A"

Aalto University
School of Arts, Design
and Architecture

Designing the interactions

MUO-E3036 Interaction Design (IxD)

24 January 2022

Antti Salovaara

MyCourses > Interaction design > Split S > Lecture slides >
Week3-Day1-Designing-the-interactions.pdf

Contents of the day

Review on where we are now in the course

+ what tasks are lying ahead

This week's group task

1. Scenario design and definition of your UX goals
2. Task structure design
3. Interaction sequence / sitemap design
4. UI sketching

Introduction to detailed IxD

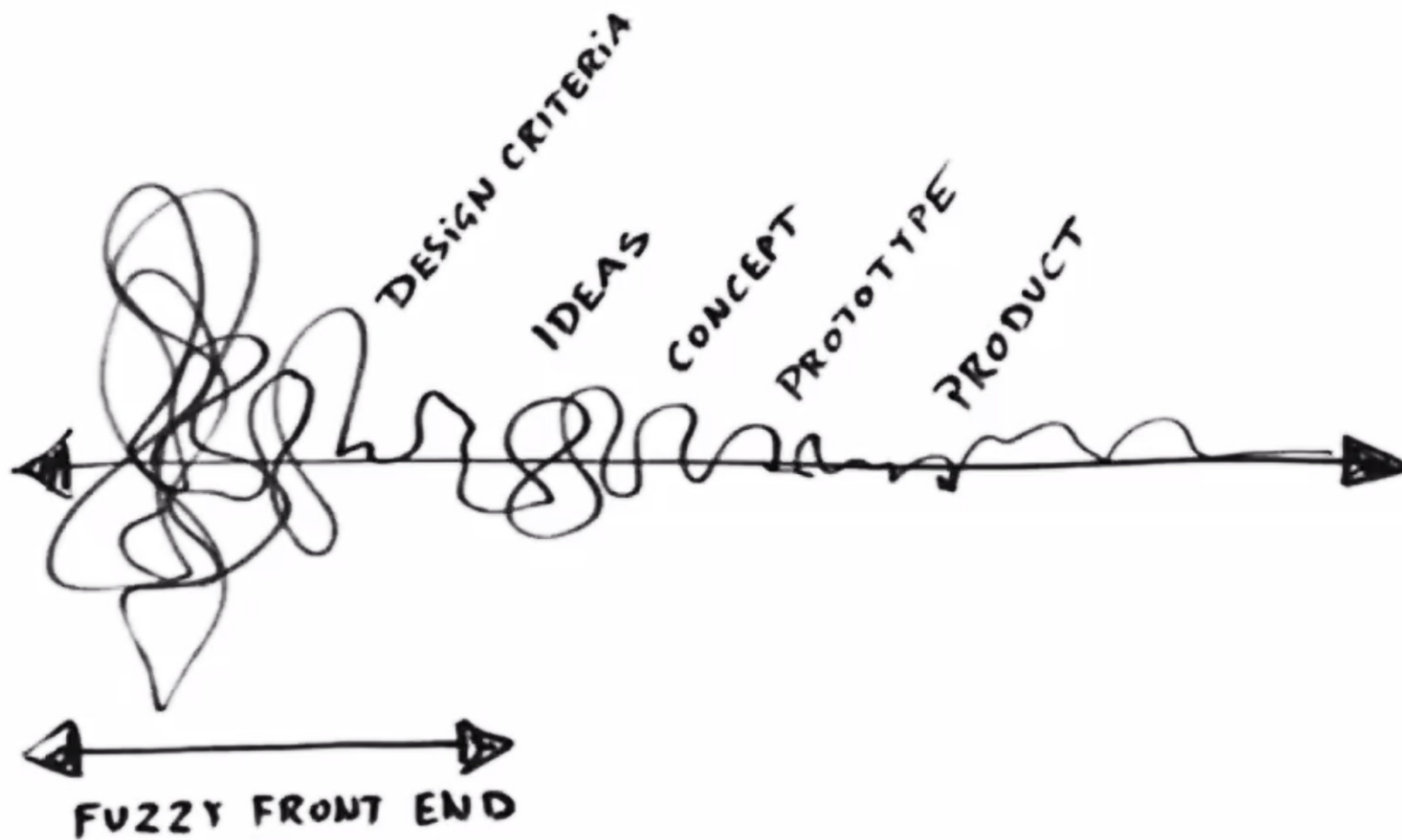Repetition of contents from UID course lecture

Friday's presentation instructions

Reading material for Friday

Tutor meetings

Where are we now?

And enjoy the user research in the wild!

DESIGN CRITERIA
IDEAS
CONCEPT
PROTOTYPE
PRODUCT

FUZZY FRONT END

Concept design ——— IX design ———

Sanders & Stappers (2008). Co-creation and the new landscapes of design. CoDesign, 4(1), 5-18.
https://doi.org/10.1080/15710880701875068

Schedule

Week 1   User research ✔

Week 2   Google Design Sprint ✔

Week 3   Interaction prototyping pt. 1

Week 4   Interaction prototyping pt. 2

Week 5   User evaluation (small A/B test)

Week 6   Wrapping up

Concept design

IX design

Week 3: Design A → Week 4: Design B → Week 5: A/B evaluation
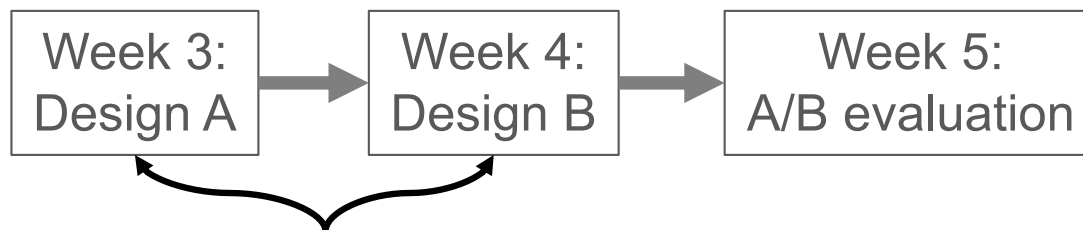
E.g., different interaction in one part of UI

This week's group task

1. Scenario design and definition of your UX goals
2. Task structure design
3. Interaction sequence / sitemap design
4. UI sketching

1. Scenario design + your UX goals

Starting point: Your storyboard from Wednesday
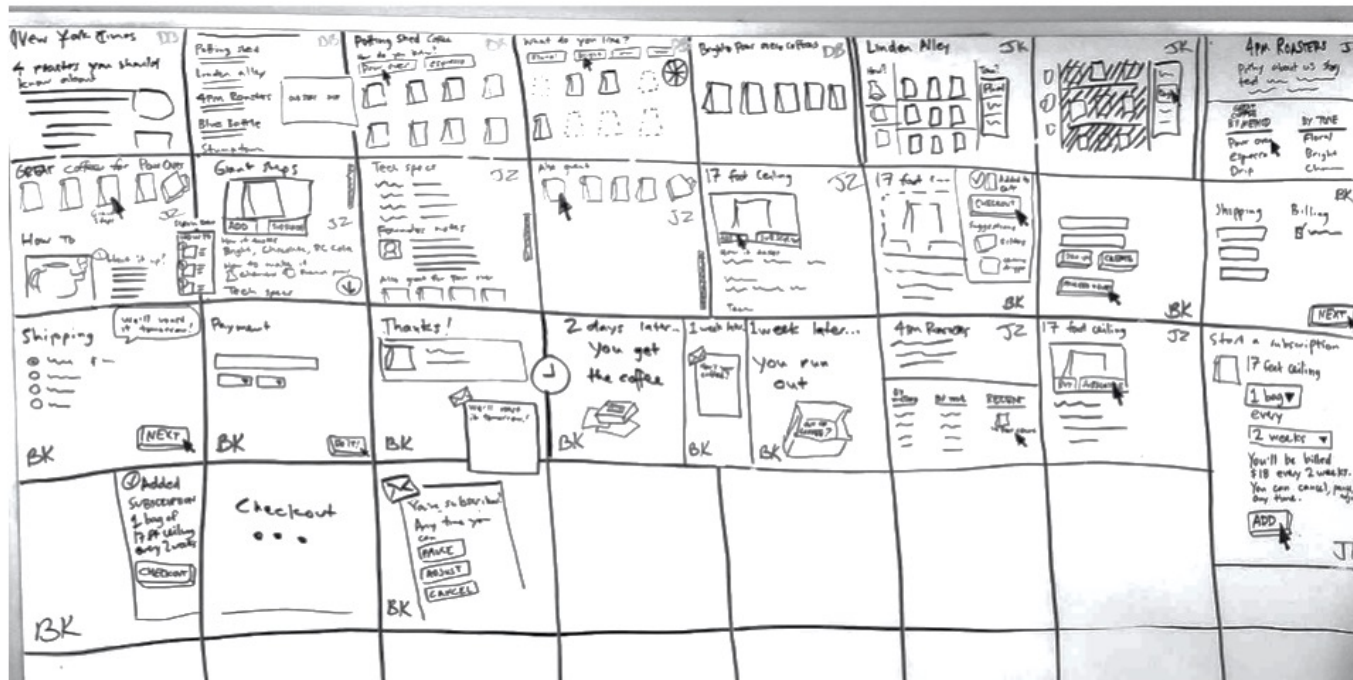
Storyboard shown
in the Sprint book

1. Scenario design + your UX goals…

Create an improved scenario for your product/service

> With improvements, based on what you learned via prototyping (Thursday) and testing (Friday)

> Think: What problem / need does your product/service address?

> Think: What is the situation where the product/service is used *

What are the criteria, goals and requirements for UX of your design?

> Do you aim for simplicity? Minimalism? Particular kind of aesthetics? Learnability? Efficiency? Prevention of errors? **

> Do not choose too many goals

*   See section 2.6 in Benyon's book in this week's reading materials and a PACT graph in the later slides.

**   The usability criteria (see later slides) can be a good (but not complete) source of inspiration.

1. Scenario design + your UX goals…

From the storyboard, choose a sequence that you will design in more detail

Example:

1. The user searches for some information

2. User contacts some friends

3. User goes to meet them

4. User sends IMs on the way.

5. When friends meet, they book a table together from a restaurant

6. They divide the costs evenly between themselves.

=> Select which part of the story will you focus on, because there can be a need for a different app for each stage

2. Task structure design

For the chosen sequence, design the structure of that activity

Example of visualizing the structure using hierarchical task analysis:

How Aalto employees might use photocopiers:

0. Photocopy sheet of A4

Plan 0: Do 1-2-4-5 in that order
when the defaults are incorrect, do 3

1. Touch reader with HSL card

2. Place document

3. Select copy details

4. Press copy button

5. Collect output

Plan 3: Do any of 3.1 or 3.2 in any order
depending on the default settings

3.1 Select A4

3.2 Select 1 copy
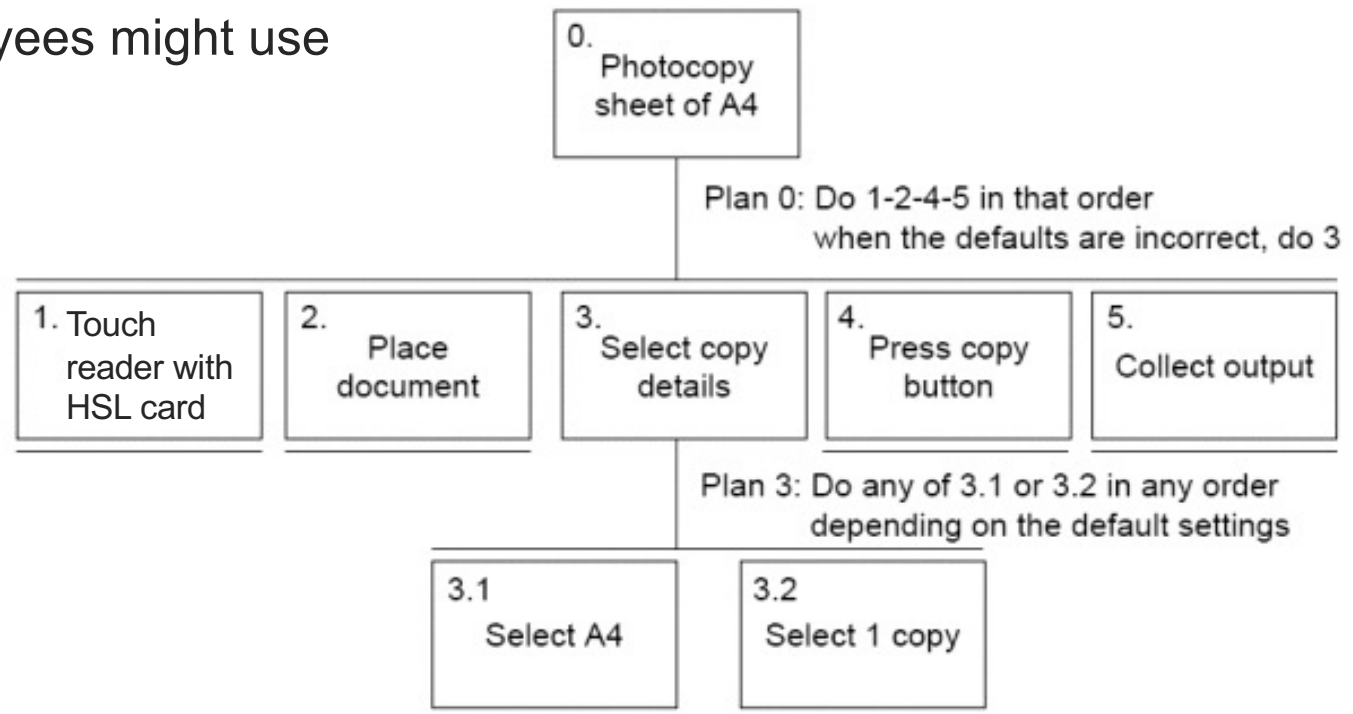
3. Interaction sequence / sitemap design

How do the user and the system interact in the task?

Remember to design the IX sequence from the point of your UX goals

```
┌──────────────┐              ┌──────────────┐              ┌──────────────┐
│              │              │    Game      │              │  Parameter   │
│   Recipe     │ ──────────▶  │ editor's IF  │ ──────────▶  │ popup for IF │
│   browser    │              │    view      │              │    view      │
│              │              │              │              │              │
└──────────────┘              └──────────────┘              └──────────────┘
                 User taps on                  User drags
                 the + button                  an icon from
                                               bottom
```

User taps the
cancel button
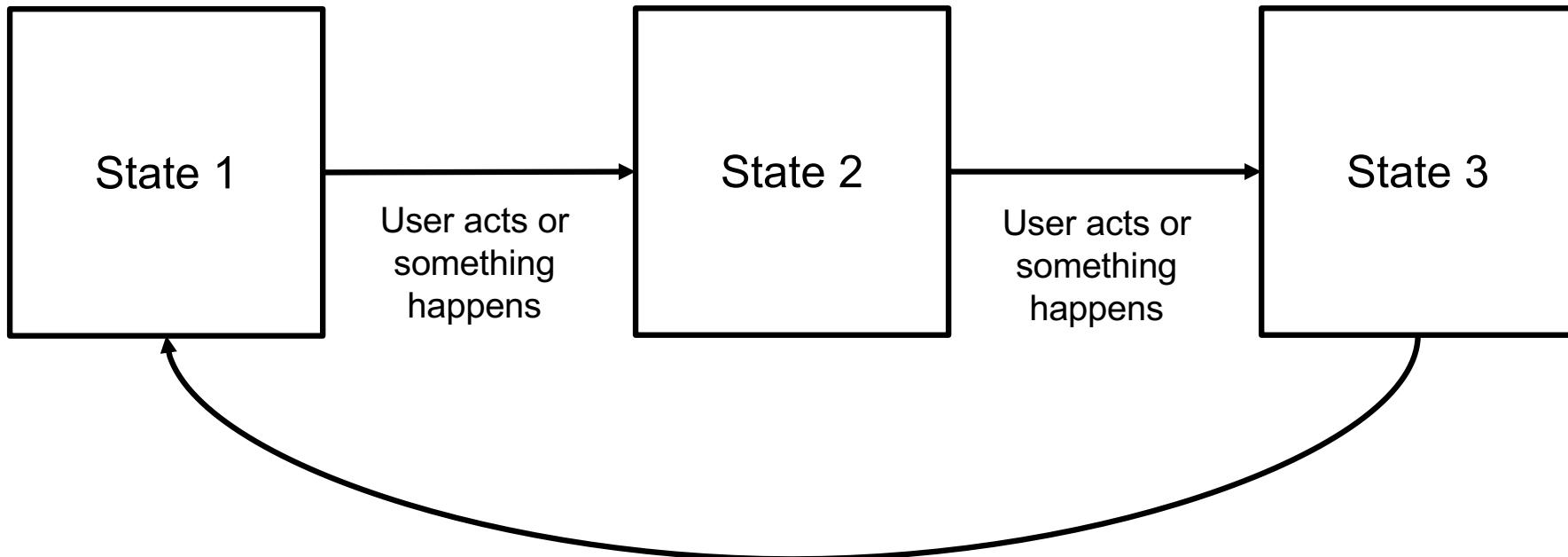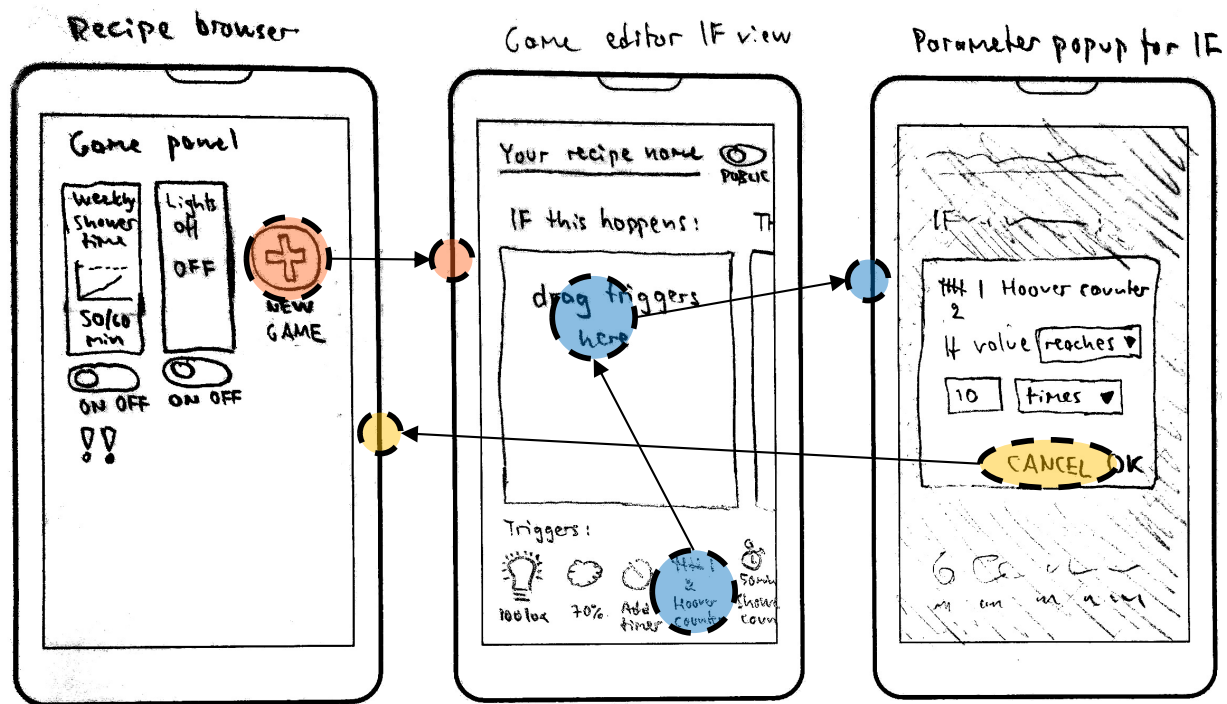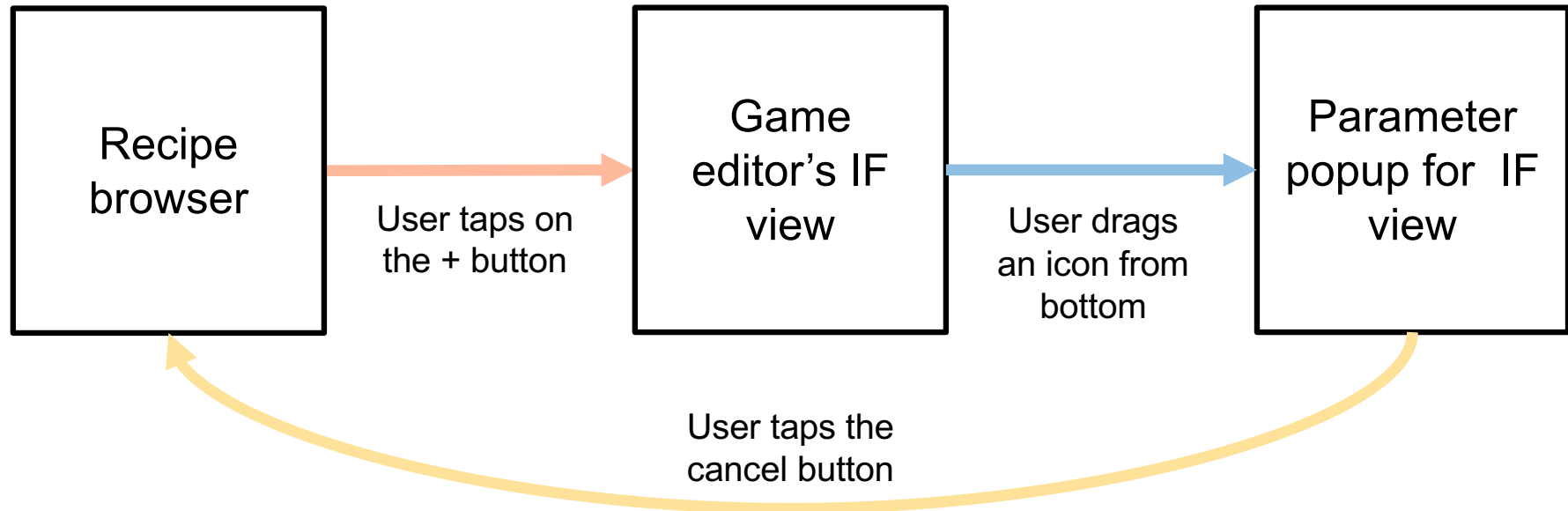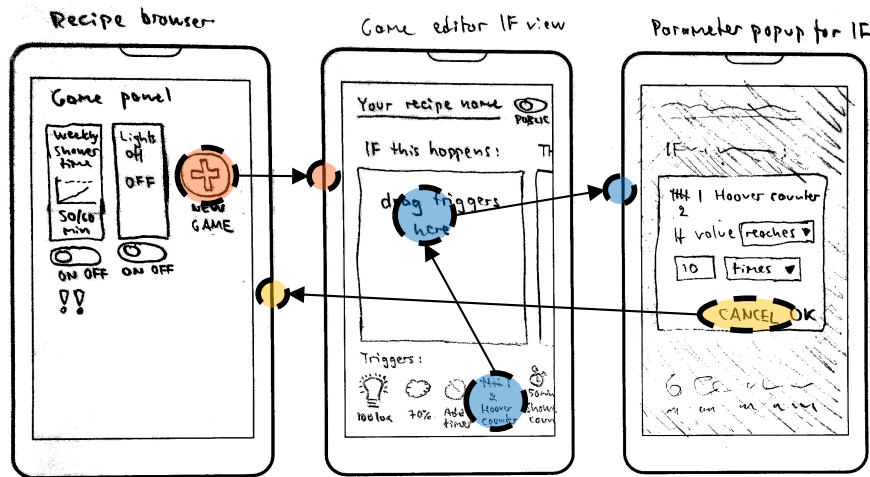
4. UI sketching

End of week 3: Sketching in Figma or some other prototyping tool

Why do we need to have so many steps?

I wanted to a blue layout

Why?

… I don't know

Designer

Client
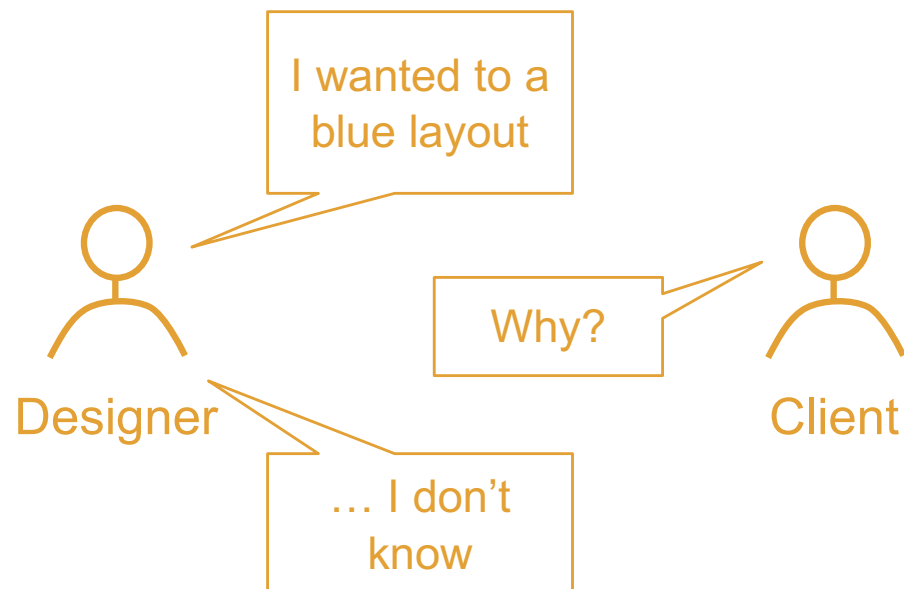
Introduction to detailed IxD

… building on the contents that were already covered in the UID course lecture *

But let's have a **break** before that!

1. Scenario design + your UX goals

Considering user's situation: PACT framework

User

People
- Strength
- Physical reach
- Perception
- Learning
- Cognition
- Values
- Emotions
- Personality
- Anthropometrics
- ?

Activities
- Cooperation
- Utilitarian
- Hedonic
- Purposes
- Temporality
- Safety and errors
- ?

Contexts
- Stationary
- Mobile
- Physical environment
- Distribution
- Digital environment
- Wirelessness
- Storage
- Social environment
- Leisure
- Work
- ?

Technologies
- Input
- Output
- Communication
- Human–human
- Human–computer
- ?

Usability criteria (Norman)

Use both knowledge in the world and in the head

Simplify the structure of tasks

Make things visible

Get the mappings right

Exploit the power of constraints

Design for error

When all else fails: Standardize!

"Seven principles for transforming difficult tasks into simple ones";
Norman (1988). The psychology of everyday things.

Usability criteria (Nielsen)

Visibility of system status	Match between system and the real world	User control and freedom	Consistency and standards	Help users recognize, diagnose, and recover from errors
Error prevention	Recognition rather than recall	Flexibility and efficiency of use	Aesthetic and minimalist design	Help and documen-tation

"Usability heuristics"; Nielsen (1993). Usability engineering.

https://www.nngroup.com/articles/ten-usability-heuristics/

Usability criteria (Shneiderman)

Make it clear to user when the task is completed

1 Strive for consistency

2 Enable frequent users to use shortcuts

3 Offer informative feedback

4 Design dialog to yield closure

5 Offer simple error handling

6 Permit easy reversal of actions

7 Support internal locus of control

8 Reduce short-term memory load

Make the user feel certain that they are controlling the task, not the computer

"Eight golden rules"; Shneiderman (1988). Designing the user interface.

Usability criteria (Shneiderman)

Easy to learn

Efficient

Memorable

Designed for error

Satisfaction

Shneiderman (1980). Software Psychology.

Your UX goals

Can you think of other goals than the heuristics in the previous slide?

Simplicity? Minimalism? Particular kind of aesthetics?
Learnability? Efficiency? Prevention of errors? **

Discussion in the groups (10 minutes):

From last week's storyboard, what part would each one of you like to focus on in the interaction design?

What UX goals are you interested in?

(Do not choose too many goals, and remember that you don't need to decide it now, during the lecture)

2. Task structure design

Don't forget the user's context

Start by considering the important PACT framework's elements

=> You will better understand the opportunities and limitations that the user has

Hierarchical task analysis

Useful for understanding the structure of **existing** practices

You may then design your system to support this task structure or to re-structure it

Can be generated with observation and interviews
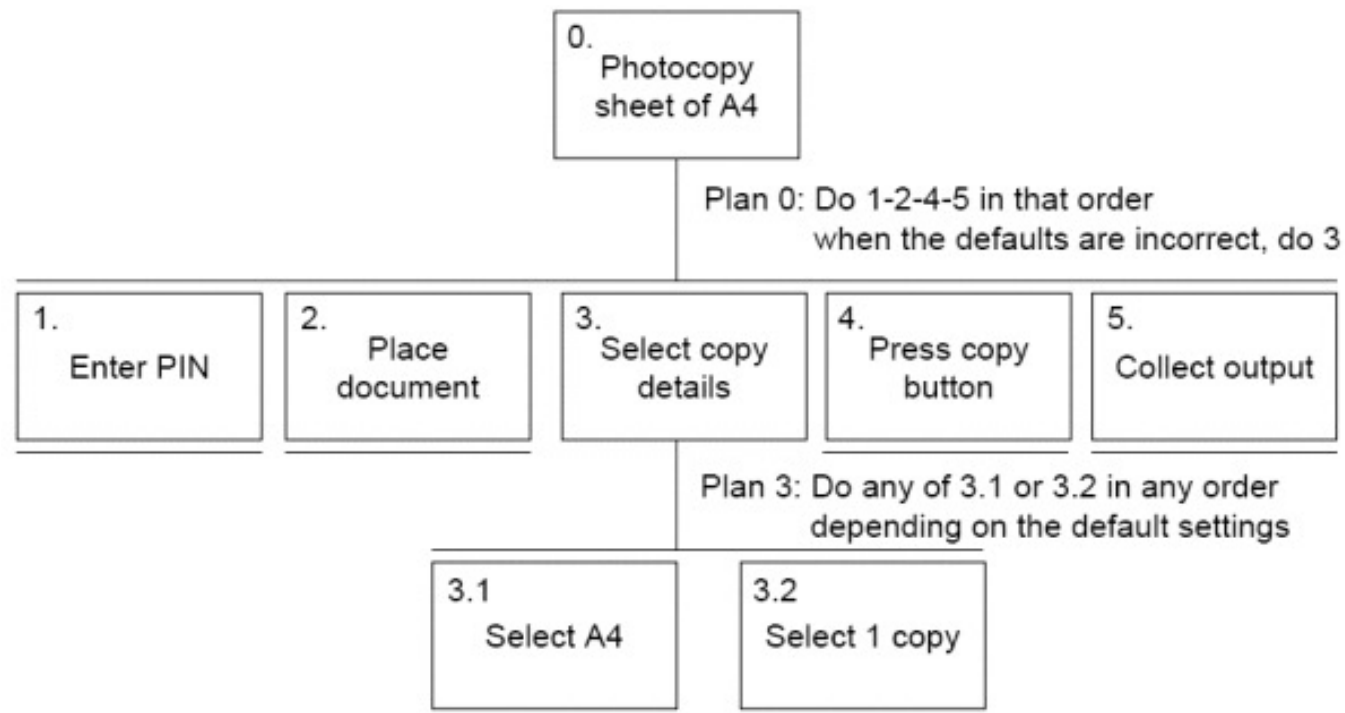
Example of a HTA diagram from https://aakins1.wordpress.com/2014/02/06/week-1-task-analysis/

Notation

Task that has subtasks

```
0.
   Photocopy
   sheet of A4
```
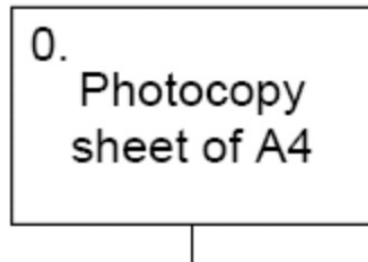
A terminal task that does not have subtasks

```
1.
     Enter PIN
```

Plan for how subtasks are carried out:

Plan 0: Do 1-2-4-5 in that order
         when the defaults are incorrect, do 3

Task numbering:

```
        0

        3

  3.1       3.2
```

Annett, J. (2003). Hierarchical task analysis. In E. Hollnagel (Ed.), *Handbook of Cognitive Task Design*, ch. 2 (pp. 17--35). Mahwah, NJ: Lawrence Erlbaum. https://mycourses.aalto.fi/pluginfile.php/1689946/mod_folder/content/0/annett2003%20Hierarchical%20Task%20Analysis.pdf?forcedownload=1
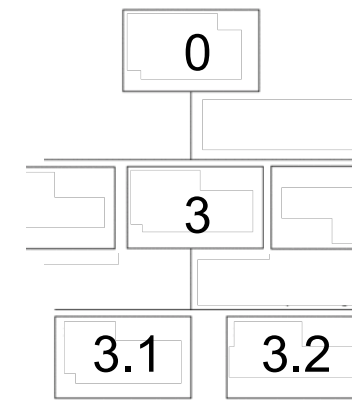
Alternative: State diagrams

Can be used to express interaction's inputs and outputs
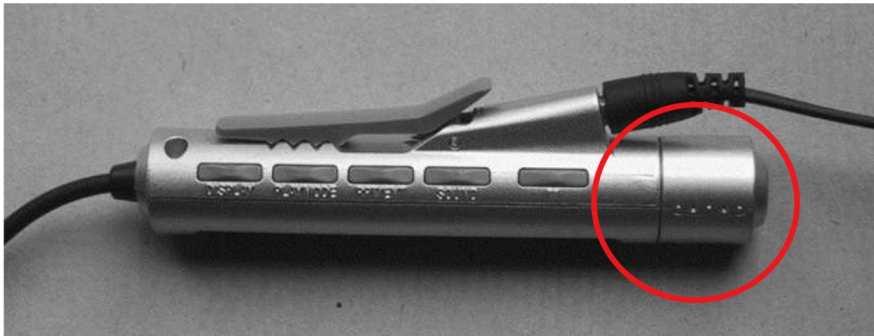
Knob in a music player. When knob is pushed in, the knob controls the volume. When pulled, it switches between tracks.

From http://www.physicality.org/physigrams/
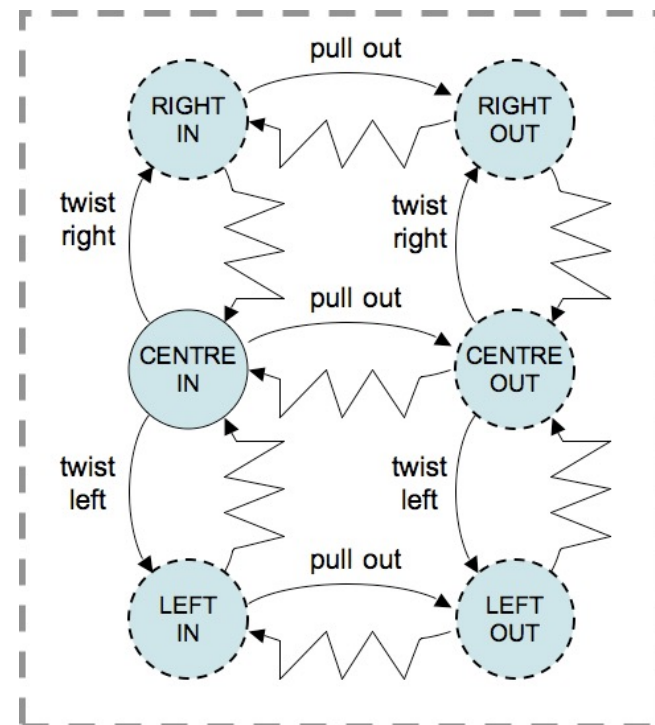
Alternative 2: Flowcharts

More info:

Silvio Piccolo (2016): Why Flowcharts are important in UX Design
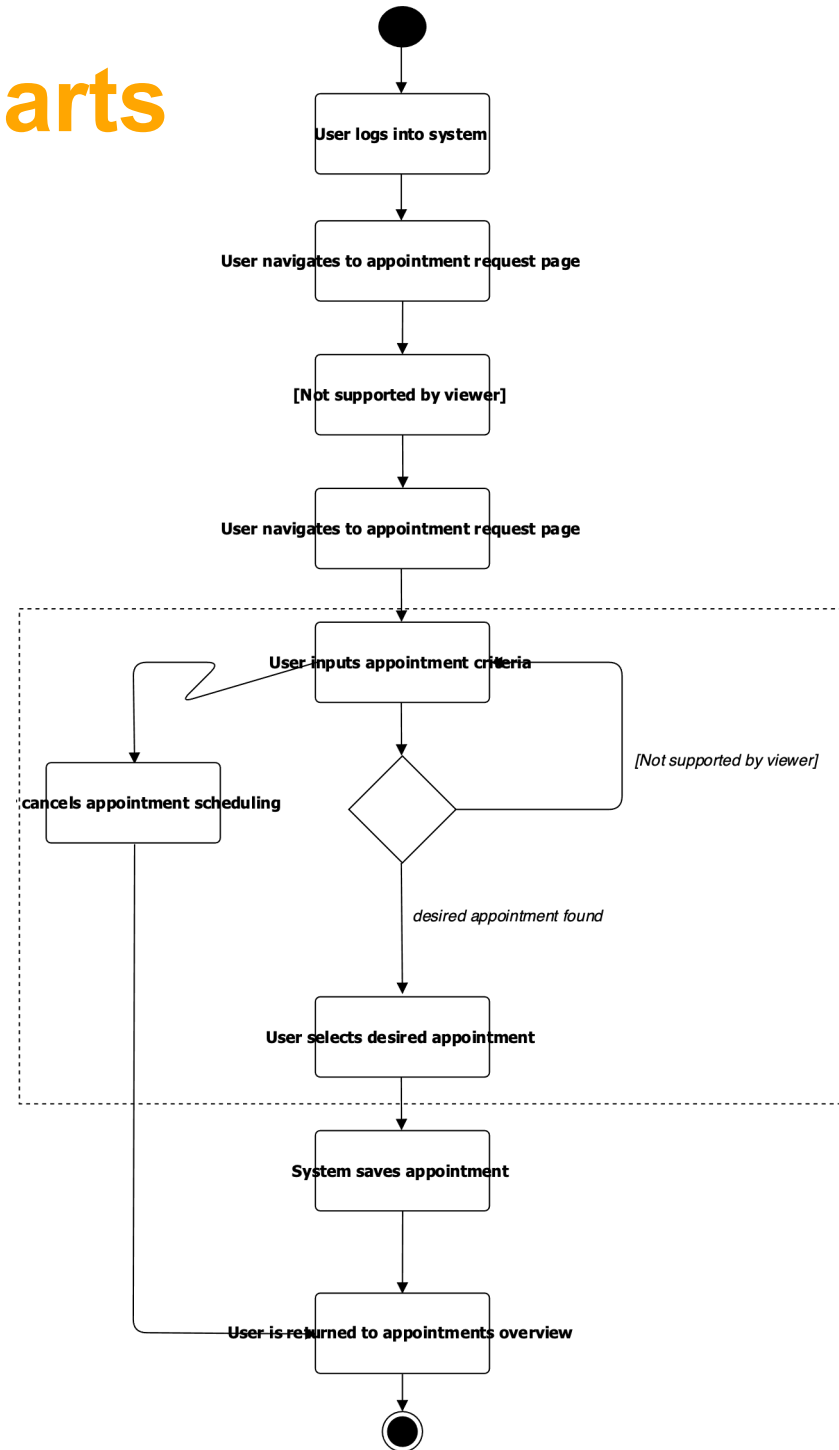
https://medium.com/@silvio piccolo/why-flowcharts-are-important-in-ux-design-f6bf3dfee080

User logs into system

User navigates to appointment request page

[Not supported by viewer]

User navigates to appointment request page

User inputs appointment criteria

cancels appointment scheduling

[Not supported by viewer]

desired appointment found

User selects desired appointment

System saves appointment

User is returned to appointments overview

Group discussion

1. Select one sequence from your storyboard

    It does not need to be your "final" decision

2. Create two possible task structures for carrying out the task

    Use any of the visualizating techniques from previous slides

10 mins

3. Interaction sequence / wireframe / sitemap design

HTA /
State diagram /
Flowchart

Reflective, well-argued
design decisions
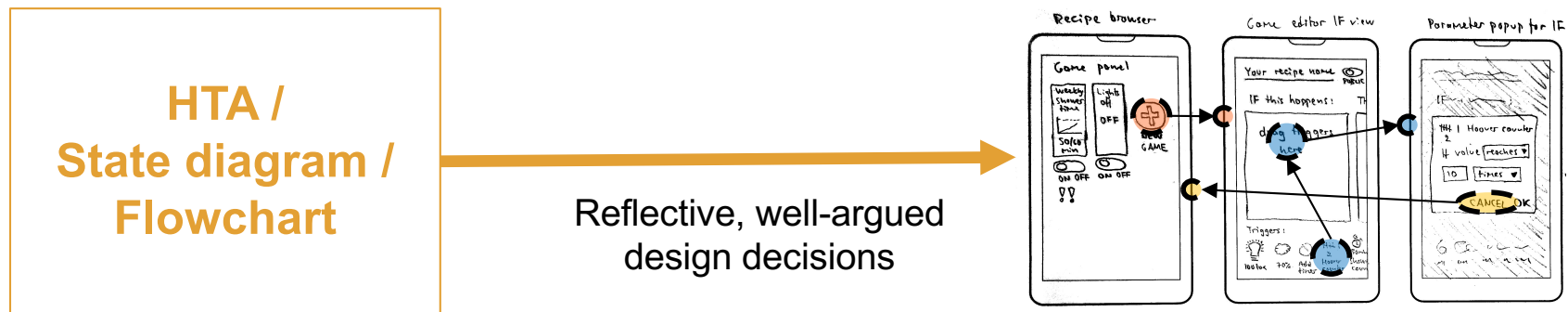
Reflective, well-argued design decisions

Visual layout principles: the Gestalt laws

Origin: Germany 1920–1950
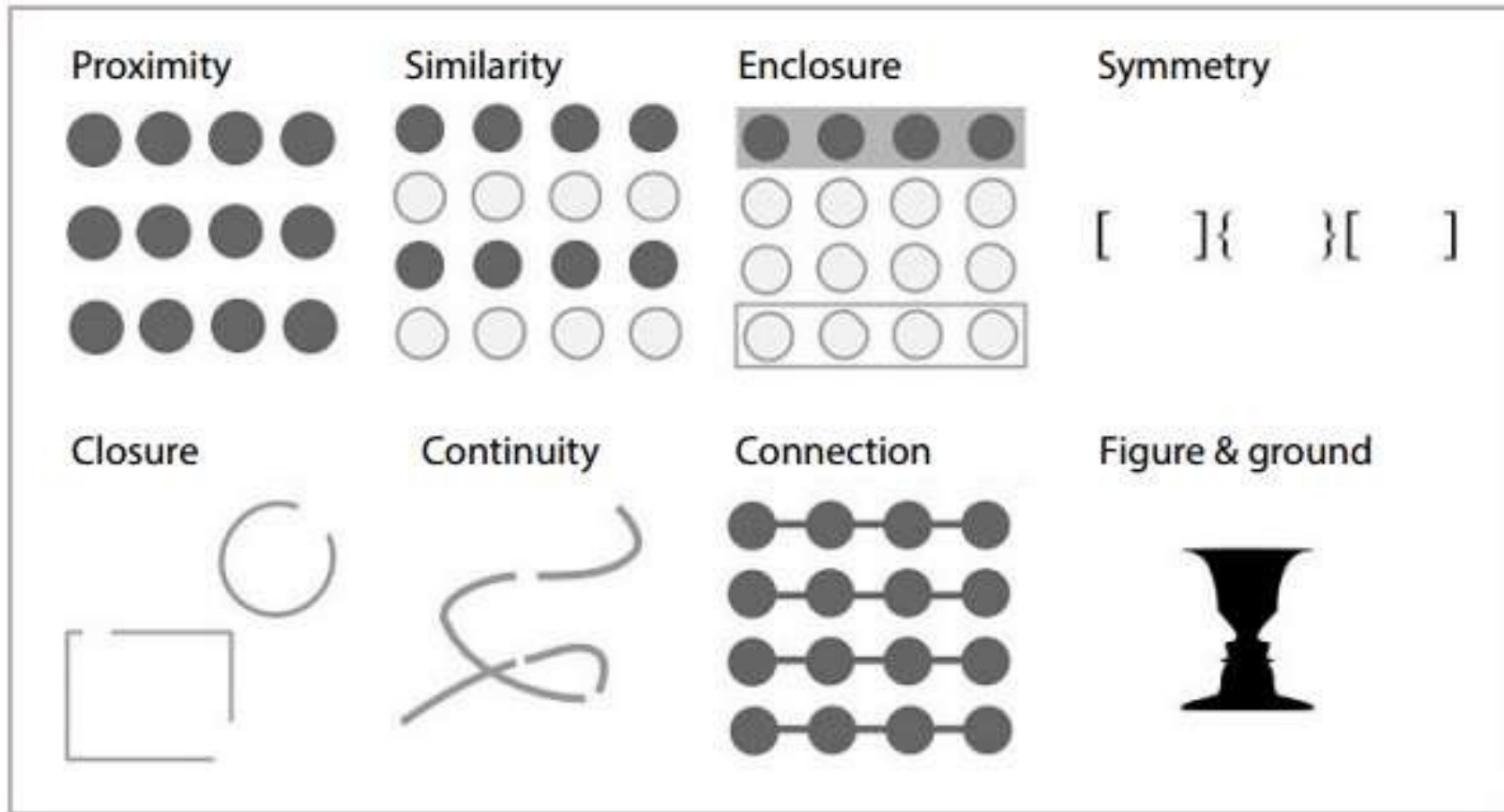
Original sources, Koffka 1935, Wertheimer 1959, Köhler 1969

Gestalt laws in UI design
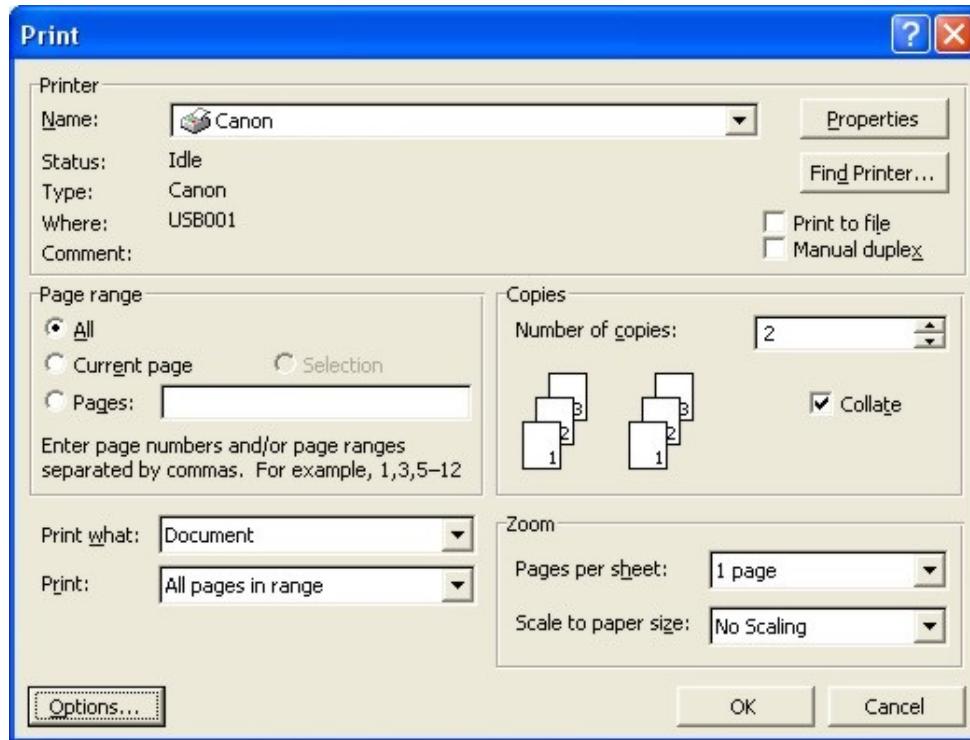
Law of enclosure used to group functionally related items together
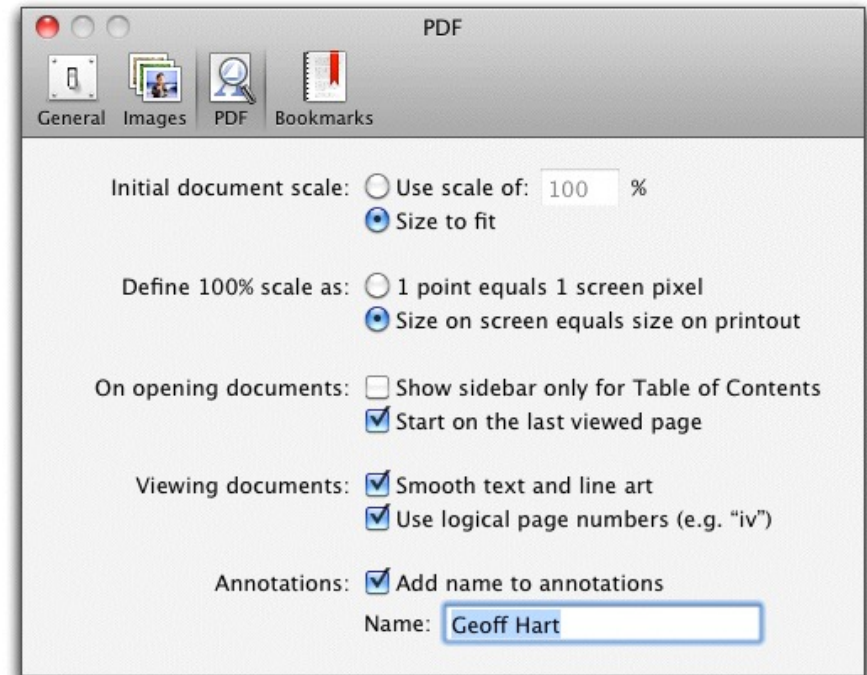
Law of proximity used to differentiate radio buttons from check boxes

Sources: Geoff Hart and Kevin Matz

Communicating what user can do: Affordances

"Direct perception" of action potential, different for each animal depending on its perceptual and action capabilities

Sources:
Gibson 1979,
Norman 1988,
Gaver 1991

Affordances in IX design

Communicate possibilities for action with their visualization.

Send

Send

Poor
perceived
affordance
of pressing
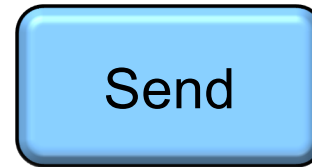
Good
perceived
affordance
of pressing

Conventions

Order of reading and interaction (e.g., in popup windows)

Commonly known icons

Blue text is a hyperlink

Shapes   Shapes

Item is clickable if it changes when it is hovered

Memory

Humans:

Good at recognition	←→	GUIs
Bad at recall	←→	Command line interfaces (e.g. order of arguments in a function call)

Encoding into larger chunks of meaning

AACSHCI
CRSWRK

Recalling vs recognizing the colours of euro notes

How IDEs help recall

```
Customer c = new Customer();
```

Sharing of responsibilities: "cognitive offloading"
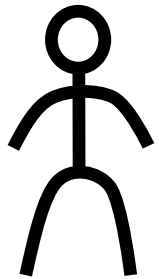
Pattern recognition

Intuitive interpretation (e.g., "reading between the lines")

Ill-defined problem solving

Creativity

Brute force solutions

Simulations

Generation of alternatives

Automatable and repetitive tasks

Planning in well-defined problem spaces

External memory

Checking for human errors

Suggested reading: Kirsh (1995): The intelligent use of space.

Use design heuristics as your guide

Use both knowledge in the world and in the head

Simplify the structure of tasks

Make things visible

Get the mappings right

Exploit the power of constraints

Design for error

When all else fails: Standardize!

Visibility of system status	Match between system and the real world	User control and freedom	Consistency and standards	Help users recognize, diagnose, and recover from errors
Error prevention	Recognition rather than recall	Flexibility and efficiency of use	Aesthetic and minimalist design	Help and documen-tation

1 Strive for consistency	2 Enable frequent users to use shortcuts	3 Offer informative feedback	4 Design dialog to yield closure
5 Offer simple error handling	6 Permit easy reversal of actions	7 Support internal locus of control	8 Reduce short-term memory load

Easy to learn	Efficient	Memorable
Designed for error	Satisfaction	

Group work

What PACT factors you must address well, based on the previous slides about cognition and design heuristics?
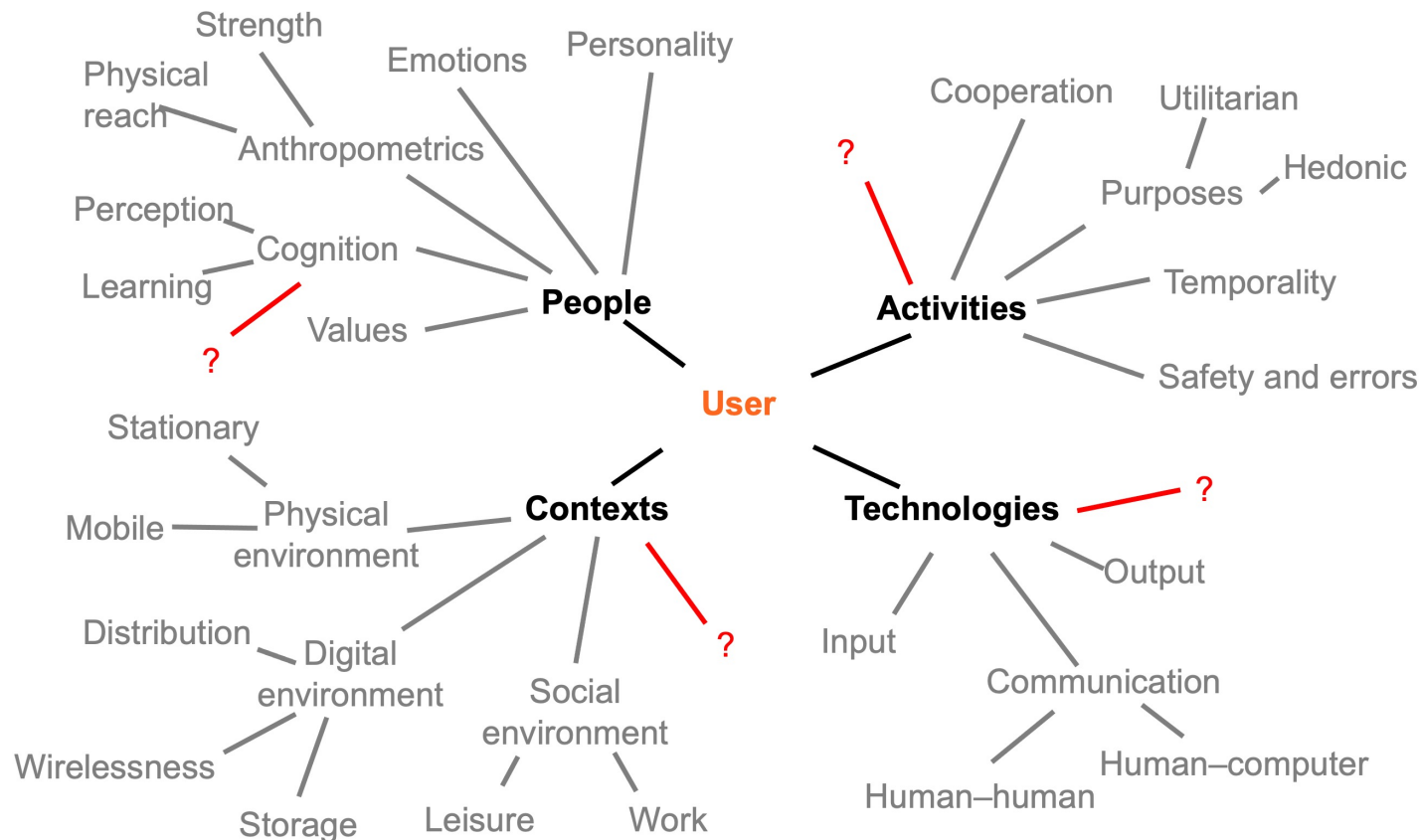
Interaction design patterns

Design patterns

"A design pattern is the re-usable form of a solution to a design problem" (Wikipedia)

Origins of the design patterns:

   Christopher Alexander (architect)

   Design patterns described repeatable design solutions to in urban plannind and house design

In computer science and interaction design:

   Highly adopted especially in object-oriented programming

   Also in IxD

Consider design patterns as a toolbox of good and tested design solutions

Wizard

Module tabs

From: news.com

Navigation tabs

Fat footer

FOLLOW US ON:

Site Links
Home
Privacy & Security
Help
Personal Finance Blog
Site Map

Company Information
About Mint
Awards
Reviews
Testimonials
Contact

Automatic Money Management
Online Money Management
Investing in Stocks
Commodities Investing
Savings Account
Investment Management

Better Budgeting
Personal Budget Planner
Real Estate Investing
Household Budget Tracking
Personal Budgeting
Creating a Budget

Personal Finance Made Easy
Online Financial Management
Credit Card Offers
Personal Finance Software
Online Budgeting Tools
Financial Planning

VeriSign Secured VERIFY ▸

TRUSTe CERTIFIED PRIVACY

McAfee SECURE™ TESTED DAILY 09-FEB

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Modal

Breadcrumbs

Resources on design patterns

Jennifer Tidwell (Book that covers many patterns)

https://primo.aalto.fi/permalink/358AALTO_INST/ha1cg5/alma999358717706526

UIPatterns.com (Computer screen oriented)

Dozens of patterns organized by their type: Getting input, Dealing with data, Navigation, …

All examples in previous slides were from the Navigation section

http://ui-patterns.com

UsabilityGeek (Mobile UI oriented)

6 patterns with short desciptions and examples

https://usabilitygeek.com/ui-patterns-for-navigation-good-ux/

UxPin (Computer screen oriented)

Every pattern presented through Examples, Problem, Solution, and Tips

https://www.uxpin.com/studio/blog/website-navigation-trends-16-ui-patterns-completely-deconstructed/

More "patterns"

Single page app design (as in Gmail)
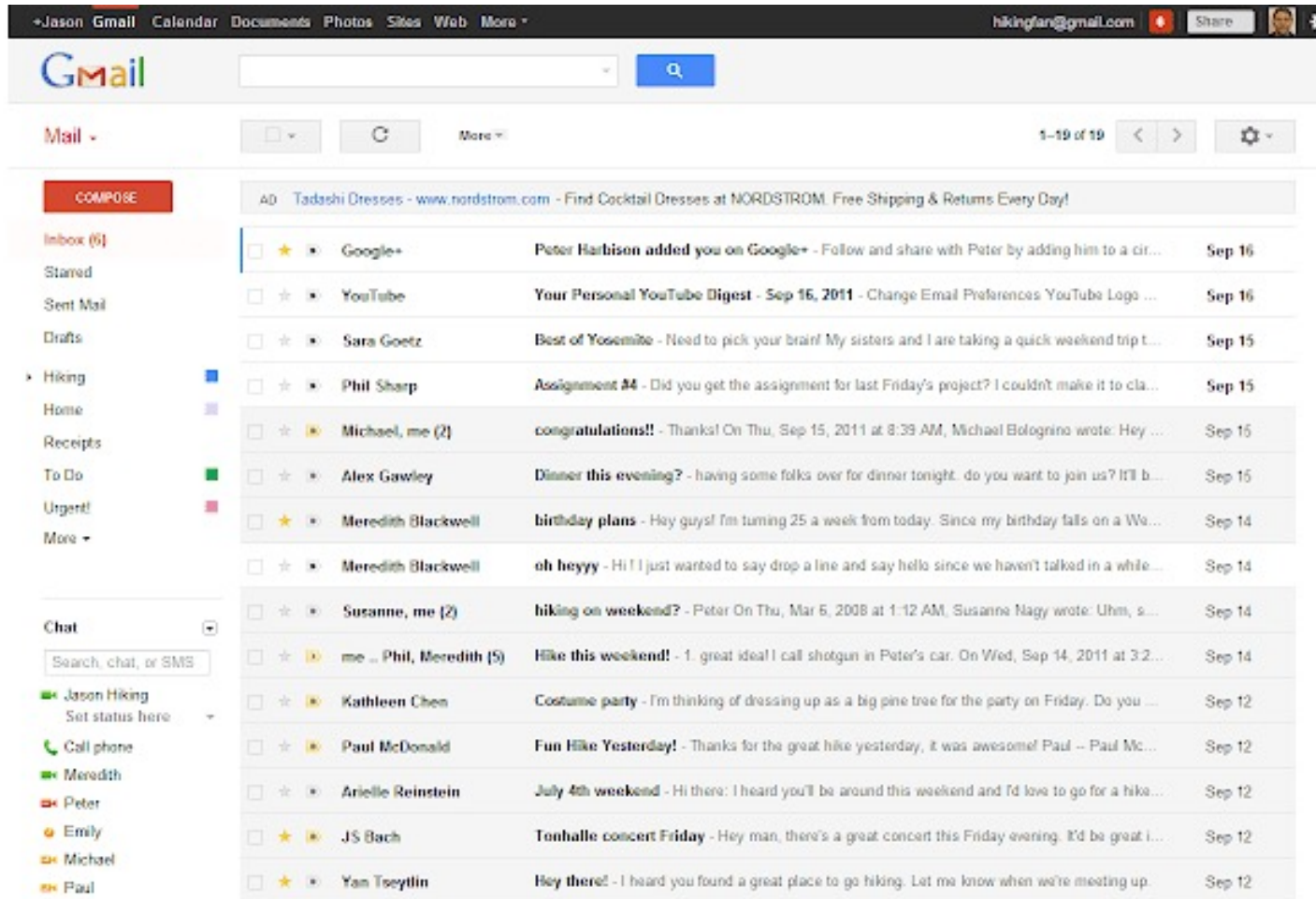
Landing page

Long format instead of a star-like navigation

Responsive design

Single-page app

Design fashions

Skeumorphism

Flat design

Infinite scroll vs pagination

Card-based design
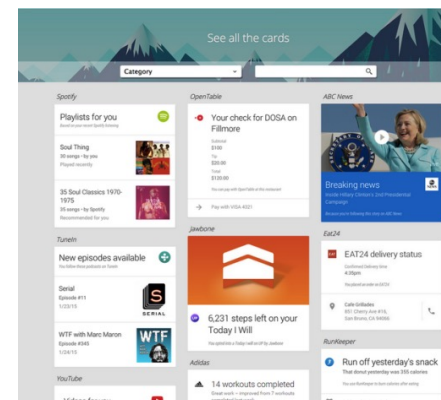
Design systems: e.g., Material (Google)
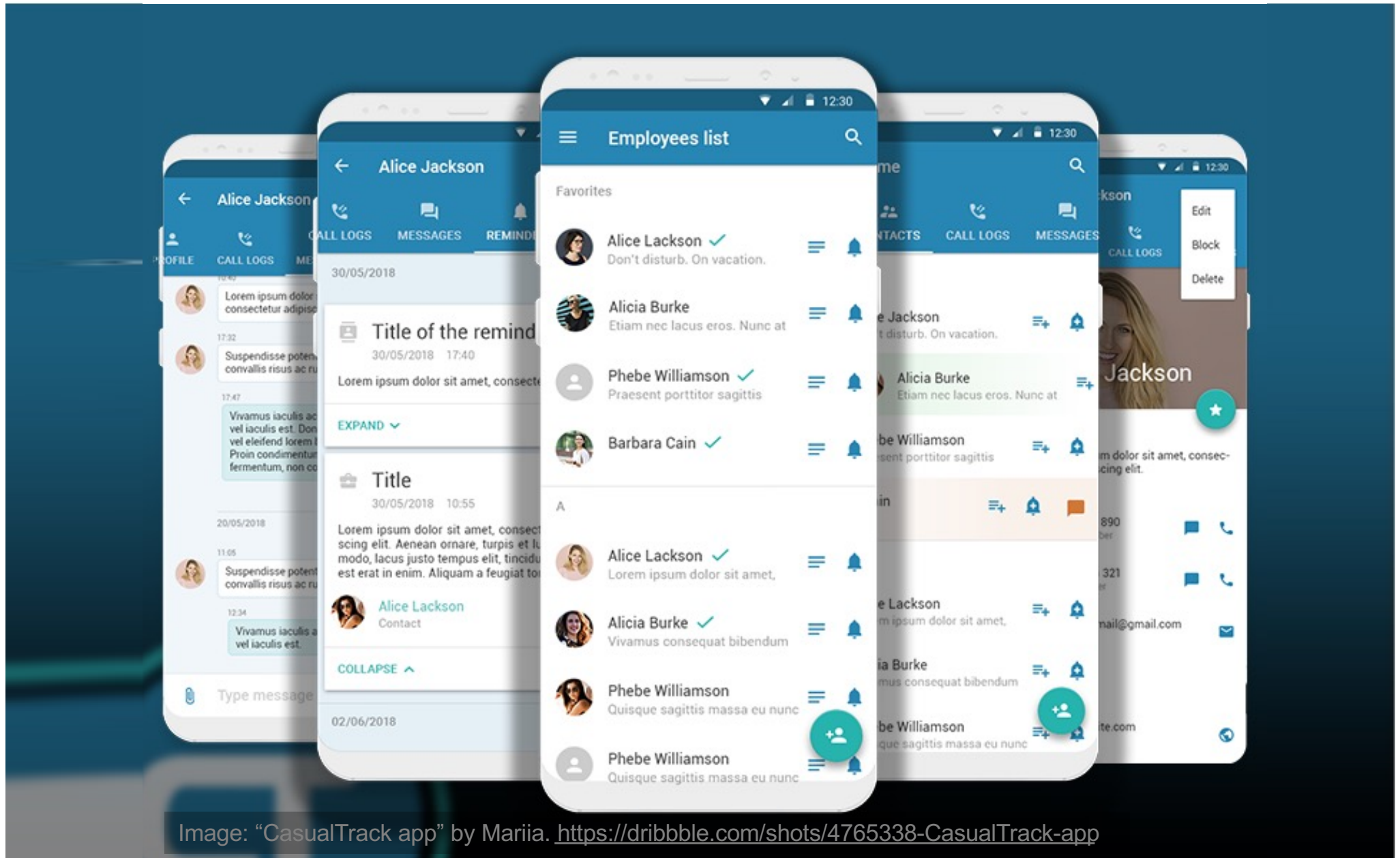
4. UI sketching
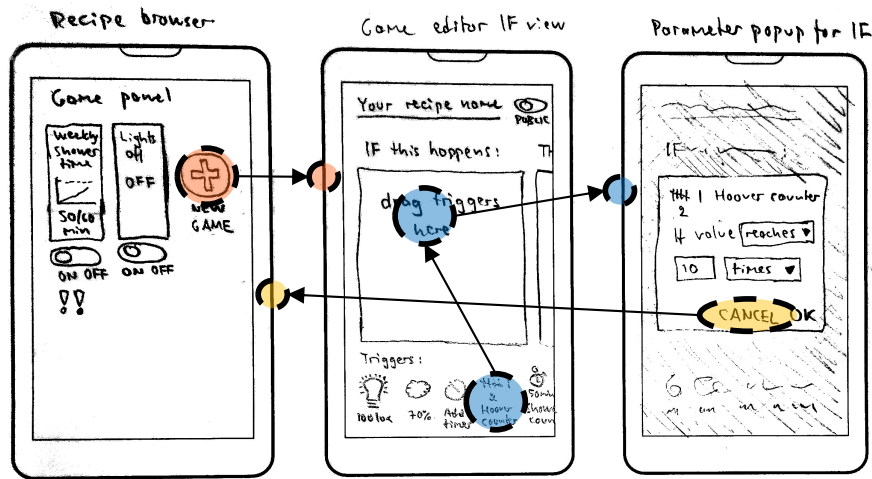
End of week 3:
(Almost) complete interaction sequence design and sketch of the graphical UI
Using a design tool of your choice

Selection criteria for the method

1. What method is best in realizing your solutions to your UX goals?

2. What method provides the most authentic user experience?

3. How much time and skills do you have (evaluations on 5th week)

4. …

Possible methods for sketching the interaction sequence:

Figma

Wizard of Oz

Unity

…

Be creative, focus on learning!

Wizard of Oz prototyping

Friday's presentation instructions

Presentation structure

10 minutes / group + 10 mins discussion in a "design crit" style

Part 1: Your focus and UX goals
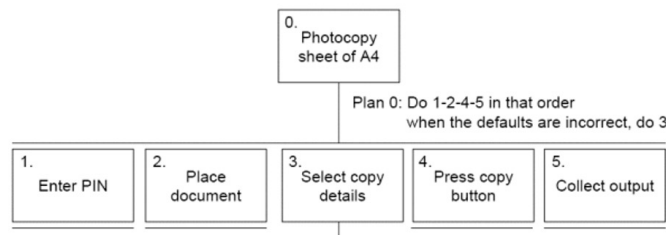
Part 3: Interaction sequence + UI sketch

Part 2: Task structure design
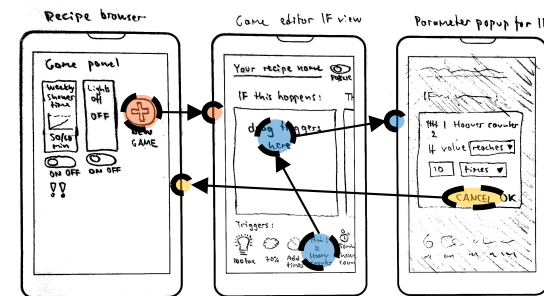
Part 4: Your design principles

Design patterns, conventions, metaphors, …

Reading materials
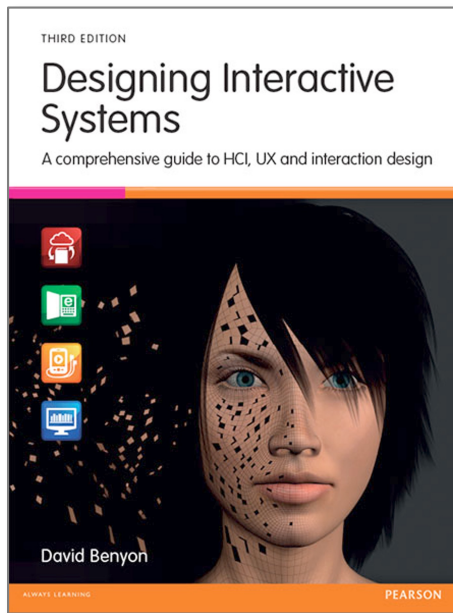
David Benyon:

Chapter 2: PACT: a framework for designing interactive systems

Chapter 3: The process of human-centred interactive systems design

https://primo.aalto.fi/permalink/358AALTO_INST/ha1cg5/alma999355378806526

Newman & Landay (DIS 2000):

Newman & Landay (DIS 2000): Sitemaps, storyboards, and specifications: A sketch of web site design practice

https://dl-acm-org.libproxy.aalto.fi/doi/10.1145/347642.347758

Tutor meetings

https://doodle.com/poll/svcbxbhgke7pgmq6?utm_source=poll&utm_medium=link