HCI Design & Evaluation

Lecture 4

Lo-fi prototyping and User Confrontation II

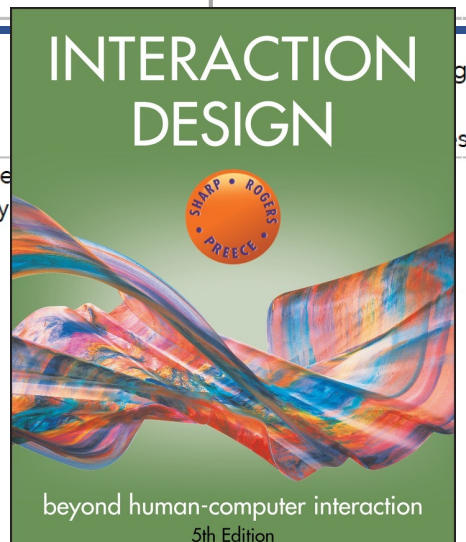
Tuesday 6-12-2021

Lorenzo Gatti

Area	Description	Mark
Submission of progressive deliverables	Deliverable progress from proposal up to and excluding final report, submitting it on time and completing them on time	5
	Final report (content)	
Introduction and Background	Context analysis and concept: Explanation of the main types of existing solutions and detailed evidence how each is insufficient, explanation of how your system is different, evidence supporting why your system should be used – its specific application Literature review (based on project proposal)	15
Proposed system	Explain clearly your concept why system is novel based on evidence and interviews. Explain the relevant values Include the concept video link (based on concept video, persona, scenario, values report and interview report)	10
Description of lo-fi prototype	Design of lo-fi prototypes, including evaluation and research questions and how the things you learned had an effect the concept and the design of the hi-fi prototype (based on lo-fi prototype report)	15
Description of hi-fi prototype	Design of hi-fi prototype (based on hi-fi prototype report) + conclusions	15
Pilot of the controlled experiment	Pilot evaluation study (Results of the pilot study with N(=groupsize) users. Report their demographics, your evaluation is soundly conceived and executed, and leads to interesting insights about how people experienced your system. (based on pilot of the controlled experiment)	15
Proposed controlled experiment	Plan for future experimental research study. Ethics reflection can be included in the appendix. (based on controlled experiment report)	5
	Final report (general)	
Lay-out and presentation	Quality of visuals, figures, tables; appendices, references, Writing, readability, organization	5
Final prototype	Degree of technical implementation of the intelligence of the assistant. Degree of technical implementation of the key interactions	10
Video		5
Total		100

The course

Week	Lecture *(Location in Rooster)*	on	Tutorial	Deadlines	Readings
1	Introduction HCI Course overview, topic and project	15.11	Ideation activity * Literature * Brainstorm * top 3 ideas	Proposal report (Fri 19-11)	Klemmer, Lecture 1. Available: YouTube Preece, Chapter 2 Link Lazar, Chapter 1 Link
2	Concepts, Ideation, Value Sensitive Design	22.11	Concept and Ideation * Scenario's, persona's, Values * Final #1 top idea * Video shotlist of above	Concept video, persona and scenario report (Fri 26-11)	Scenario-Based Design - Mary Beth LINK Value Sensitive Design and Information Systems - Batya Friedman LINK CHI - Guide to a Successful Video Submission
3	User confrontation	29.11	User confrontation * Interview script * Interview with peer groups * Interview results and conclusions	Interview report (Fri 03-12)	Lazar, Chapter 5 Surveys Link Lazar, Chapter 8 Interviews Link Lazar, Chapter 11 Qualitative Data Link
4	Lo-fi prototyping	06.12	Prototyping part I * (digital) prototyping * Setup user evaluation	-	Preece, Chapter 12 Link Klemmer, Lecture 2, The Power of Prototyping Link Lazar, Chapter 15 Link Lazar, Chapter 16 Link
	ng		g	Lo-Fi prototype report (Fri 17-12) **Exam part I (Fri 17-12)**	Lazar, Chapter 10 Link
	sign, Rese Data Analy		sults	-	Lazar Chapter 2 Link Lazar, Chapter 3.1, 3.2, 3.3 Link Lazar, Chapter 4 Link Usability.gov Link; Quant. Spec. Link



Today

- Lo-fi prototyping
  - Design, prototyping and construction (Preece Ch. 12)
  - The power of prototyping (Klemmer, lecture 2)

- User confrontation (part II)
  - Working with human subjects (Lazar Ch. 15)
  - Working with research participants with disabilities (Lazar Ch. 16)

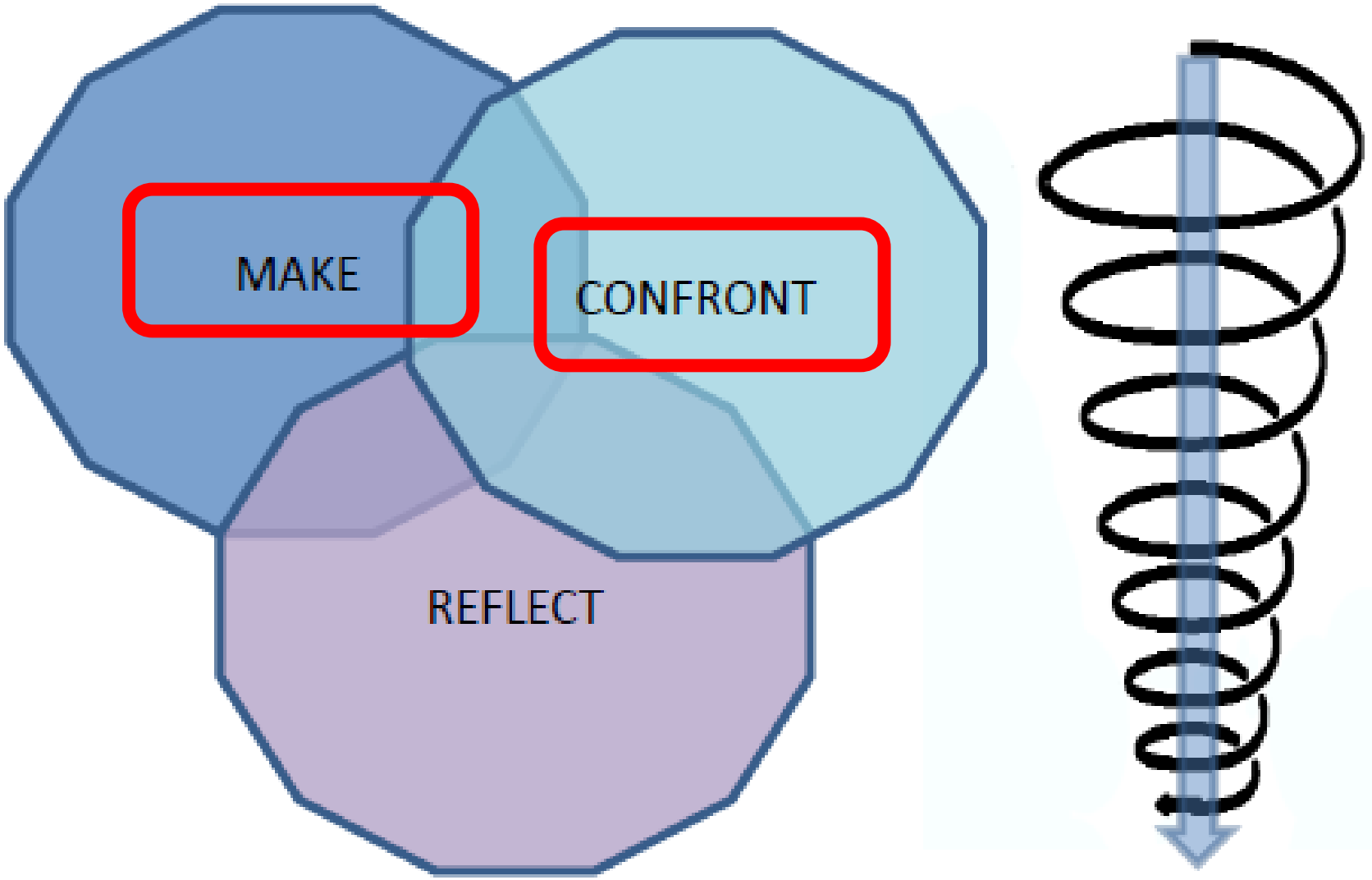


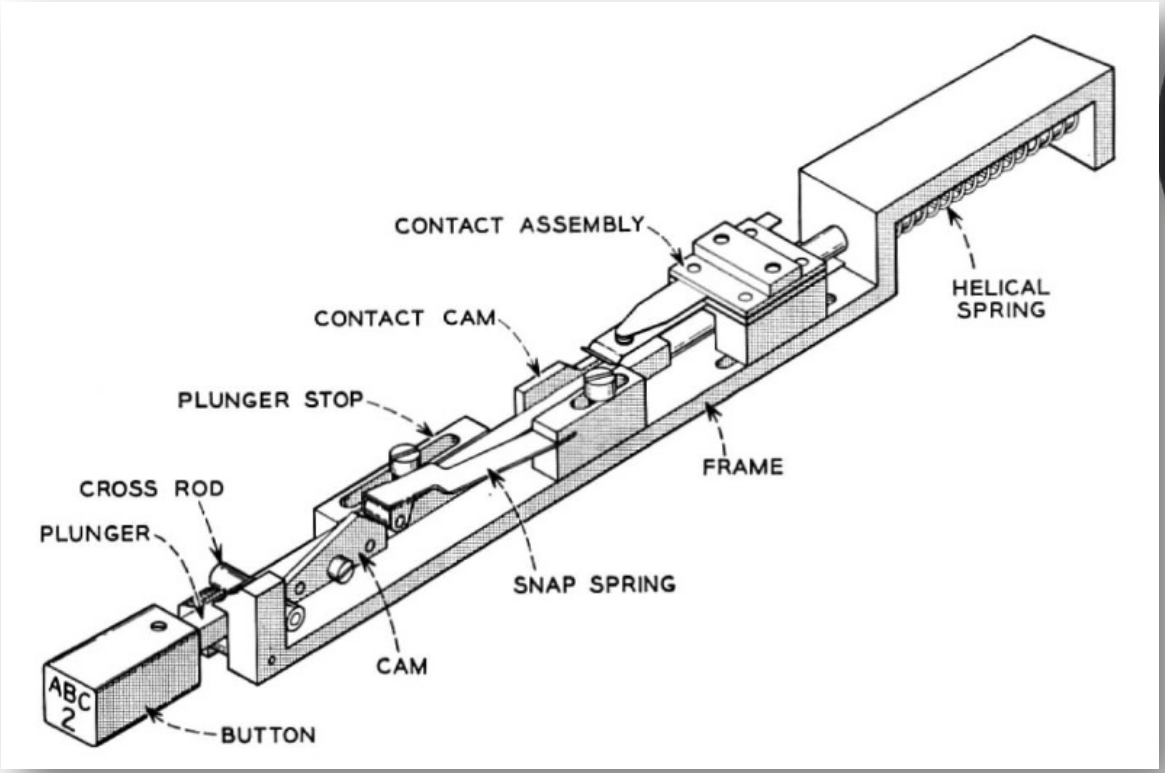
Figure 1: Activities and phases in the iterative method underlying our design work


ELECTRONIC CALCULATOR
DT210
OFF
ON/C
CE
M+
M-
MR
MC
9
8
6
5
3
2
7
4
1
0
%


1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
*
0
#


4 3 2 1
5 4 3 2 1
6 5
7 6
8 7
9 8
0 9
0

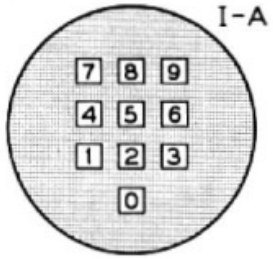

DEF 3
ABC 2
1
GHI 4
JKL 5
MNO 6
PRS 7
TUV 8
WXY 9
OPERATOR 0
AREA CODE 416
mycompasstv


CONTACT ASSEMBLY
HELICAL SPRING
CONTACT CAM
PLUNGER STOP
FRAME
CROSS ROD
PLUNGER
SNAP SPRING
CAM
ABC 2
BUTTON

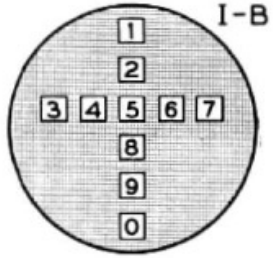

DIAL
999
100
FIRE
POLICE
AMBULANCE
OPERATOR
REDIAL
1
2
3
4
5
6
7
8
9
0
*
#

GROUP I

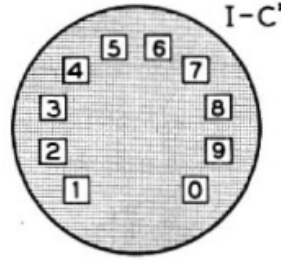
I-A



I-B

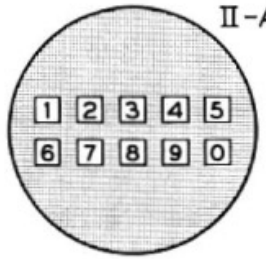


I-C*†

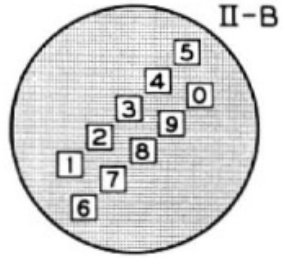


GROUP II

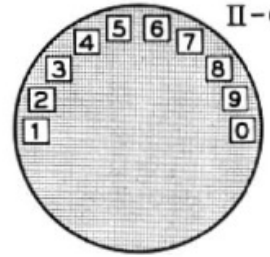
II-A*



II-B

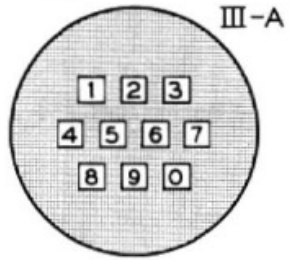


II-C

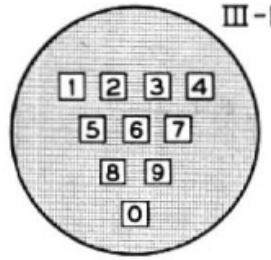


GROUP III

III-A



III-B



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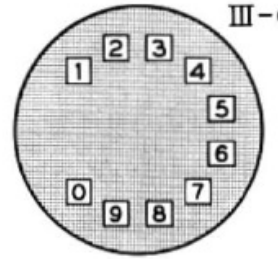
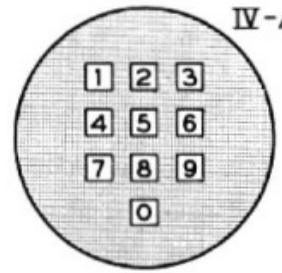
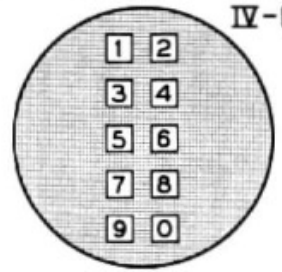


GROUP IV

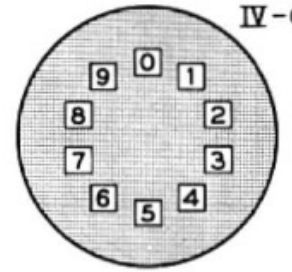
IV-A*



IV-B*

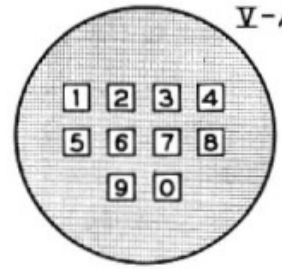


IV-C

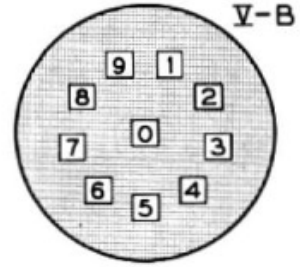


GROUP V

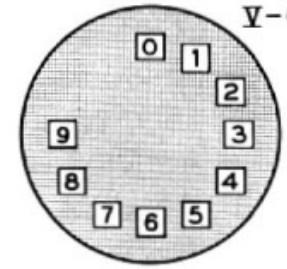
V-A



V-B

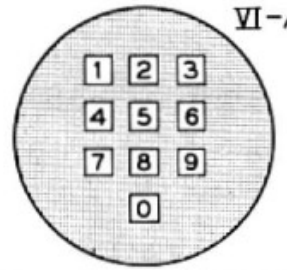


V-C

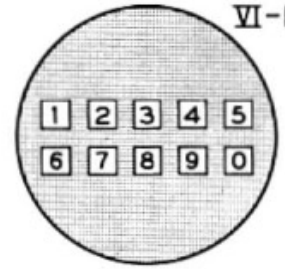


GROUP VI

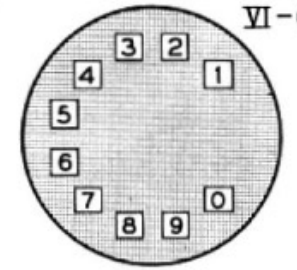
VI-A



VI-B†



VI-C

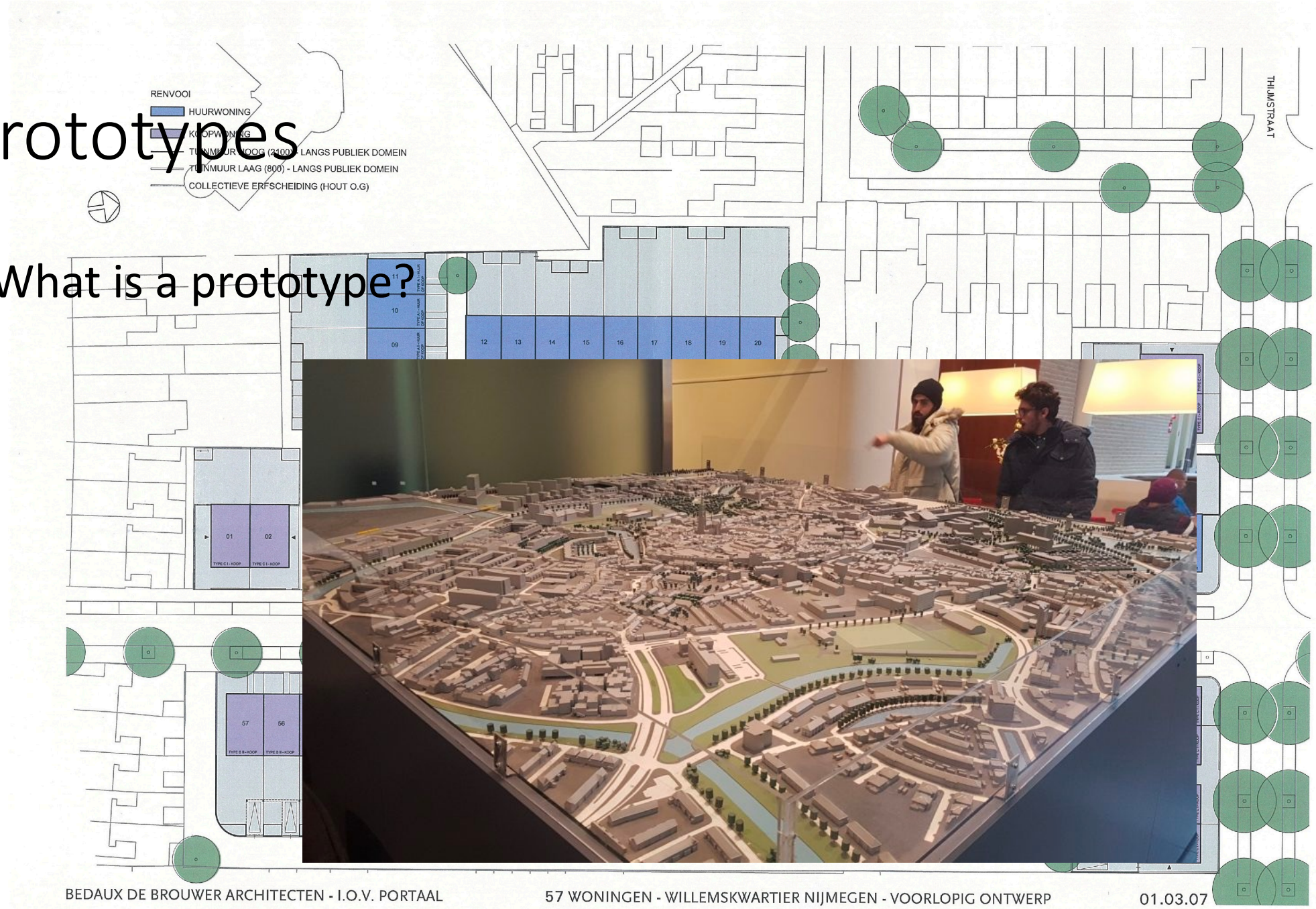


Prototypes

- What is a prototype?

Prototypes

- What is a prototype?



Prot

- Wha

Pro

- wh

Prototypes

http://www.youtube.com/watch?v=w7Q6bHVESsE

Prototypes

- Helps communicate the story of your app/technology/system for feedback
- Stops you from building a polished product with glaring flaws
  - Spaghetti code, ‘quick and dirty’
- Prevents the need for fixing an error after development
  - Save time and money

Prototypes

- What is a prototype? From the book:

- *"… a prototype can be anything from a paper-based storyboard to a complex piece of software, and from a cardboard mockup to a molded or pressed piece of metal"* (p. 422)
- *"a prototype is one manifestation of a design that allows stakeholders to interact with it and to explore its suitability"* (p. 422)
- "*prototypes are useful when discussing or evaluating ideas with stakeholders; they are a communication device […] and an effective way for designers to explore design ideas*" (p. 424)
- "*prototypes answer questions and support designers in choosing between alternatives*" (p. 424)

Book == Preece Chapter 12

Prototypes

- What is a prototype?

“Prototypes are questions, ask lots of them”

The goal of any prototyping is feedback!

What do prototypes prototype
    Feel - What might it look like
    Implementation - What might it work like
    Role - What might the experience be like

See also the Scott Klemmer video in the readings!

Prototypes


Palm Pilot


WED • NOV 5
8:00 meet ed
9:00
10:00 Staff meeting
11:00 Send price list
12:00 Lunch
1:00 Touchdown spec
2:00 review meeting
3:00
4:00 Forecast meeting
5:00
6:00
Today
S M T W T F
Goto
Menu


Palm Pilot

From last week(s):

most clients don’t tell you what to make,

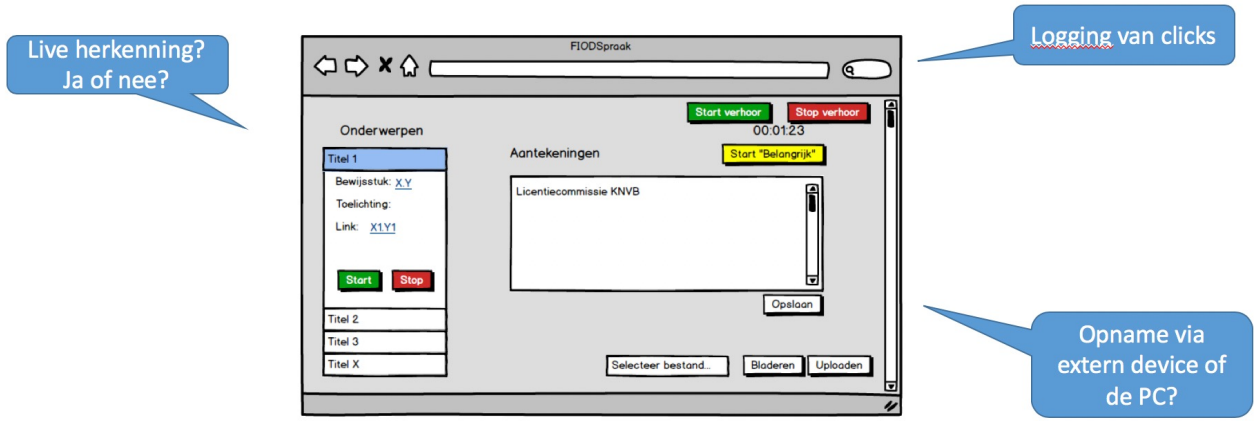
the user doesn’t tell you what to make

the users might not even know what they want

but neither do you

It is often said that users can't tell you what they want, but when they see something and get to use it, they soon know what they don't want.

- **TIJDENS** het verhoor:



Prototypes

- A lot of people confuse prototypes with sketches, wireframes, and mockups.
- These assets are not prototypes. The idea of simulation (read, “interactivity”) is essential for prototypes. That’s why static assets — such as sketches, wireframes, and mockups — can’t be considered prototypes.
- But you could do prototyping with them!

Prototypes

- Prototypes don’t necessarily look like final products — they can have different fidelity. The fidelity of a prototype refers to how it conveys the look-and-feel of the final product (basically, its level of detail and realism).
- Fidelity can vary in the areas of:
  - Visual design
  - Content
  - Interactivity

Prototypes

- Visual design: Only some of the visual attributes of the final product are presented (such as shapes of elements, basic visual hierarchy, etc.).
- Content: Only key elements of the content are included.
- Interactivity: The prototype can be simulated by a (real) human. During a testing session, a particular person who is familiar with design acts as a computer and manually changes the design's state in real-time.
- Interactivity can also be created from wireframes, also known as "connected wireframes."

Prototypes

- Visual design: Only son es of the final product are presented (such as sic visual hierarchy, etc.).
- Content: Only key elem included.
- Interactivity: The proto by a (real) human. During a testing sessio ho is familiar with design acts as a compu ges the design's state in real-time.
- Interactivity can also b nes, also known as "connected wireframes

Prototypes

- There are many types of prototypes, ranging anywhere between these two extremes:
  - Low-Fidelity
  - High-Fidelity

- Product teams choose a prototype's fidelity based on the goals of prototyping, completeness of design, and available resources.

Prototypes

- There are many types of prototypes, ranging anywhere between these two extremes:
-

Prototypes

- Can you guess of what very popular product of the ‘00s-’20s this thing is a prototype?
- This is an early prototype of the first iPod (with an actual 1st gen iPod for comparison)
- Is this a lo-fi prototype? Is it a hi-fi protoype?

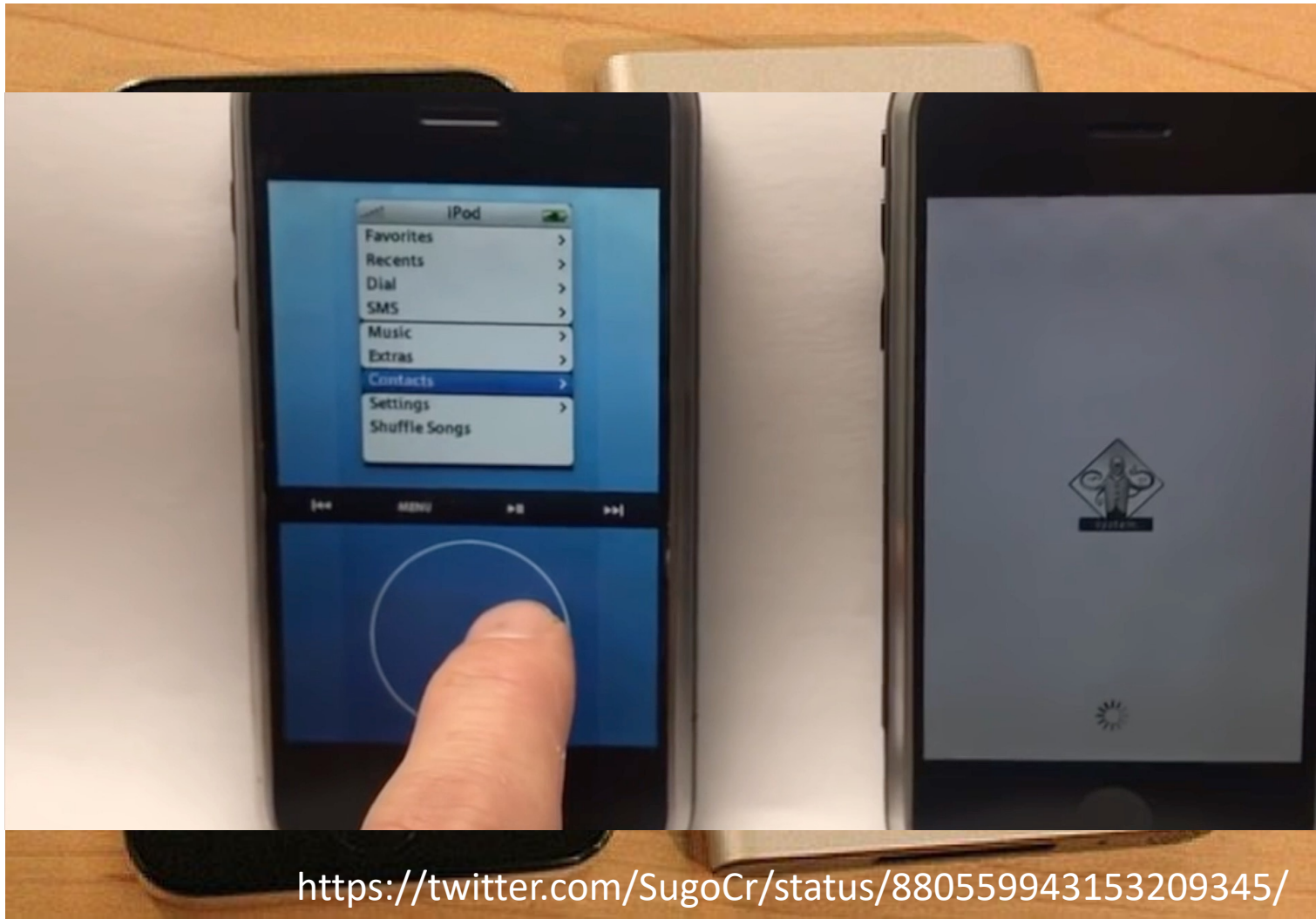
Prototypes

- Early iPhone prototypes

https://twitter.com/SugoCr/status/880559943153209345/

Prototypes

- Early iPhone prototypes
- In addition to the physical form, different UIs were also explored



Lo-fi prototy

- Inexpensive. The cl
low cost.
- Fast. It’s possible to
minutes. This allow
much effort.
- Collaborative. This
prototyping doesn’
the design process.
formulation proces
- Clarifying. Both tea
expectation about a

https://www.cnet.com/tech/mobile/android-prototype-from-2006-is-first-google-phone/

The picture above shows Google's prototype for a Google Mass Market Phone, sporting a "basic phone user interface". It was shown to phone network T-Mobile, along with a plan for Google to pay for people's data costs if they bought the phone.

Lo-fi prototypes – Cons

- Uncertainty during testing. With a prototype (esp. hi-fi), it might be unclear to test participants what is supposed to work and what isn't. A low-fidelity prototype requires a lot of imagination from the user, limiting the outcome of user testing.
- Limited interactivity. It's impossible to convey complex animations or transitions using this type of prototype.
- Danger of prototypes: users may believe that the prototype is the system (users will be less open to critiques; users will enjoy it, thus fewer alternative designs are considered/tested)

Prototyping

- Prototypes vs Proof of Concept (POC) vs Minimal Viable Product (MVP)

- Proof-of-concept is a small project created to test whether a certain idea or theory about the product can be implemented.

- A MVP is a version of a product that has just enough features to stay viable.

Lo-fi prototyping

- LOFI PROTOTYPING / PLAYTESTING / USER TESTING

- explore **alternatives** for your product
- using **discardable** prototypes
- where each prototype embodies a **design question**
- the answer to which leads to **grounded design decisions**
- that **evolve** the story of your product

Lo-fi prototyping - questions

- Do people like prototype “A”?
- Is idea “B” a good idea?
- Would idea “C” work?

- Why not so good?

Too unspecific

The answer (yes/no) does not help us make grounded decisions

Lo-fi prototyping – better questions

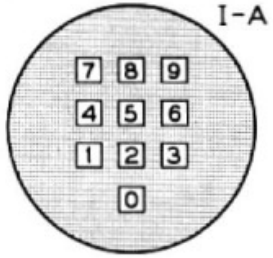
- Which of the following activities is better at triggering the user to contact family and friends proactively?
- Which of the following ideas to get into contact with a stranger is most feasible? Secure? Preferred by user? Likely to be used for real?
- Or: Do people understand our new brilliant gesture based interaction method?

Lo-fi prototyping - results

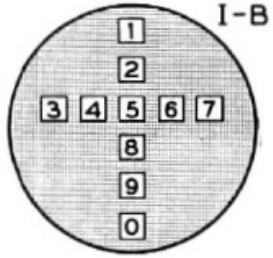
- Multiple (partial) product alternatives that you have tried out
- For each alternative, insights in what works, what doesn’t, where are problems, etcetera
- Preferences / differences between alternatives
- A new story: given all these new insights, what is your more concrete product concept now?
- Discardable prototypes:
  - You are doing this to learn from it.
  - Finding out that “you were right” is a waste of your time.

GROUP I

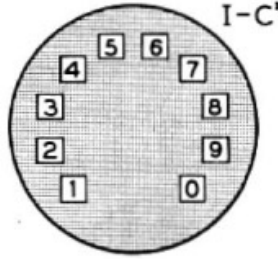
I-A



I-B

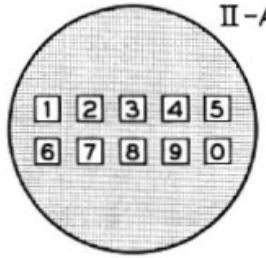


I-C*†

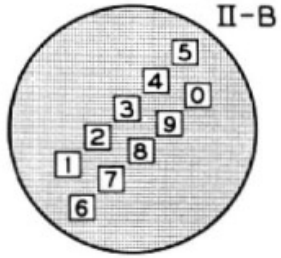


GROUP II

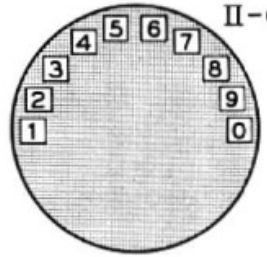
II-A*



II-B

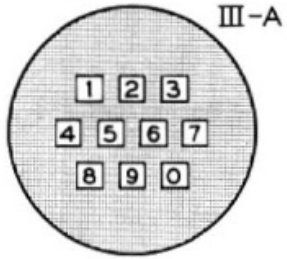


II-C

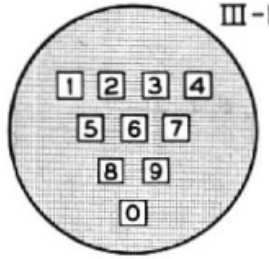


GROUP III

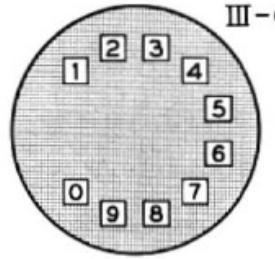
III-A



III-B

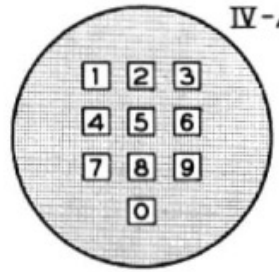


III-C

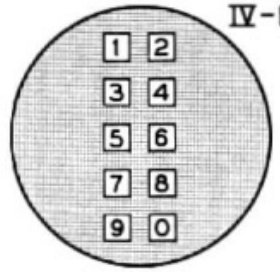


GROUP IV

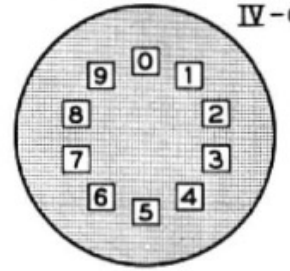
IV-A*



IV-B*

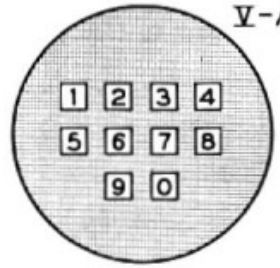


IV-C

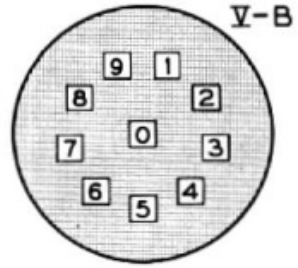


GROUP V

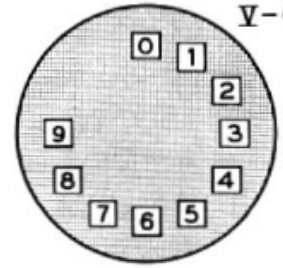
V-A



V-B

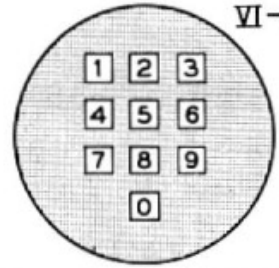


V-C

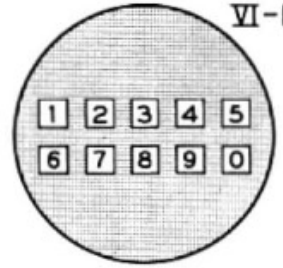


GROUP VI

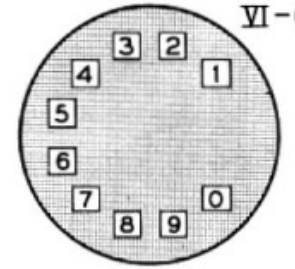
VI-A



VI-B†



VI-C




Coffee break!

OK Google, what do you think?

http://www.youtube.com/watch?v=JMjozqJS44M

It is not about the colors, icon and content in this phase!

Lo-fi prototyping - tools

- Paper and pencil
- Cardboard

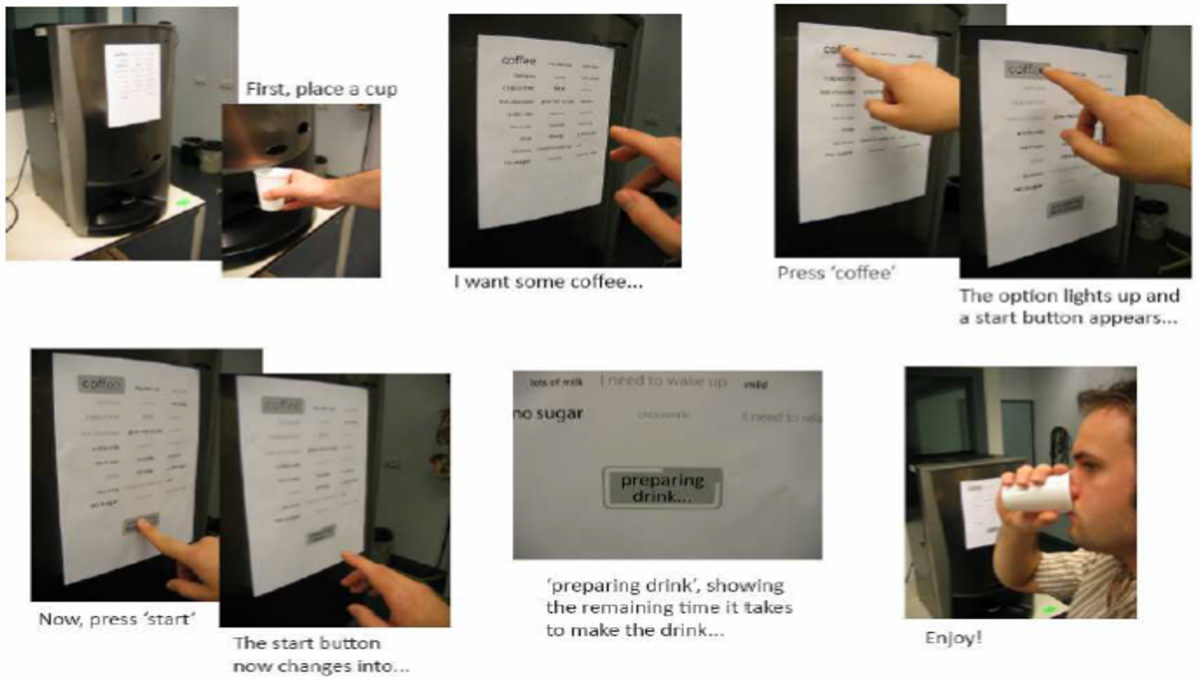
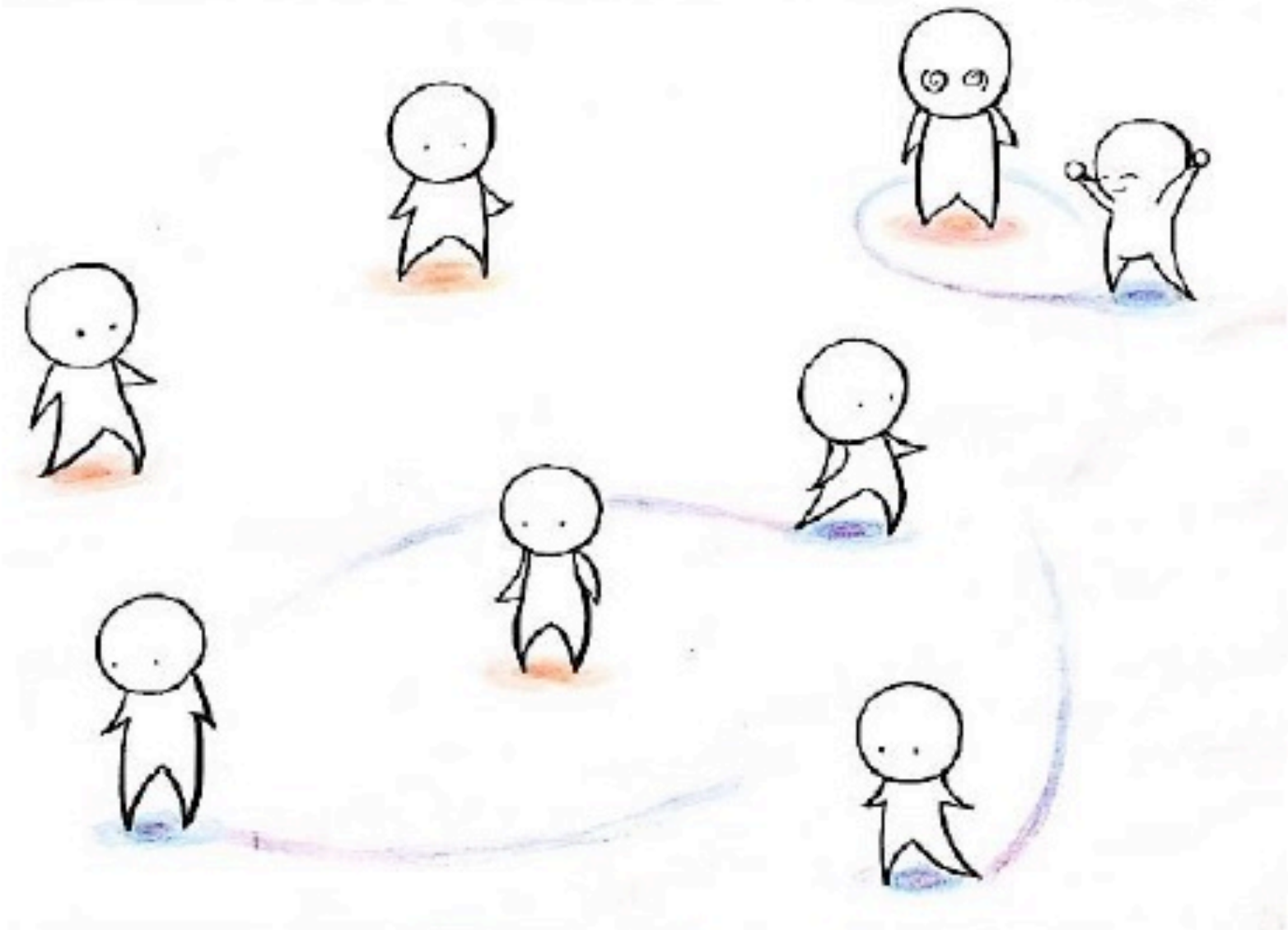


Figure 1: The printer, as it has been represented in the hi-fi



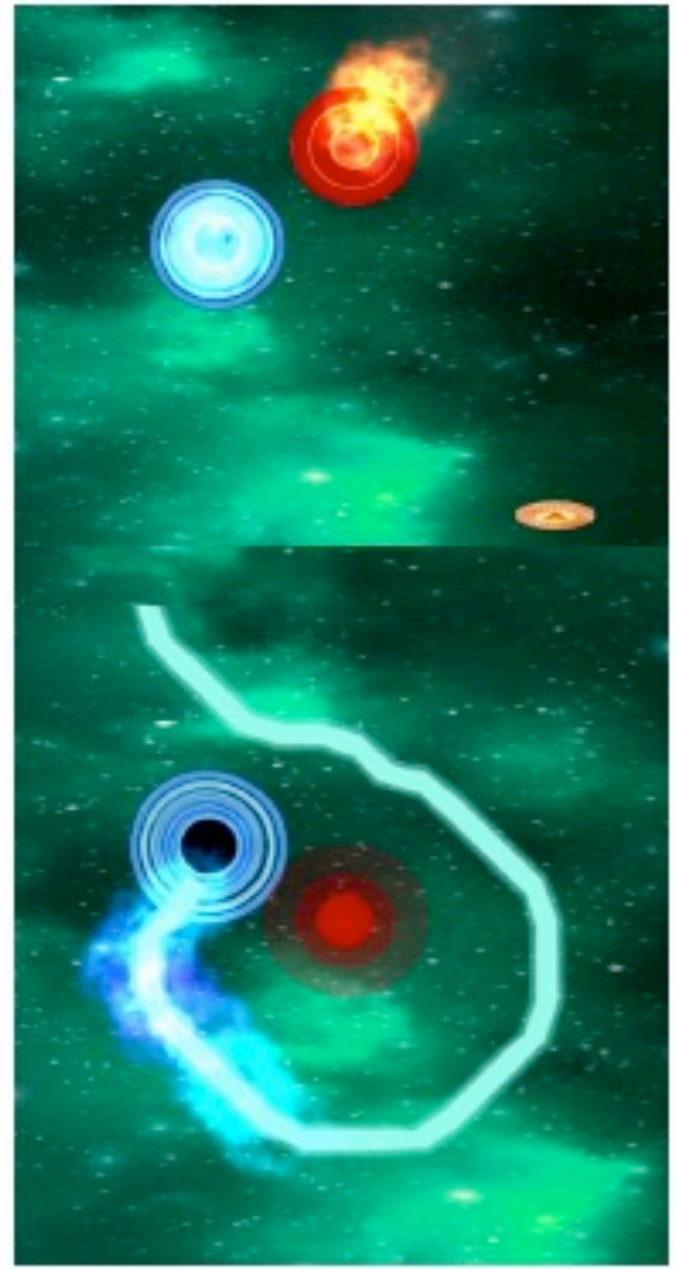


Figure 5 : Game concept

Figure 6 : Paper test setting

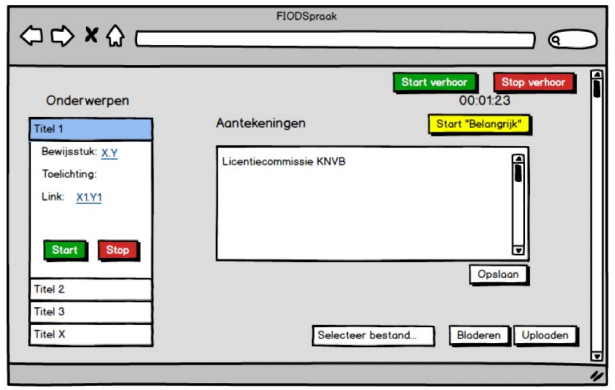
Digital prototyping - tools

balsamiq®

https://balsamiq.com/

- **TIJDENS** het verhoor:

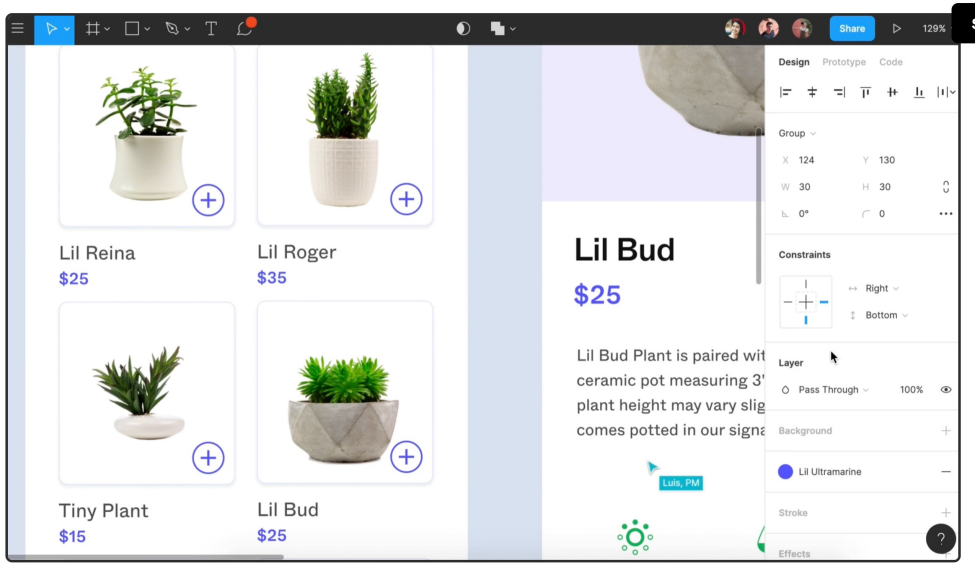
Live herkenning? Ja of nee?



Logging van clicks

Opname via extern device of de PC?

https://www.figma.com/



axure

https://www.axure.com/

wireframe|cc

www.wireframe.cc

Microsoft PowerPoint

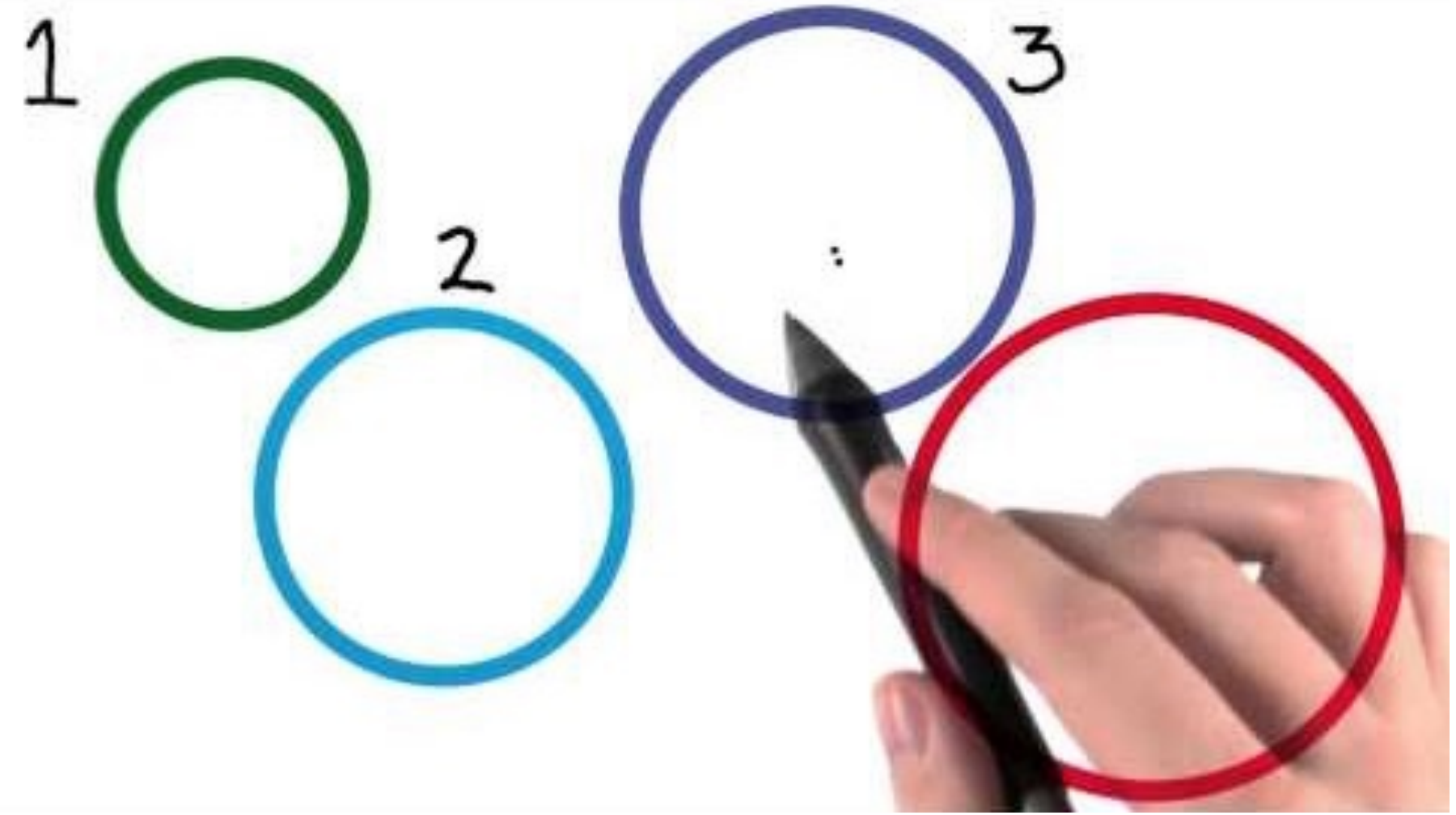
OK Google, what do you think?

http://www.youtube.com/watch?v=KWGBGTGryFk

Working with human subjects

- Last week’s tutorial (Chapter 5: Surveys)
- Who will be my subject?

Working with human subject



http://www.youtube.com/watch?v=kLxKFYR0WyU

Working with human subjects

- Who will be my subject?
- Personal attributes
  - Demographics, educational , professional background
  - Too few – no generalizable results
  - Too many – expensive and time consuming

- Goals
  - Motivation – students vs. trained experts

“How many users do I need to have?”

- Strict experimental answer:

  depends on the effect-size, do a power analysis.

- “Lazy” overused excuse HCI answer:
  - “five users will find approximately 80% of usability problems in an interface (Virzi, 1992)”

- Book/my realistic answer: You don’t know in advance
  - You don’t know the number of mistakes
  - [some mistakes might be hidden behind other, requiring multiple tests]

“How many users do I need to have?”

- Accuracy needed (Lewis 2006)
- Depends on discovery goals (Lewis 2006)
  - [project dependent, generalization needed?]
- How many participants are available? (Lewis 2006)

- Optimal 10+-2 (suggestion Hwang and Salvendy (2010))

In the book (Ch. 15):

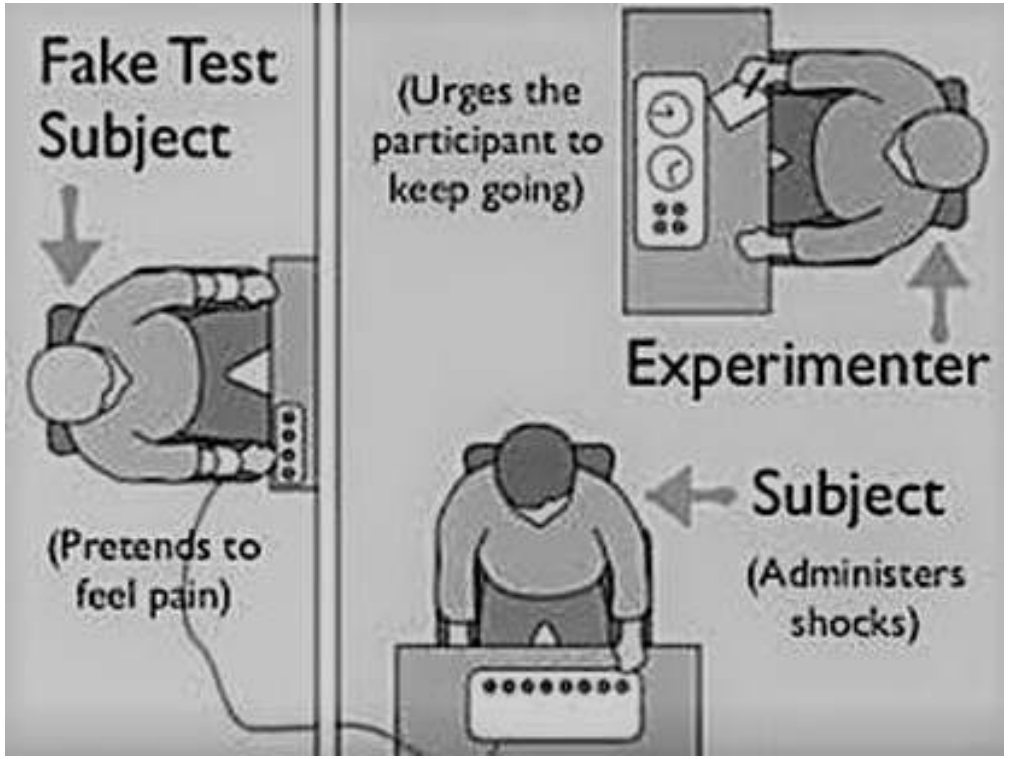
- “how many users can we afford?”
- “how many users can we get?”
- “how many users do we have time for?”

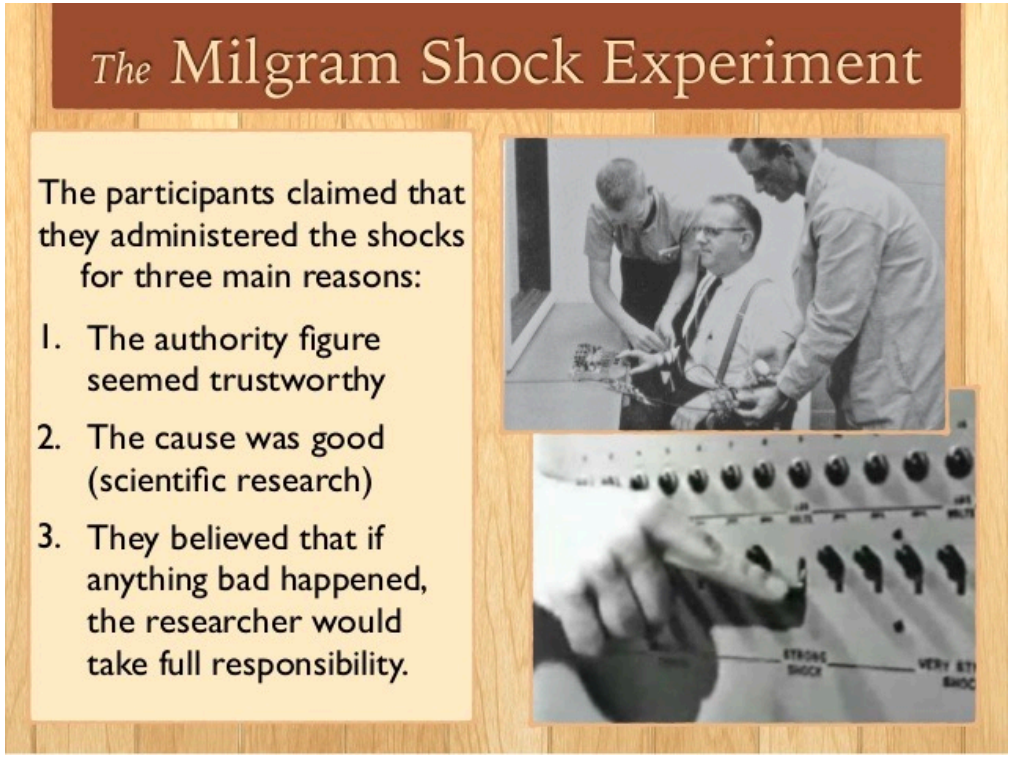
“Where do I find my participants?”

- Depends on the characteristics needed
- Incentives and motivation
  - Food
  - Payment
  - …
- Screening – e.g. blind users

Risks and concerns of research participants

- 'We' agree to conduct responsible research that protects participants' rights, health, privacy and safety





Collecting data and privacy

- Systematic notes
- Post-interaction interviews
- Audio/video recording (over the shoulder?)
- Photo’s of setup, the interaction and participants

- Informed consent
- Ethics boards – EEMCS in week 8!
- Personal identifiable data (GDPR rules)
- (Corona measures)

User evaluation studies

- Humans are unpredictable

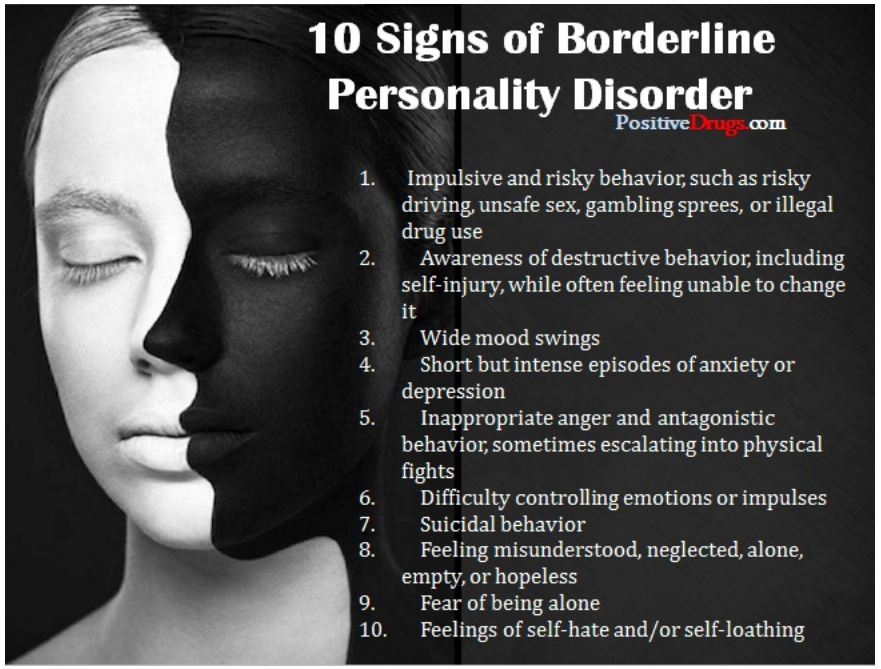
User evaluation studies

- Humans are unpredictable
- Expect the unexpected
  - It’s rare that a study goes off completely without a hitch
- Participants should be well treated and approached with an open mind
- Participating should be fun, engaging and a positive experience

Working with human subject - participants with disabilities

- The goals of research involving user with disabilities is the same
- Only accessibility guidelines and proxy users is not sufficient
- We must work directly with users with disabilities
  - Inclusion criteria – different levels of ability
- We need to pay special attention to
  - Participants
  - Research methodology
  - Logistics

Working with human subject - participants with disabilities



Working with human subject - participants with disabilities

Tutorial 4 – lo-fi prototyping (and user evaluation)

Overall goal of lo-fi prototype

With your lo-fi prototype(s) you will be able to test the first response of the users with regard to 2 to 3 key interactions of the system. Key interactions are interactions with the key aspects or elements of your system that showcase the user experience while use your assistant in the intended practice. You can argue that installing an app, registering or logging in to a system are key interactions, because without them there is no system to be used. In this assignment, however, we consider them as a given fact; instead, we focus on the actual use of the system by the user to help or support them in the context of use. For this, you will use a mock-up version of your system. You will use (digital/paper) prototyping tools to develop your lo-fi prototype.

Evaluation

The mock-up version of the system will be evaluated with other groups during the tutorial. During this evaluation you test how the user responds to your mock-up and evaluate the key user interactions that take place. For the evaluation test of your lo-fi prototype you have to design an **interaction scenario** (= a description of a person's interaction with a system) that shows what you are going to test, and a **research question** that you can answer after the test. You will evaluate the lo-fi prototype with (at least) N students, where N is the number of students in your group.

Objectives

Designing and implementation of lo-fi prototype (or mock-up) of the user interface or user interaction with the system. The technical implementation level is low (paper/digital prototype or clickable UIs). Intelligence of the mock-up is wizarded (no technical implementation), and members of your group may act as part of the system (play out parts of the interactions/intelligence, Wizard of Oz techniques).

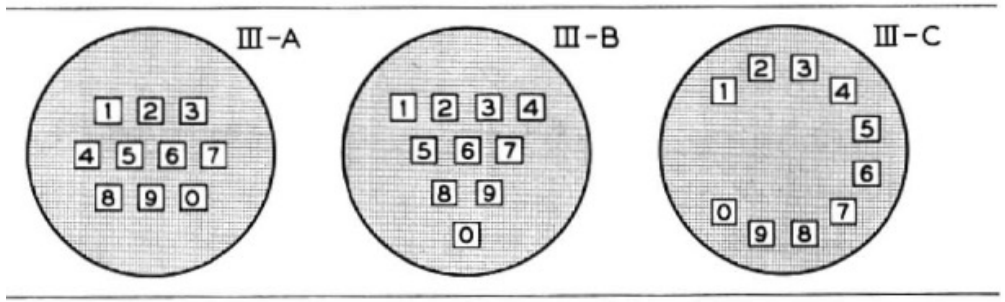
The prototype enables the interaction of the participants with key aspects of the system (it is ok if this is not in real-time). The prototype presents the basics for the look and feel (e.g. wireframes) of key aspects of the system. Make sure you keep your selected values in mind in the design. Degree of technical implementation is low. Remember it should be ‘cheap’ to throw away your lo-fi prototype. You can test different versions of your system (multiple prototypes with different UIs) for the same key interactions. It is also possible to tweak or modify the prototype during the tutorial, if needed. In that case, make sure to document these modifications and the reasons you made them in the report.

What to deliver

A report that presents and explain (with your name and group number on it! Thank you :)):

- The interaction scenario(s) that shows what you are going to test.
- The design of your lo-fi prototype and the interaction with the key aspects of the system. Add pictures or sketches of your lo-fi prototype.
    - Explanation and argumentation of the interaction design and integration of values in the lo-fi prototype
- The setup for the evaluation study, what is the procedure, tasks, roles in the team.
- The research question(s) for the evaluation test.
    - At least one sub question about the interaction key aspects
    - At least one sub question about the implementation of the selected values
- Notes and observations of the user test.
- Results and conclusions (the answer to your research question(s), how this will influence your concept/hi-fi prototype, etc.)

Thank you!


III-A
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4 5 6 7
8 9 0
III-B
1 2 3 4
5 6 7
8 9
0
III-C
1 2 3
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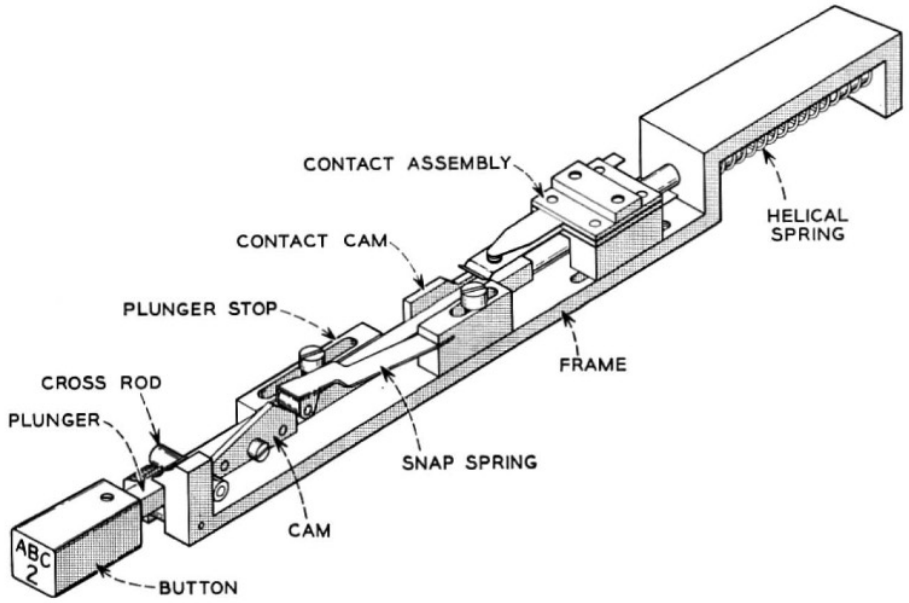
PRS 7
TUV 8
OPER 0


CONTACT ASSEMBLY
HELICAL SPRING
CONTACT CAM
PLUNGER STOP
FRAME
CROSS ROD
PLUNGER
SNAP SPRING
CAM
ABC 2
BUTTON