Maastricht University

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Intelligent User Interfaces

System design and prototypes

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In this lecture

- An introduction to interactive systems design
- Human-centric design
- Prototypes

Interactive System Design

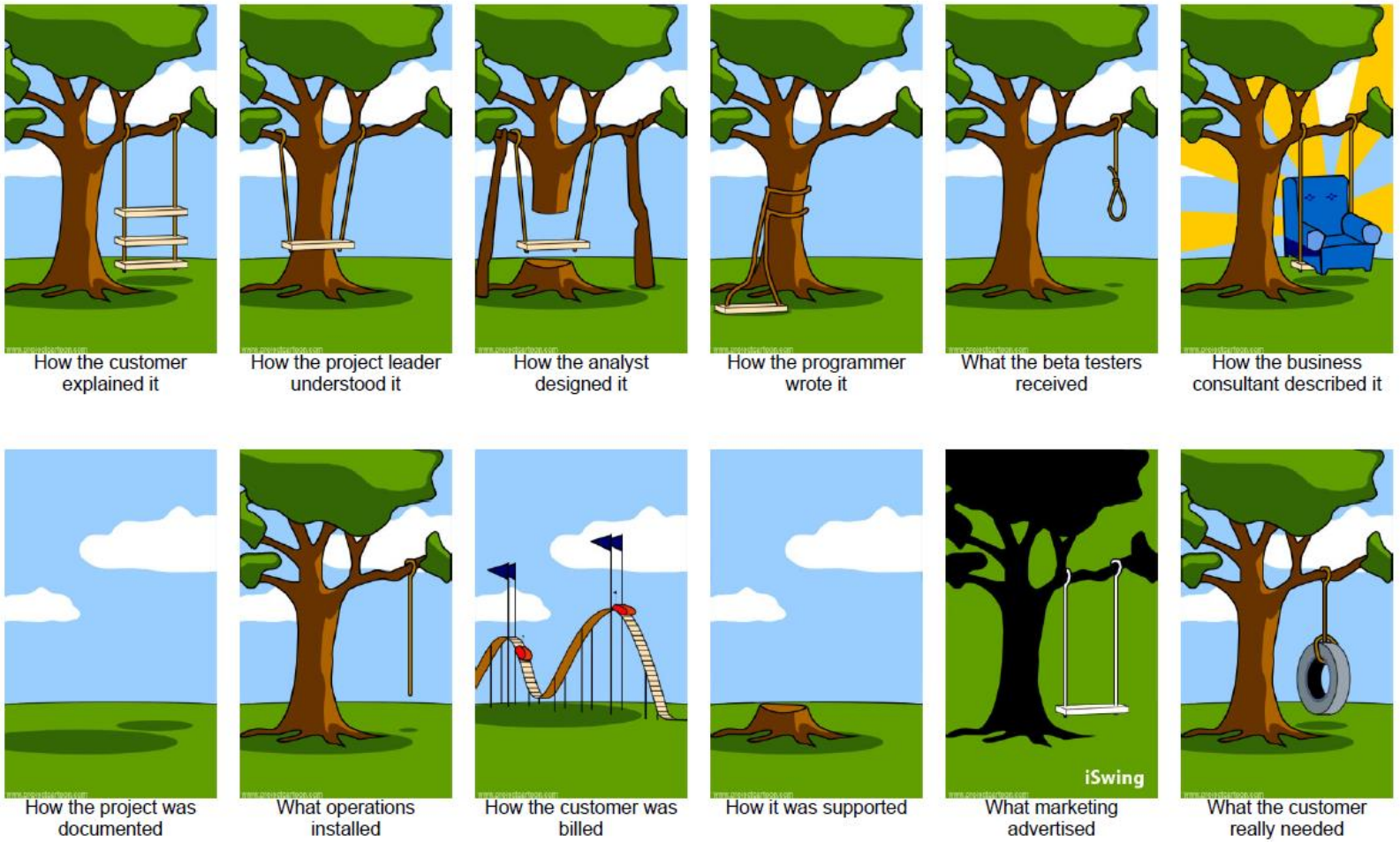
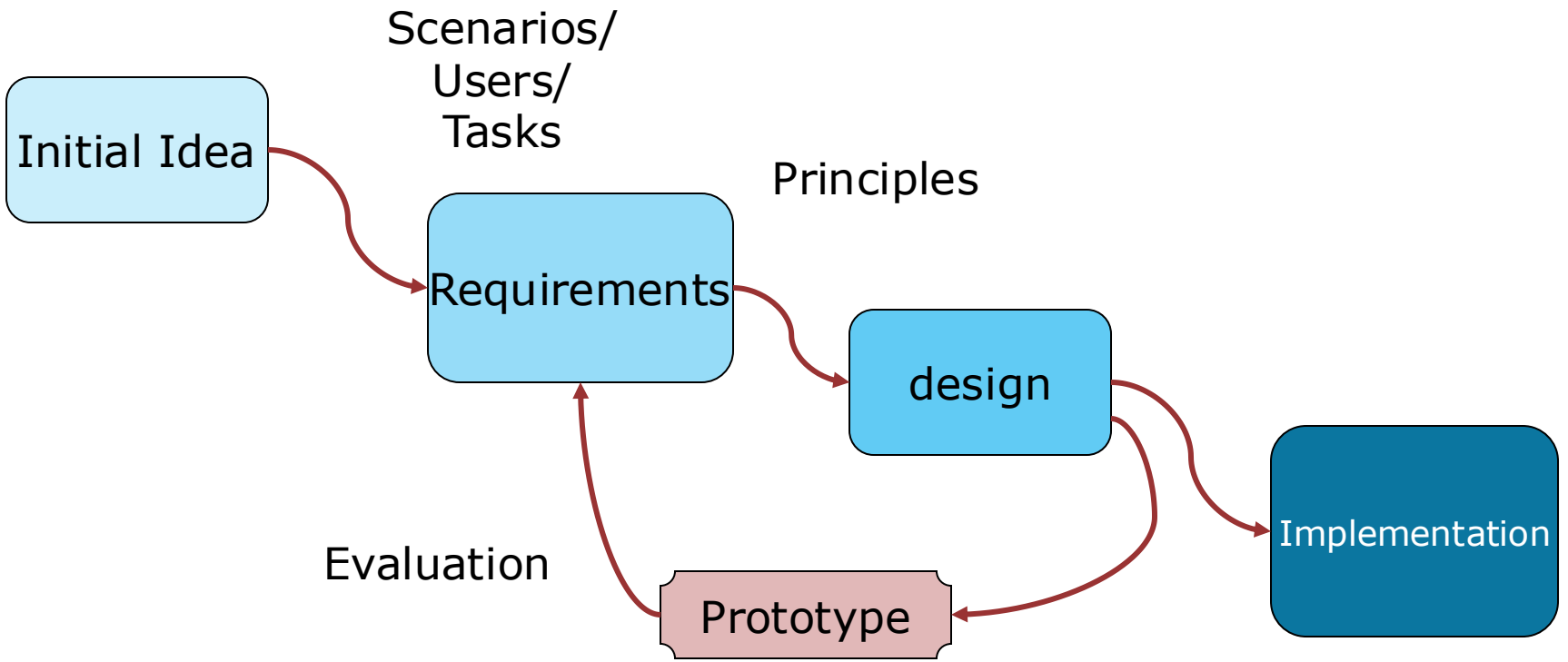


Image from slides of Sagar Behere, A systems engineering approach to design of complex systems

Interactive systems development process



- To have something that can be tested with real users
- To gather information
- To test early user reactions, propositions and subsequently, organize revision plans

What it is…

- It is a problem solving procedure, driven by user requirements and the intended use of the product by them. It is defined by the application area, materials, cost and technical feasibility studies.
- It is not only about technical steps but there is a lot of
  - Creativity
  - Decision making regarding trade-offs and compromisation
- Representation
  - of how a concrete and precise system will be built
  - of what alternatives will be followed and at what sequence

Human-Centric design

- User responses can be registered and analyzed through
  - Co-creation activities
  - System simulation
  - **Usability analysis activities on advanced prototypes**
- Such procedures must be repetitive and should allow for the gradual improvement of system features

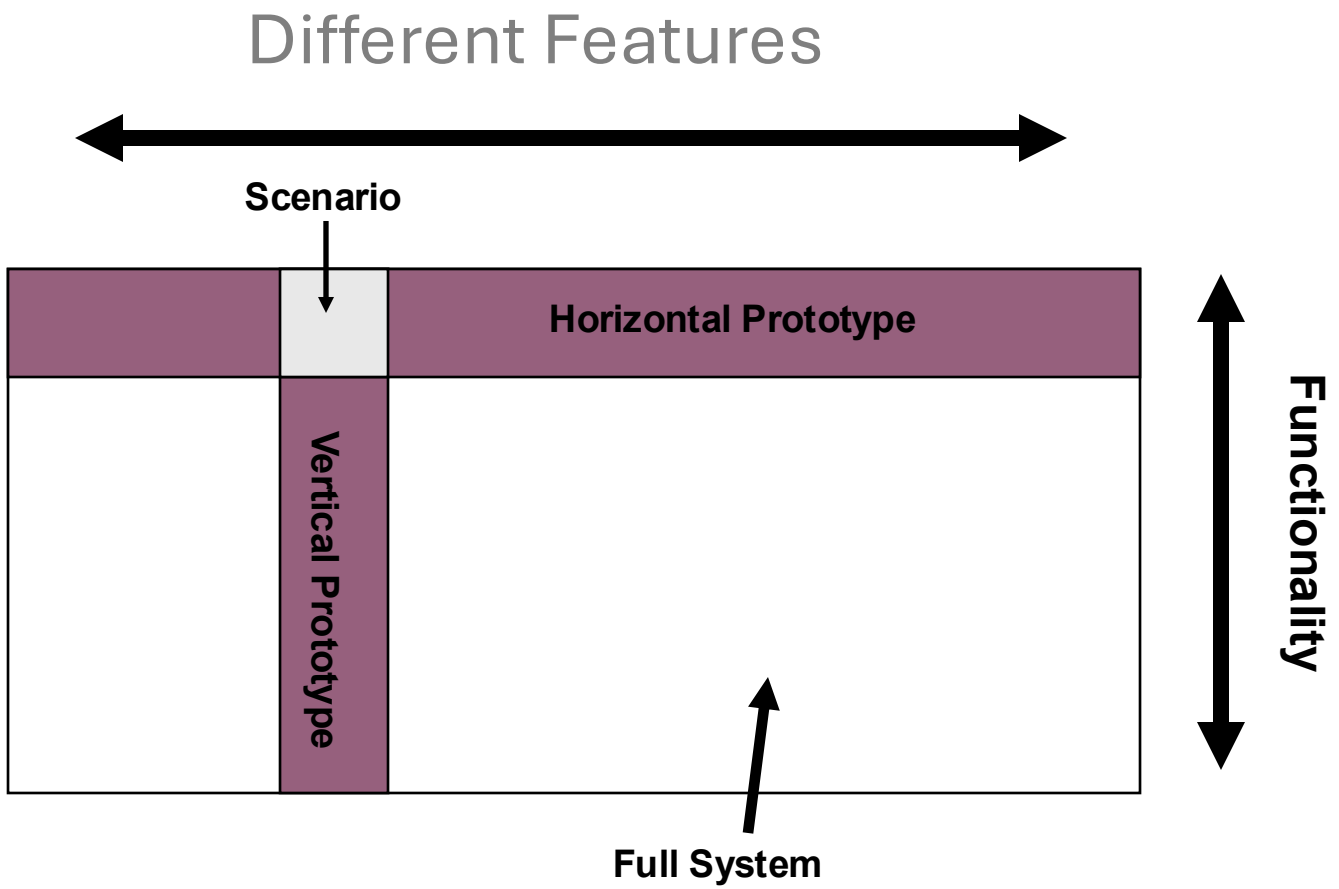
Prototyping

- It is about gathering information
- We need them to test early user reactions, propositions and, subsequently, organize revision plans
  - Good basis for testing, if seen as intermediary products
  - Aim is to have something that can be tested with real users
- Prototyping can be embedded in a System's development Lifecycle or can be performed independently, as an alternative

Cost of prototyping

- Cheaper than not doing it……
  - Sommerville: cost of repairing an error made in analysis and design phase can cost up to 100 times the original cost
- Usability work (including prototyping) should amount for 5-10% of a project's budget
- Testing early & iterating often makes the product cheaper.
- Prototyping offers a cheap means of testing usability early in the lifecycle

Prototyping



Horizontal prototyping

- Shallow
  - Overview with limited underlying functionality
- But broad
  - Simulation of entire interface
- Cons
  - Not possible to perform real work
- Pros
  - Can be created quickly
  - Gives an idea of how the whole interface will hang together
  - Identifies top level functionality

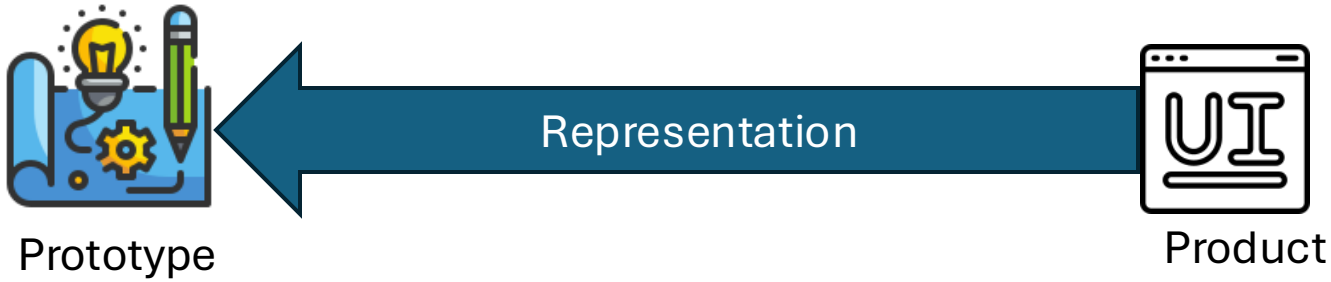
Vertical prototyping

- Limited number of functionalities
- But with deep features, each
- Mainly for testing part(s) of the system
- Aims at being tested under realistic circumstances with real user tasks
- Cons
  - Main limitation: users cannot move freely through the system
  - May lead to biased implementation
- Pros
  - Full scenario development and testing

Fidelity

Fidelity

- Degree to which prototype accurately represents the **appearance** and interaction of the product
- Judged by how it **appears** to the person viewing it
- It is **not** about similarity to desired application
- It is **not** the degree to which the code and other attributes invisible to the user are accurate

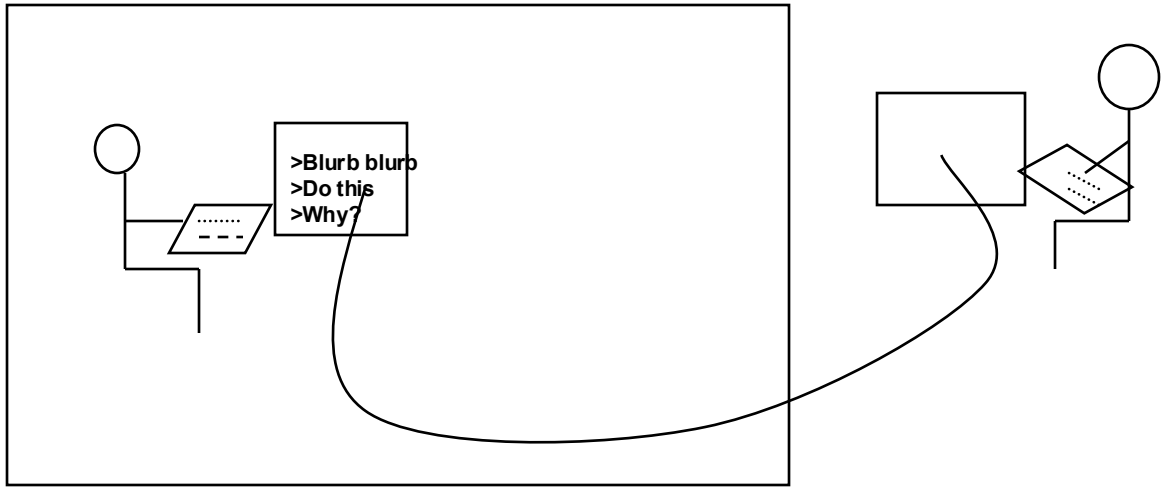


Fidelity Spectrum

- High Fidelity
  - Close to final product
  - Electronically faithful
  - Uses similar media
- Low Fidelity
  - Basis for final product
  - Proof of concept
  - Use of low cost, non-electronic media

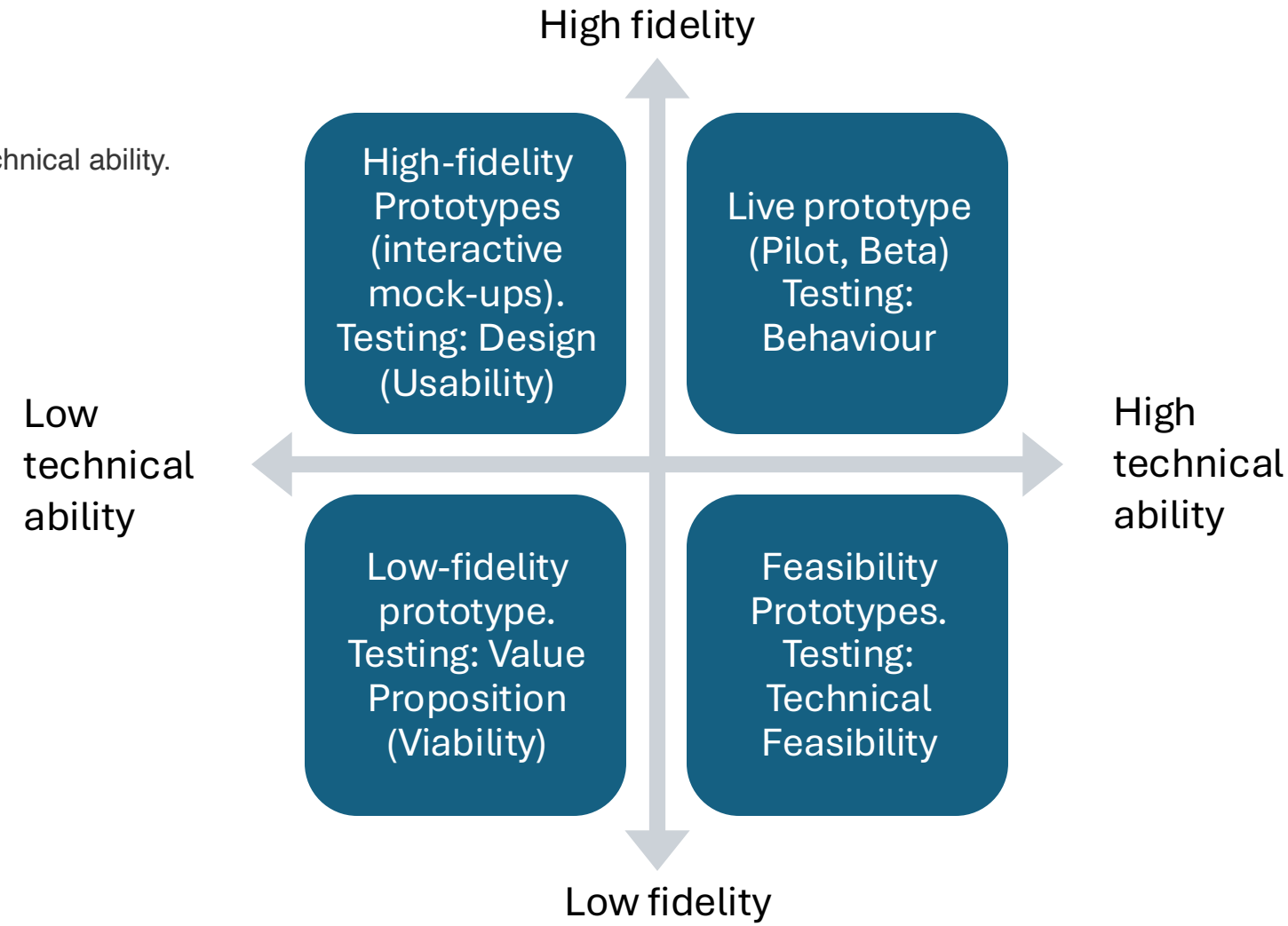
High Fidelity prototyping: *Wizard of Oz*

- User thinks they are interacting with a device, but a human is responding to output rather than the system.
- Usually done early in design to understand users' expectations



Prototype matrix

There are two axes, fidelity and technical ability.



Low fidelity prototyping

- Often there is no code
- If there is, it's not necessary to re-use it
- Produces prototype early during requirements specifications phase
- Types of Lo-Fi Prototyping
  - Storyboards (early in the design process)
  - Sketching (early in the design process)
  - Videos (early in the design process)
  - Index Cards/Screen Shots (slightly later in the design process)

Low Fidelity Prototyping: *Sketches and Storyboards*

- Not really a prototype!
- Often used with scenarios, bringing more detail, and a chance to role play
- Pitches the idea in terms of needs and solutions
- It is a series of sketches showing how a user might progress through a task using the device
- Used early in design
- Sketching is important to low-fidelity prototyping
- Don’t be inhibited about drawing ability. Practice simple symbols
- Can use videos as well

Low Fidelity Prototyping: *Sketches and Storyboards*

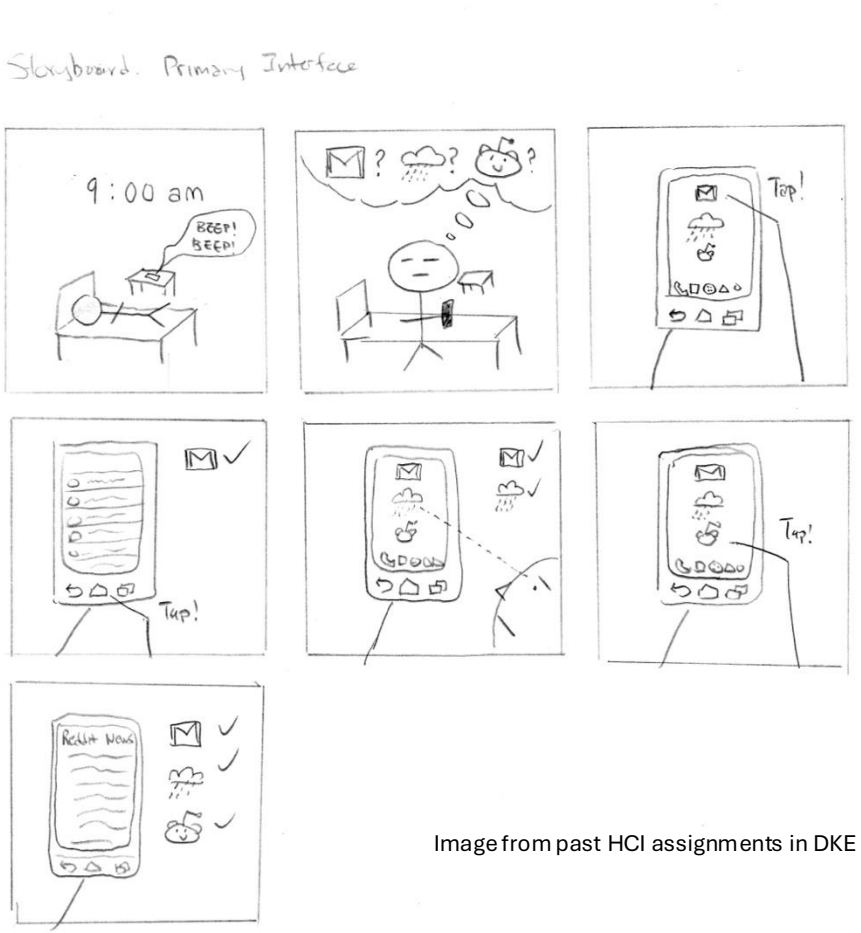


Image from past HCI assignments in DKE

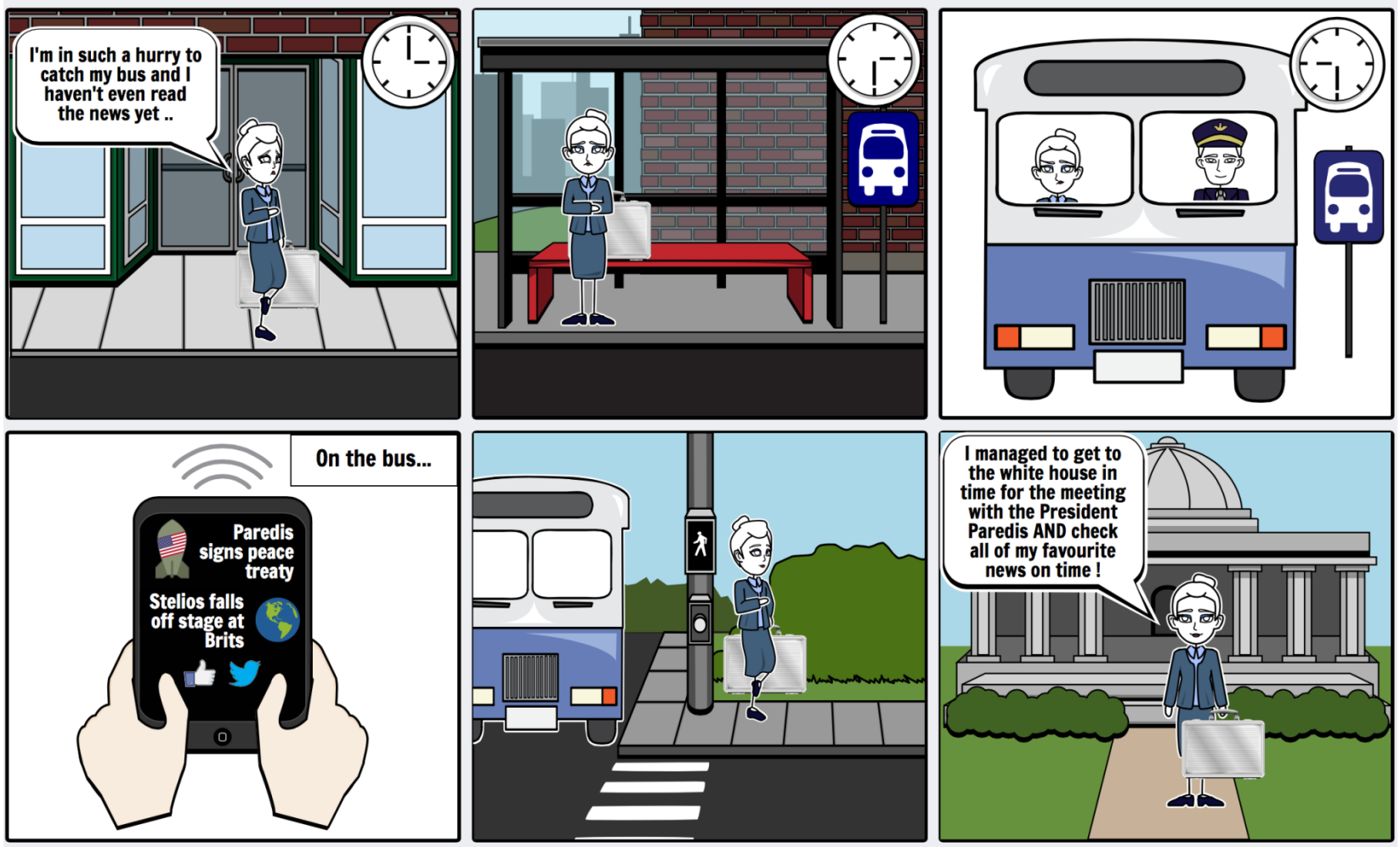


Image from past HCI assignments in DKE

Low Fidelity Prototyping: *Sketches and Storyboards*

Low fidelity prototyping: *Index Cards*

- Index cards
- Each card represents one screen
- Often used in website development
- Used slightly later in the design process when the content and the functionalities have already been defined

A home page

Pulldown menu

Image from: https://slideplayer.com/slide/4463509/

A second-level page

Image from: https://slideplayer.com/slide/4463509/

After user testing and prototyping…

Image from: https://slideplayer.com/slide/4463509/