Praktikum Entwicklung von Mediensystemen mit iOS

SS 2011

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Today

- Milestones
- Camera API
- Networking
- Design Process

Milestones

- 26.5.
  - Project definition, brainstorming, main functions, persona
- 9.6. (week 1) ⟸ today
  - Identify user needs (interview or observation)
  - Storyboarding, low fidelity paper prototyping
- 16.6. (weeks 2,3)
  - Test paper prototype with users
  - Start of software prototype development
- 30.6. (week 4)
  - Heuristic evaluation of software prototype
- 7.7. (weeks 5,6)
  - Think-aloud user study on software prototype
- 21.7. (week 7)
  - Completion of software prototype, preparation of presentation
- 28.7.
  - Presentation of project results

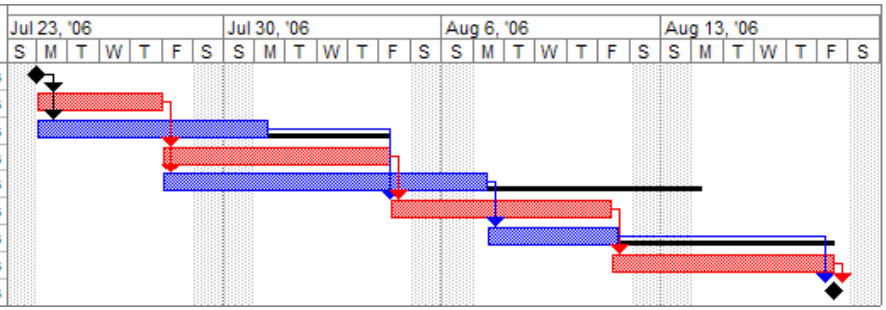
Tasks

- Present milestone results at meetings
- Meet with your group regularly
- 9.6.
  - Present project idea, present persona, narrow down functionality
- 16.6.
  - Present interview results, storyboard, first paper prototype
- 30.6.
  - Present paper prototype test results (and plan for revision)
- 7.7.
  - Present results of heuristic evaluation (and plan for revision)
- 21.7.
  - Present results of think-aloud user study (and plan for revision)
- 28.7.
  - Present complete project

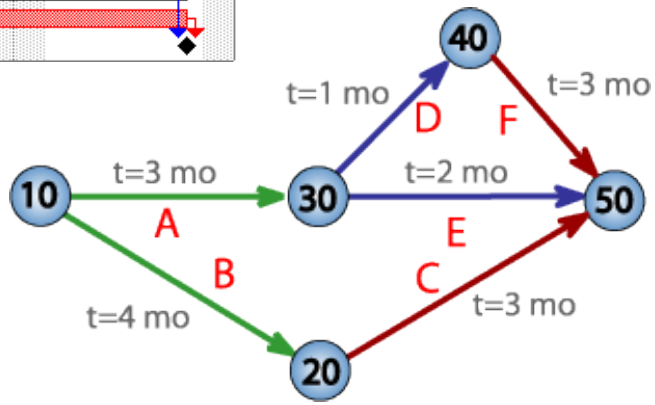
Recommendations

- Set up a Web site or Wiki to document the progress of your project
- Plan the communication within your team
- Create a Gantt chart to plan your project
  - en.wikipedia.org/wiki/Gantt

ID	Task Name	Predecessors	Duration
1	Start		0 days
2	a	1	4 days
3	b	1	5.33 days
4	c	2	5.17 days
5	d	2	6.33 days
6	e	3,4	5.17 days
7	f	5	4.5 days
8	g	6	5.17 days
9	Finish	7,8	0 days



- Create a PERT chart to evaluate the critical path
  - en.wikipedia.org/wiki/Program_Evaluation_and_Review_Technique



NETWORKING

Synchronous Download of Data

- Waits until data completely downloaded

```
- (UIImage*) imageFromUrlString:(NSString*)urlString;
{
    NSURL *url = [NSURL URLWithString:urlString];
    NSData *data = [NSData dataWithContentsOfURL:url];
    UIImage *image = [UIImage imageWithData:data];
    return image;
}
```

- Variant: specify options (e.g. caching) and error variable

```
NSDataReadingOptions o = NSDataReadingUncached;
NSError *e = nil;
NSData *data = [NSData dataWithContentsOfURL:url options:o error:&e];
    UIImage *image = [UIImage imageWithData:data];
    if (e) {...}
```

Synchronous Downloads with NSURLConnection

- Synchronous request with error response

```
NSMutableURLRequest *req = [NSMutableURLRequest
                                    requestWithURL:url];
NSURLResponse *res = nil;
NSError *e = nil;
NSData *data = [NSURLConnection sendSynchronousRequest:req
                                    returningResponse:&res error:&e];
```

- NSURLResponse contains content length, MIME type, etc.

Asynchronous Downloads with NSURLConnection

- Put request on a second thread

```
[NSThread detachNewThreadSelector:@selector(downloadImage:)
                         toTarget:self withObject:urlString];
```

- Update GUI on main (GUI-safe) thread

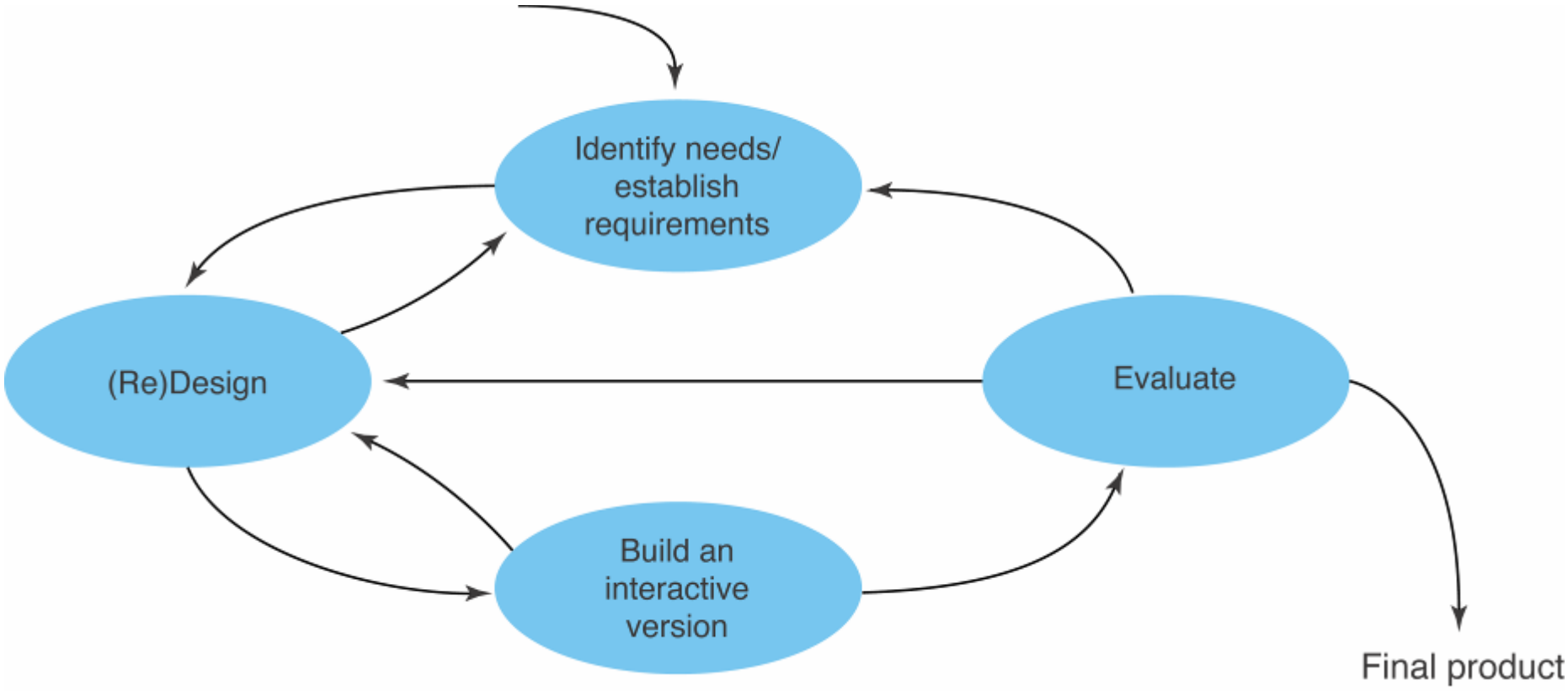
```
[imageView performSelectorOnMainThread:@selector(setImage:)
                            withObject:image waitUntilDone:NO];
```

DESIGN PROCESS

Basic Activities of Interaction Design
(Preece et al.)

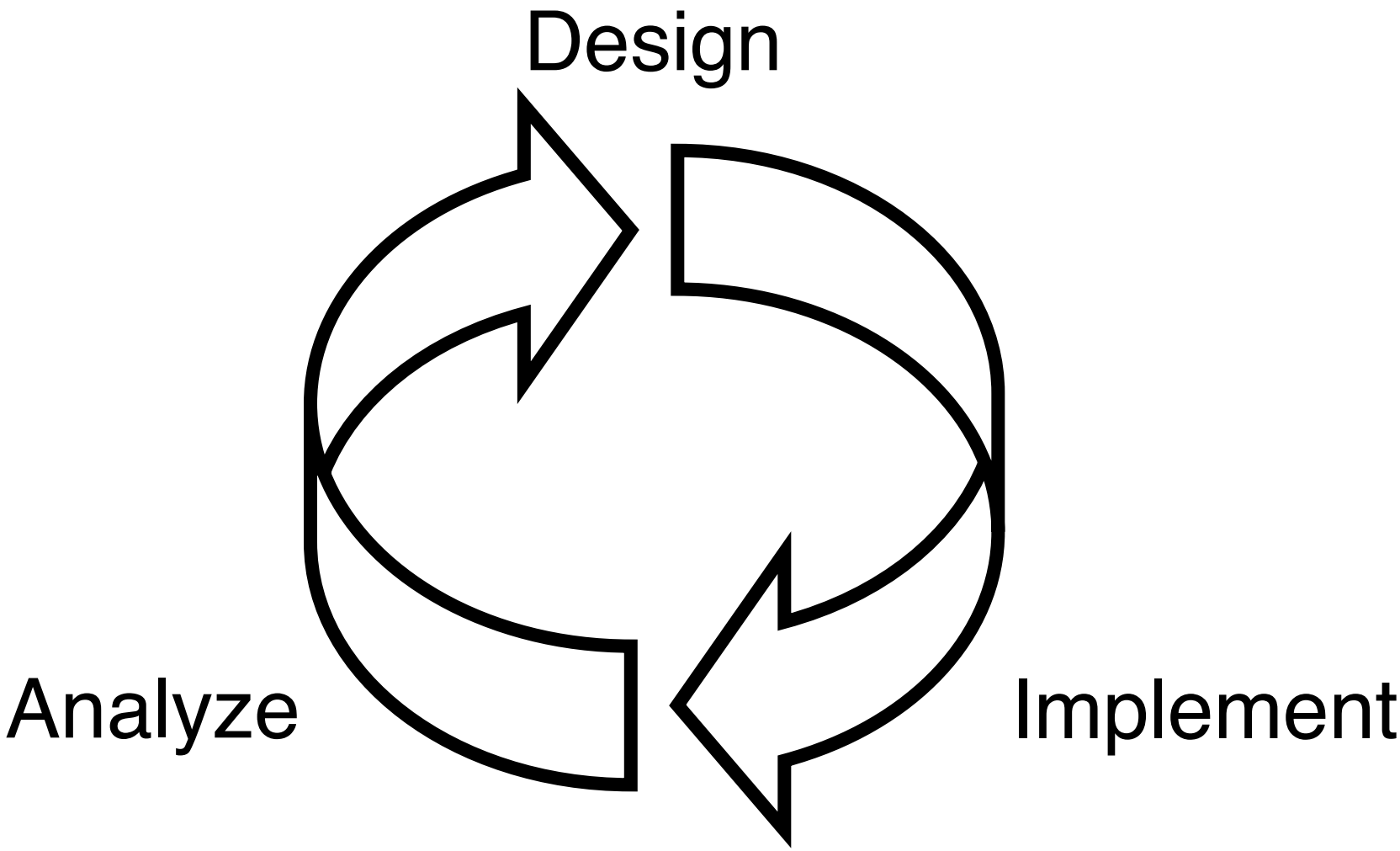
- Identify needs and establishing requirements
  - Target users
  - Needs and wants of target users
- Develop alternative designs
  - Suggesting ideas for meeting the requirements
  - Conceptual design and physical design
- Build interactive versions of the designs
  - Paper-based prototypes
  - Role-playing users
- Evaluate designs
  - Determining usability and acceptability of the product
  - User involvement throughout the process

Basic Activities of Interaction Design
(Preece et al.)



Source: Preece, Rogers, Sharp: Interaction Design

Iterative Design: DIA Cycle



Focus on Users

- Decide **who** the users will be
- Decide **what** they will be doing with the system

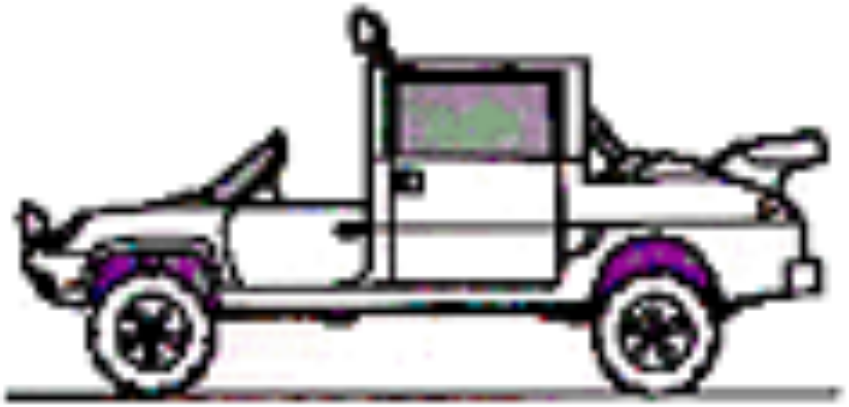
- "You can't figure out what people want, need, can do, and will do without talking to them."
- Find real people interested in your planned system (otherwise there's a problem)
- Methods
  - Talk with users
  - Visit user locations, observe (and videotape) users working
  - Have users think aloud, try it yourself
  - Use surveys and questionnaires
  - Make testable usability goals

User Profiles or “Personas” (Cooper, 1998)

- Short profiles of typical users
  - Prototypical user for a specific user group
  - Fictitious individual with concrete characteristics
- Building personas
  - Often built from interview results
  - Synthesize fictitious users from real user characteristics
  - Develop multiple personas for different types of users
- Bring them to life
  - With a name, characteristics, experience, personal background, environment they are located in, goals, tasks, skill levels, etc.
- Base design decisions on the needs of the personas

Personas Example
(Cooper, About Face, Chapter 5)

Building a car that pleases everyone



Building a car based on three personas (representing larger groups)

Marge, *mother of three*

Marge wants safety and room for many passengers. A minivan meets her needs.

Jim, *construction worker*

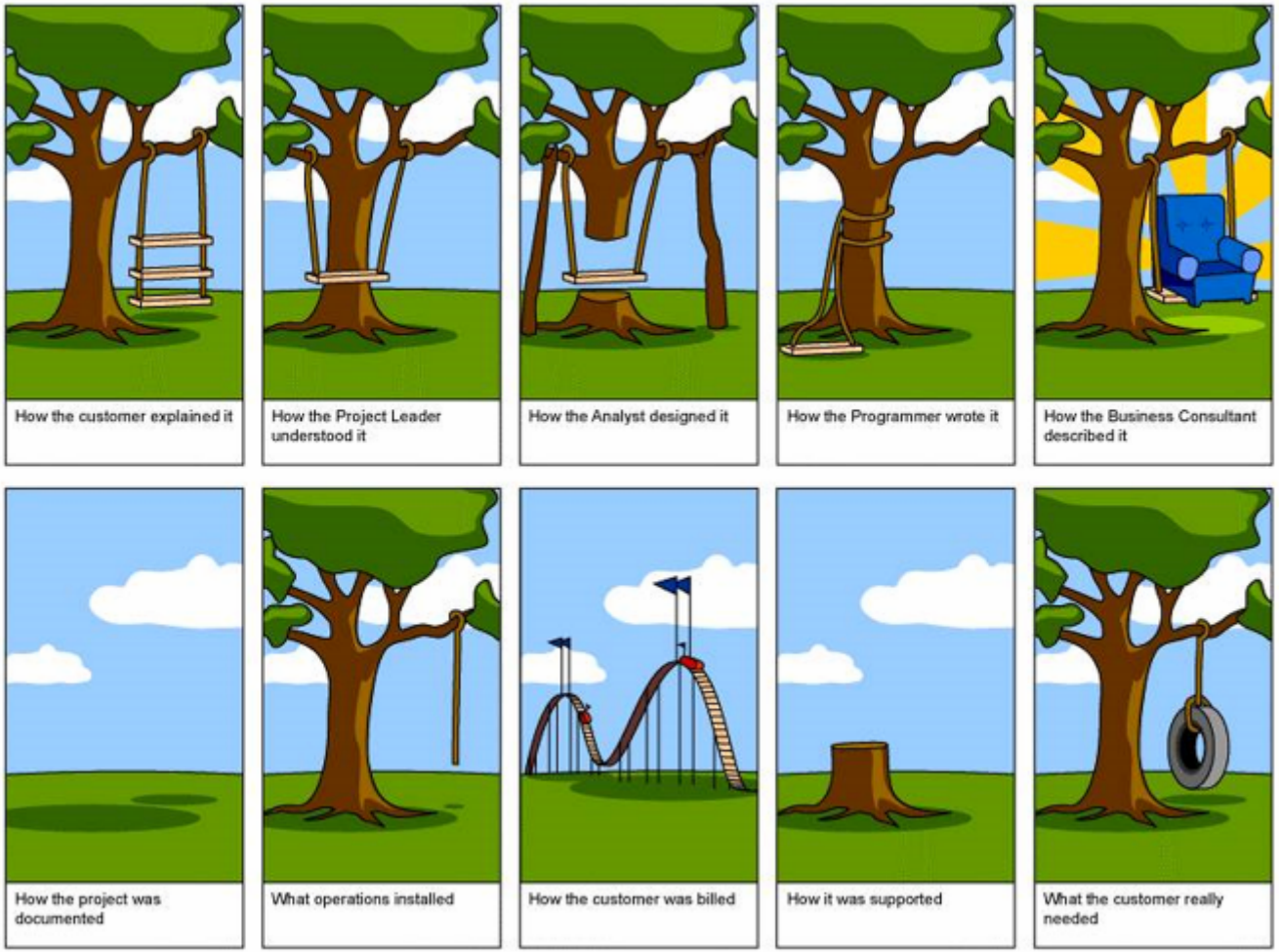
Jim wants cargo space and the ability to carry heavy load. A pickup truck meets his needs.

Alesandro, *software engineer*

Alesandro wants sporty looks and speed. A two-door sports car meets his needs.

Getting the Requirements Right

Major cause of project failure: unclear requirements

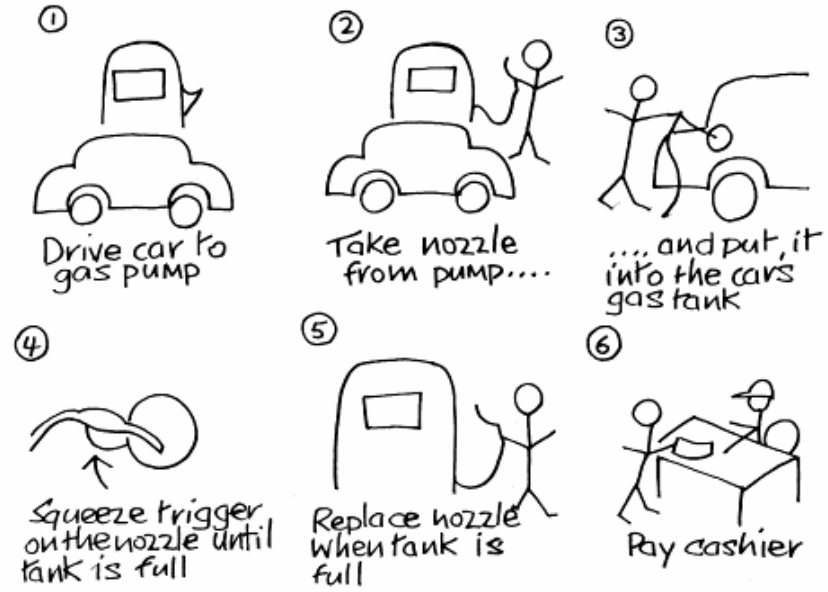


Source: Preece et al.: Interaction Design

Gathering Data

- Researching similar products
  - State-of-the-Art
  - Sets level of user expectation
- Interviews
  - Good for exploring issues
  - New perspectives
  - Props, e.g. sample scenarios, paper prototypes
- Focus groups
  - Group interviews
  - Multiple viewpoints, highlighting areas of conflict
  - Can be dominated by individuals

Initial Design Techniques: Storyboarding

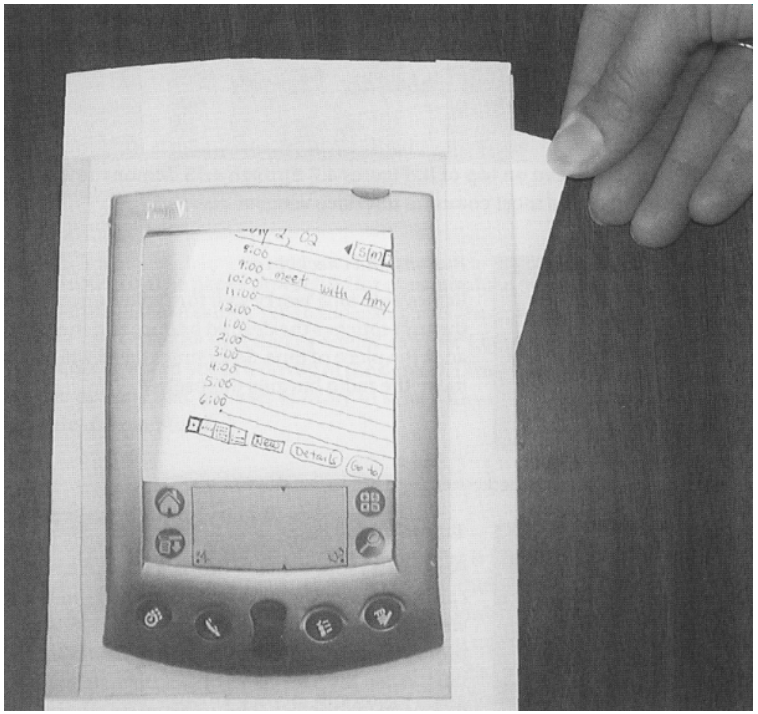


- What?
  - Sequence of single images
  - Like visual outline of a movie
  - Illustrates interaction
- Why?
  - Describes task showing environment, user, and computer
  - Or describes UI as series of screen images
  - Helps working out interaction details
  - Great at-a-glance overview of interaction
  - Helps developing usage scenarios
- When?
  - After describing a task, storyboard it, then take back to user.

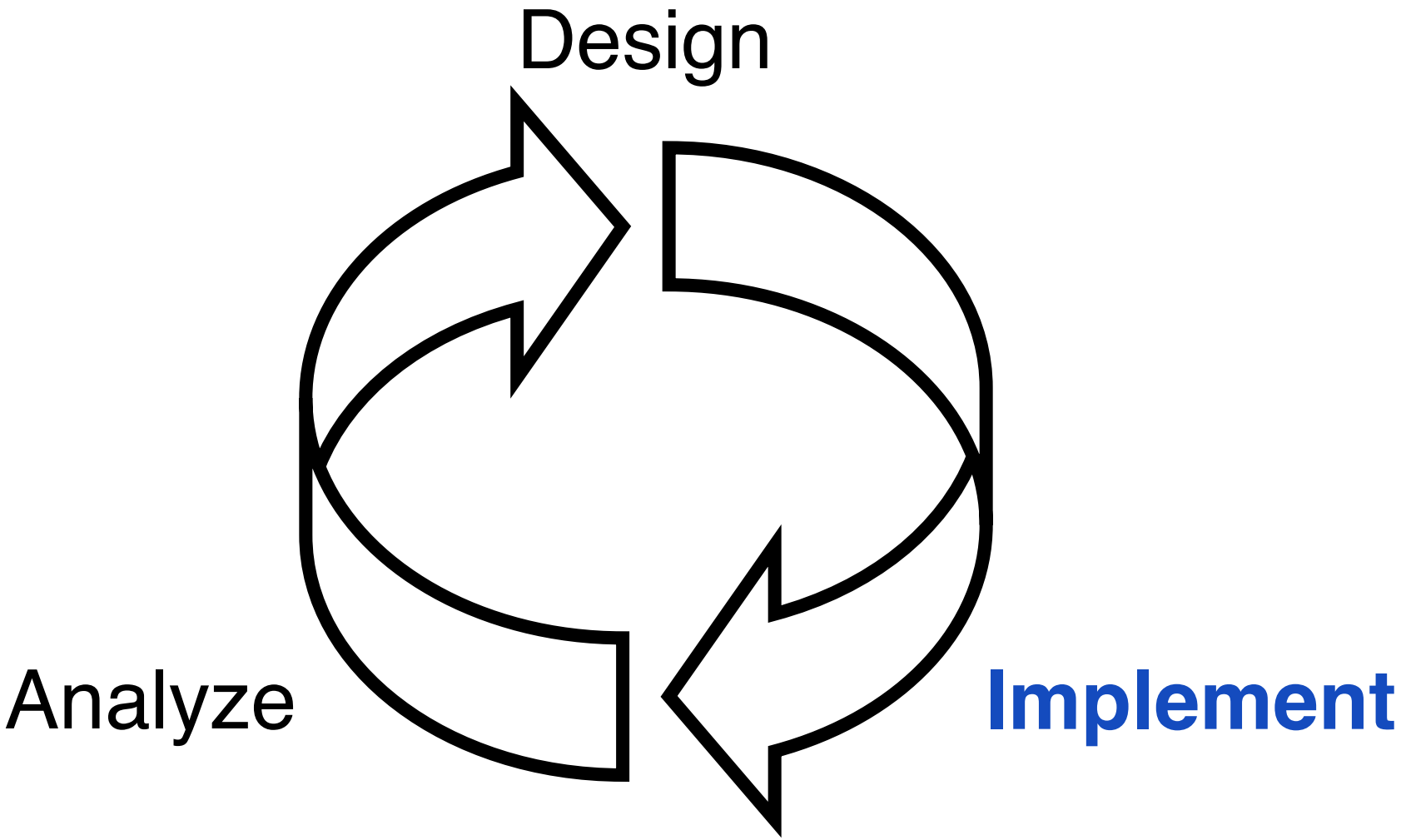
Scenario-based Design

- User interaction scenario
  - Informal narrative description of user activity and experience when performing a task
  - What a user would have to do and sees in performing a task step-by-step using a given system
- Scenarios are design-specific
  - How would a task be performed in a particular design
  - Task is design-independent
- Representations
  - Text
  - Storyboards
  - Video mock-ups
  - Physical situations

PROTOTYPING

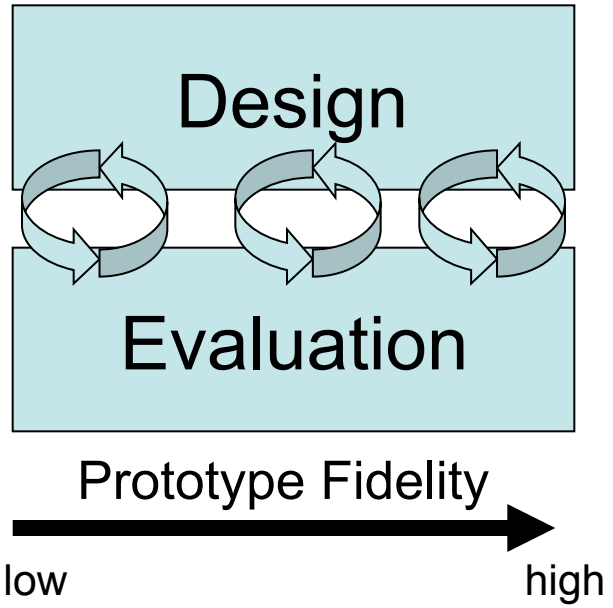


DIA Cycle: How to realize design ideas?

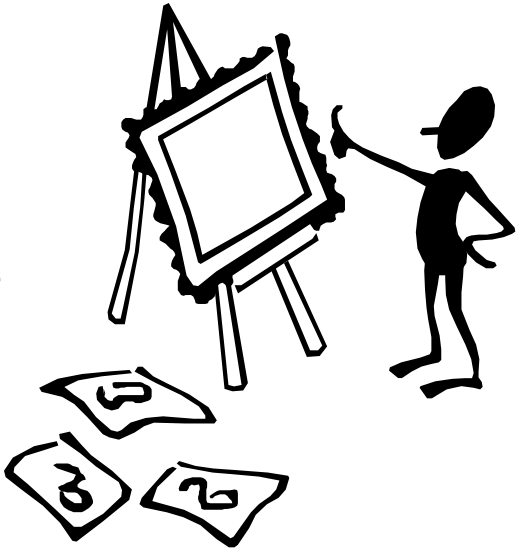


From Ideas to Implementation: Prototyping

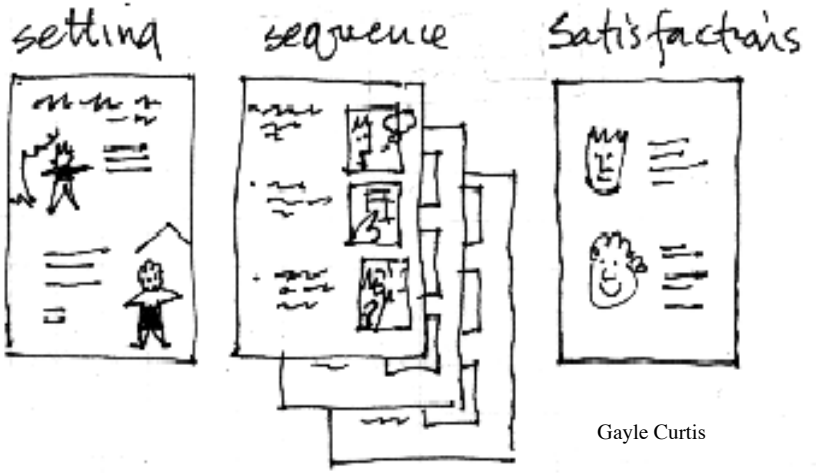
- Building a scaled-down version of an interactive system to collect information to guide its further design
  - Invaluable for iterative design
- Get early feedback on emerging designs
  - After initial requirements analysis, scenarios
- Continuous input for design decisions
  - During all design phases
- Prototype appropriate for
  - Audience
  - Design phase
  - Design question



Low-Fidelity Paper Prototypes



- First prototype, quick and cheap
- Paper and pencil mockup of user interface
  - Rough sketches of the main screens and dialogs
  - Textual description of interface functions and relationships between screens
- Goals
  - Brainstorming
  - Expert review of interaction flow
  - First user feedback
  - User tests



Gayle Curtis

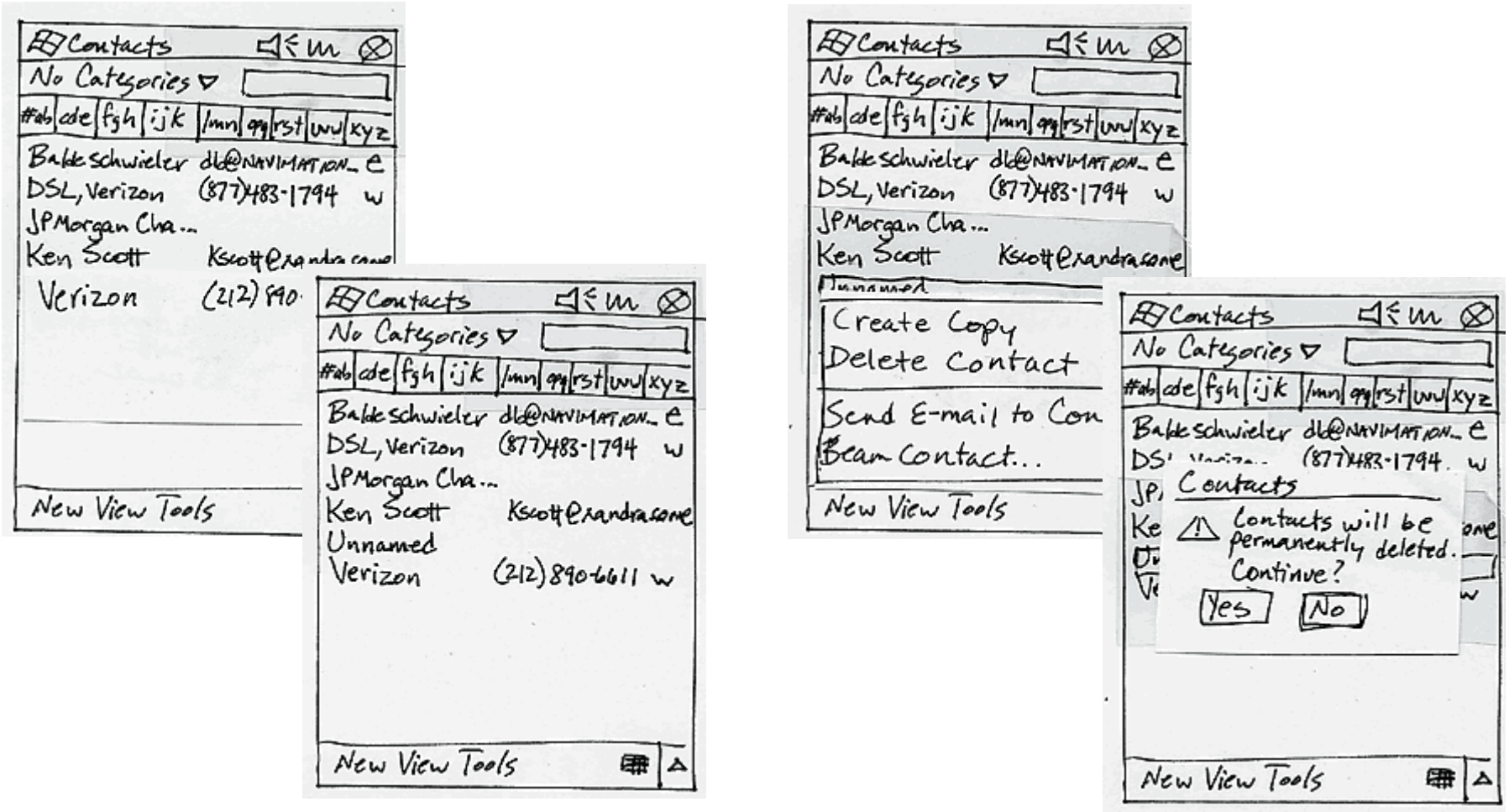
Paper / Post-it Prototype Process

Collaboratively creating the prototypes

Reviewing the prototypes

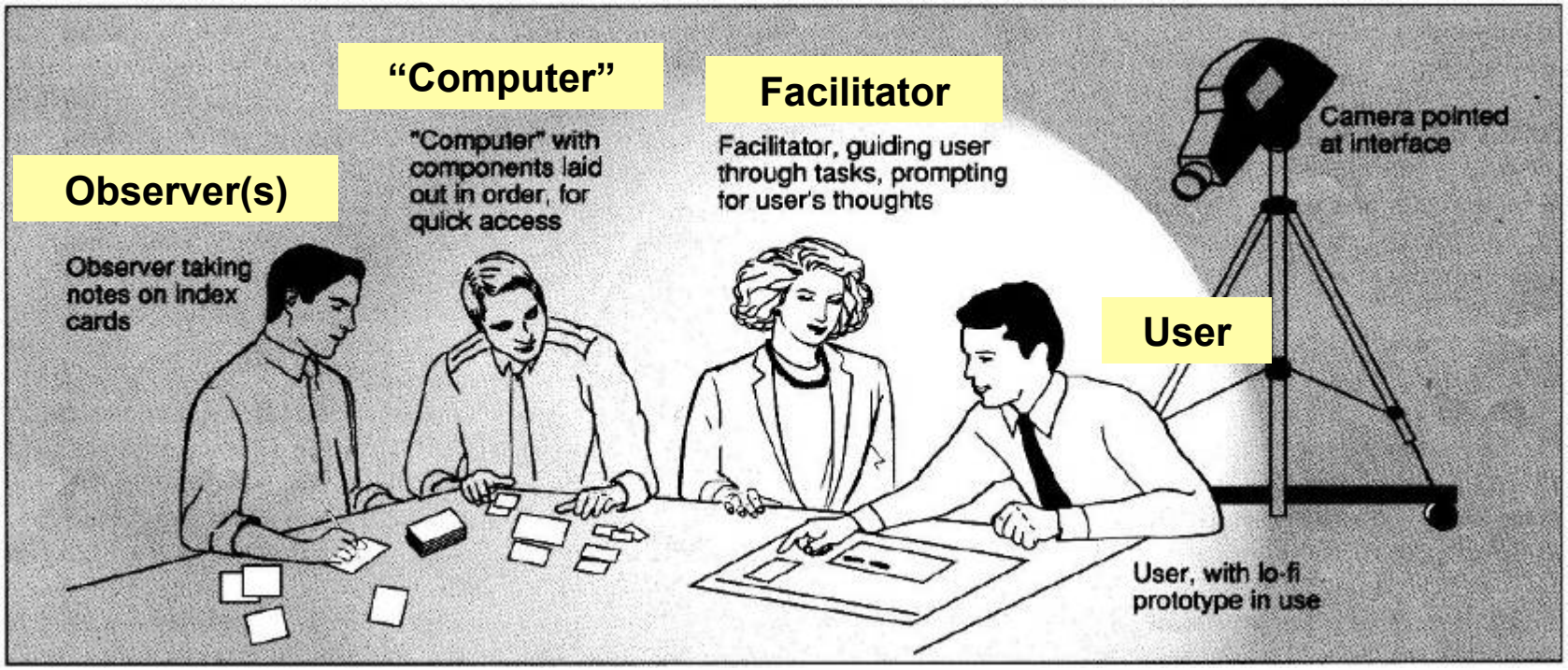
Source: http://www.pocketpcmag.com/_archives/may03/e_prototyping.asp

Paper Prototype Examples



Source: http://www.pocketpcmag.com/_archives/may03/e_prototyping.asp

Low-Fidelity User Testing

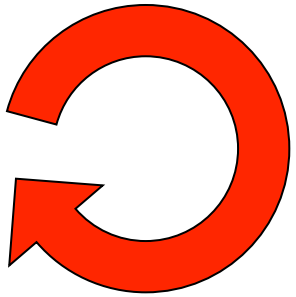


Marc Rettig: Prototyping for Tiny Fingers

- Select users
- Prepare test scenarios, drawn from task analysis
  - familiar data, realistic tasks
- Practice
  - team members know their roles, no “computer” delays

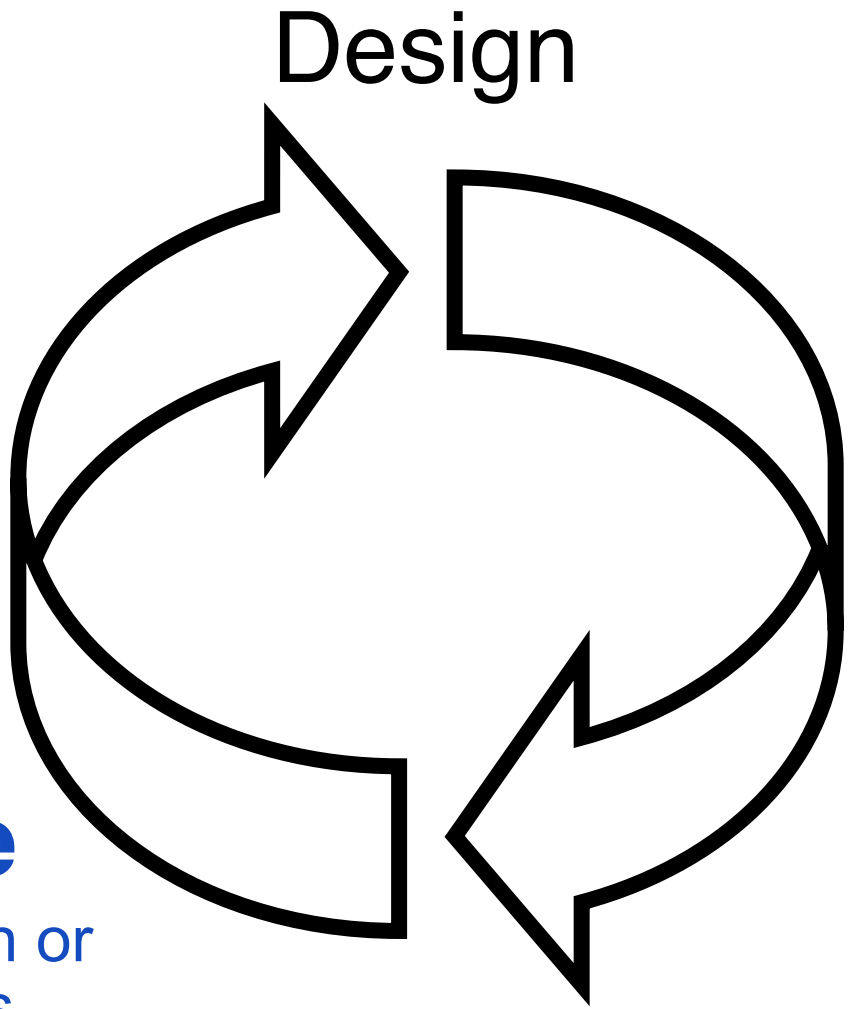
Low-Fidelity Prototype Revision

- Evaluation of test results
  - Arrange paper prototype on table
  - Pile note cards next to component
- Summarize and prioritize problems
  - Written report on findings
- Prototype refinement
  - Agenda for meeting to discuss design changes
  - Attach post-it notes with changes to each component



EVALUATION

DIA Cycle: When to evaluate?



Analyze

Evaluate with or without users

Heuristic Evaluation

- Choose usability heuristics
  - (general usability principles, e.g., Nielsen's 10 Usability Principles)
- Step through tasks and check whether guidelines are followed
- Severity rating for each problem (Nielsen)
  - 0 = I don't agree this is a problem at all
  - 1 = cosmetic problem
  - 2 = minor usability problem, low priority to fix
  - 3 = major usability problem, high priority to fix
  - 4 = usability catastrophe, imperative to fix before release

\+ Quick and cheap

– Subjective (have several independent evaluators)

See also: www.useit.com/papers/heuristic

10 Usability Principles (Jakob Nielsen)

1. Keep the interface simple!
2. Speak the user's language!
3. Minimize the user's memory load!
4. Be consistent and predictable!
5. Provide feedback!
6. Design clear exits and closed dialogs!
7. Offer shortcuts for experts!
8. Help to recover from errors, offer Undo!
9. Prevent errors!
10. Include help and documentation!

8 Golden Rules of Interface Design (Ben Shneiderman)

1.	Strive for consistency	Sequences, terminology, layout
2.	Cater to universal usability	Diverse users, experience, needs
3.	Offer informative feedback	Direct manipulation, subtle feedback
4.	Design dialogs to yield closure	Grouping of related interactions
5.	Prevent errors	Gray out items, numeric input fields
6.	Permit easy reversal of action	Allow undo, encourage exploration
7.	Support internal locus of control	Minimize surprise, users as initiators rather then responders of actions
8.	Reduce short-term memory load	7 ±2, reduce abbreviation

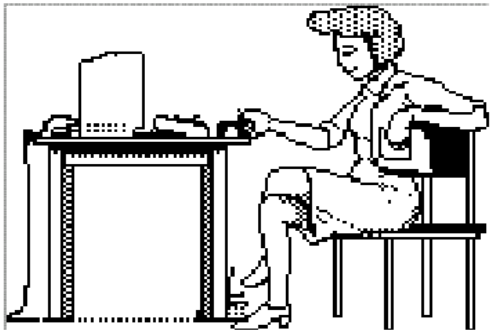
Four Fundamental Concepts (Donald Norman)

- Affordances & visibility
  - Affordances
    - http://www.jnd.org/dn.mss/affordances_and_design.html
  - Can the user tell the state of the system and the alternatives for action by looking at the system?
- Conceptual models
  - Is the user able to predict how actions affect the system?
- Natural mapping
  - Is it possible to determine the relationships between actions and results, between controls and effects?
- Feedback
  - Does the user receive full and continuous feedback about the results of actions?

User Interface Guidelines

- Concrete guidelines for look-and-feel and behavior
  - Visual appearance, e.g., icon design
  - Purpose of user interface elements
  - Layout of user interface elements
  - Behavior, conventions of system features
- Android User Interface Guidelines
  - http://developer.android.com/guide/practices/ui_guidelines/index.html
- iOS Human Interface Guidelines
  - http://developer.apple.com/library/ios/documentation/userexperience/conceptual/mobilehig/MobileHIG.pdf
  - Aesthetic integrity, consistency, direct manipulation, feedback, metaphors, user control, …

Silent Observation



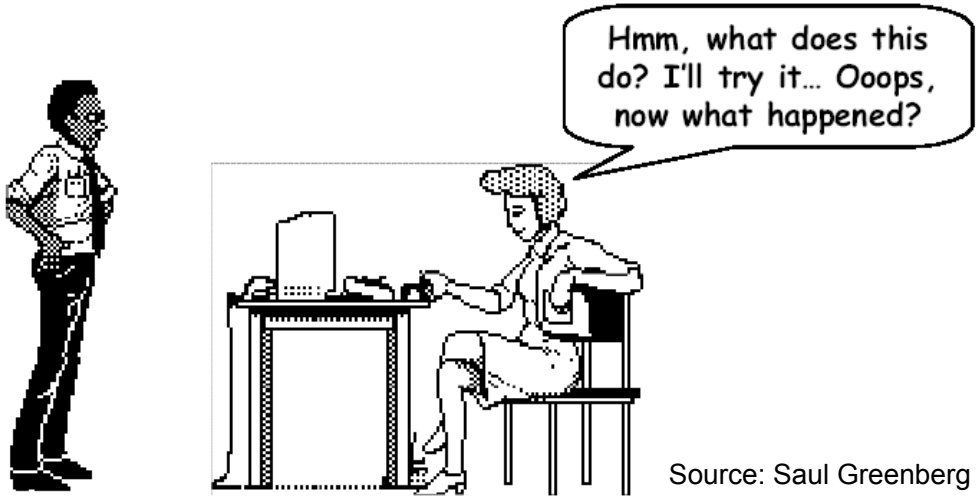
Source: Saul Greenberg

- Designer watches user in lab or in natural environment while working on one of the tasks
- No communication during observation

\+ Helps discover big problems

– No understanding of decision process (that may be wrong) or user's mental model, opinions, or feelings

Think Aloud



Source: Saul Greenberg

- As Silent Observation, but user is asked to say aloud
  - What he thinks is happening (state)
  - What he is trying to achieve (goals)
  - Why he is doing something specific (actions)
- Most common method in industry

+ Good to get some insight into user's thinking, but:
  - Talking is hard while focusing on a task
  - Feels weird for most users to talk aloud
  - Conscious talking can change behavior

Interviews

- Unstructured
  - Not directed by a script
  - Rich but not replicable
- Structured
  - Tightly scripted, often like a questionnaire
  - Replicable but may lack richness
- Semi-structured
  - Guided by a script but free to explore interesting issues in more depth
  - Good balance between richness and replicability

How to Ask Questions

- Clear and simple, not too broad
  - "How do you like the UI?" is too general!
- Affording logical, quantitative answers
  - Bad questions give unusable or wrong answers
  - Open vs. closed questions
- Users don't always answer truthfully
  - Lack of knowledge, bad estimates, embarrassment
  - So formulate questions carefully, maybe indirectly
- No leading questions!
  - For initial input, do not focus on presenting your design ideas, but on learning about the task

Evaluation in the Mobile Context

- Context of use needs to be taken into account
  - Factors: User, activity, device, environment
- Usage “on the move”
  - Physically moving: walking, driving a car, traveling as a passenger
  - Being in different places: away from office environment or home
- Difficult to collect data in the field
  - Recording data
  - Controlling experimental conditions