Human-Computer Interaction

Class Code: BSCS-F2015A

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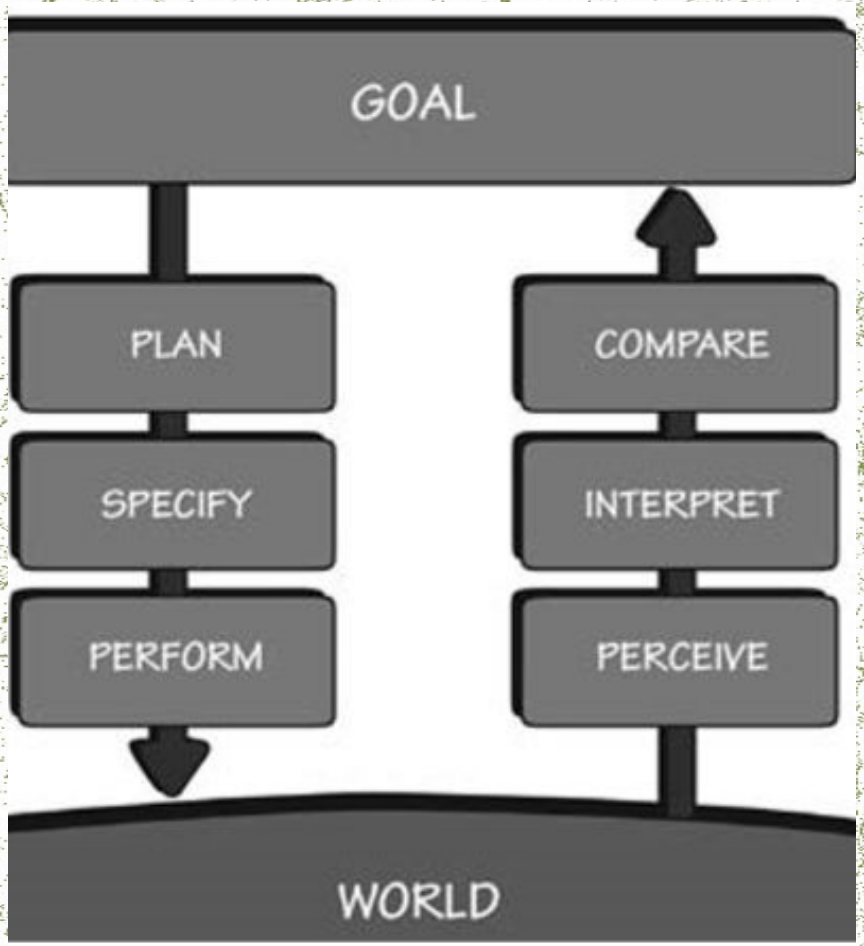
Prototyping:
Design and Development

The Seven Stages of Action



Goal (form the goal)
Plan (the action)
Specify (an action sequence)
Perform (the action sequence)
Perceive (the state of the world)
Interpret (the perception)
Compare (the outcome with the goal)

Human Cognition and Emotion:
3-Levels of Processing

The Visceral Level: All people have **the same basic** visceral responses. The visceral system allows us to respond quickly and subconsciously, without conscious awareness or control.

The Behavioral Level: The behavioral level is the home of **learned skills**, triggered by **situations** that match the **appropriate patterns**. Actions and analyses at this level are largely subconscious.

The reflective level: is the home of conscious cognition. As a consequence, this is where deep understanding develops, **where reasoning and conscious decision-making take place**.

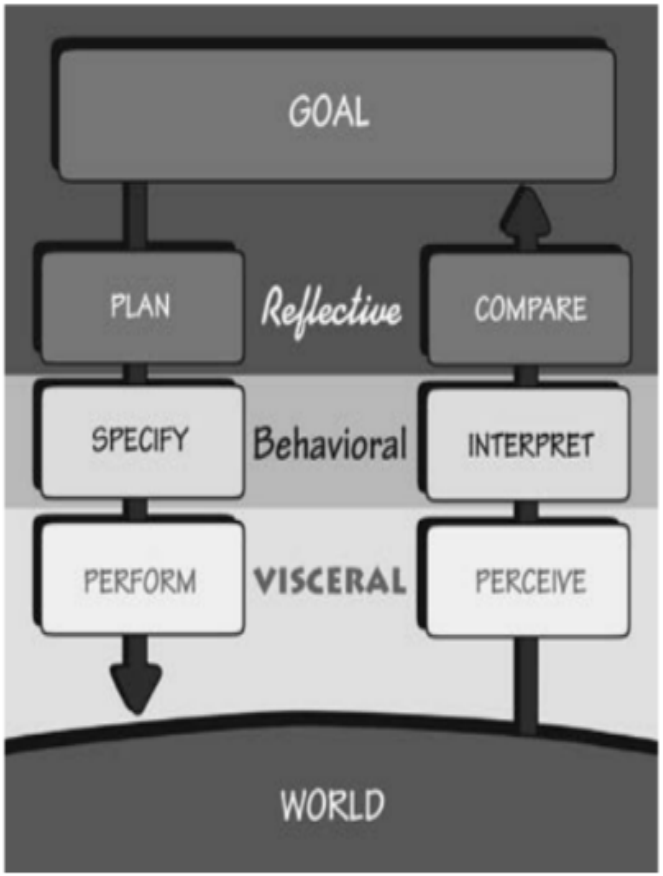
The visceral and behavioral levels are subconscious and, as a result, they respond rapidly, but without much analysis. Reflection is cognitive, deep, and slow. It often occurs after the events have happened. It is a reflection or looking back over them, evaluating the circumstances, actions, and outcomes, often assessing blame or responsibility. The highest levels of emotions come from the reflective level, for it is here that causes are assigned and where predictions of the future take place.

DESIGN MUST TAKE PLACE AT ALL LEVELS: VISCERAL, BEHAVIORAL, AND REFLECTIVE

- To the designer, reflection is perhaps the most important of the levels of processing. Reflective responses are part of our memory of events. Memories last far longer than the immediate experience or the period of usage, which are the domains of the visceral and behavioral levels. It is reflection that drives us to recommend a product, to recommend that others use it-or perhaps to avoid it.

- All three levels of processing work together. All play essential roles in determining a person's like or dislike of a product or service. One nasty experience with a service provider can spoil all future experiences. One superb experience can make up for past deficiencies. The behavioral level, which is the home of interaction, is also the home of all expectation-based emotions, of hope and joy, frustration and anger. Understanding arises at a combination of the behavioral and reflective levels. Enjoyment requires all three.

The Seven Stages of Action and the Three Levels of Processing



Levels of Processing and the Stages of the Action Cycle

Prototyping

Creating a scaled-down or incomplete version of a system to demonstrate or test aspects of it.

- Reasons to do prototyping:
  - aids UI design
  - provides basis for testing
  - team-building
  - allows interaction with user to ensure satisfaction

Behavioral prototype

- Simulating situation of users activity to understand user behavior and build early concepts

Concept prototype

- Concept prototypes address both the appearance and performance of the offering

Some prototyping methods

- UI builders (Visual Studio, ...)
  - draw a GUI visually by dragging/dropping UI controls on screen
- implementation by hand
  - writing a "quick" version of your code
- **paper prototyping**: a paper version of a UI

  Why not just code up a working prototype?

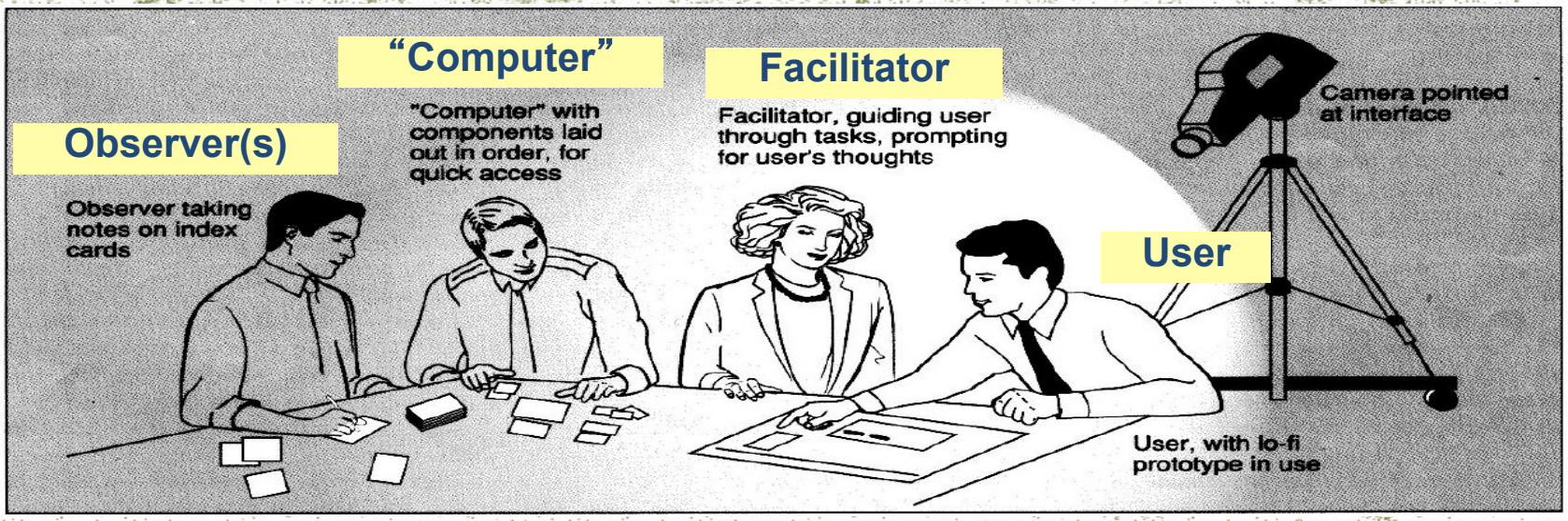
Where Does P.P. fit in?

- At what point in the software lifecycle should we do (paper) prototyping? When would it be most useful to do it? Why?

- We talk about requirements being about "what" and design being about "how." Which is paper prototyping?
  - PP helps us uncover requirements and also upcoming design issues
  - "what" vs. "how": PP shows us "what" is in the UI, but it also shows us details of "how" the user can achieve their goals in the UI

P.P. usability session

- user is given tasks to perform using paper prototype
- session can be observed by people or camera
- one developer can "play computer"

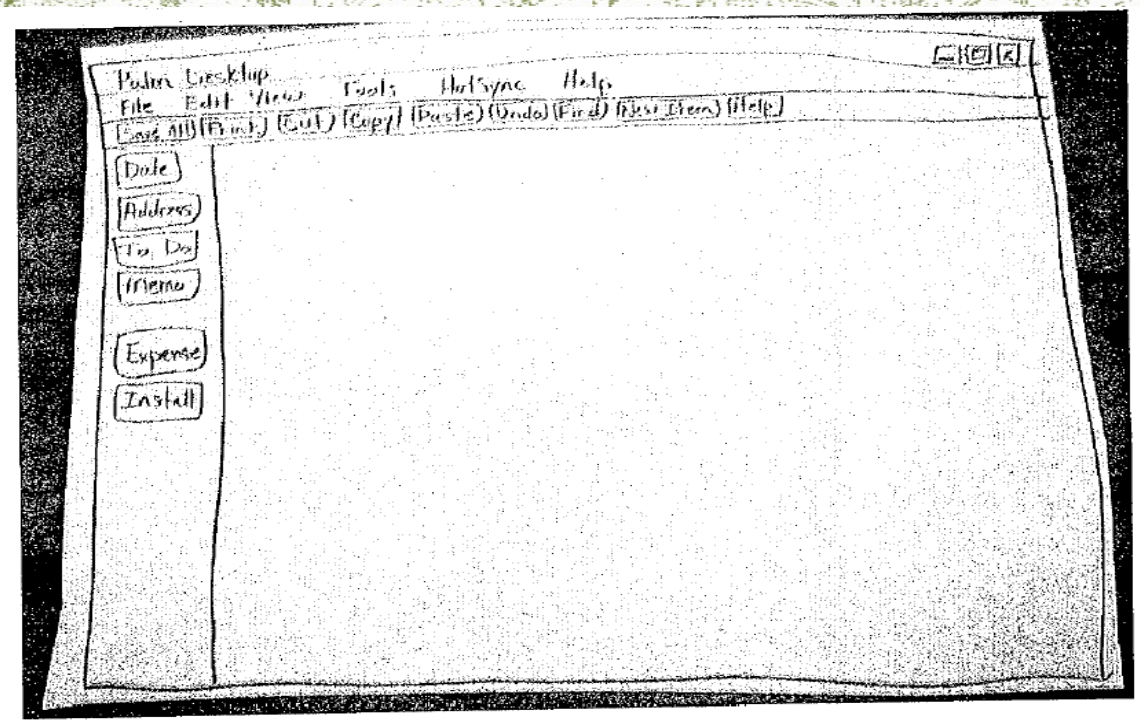


Creating a paper prototype

- gather materials
  - paper, pencils/pens
  - tape, scissors
  - highlighters, transparencies
- identify the screens in your UI
  - consider use cases, inputs and outputs to user
- think about how to get from one screen to next
  - this will help choose between tabs, dialogs, etc.

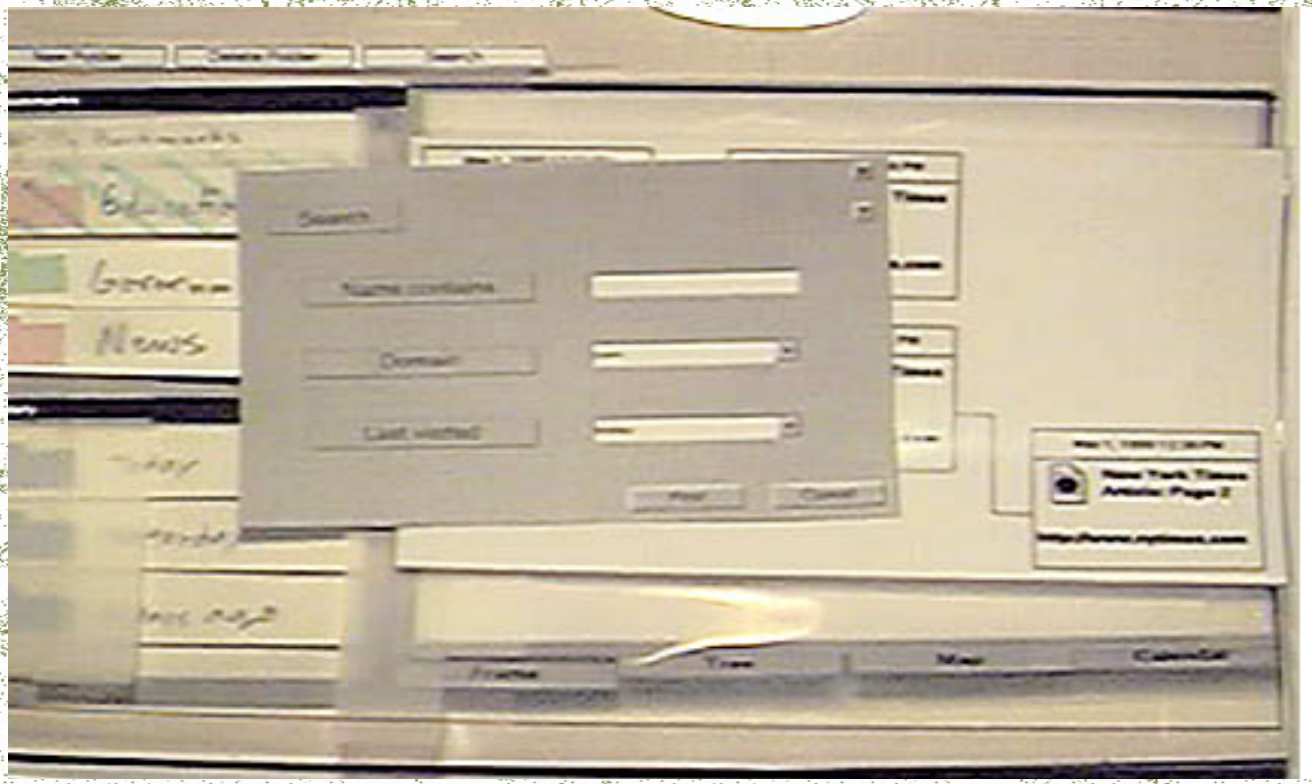
Application backgrounds

- draw the app background (the parts that matter for the prototyping) on its own, then lay the various subscreens on top of it

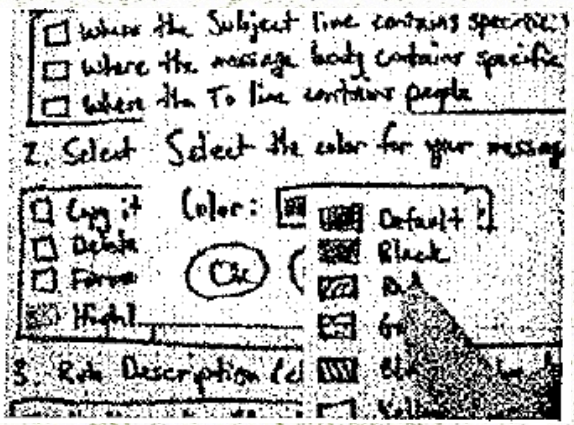


Representing a changing UI

- layers of UI can be placed on top of background as user clicks various options



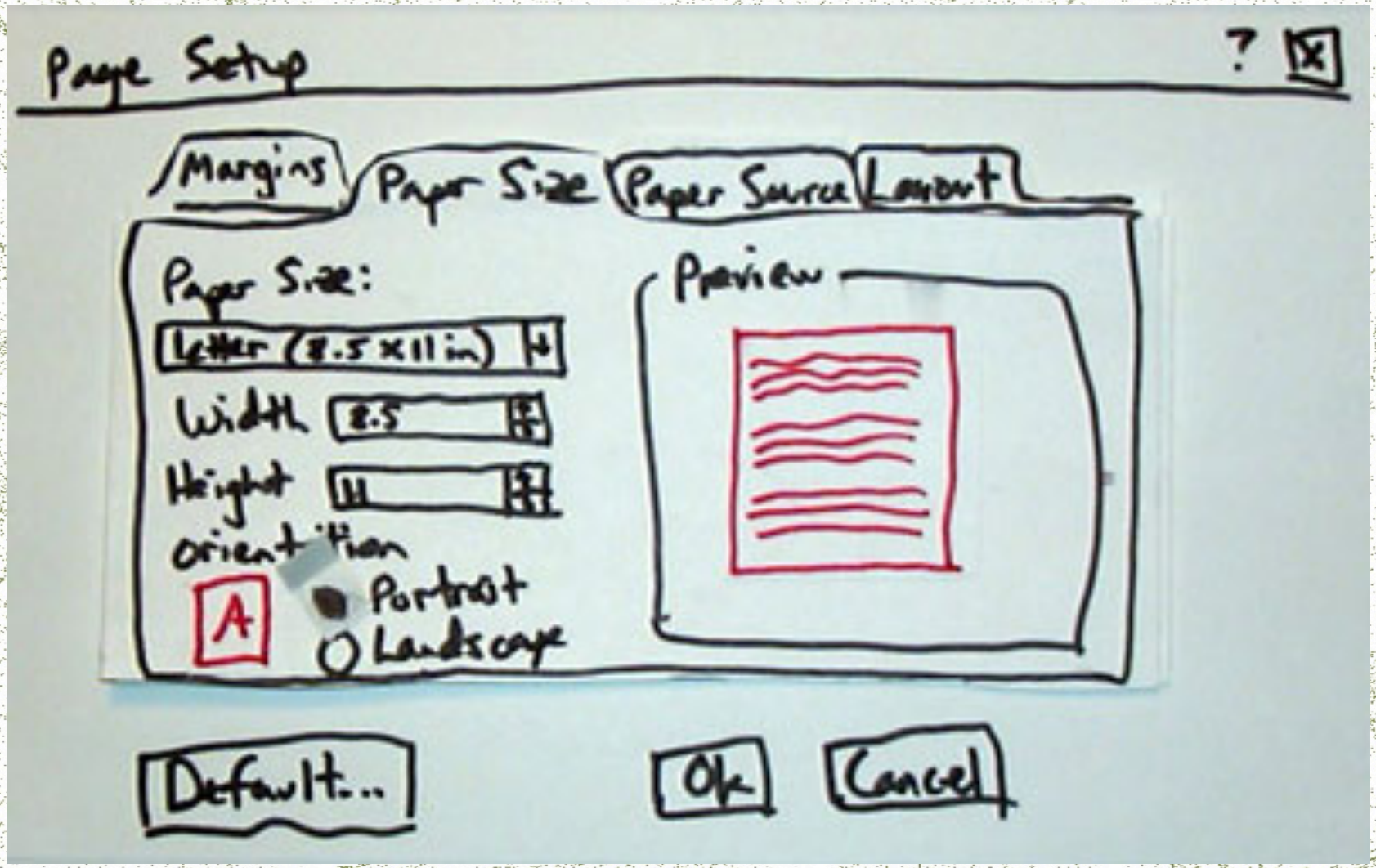
Representing interactive widgets



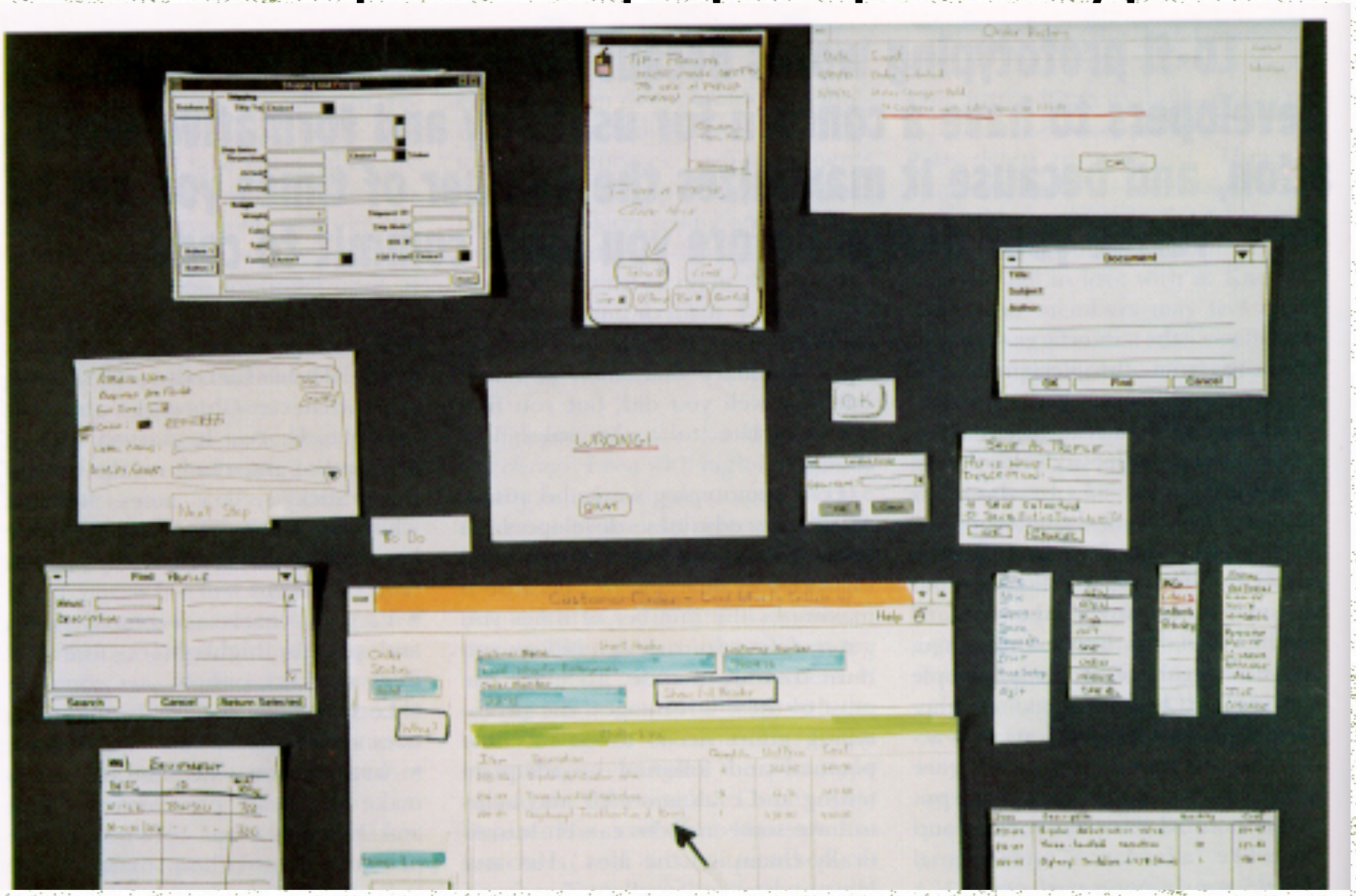
- buttons / check boxes: tape
- tabs, dialog boxes: index cards
- text fields: removable tape
- combo boxes: put the choices on a separate piece of paper that pops up when they click
- selections: a highlighted piece of tape or transparency
- disabled widgets: make a gray version that can sit on top of the normal enabled version

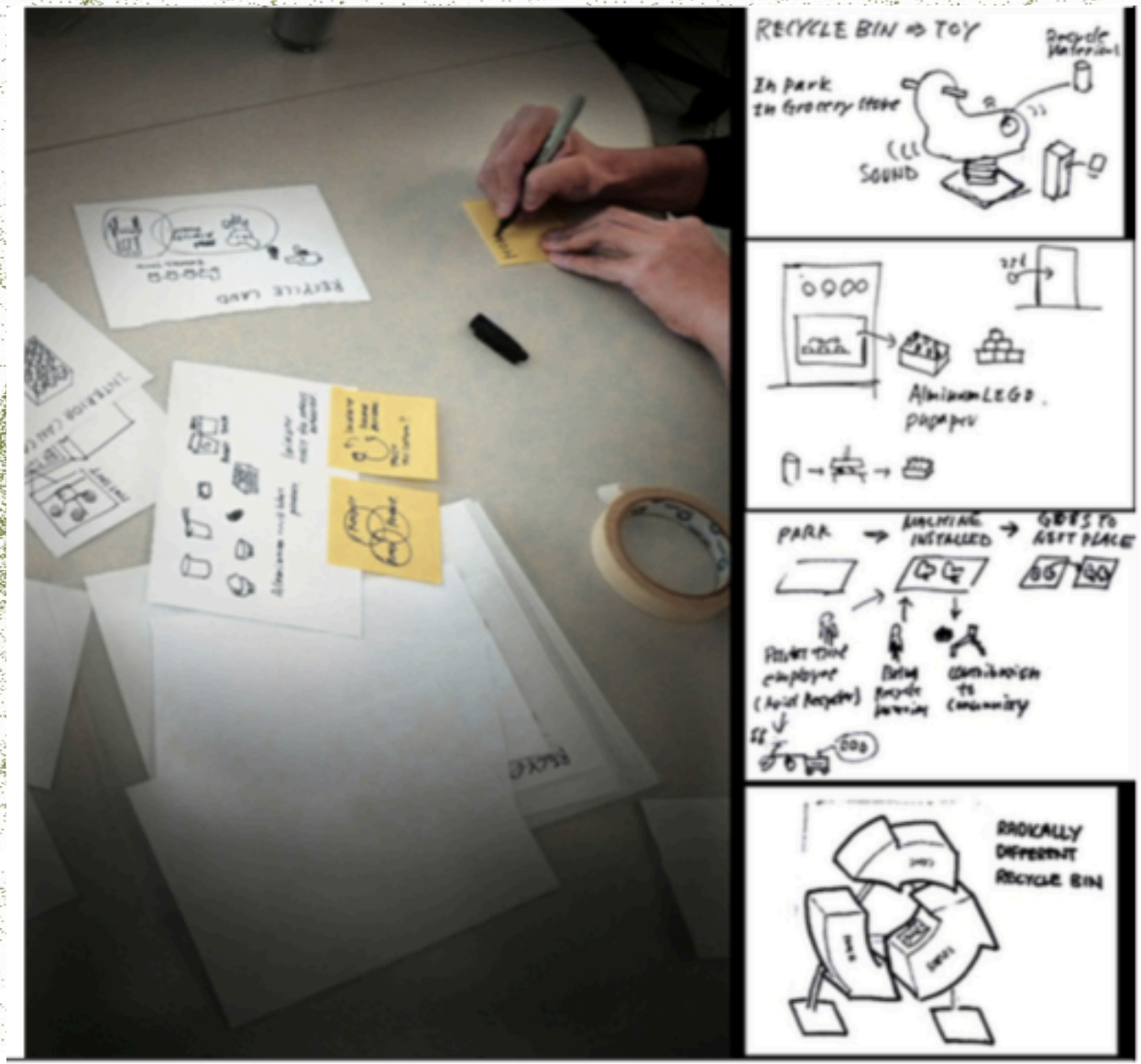
- computer beeps: say "beep" (hah!)

Example paper prot. screen



Example full paper prototype



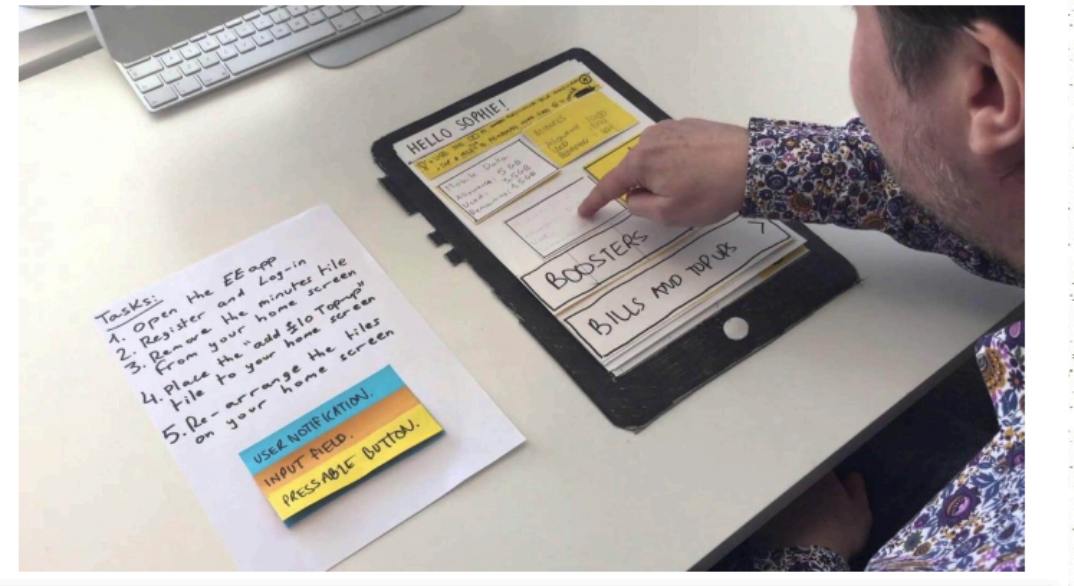

RECYCLE BIN ⇒ TOY
In park
In Grocery store
SOUND
PARK
BUILDING INSTALLED
RADICALLY DIFFERENT RECYCLE BIN

Low vs High Fidelity Prototype

Low-fidelity prototyping

- Low-fidelity (lo-fi) prototyping is a quick and easy way to translate high-level design concepts into tangible and testable artifacts.
- The first and most important role of lo-fi prototypes is to check and test functionality rather than the visual appearance of the product.

Low-fidelity prototyping

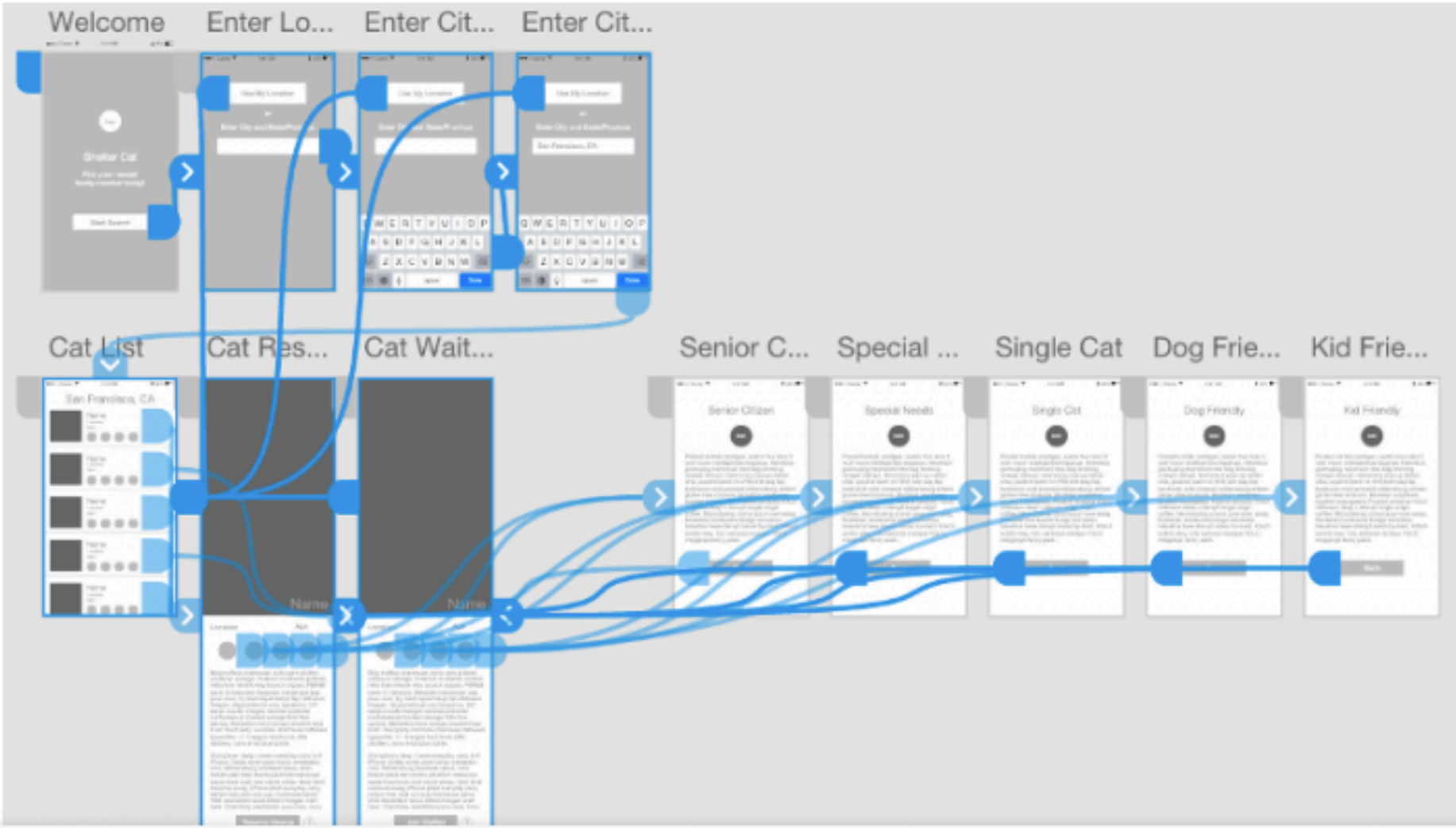


Pros

- Inexpensive
- Fast
- Collaborative
- Clarifying

Cons

- Uncertainty during testing
  - A low-fidelity prototype requires a lot of imagination from the user, limiting the outcome of user testing.
- Limited interactivity



An example of a low-fidelity prototype made in Adobe XD.

High-fidelity prototyping

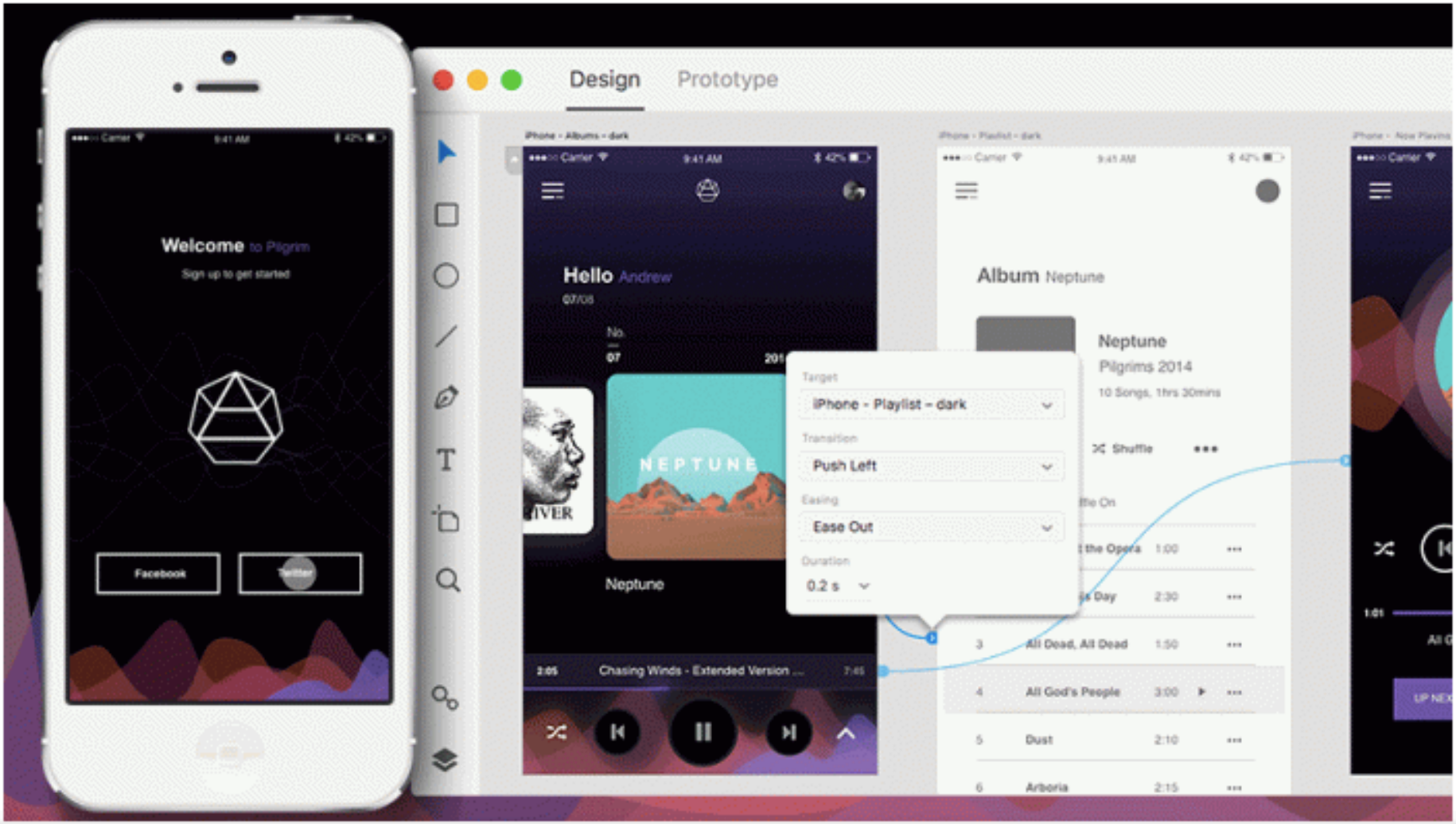
- High-fidelity (hi-fi) prototypes appear and function as similar as possible to the actual product that will ship. Teams usually create high-fidelity prototypes when they have a solid understanding of what they are going to build and they need to either test it with real users or get final-design approval from stakeholders

Pros

- Meaningful feedback during usability testing
- Testability of specific UI elements or interactions
- Easy buy-in from clients and stakeholders.

Cons

- Higher costs. In comparison with low-fidelity prototypes, creating high-fidelity prototypes implies higher costs, both temporal and financial.



A high-fidelity interactive prototype created in Adobe XD and mirrored on an iPhone.

Q & A

Thank you

for your attention

Prototyping Exercise

- In your project groups, let's draw a rough prototype for a music player (e.g. iTunes).
  - Assume that the program lets you store, organize, and play songs and music videos.
  - Draw the main player UI and whatever widgets are required to do a **search for a song or video**.
  - After the prototypes are done, we'll try walking through each UI together.
- Things to think about:
  - How many clicks are needed? What controls to use?
  - Could your parents figure it out without guidance?