

Create interaction design concepts

Analyze

Understand user work and needs

Prototype

Realize design alternatives

Evaluate

Verify and refine interaction design

1st edition

Use of the Term "design"

- We mainly use "design" narrowly to refer to creative human activity
- How new ideas are synthesized and put together
- Usually meaning will be obvious from context
- And, of course, it is about interaction design

HCI Design Paradigms (patterns of thinking)

- **Engineering** – focus on design for HCI usability performance achieved through evaluation and iteration

- **Human Information Processing (HIP)** – cognitive science based design model of human mind as information processor

- **Design-Thinking** – consider emotional and phenomenological, social and cultural aspects

Information Processing Model
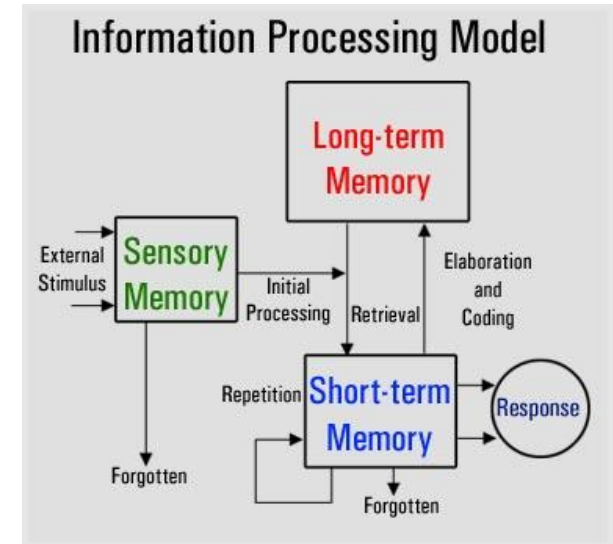
Example: Car Design

FRONT & REAR SEATING DIMENSIONS:
Accommodations made for 95% anthropometrically-sized males
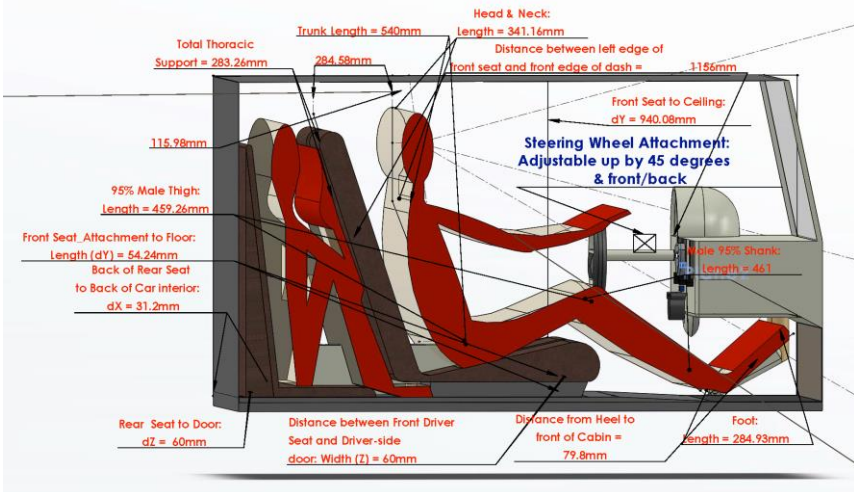
Engineering view

Seat height, fit of the curve on the seat to fit lower back shape, safety restraints, airbags

HIP view

Meets limits of human signal detection (tactile via steering wheel, audio cue, blinking visual cue e.g. low tire pressure)

Design Thinking view

Cool factor, joy of driving, life style considerations, pride of ownership, thrill of speed

Software Engineering
Rochester Institute of Technology

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"Design Thinking"

- **Creative** and **innovative** UX **design concept first**
    - Combination of art, craft, science, invention
- **Followed** by **functional and interactive design**
- Long term **emotional impact**
- **Aesthetics**
- **Social** and **value** oriented interaction
- How **technology** takes on "presence" in user's life
- May be **market driven** (think Apple)

Tools:
      Understanding emotions
      Persona
      Ideation
      Sketching
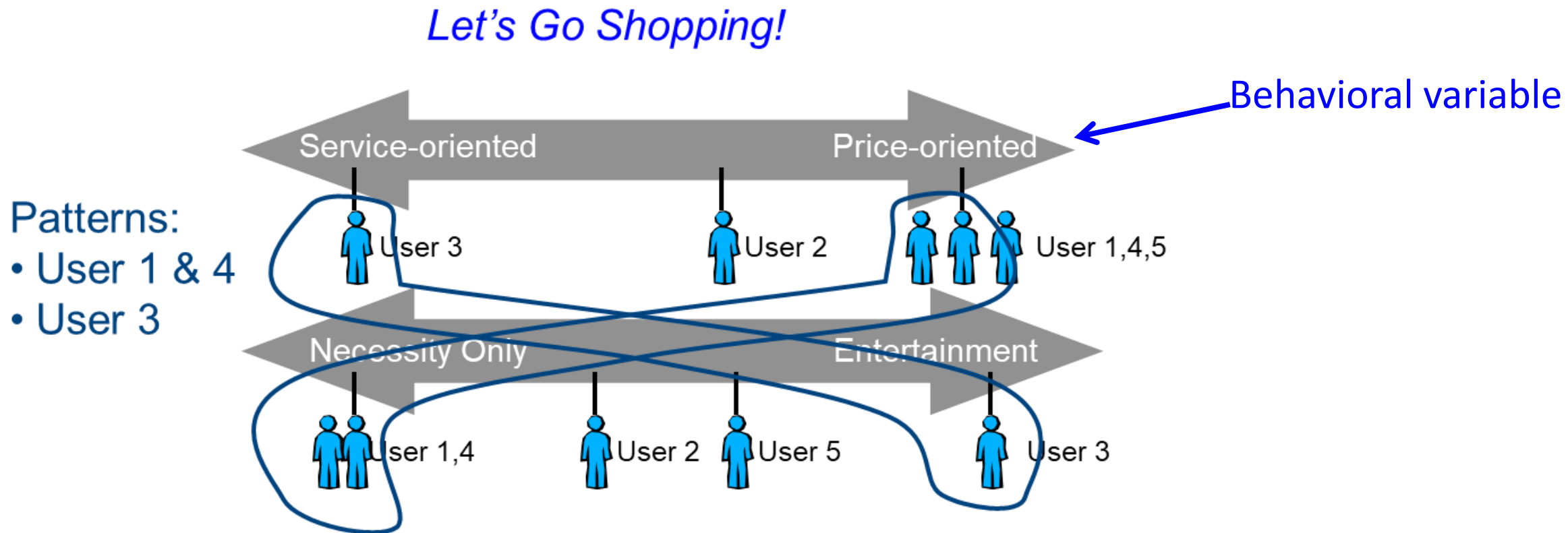
Plutchik's Wheel of Emotions
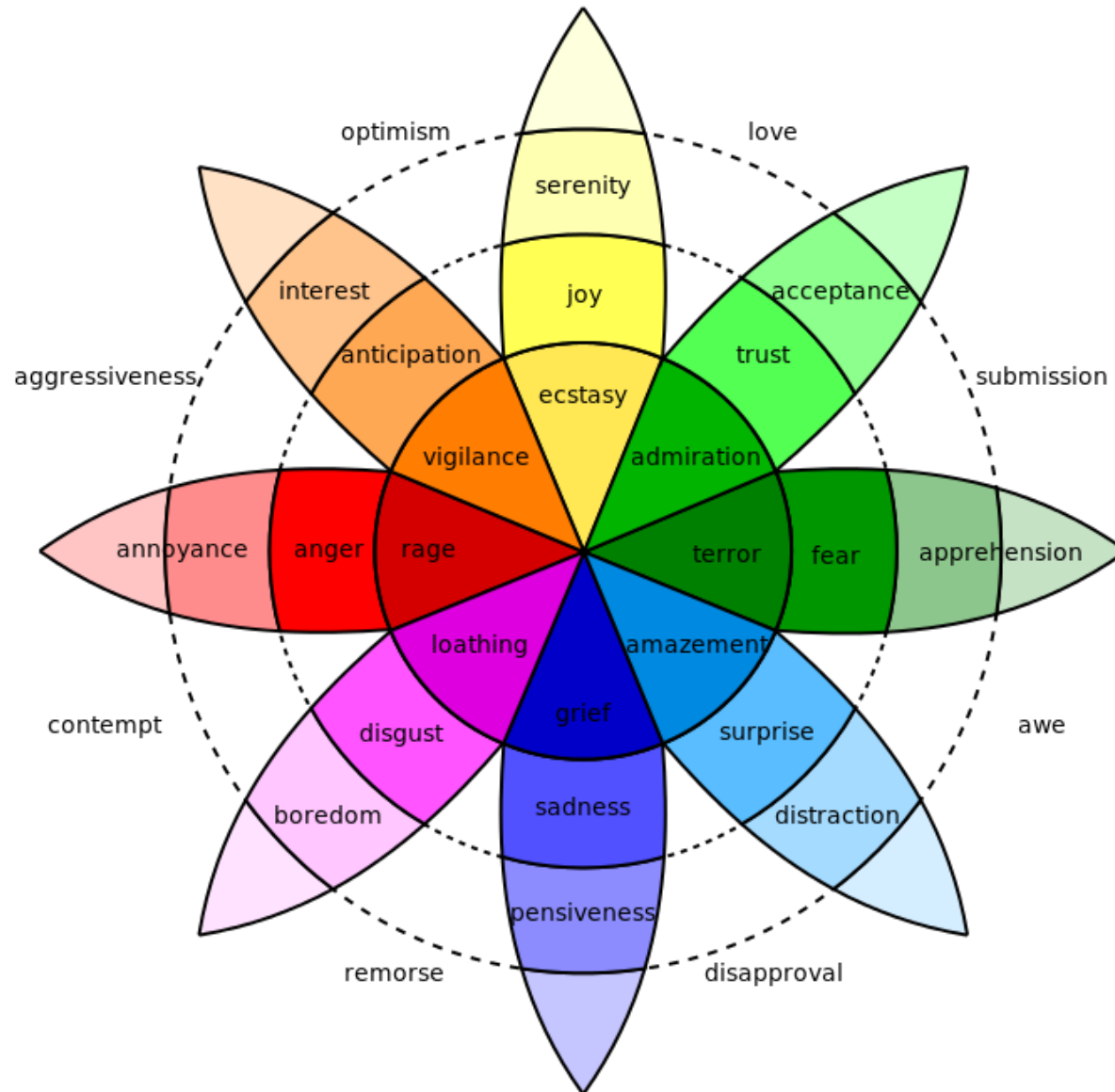
Personas - a Pretend User

- A **specific** (but imaginary) **person** in a specific **work role**; a personification
  - Represent a class of users
  - Composite user archetypes based on behavioral data gathered from many actual users
- Make design thinking more **concrete**
  - Work roles are too broad – can't satisfy everyone
  - Focus and satisfy one "person"
- Minimize designer bias to design for their own needs; engage **designer empathy**
  - Select a small number of personas from the user class
  - Pick one as primary and design for that one
  - Adjust as necessary to accommodate the others
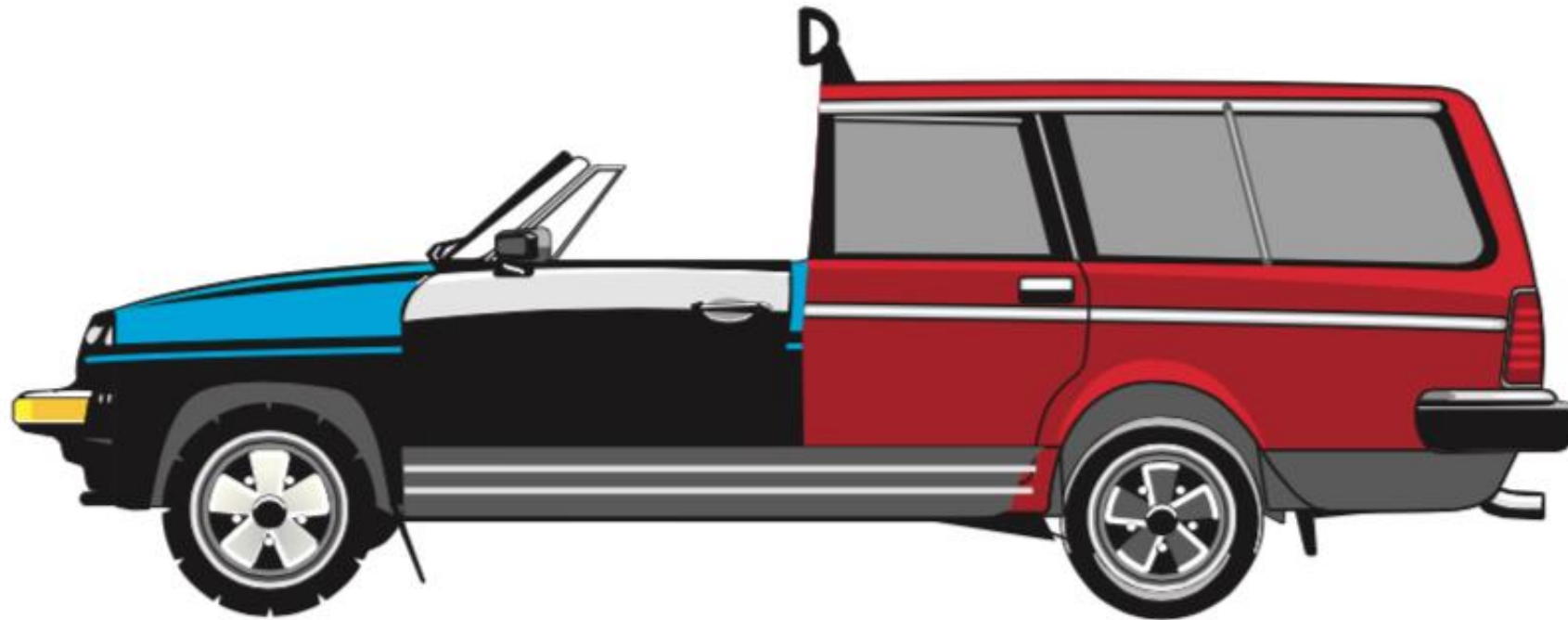
Constructing Personas

- Establish a persona **hypothesis**
- Segment use across a set of observed **behavioral variables** (also called axes or ranges)
  - E.g., computer literacy, annual income
- Identify significant **behavior patterns**
  - Clusters of users with shared behavior across multiple behavioral variables (6-8)
  - Valid patterns demonstrate logical or causative relationships between clustered behaviors
- **Combine** one of more **patterns** into a persona role
- Synthesize persona **characteristics** and relevant **goals**
- Review for completeness and distinctiveness
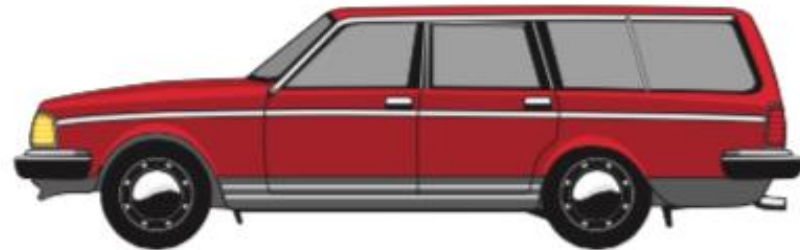
Map Interview Subjects to Behavioral Variables
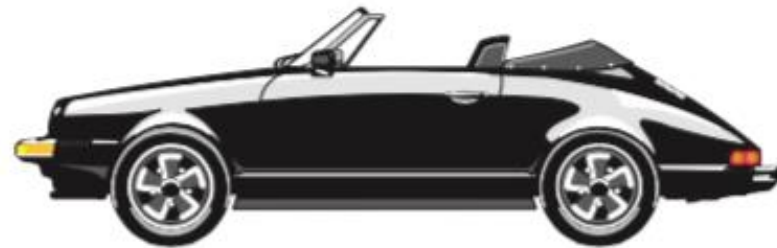
Let's Go Shopping!

Behavioral variable

Service-oriented ← → Price-oriented

Patterns:
- User 1 & 4
- User 3

User 3   User 2   User 1,4,5

Necessity Only ← → Entertainment

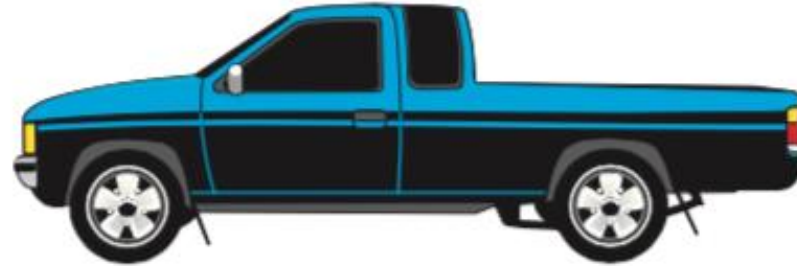User 1,4   User 2   User 5   User 3

[Cooper and Reimann]

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Do not design for the "average" user.

A cast of personas represent different clusters of behaviors.

Synthesize Characteristics

- Give each major pattern a **brief description**, such as "the bargain-hunter" or "the impulse-buyer"
- **Synthesize details** from the data
  - Describe use environment, typical workday (or other relevant time period), current solutions and frustrations, relevant relationships, etc.
  - Stick to observed behaviors
  - Avoid too much fictional, idiosyncratic biography
  - A persona is a design tool, not a character sketch for a novel
- Carefully select a first [and last] **name** for the persona
  - Evocative of the type of person the persona is
- Add some **demographic information**: age, geographic location, relative income (if appropriate), job title

Example Persona

example persona: Giles

"I do everything with my laptop"

Background
Age: 25
Occupation: Graduate student
School: Faculty of Information
Technology level: Programmer,
uber power-user of computers,
very "Web 2.0"

Attributes
- Tech-savvy, interested in new technologies
- Uses a lot of keyboard shortcuts
- Comfortable in both Mac and PC platforms
- Eager to try out new technologies
- Diligent blogger
- Finds IM too distracting so stays off it

Goals
- Get good grades
- Continue to get funding to complete his masters thesis next year
- Be actively involved in bike clubs and lead an social/outdoorsy life outside school
- Keep fit
- Continue to blog regularly to get recognition from the online community

Team Activity

- Construct a detailed description of the persona for one of your work roles
- See if you can define and apply some behavioral variables.
- Write up a personalized description starting with an appropriate name

Ideation

- Collaborative group process for forming conceptual design ideas; i.e., "applied design thinking"
  - Idea creation
  - Idea critiquing – review and judgment
- **Brainstorming**
  - Team activity
  - Stream-of-consciousness
  - Generate as many ideas as possible
  - Don't be critical of or constrain creativity
- Brainstorming sessions generate a lot of material that must be filtered and organized
  - Categorize, sort, vote

Dissent

- An alternative to brainstorming
- Participants encouraged to criticize ideas
- Criticism surfaces problems that forces new thinking to respond
- Produces more productive and innovative ideas

BLACK BOX THINKING: Why Most People Never Learn From Their Mistakes—But Some Do by Matthew Syed

Example: Ideation for the Ticket System

- Thought questions to get started:
  - What does "an event" mean? How do people treat events in real life?
  - An event is more than something that happens and maybe you attend
  - An event can have emotional meanings, can be thought provoking, can have meaning that causes you to go out and do something

- Things people might want to do with tickets:
  - People might want to email tickets to friends

- Possible features and breadth of coverage:
  - Homecoming events
  - Parents weekend events
  - Visiting speakers on current topics
  - Visitor's guide to what's happening in town and the university
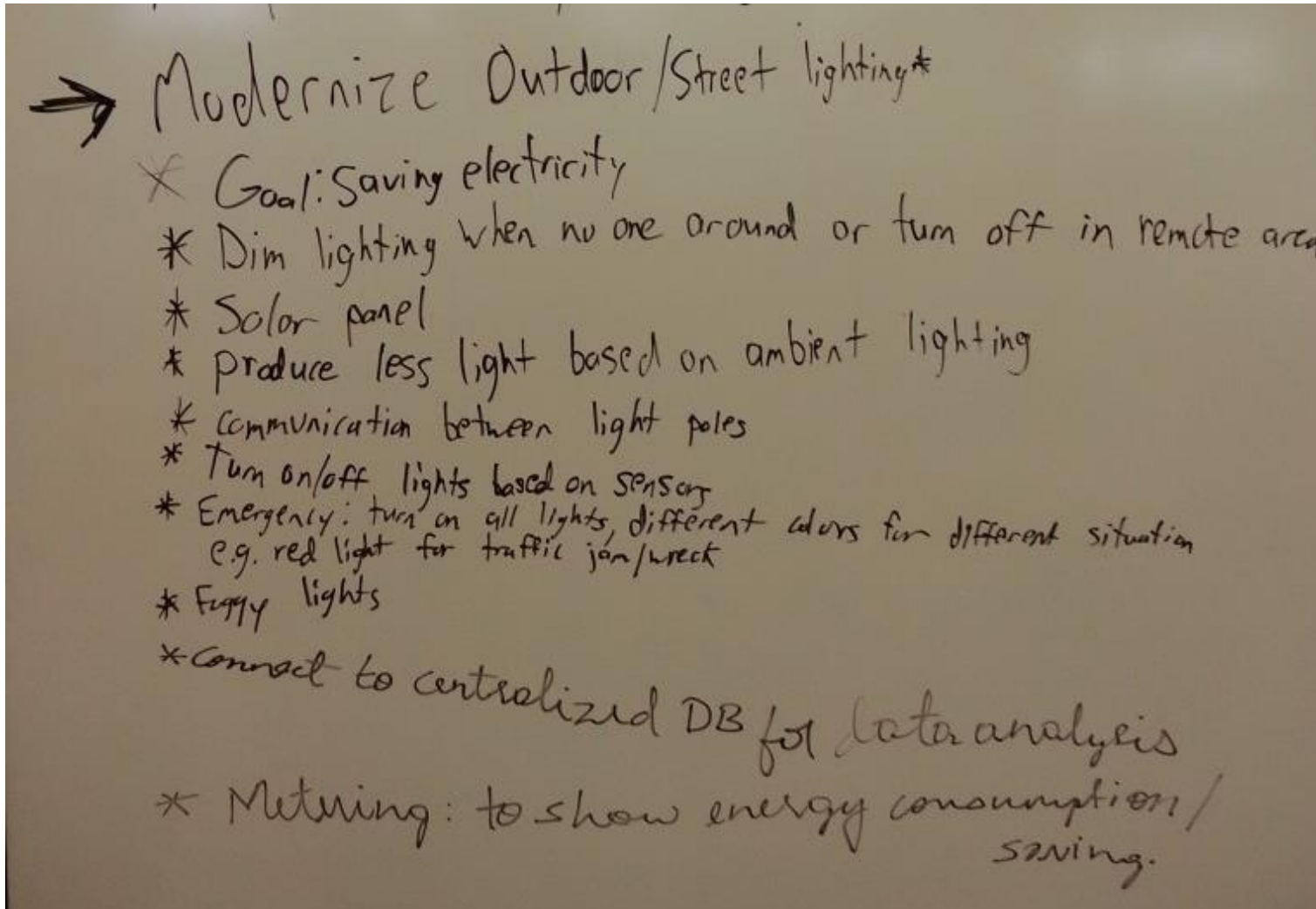 - Christmas tour of Middleburg

Sketching

- Rapid creation of freehand drawings
  - Expressing **preliminary design ideas**
  - Focusing on **concepts rather than details**
- Reinforces design thinking, augments communication
- Explore and expand design ideas
- **Sketches are not prototypes**
- They are abstract, incomplete, not artistic, disposable, fast, annotated !!

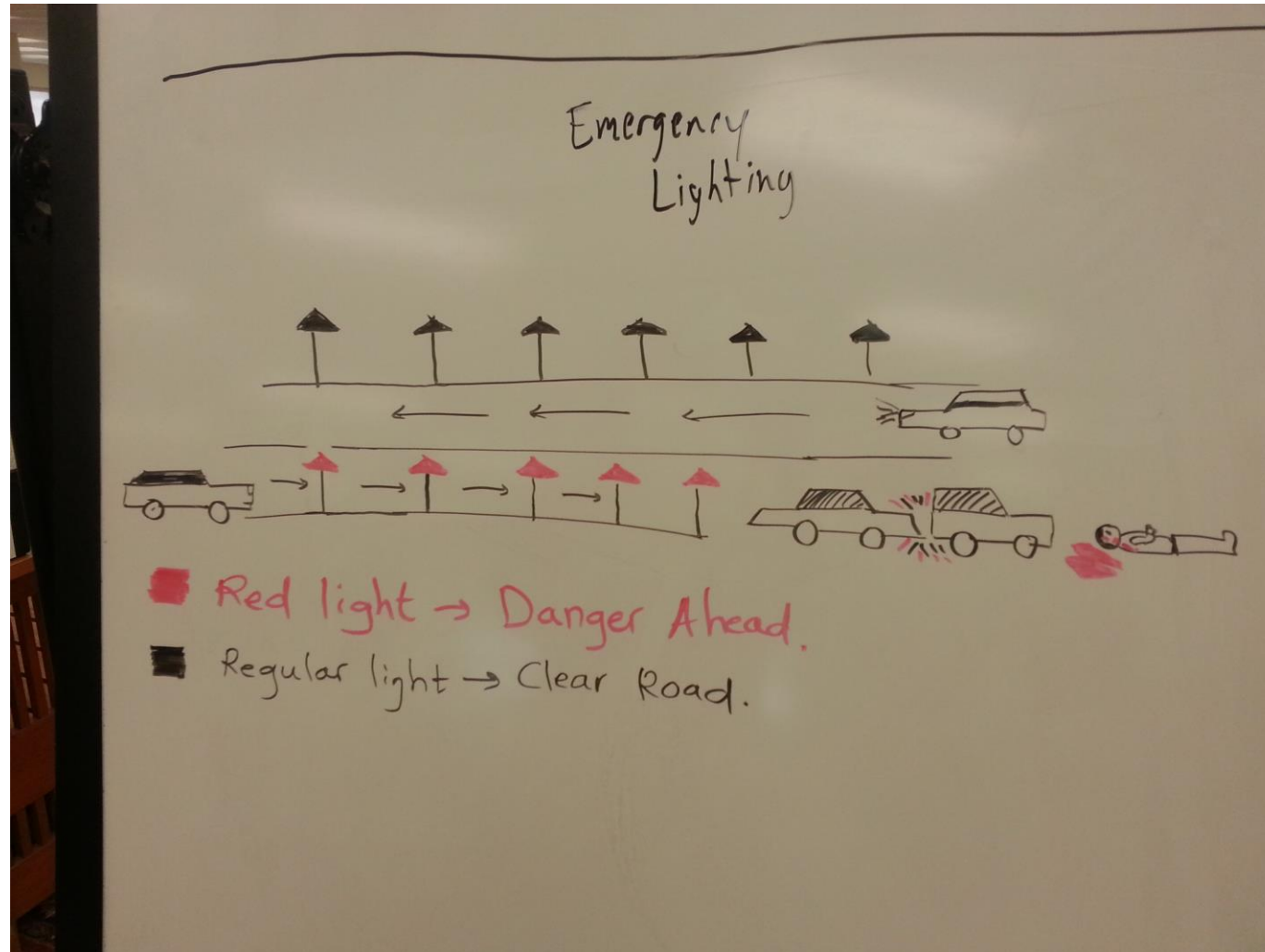http://olliekhakwani.com/workshop-ux-sketching/
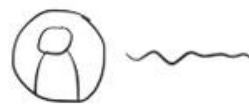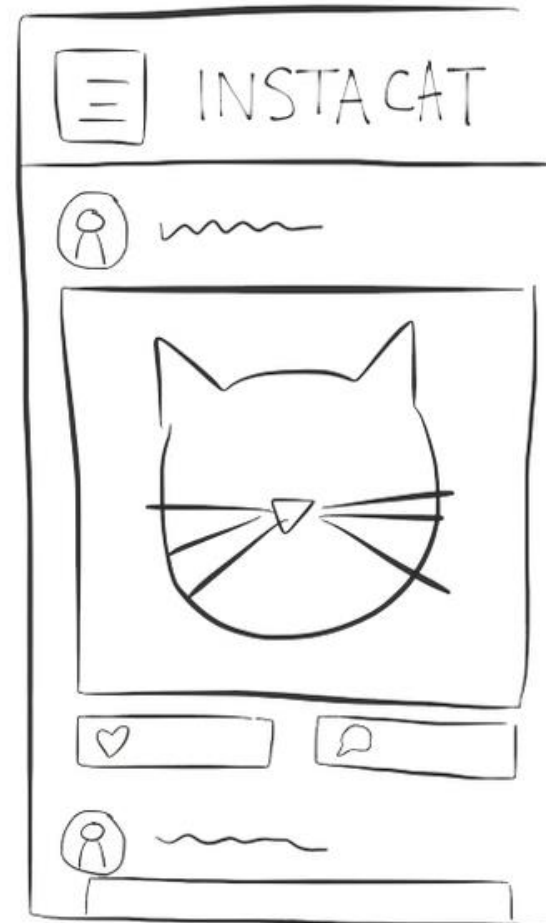
Example: Smart Outdoor Lights

- The main purpose of these lights is to save electricity. It runs on solar power and provides intelligent lighting. The way it works is by providing light and hence consuming power only when required.

- The new smart outdoor light saves power by making use of sensors which detect activity around them. They can also communicate with one another over the network to smartly and efficiently light up when required.
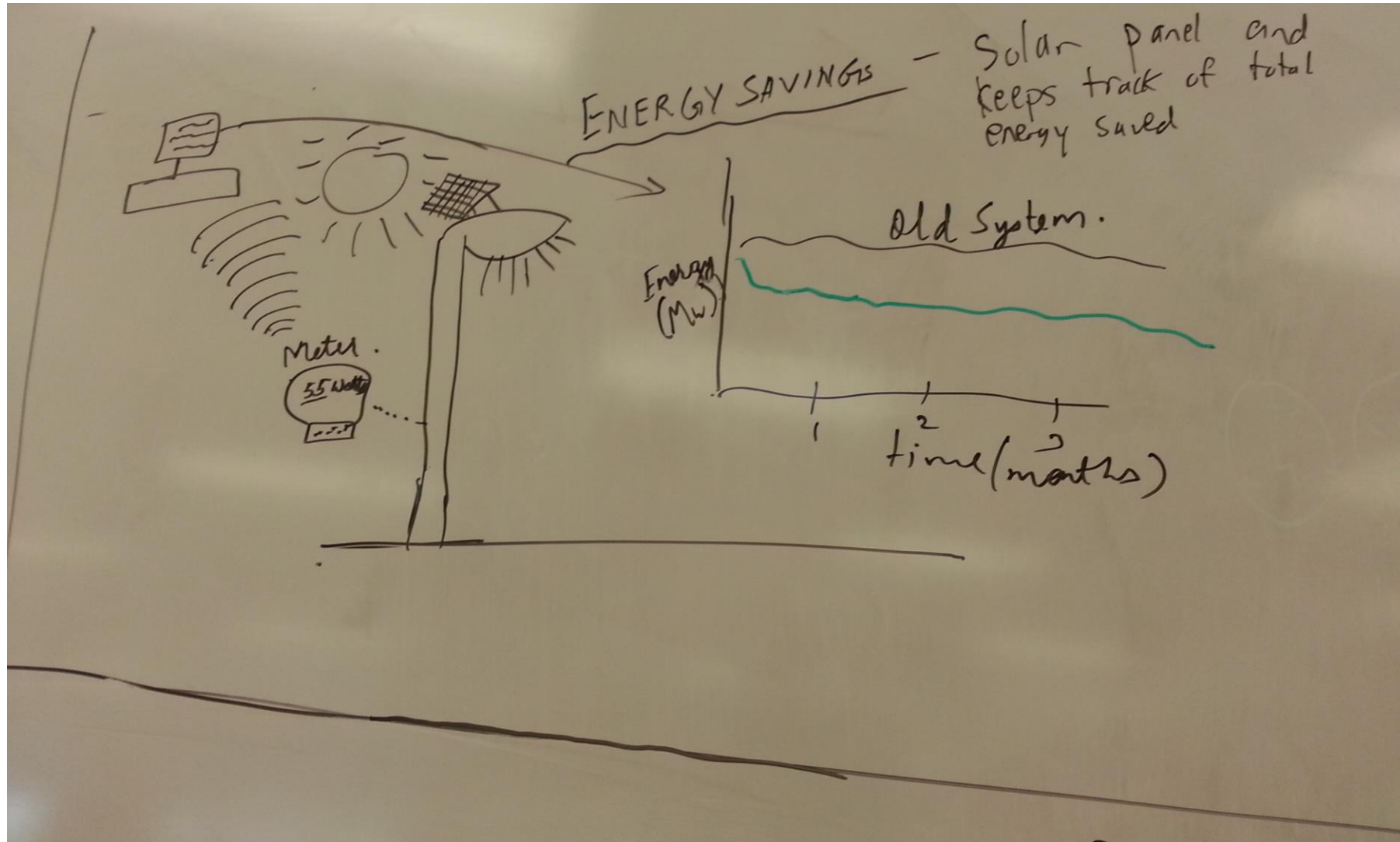
Example: Smart Outdoor Lights

→ Modernize Outdoor/Street lighting*

* Goal: Saving electricity
* Dim lighting when no one around or turn off in remote area
* Solar panel
* Produce less light based on ambient lighting
* Communication between light poles
* Turn on/off lights based on sensors
* Emergency: turn on all lights, different colors for different situation
  e.g. red light for traffic jam/wreck
* Fuzzy lights
* Connect to centralized DB for data analysis

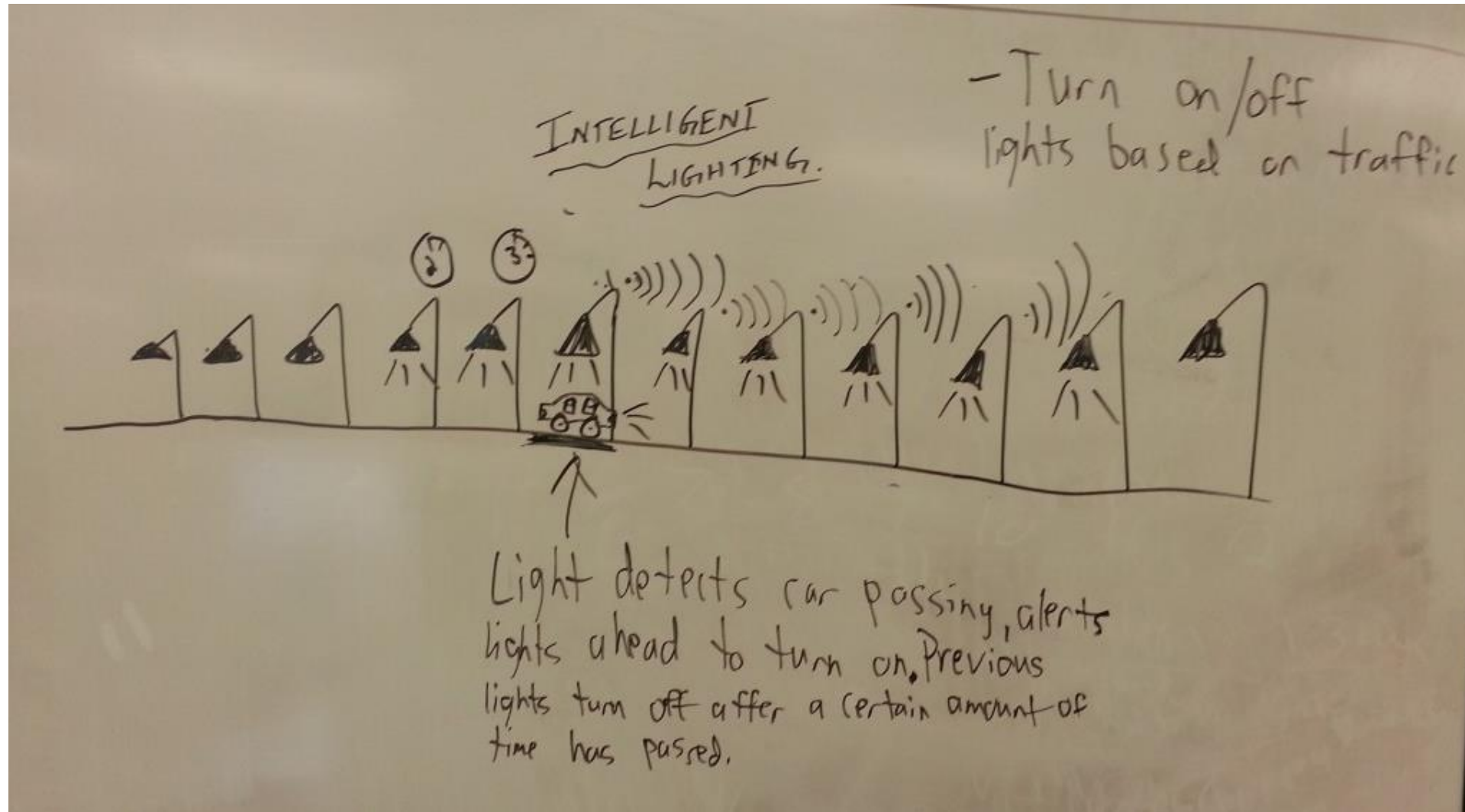* Metering: to show energy consumption/saving.

Example: Smart Outdoor Lights

Example: Smart Outdoor Lights

Example: Smart Outdoor Lights

"Overfitting"

- In computer science, pursuing complex models not supported by detailed data
- By analogy, in UX design, starting out keep it simple, avoid complexity
- ***Don't over design in the beginning, iterate***

Team Activity

Take on the role of UX designer and create a new design vision. Here you are totally focused on the user experience. What emotional impact do you want to achieve?

- Engage in ideation, to rapidly create and compare a large number of design alternatives.
- Start by discussing the goals and how you expect to proceed.
- Everyone in turn, start throwing out ideas for discussion.
- Make sketches of design ideas (**each individual**) and hang them on the wall. Remember that a sketch is not just a picture; it's a conversation.
- Remember to keep separate idea creation and critiquing.
- In the idea creation phase, keep the rich ideas flowing. No idea is too far out.
- When that well starts running dry, switch to critiquing and evaluate the ideas, winnowing out the most promising ones.