Prototyping

approaches to design

Overview

– Prototyping and construction

– Conceptual design

– Physical design

– Generating prototypes

– Tool support

Prototyping and Construction

- What is a prototype?
- Why prototype?
- Different kinds of prototyping
  - low fidelity
  - high fidelity
- Compromises in prototyping
  - vertical
  - horizontal
- Construction

What is a Prototype

- In other design fields a prototype is a small-scale model:
  - a miniature car
  - a miniature building or town

What is a Prototype

- In interaction design it can be (among other things):
  - a series of screen sketches
  - a storyboard, i.e. a cartoon-like series of scenes
  - a Powerpoint slide show
  - a video simulating the use of a system
  - a lump of wood (e.g. PalmPilot)
  - a cardboard mock-up
  - a piece of software with limited functionality written in the target language or in another language

Why Prototype

- Evaluation and feedback are central to interaction design
- Stakeholders can see, hold, interact with a prototype more easily than a document or a drawing
- Team members can communicate effectively
- You can test out ideas for yourself
- It encourages reflection: very important aspect of design
- Prototypes answer questions, and support designers in choosing between alternatives

What to Prototype

- Technical issues
- Work flow, task design
- Screen layouts and information display
- Difficult, controversial, critical areas

Lo-Fi Prototyping

- Uses a medium which is unlike the final medium, e.g. paper, cardboard
- Is quick, cheap and easily changed
- Examples:
  - sketches of screens, task sequences,
  - ‘Post-it’ notes
  - storyboards
  - ‘Wizard-of-Oz’

Why Use Low-Fi Prototypes

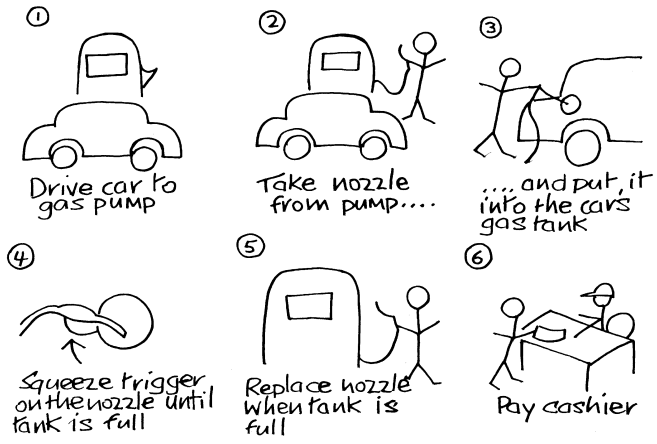
- Traditional methods take too long
  - Sketches → prototype → evaluate →iterate
- Can simulate the prototype
  - Sketches act as prototype
    - Designer “plays computer”
    - Other design team members observe & record
    - Might sound silly, but is surprisingly effective
- Kindergarten implementation skills
  - Allows non-programmers to participate
- Widely used in industry

Storyboards

- Often used with scenarios, bringing more detail, and a chance to role play
- It is a series of sketches showing how a user might progress through a task using the device
- Used early in design

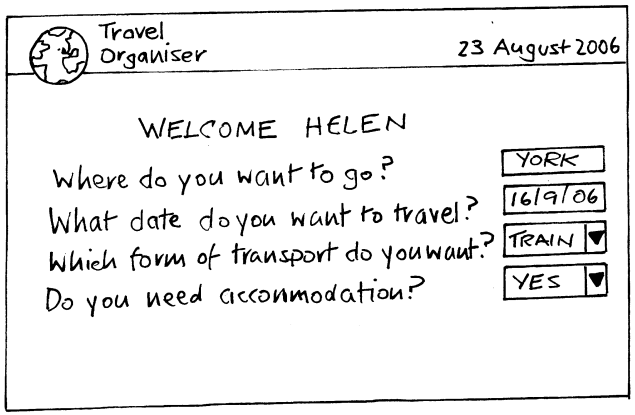
Sketching

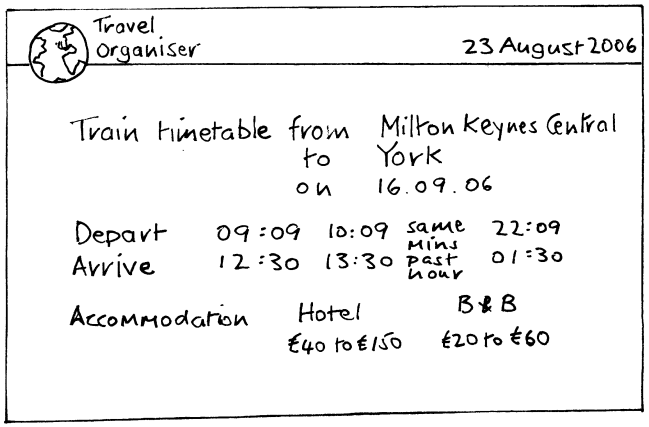
- Sketching is important to low-fidelity prototyping
- Don’t be inhibited about drawing ability. Practice simple symbols



Card-based prototypes

- Index cards (3 X 5 inches)
- Each card represents one screen or part of screen
- Often used in website development





Wizard of Oz

- The user thinks they are interacting with a computer, but a developer is responding to output rather than the system.
- Usually done early in design to understand users' expectations
- What is 'wrong' with this approach?

Balsamiq

http://www.balsamiq.com/

http://www.youtube.com/watch?feature=player_embedded&v=_8IyyvECYrg

Hi-Fi Prototyping

- Uses materials that you would expect to be in the final product.
- Prototype looks more like the final system than a low-fidelity version.
- For a high-fidelity software prototype common environments include Macromedia Director, Visual Basic, and Smalltalk.
- Danger that users think they have a full system…….see compromises

Compromises

- All prototypes involve compromises
- For software-based prototyping maybe there is a slow response? sketchy icons? limited functionality?
- Two common types of compromise
  - ‘horizontal’: provide a wide range of functions, but with little detail
  - ‘vertical’: provide a lot of detail for only a few functions
- Compromises in prototypes mustn’t be ignored. Product needs engineering

Hi-Fi Disadvantages

- Distort perceptions of the tester
  - Formal representation indicates “finished” nature
  - People comment on color, fonts, and alignment
- Discourages major changes
  - Testers don’t want to change a “finished” design
  - Designers don’t want to lose effort put into creating the hi-fi design

Construction

- Taking the prototypes (or learning from them) and creating a whole
- Quality must be attended to: usability (of course), reliability, robustness, maintainability, integrity, portability, efficiency, etc.
- Product must be engineered
  - Evolutionary prototyping
  - ‘Throw-away’ prototyping

So how do I design?

Approaches to creativity

- Design is a creative exercise
- Requires lots of knowledge about
  - People
  - Tasks
  - Technology
- Awareness of
  - Fashion
  - Trends
  - Graphic design

Creativity

- Anyone can be creative
- Need appropriate support
- Approaches
  - Brainstorming
  - Lateral thinking
  - Future envisaging
  - Impossible combinations
  - Inspiration tray
  - etc

Support

- Whiteboard, paper, pens, post-its, crayons, etc.
- Mind-mapping tools
- Collaborative brainstorming with CSCW tools
- Some people work better visually, some textually

Brainstorming

- Melee of ideas and concepts
- Collect all ideas (expansion phase)
- Ground rules
  - No criticism
  - Nothing is too outlandish
  - Don’t speak for long

Brainstorming II

- Comment on ideas, remove less useful ones
- Organise
  - Cluster by topic, approach etc
- Discuss, elaborate
- Record decisions, routes to follow up
- Keep originals

Lateral thinking

- Take common concept
- Split into components
- See how can alter one of the components dramatically
  - E.g. F1 teams asked to design car with square wheels
  - Led to active suspension development

Future envisaging

- Create atmosphere in which anything is possible
- Tel story to get people in the mood
- Get them to describe how things could work
- These are the use cases
- Good for expanding boundaries and horizons of existing users

Impossible combinations

- Take odd things and try to create something new
- E.g. cloth darts; chocolate teapot
- Good for inspiring creativity, less good for focused design approaches

Inspiration tray

- Collection of unusual or interesting items
- Keep around, use for inspiration
- Can also use as part of impossible combinations approach

- Modern take - Pinterest

Conceptual design – R to D

- Transform user requirements/needs into a conceptual model
- “a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave and look like, that will be understandable by the users in the manner intended”
- Don’t move to a solution too quickly. Iterate, iterate, iterate
- Consider alternatives: prototyping helps

Interface Metaphors

- Interface metaphors combine familiar knowledge with new knowledge in a way that will help the user understand the product.
- Three steps: understand functionality, identify potential problem areas, generate metaphors
- Evaluate metaphors:
  - How much structure does it provide?
  - How much is relevant to the problem?
  - Is it easy to represent?
  - Will the audience understand it?
  - How extensible is it?

Interaction Types

- Which interaction type?
  - How the user invokes actions
  - Instructing, conversing, manipulating or exploring
- Do different interface types provide insight?
  - WIMP, shareable, augmented reality, etc

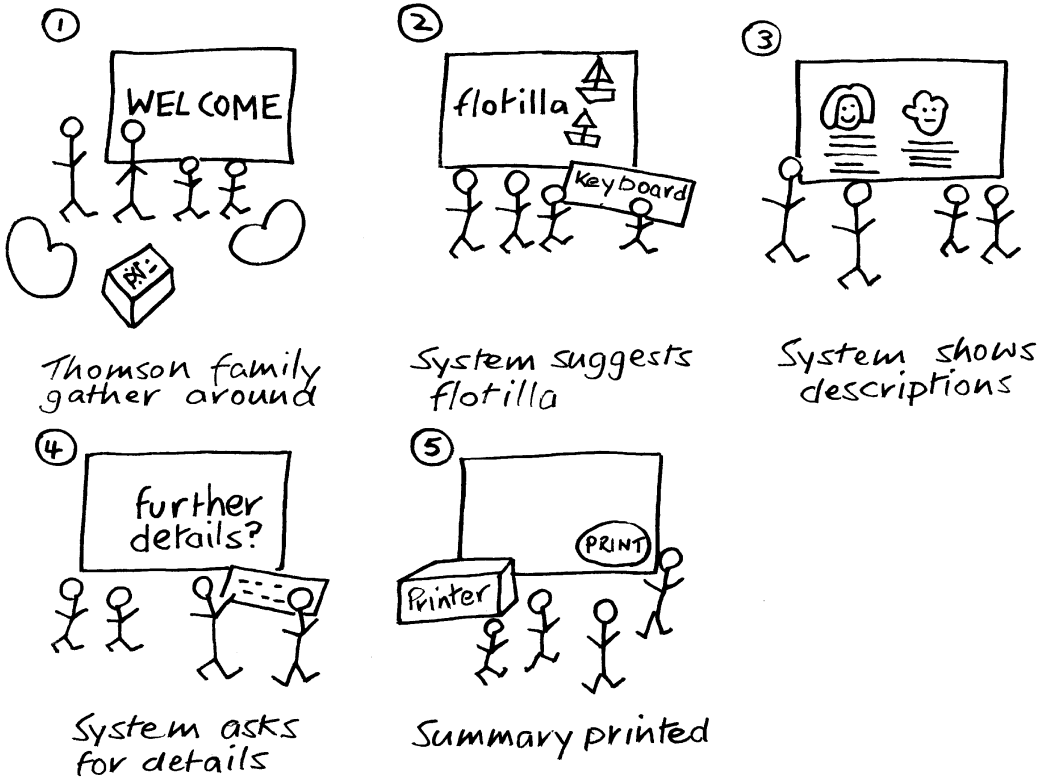
Expanding the model

- What functions will the product perform?
  - What will the product do and what will the human do (task allocation)?
- How are the functions related to each other?
  - Sequential or parallel?
  - Categorisations, e.g. all actions related to telephone memory storage
- What information needs to be available?
  - What data is required to perform the task?
  - How is this data to be transformed by the system?

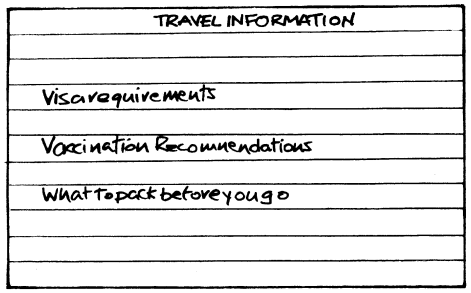
Using Scenarios

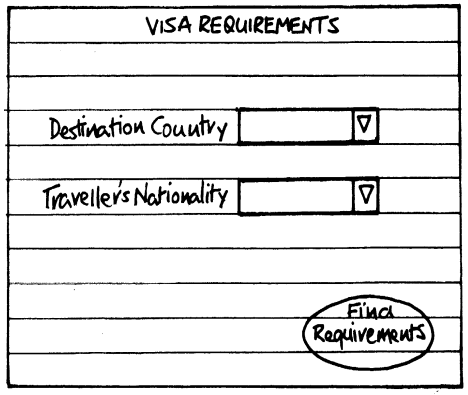
- Express proposed or imagined situations
- Used throughout design in various ways
    - scripts for user evaluation of prototypes
    - concrete examples of tasks
    - as a means of co-operation across professional boundaries
- Plus and minus scenarios to explore extreme cases

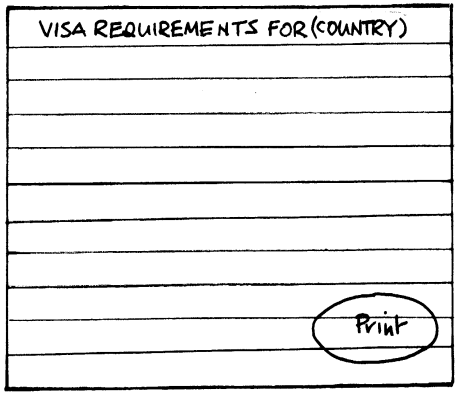
Generating Storyboards



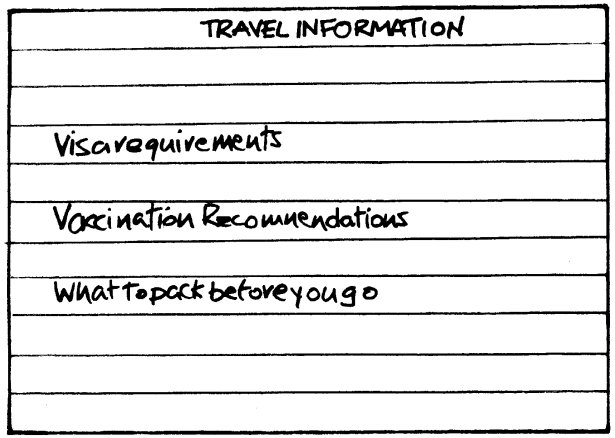
Generating Cards…

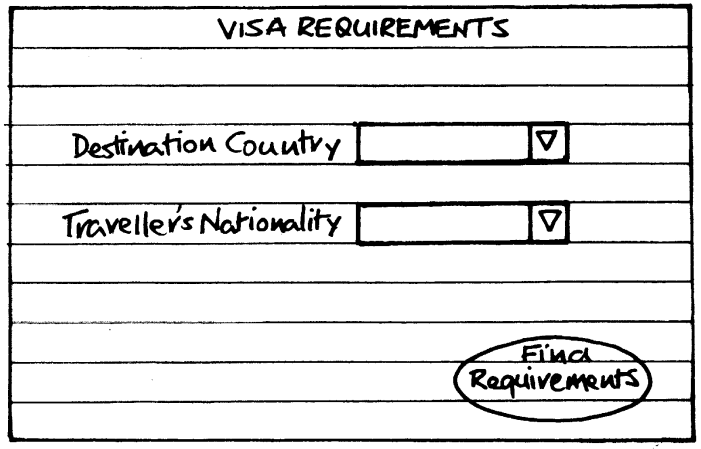


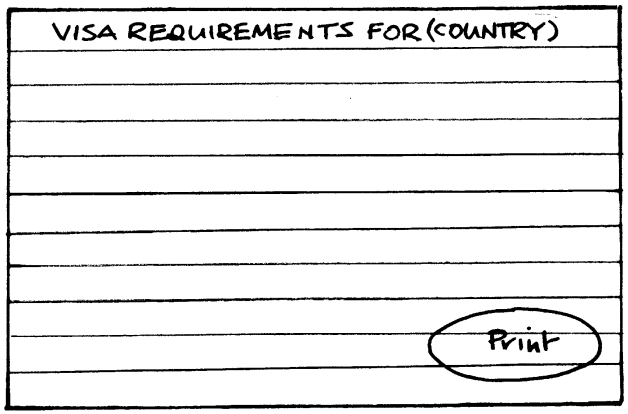




Generate card-based prototype from use case







Summary

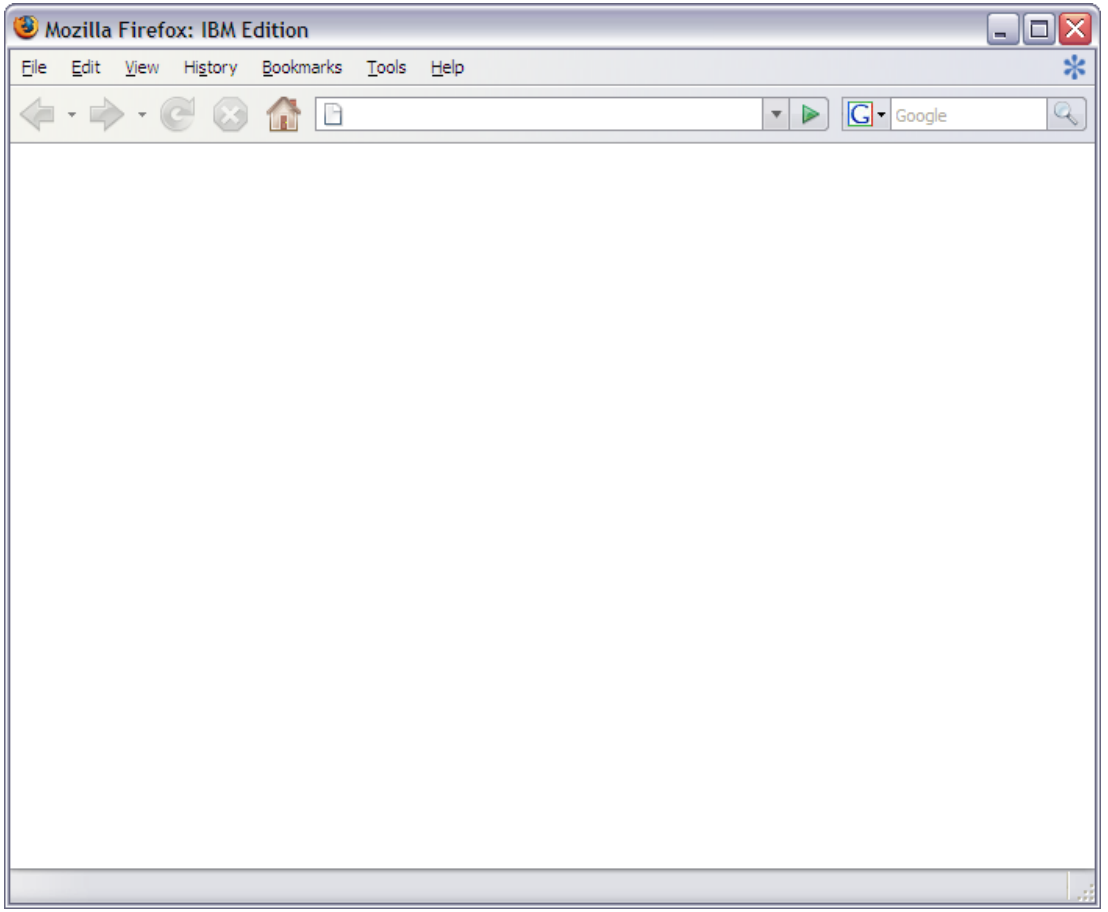
- Different kinds of prototyping are used for different purposes and at different stages
- Prototypes answer questions, so prototype appropriately
- Construction: the final product must be engineered appropriately
- Conceptual design (the first step of design)
- Consider interaction types and interface types to prompt creativity
- Storyboards can be generated from scenarios
- Card-based prototypes can be generated from use cases

Down-sides to informal design

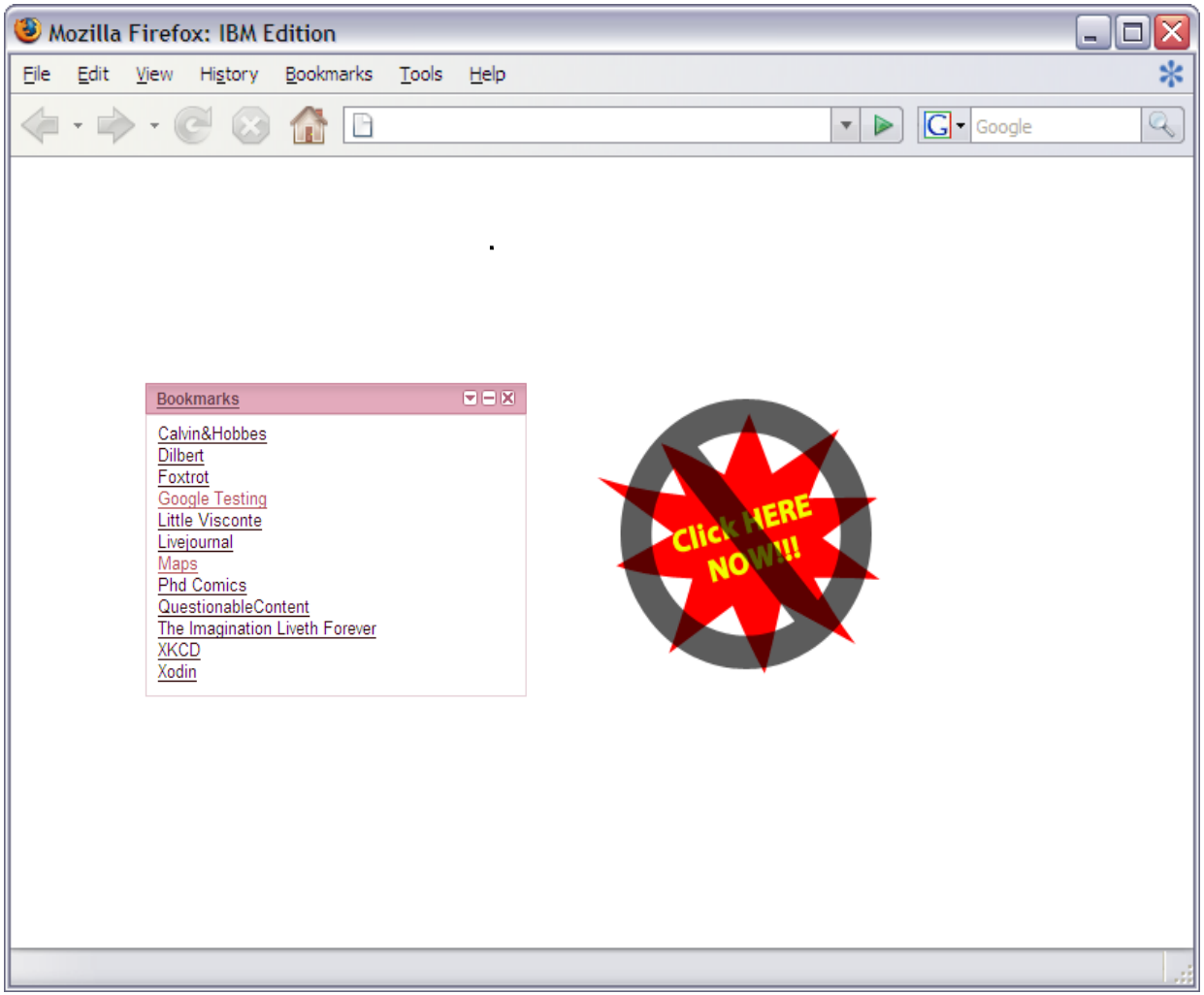
- Clients
  - Often see the fidelity of the interface as an indication of development effort
  - Often hard to involve them as subjects
  - Talk to them early and often!
  - Explain the process and set expectations up front!

Screenshotting

Start with a Blank Page



Use a drawing program to insert items you want



Useful Tricks

- Print Screen and then cut out elements you like
  - Windows: Alt-PrtScn captures the active window into the clipboard
  - Mac Control - Command (Apple)-Shift-4 captures the "grabbed" area into the clipboard
  - Mac OSX Grab Utility
    - Open Grab (located in Applications/Utility).

- Use a simple graphics editor like Paint to stitch the images together
  - Copy & Paste many elements for different looks/feels

Web-Based

- Provides the illusion of interactivity
- Can employ screenshots to show parts of your webpage
- Can be used as just a “click-through” of screenshots
- Good if you are considering adding features to an existing website

Resources

- http://www.krisjordan.com/2008/09/07/10-minute-mock-prototyping-tips-for-powerpoint/
- http://www.istartedsomething.com/20071018/powerpoint-prototype-toolkit-01/