Some Notes (09.05.2017)

- **Paper Prototyping – A helpful reference**
  https://www.uxpin.com/studio/blog/paper-prototyping-the-practical-beginners-guide/

  Some points to consider in paper prototyping:

  - Consists of creating hand drawings on paper to enable them to be rapidly designed, simulated, and tested
  - Used to communicate ideas (between designers/developers etc) and as a usability testing method (to observe human interaction with the interfaces)
  - To test usability of the paper prototype you need the following people:
    - **Real users** – At least 5 users should be able to identify 85% of all usability problems[1]. The users will be basing this judgment on the paper version of the user interface that is being tested.
    - **Facilitator -** A usability professional whose role is to record the issues raised during the discussion of the prototype. The facilitator needs to probe into the issues raised so that these are well documented. The facilitator acts as a mediator for conflicting ideas.
    - **The developer (sometimes referred to as "Human Computer") -** This person (knows how the system is supposed to work), and manipulates the prototype to ensure it provides the feedback drawn from the user interaction. This person will not explain or give hints to the users about how the interface is supposed to behave, so that the users are left entirely on their own to perform the tasks that they have been assigned.
    - **Observers:** These people are typically member of the development team. Their role is to observe and interpret the users' interactions with the paper prototype

[1] Jakob Nielsen (https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/) -- Nielsen, Jakob, and Landauer, Thomas K.: "A mathematical model of the finding of usability problems," *Proceedings of ACM INTERCHI'93 Conference* (Amsterdam, The Netherlands, 24-29 April 1993), pp. 206-213.

Types of Studies

1. What people want/think/do overall?
    - Surveys
    - Interviews
    - Focus Groups

2. What people want/think in context?
    - Contextual Inquiry (Interviews)
    - Diary Study (Prompt People)
    - Observations in the field

3. Expert evaluation of usability
    - Cognitive walkthrough
    - Heuristic evaluation

4. Usability Test
    - Laboratory ("think aloud")
    - Online study
    - Log analysis

5. Controlled experiments to test causation

6. Varying different conditions
    - Full-factorial design or not
    - Independent and dependent variables

7. Many methods apply (e.g. surveys can be designed to test causation)
    - Role-playing studies
    - Field studies

Data to collect during experiments…

- Performance (time, success rate, errors)
- Opinions and attitudes
- Actions and decisions
- Audio recording, screen capture, video, mouse movements, keystrokes,…
- Demographics: Age, gender, technical background, income, education, occupation, location, disabilities, first language, privacy attitudes, etc.
- Open-ended questions
- Preferences and attitudes

Logistics for a Study…

- How many participants?
  - Statistical power
  - Time, budget, participants' time
- What kind of participants?
  - Skills, background, interests
  - Their motivations
  - Often not a "representative sample"
- What do you need to build, if anything?
  - Prototype Fidelity

Study Designs…

- Within subjects
  - Every participant tests everything
  - Crucial to randomize order! (learning effect)
  - Fewer participants
- Between subjects
  - Each participant test 1 version of the system
  - You compare these groups
  - Groups should be similar (verify!)
  - Still randomize

Validity…

- Is this study ecologically valid?
  - Does it mirror real-life conditions and context?
- To what degree can we generalize about our results (externally valid)?
  - What biases does our sample introduce?

Exercises (In Class)

Exercise #1: Consider the two case studies we discussed in Lecture #2 namely:

- Case Study #1: The Bamberini Museum Interface. Imagine that this system is linked to a social networking site on which users can share photos taken at the museum, and also share the kinds of activities (e.g. items of interest, artists work, …). In addition, to better serve customers, a little bit of user tracking is done to determine which menu items interested users and what the age/gender/height of the users is?

- Case Study #2: The S-Bahn Ticket Machine. Imagine that this system is extended to include fingerprint authentication to support the current payment system. In addition, to better serve customers data is stored about the number of times a given bank card is used at a specific ticket machine and how long it took the user from the point of first touching the screen, to successfully buy a ticket.

Choose any privacy/security usability area that is of interest to you. Some suggestions:

- Privacy on social networking sites
- The usability of biometric authentication
- What people think private browsing mode does in their browser
- How people protect photos they consider private
- How parents help teenagers protect their privacy online
- What do people think of website tracking their online activities
- User's perceptions of the warnings that pop up when they request a given service

For the area and case study chosen, do the following:

1. Think of separate research studies using each of the following five types of methods: *Survey, Diary Study, Interviews, A Usability Test, Collecting observational or experimental data in the field.*

2. Select one of these 5 types of studies you have imagined, and write a short paragraph that:

    a. State in one sentence what research question you hope to answer
    b. State in 3-4 sentences, an outline of the design of your study
    c. Conclude with one sentence explaining why you chose this particular method to investigate your stated research question

- **Exercise #2:** Pretend that you are a reviewer on an ethical commission, and that you have received an experimental protocol description (see below).

    a. Create a bulleted list of potential ethics concerns raised by this protocol
    b. Suggest modifications to the study protocol

Proposed User Study Protocol…

We will employ a bi-phased protocol to study the usability of biometric eye scanners as an authentication device in banks. Banks in the Berlin and Brandenburg area recently installed fingerprint scanners with great success, and believe that eye scanners will be an added step in ensuring that only verified account owners can conduct financial transactions. The first part of the study will be conducted as an observational field study at the Deutsche Bank, Zoologischer-Garten Branch because there are several restaurants and coffee shops within the vicinity of the bank.

We will sit at an outdoor table at a coffee shop just across the street and watch people who going into the bank. In order to make sure we collect a broad dataset, we will also have a video camera at our table pointed at the bank. The camera will record continuously so that for each bank visitor the number of attempts are required for successful authentication on both the eye scanner and the fingerprint reader, are recorded. Using the video recording, will allow us estimate the height, weight, and ethnicity of the bank's visitors. Based on this information, we will be able to determine the impact of height, weight, and ethnicity in successfully using the authentication equipment. In order to make it easier to collect data, we will use crowdsourcing to estimate height/weight/ethnicity by posting screen captures (from our videos) on Amazon's Mechanical Turk platform and letting the crowd workers vote.

The second part of our study will be a between-subjects, in-lab experiment comparing the usability of different brands of eye scanners commonly used in banks. Participants will come to our lab, and we will begin by giving them a detailed demographics survey (age, occupation, annual income, and past experience using biometric systems). Afterwards, they will use each eye scanner on the market in a randomized order. To understand the tolerance of the eye scanner at accepting partial matches of the iris, we will retain participants' iris readings from each device so that graduate students working in the security research group at our institution can analyse the tolerance as part of a research project on Identity Management. We will then administer a survey about participants' perceptions of the usability and comfort of each eye scanner. To recruit participants, we will post flyers for the study at local public spaces. We will compensate each participant **EUR 10.00** for the study.