

CS-399: INTRODUCTION TO HUMAN-COMPUTER INTERACTION

DD.MM.YY

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OFFICE: TBD

# Design Process

Week 4

# ANNOUNCEMENTS

- Listen to the following announcements!

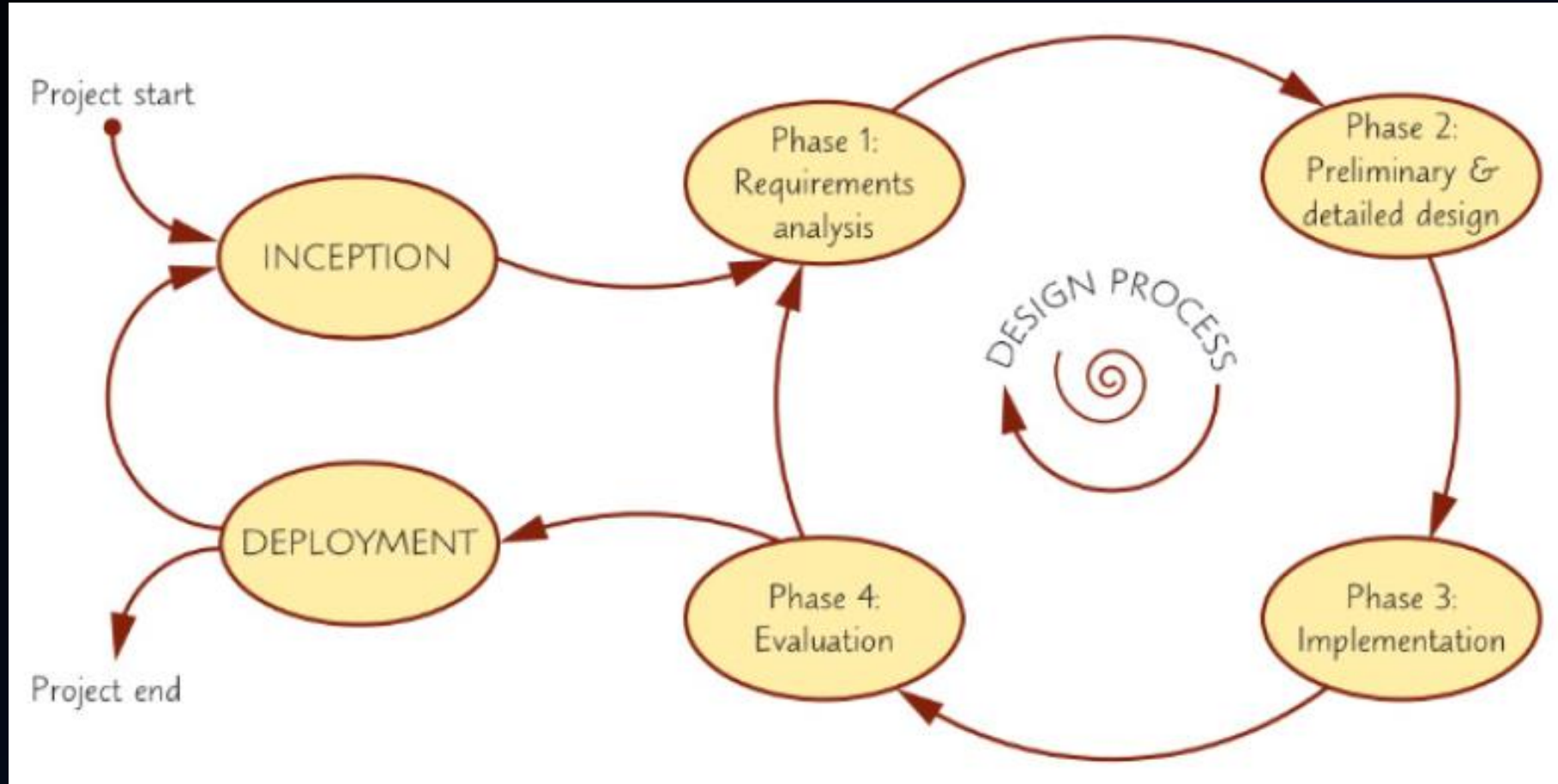
# ORGANIZATIONAL SUPPORT FOR DESIGN

- Design is inherently creative and unpredictable.
- Interactive system designers must blend knowledge of technical feasibility with a mystical esthetic sense of what attracts users
- Some companies are beginning to employ chief design officers (CDOs), which may help to promote usability and design thinking at every level
- Usability engineering has evolved into a recognized discipline with maturing practices and a growing set of standards
- Usability engineers and user-interface architects, sometimes called the user experience (UX) team are gaining experience in organizational change

# ORGANIZATIONAL SUPPORT FOR DESIGN

- According to Rosson and Carroll (scenario-based) design characterization:
  - Design is a process, not a state
  - The design process is nonhierarchical
  - The process is radically transformational
  - Design intrinsically involves the discovery of new goals
  - <https://www.taylorfrancis.com/chapters/edit/10.1201/9781420088892-14/scenario-based-design-mary-beth-rosson-john-carroll>

# DESIGN PROCESS



An iterative design process would consist of four distinct phases (by Shneiderman et al., 2016)

# Design Process: Phase 1 - Requirements Analysis

- Examples of requirements regarding system behavior for three distinct types of interactive systems: an e-commerce website, an ATM, and a mobile messaging app

## Functional requirements:

- **Website:** The website shall allow users to purchase items and shall provide other, related merchandise based on past visits and purchases.
- **ATM:** The system shall let users enter a PIN code as identification and shall ensure that the code matches the one on file.
- **Mobile app:** The app shall be able to send messages at all times, even when out of the service area (in which case they are saved for later sending).

## Non-functional requirements:

- **Website:** The website shall give users the ability to access their user account at all times, allowing them to view and modify name, mail address, e-mail address, phone, etc.
- **ATM:** The system shall permit the ATM customer 15 seconds to make a selection. The customer shall be warned that the session will be ended if no selection is made.
- **Mobile app:** Messages should send within 2 seconds, returning the user to the new message window (continuing in the background if necessary).

## User experience requirements:

- **Website:** The website shall always have a visible navigation menu in the same position on the screen.
- **ATM:** On-screen prompts and instructions shall be clear and accessible. The ATM should return the user's commands within half a second.
- **Mobile app:** The mobile app shall support customization such as color schemes, skins, and sounds.

# Design Process: Phase 2 – Preliminary and Detailed Design

- The design phase in turn consists of two stages:
  - a preliminary stage, where the high-level design or architecture of the interactive system is derived
  - a detailed stage, where the specifics of each interaction is planned out
- The preliminary stage is also called *architectural* or *conceptual design*
- Examples of suitable design methods include sketching, paper mockups, and high-fidelity prototypes
  - Can be clarified via tools, patterns, best practices

## Design Process: Phase 3 – Build and Implementation

- Where all the planning gets turned into actual, running code
  - The actual software and hardware engineering needed to achieve this are outside the scope of this book
  - Included in this text is software development platforms for interactive applications for mobile apps, the web and PC's
  - Make sure to evaluate tool capabilities, ease of use, ease to learn, cost, and performance
  - Tailor tool choices for the size of the job



## Design Process: Phase 4 – Evaluation

- Developers test and validate the system implementation to ensure that it conforms to the requirements and design set out earlier in the process
- We will cover a range of suitable evaluation methods for this phase in depth in future class.

# Design Frameworks

## ➤ **User-centered design (UCD)**

- Takes the needs, wants, and limitations of the actual end users into account during each phase of the design process

## ➤ **Participatory design (PD)**

- Direct involvement of people in the collaborative design of the things and technologies they use

## ➤ **Agile interaction design**

- Development methods for self-organizing, dynamic teams and that facilitate flexible, adaptive, and rapid development that is robust to changing requirements and needs

# Example of Participatory Design

- Intergenerational and interdisciplinary design team from the University of Maryland's KidsTeam working on new human-computer interaction technologies using paper prototypes (<https://hcil.umd.edu/children-as-design-partners/>)

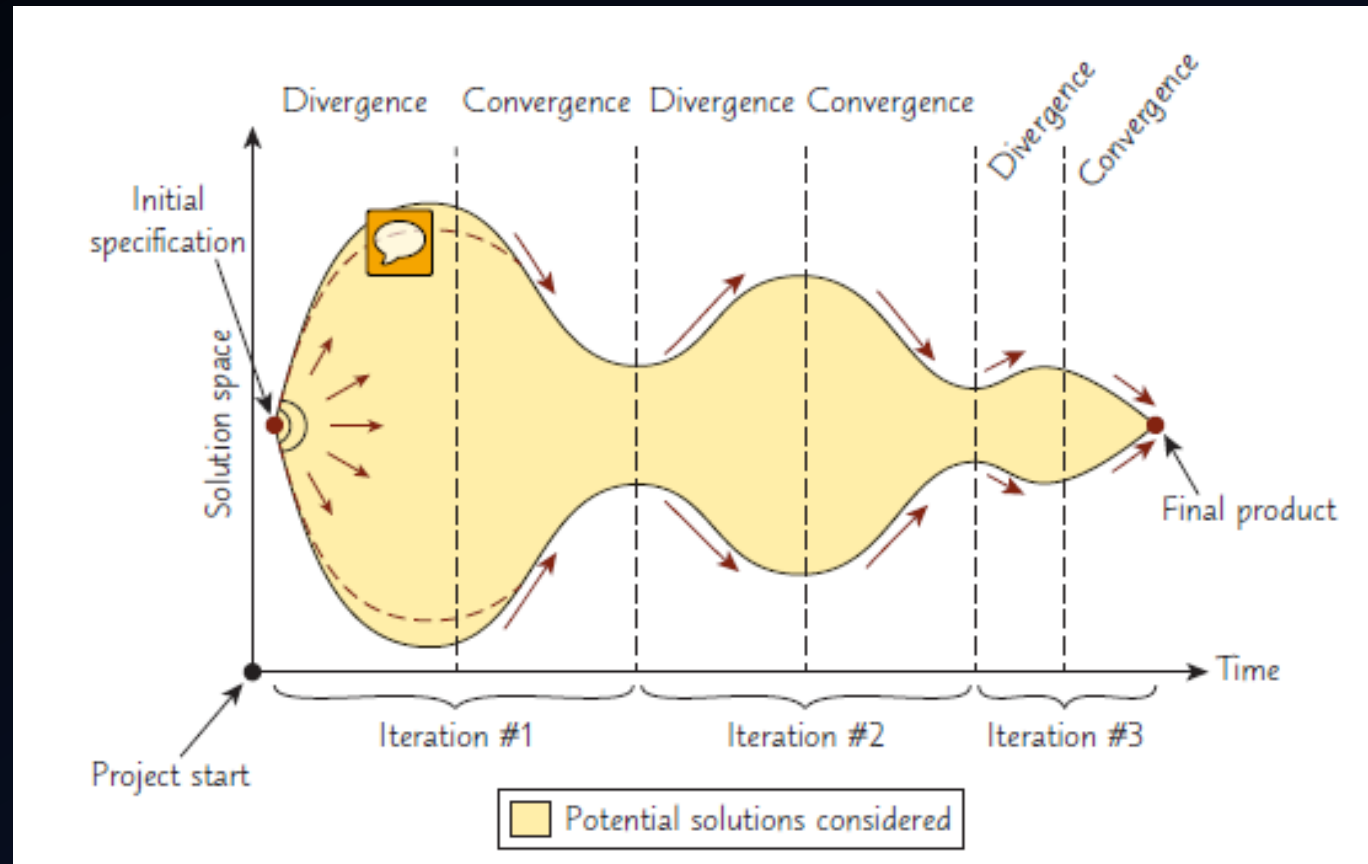


# Design Methods

- Practical building blocks that form the actual day-to-day activities in the design process
  - Ideation and creativity
  - Surveys, interviews and focus groups
  - Ethnographic observation
  - Scenario development and storyboarding
  - Prototyping

# Design Methods cont'd

- Illustration of how the solutions considered during a design process will grow (diverge) and shrink (converge) iteratively until it eventually fixates on a single point, the finished product
- This particular design process involves three iterations, but real processes may have more or fewer iterations.



# Ethnographic Observation

## ➤ Preparation

- Understand organization policies and work culture
- Familiarize yourself with the system and its history
- Set initial goals and prepare questions
- Gain access and permission to observe/interview

## ➤ Field Study

- Establish rapport with managers and users
- Observe/interview users in their workplace and collect subjective/objective quantitative/qualitative data
- Follow any leads that emerge from the visits

# Ethnographic Observation Cont'd

## ➤ Analysis

- Compile the collected data in numerical, textual, and multimedia databases
- Quantify data and compile statistics
- Reduce and interpret the data
- Refine the goals and the process used

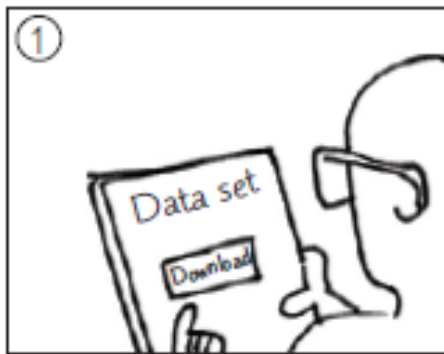
## ➤ Reporting

- Consider multiple audiences and goals
- Prepare a report and present the findings

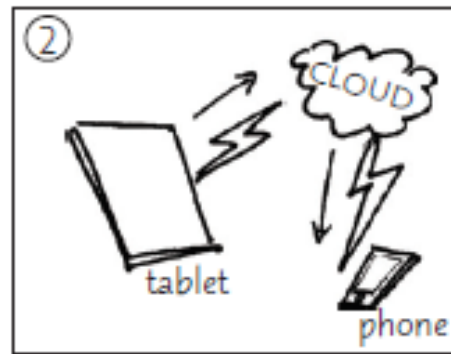


# Storyboarding

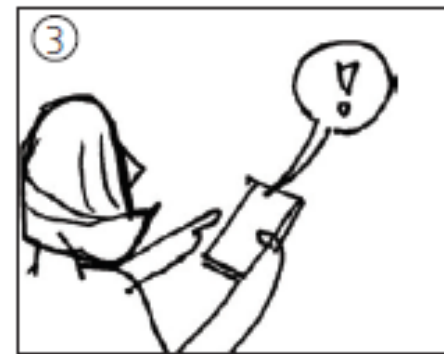
- Hand-drawn storyboard for a collaborative software that allows multiple people to view a common dataset using their personal smartphones and tablets



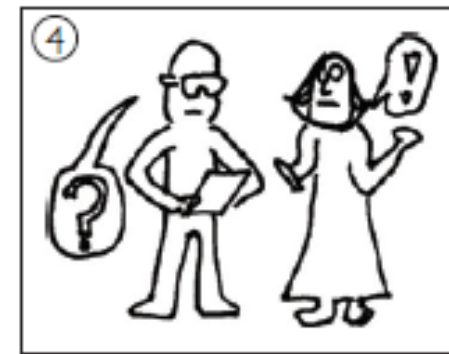
USER #1 FINDS DATA



DATA IS SYNCHRONIZED



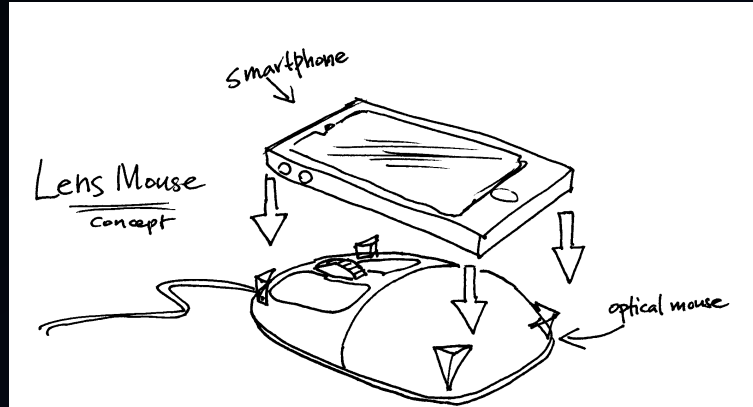
USER #2 IS NOTIFIED



USERS CAN ANALYZE  
TOGETHER



# Prototyping



- **Low-fidelity prototypes** are generally created by sketching, using post-it notes, or cutting and gluing pieces of paper together (paper mockups)
- **Medium-fidelity prototypes** are often called *wireframes*, and provide some standardized elements (such as buttons, menus, and text fields), even if potentially drawn in a sketchy fashion, and has some basic navigation functionality
- **High-fidelity prototypes** look almost like the final product and may have some rudimentary computational capabilities; however, the prototype is typically not complete and may not be fully functional

# Design Tools, Practices, and Patterns

- Design Tools
  - Dedicated prototyping design tools are specifically designed for the purpose of creating interface mockups rapidly and effortlessly
- Design Guidelines and Standards
  - Guideline documents are a powerful tool for interaction design
  - Four E's: *Education, Enforcement, Exemption, Enhancement*
- Interaction Design Patterns
  - Best-practice solutions to commonly occurring problems specified in such a way that they can be reused and applied to slightly different variations of a problem over and over again
  - *Model-View-Controller (MVC)*, document interface, Web app page architecture



## LET'S MEET IN THE NEXT CLASS!

Remember to read-up the text and  
keep every due date.