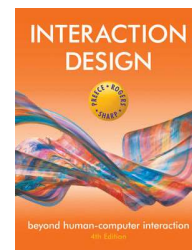


Chapter 11

Design, Prototyping and Construction



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Prototyping

- ❖ What is a prototype?
- ❖ Why prototype?
- ❖ Different kinds of prototyping
 - Low fidelity (دقة)
 - High fidelity
- ❖ Compromises in prototyping
 - Vertical
 - Horizontal
- ❖ Final product needs to be **engineered**



What is a Prototype?

❖ In other design fields a prototype is a **small-scale model**:

- A small car.
- A small building or town.

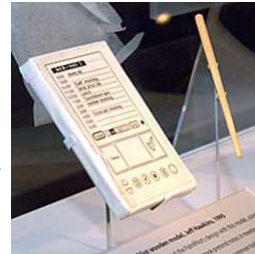


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What is a Prototype?

❖ In I.D. 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 (كرتون) model.
- A piece of software with limited functionality written in the target language or in another language.



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Why Prototype?

- ❖ **Evaluation** and **feedback** are central to ID.
- ❖ 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.



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Filtering Dimensions of Prototyping

Filtering dimension	Example variables
Appearance	size; color; shape; margin; form; weight; texture; proportion; hardness; transparency; gradation; haptic; sound
Data	data size; data type (e.g., number; string; media); data use; privacy type; hierarchy; organization
Functionality	system function; users' functionality need
Interactivity	input behavior; output behavior; feedback behavior; information behavior
Spatial structure	arrangement of interface or information elements; relationship among interface or information elements – which can be either two- or three-dimensional, intangible or tangible, or mixed



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Appearance Dimensions of Prototyping

Manifestation dimension	Definition	Example variables
Material	Medium (either visible or invisible) used to form a prototype	Physical media, e.g., paper, wood, and plastic; tools for manipulating physical matters, e.g., knife, scissors, pen, and sandpaper; computational prototyping tools, e.g., Macromedia Flash and Visual Basic; physical computing tools, e.g., Phidgets and Basic Stamps; available existing artifacts, e.g., a beeper to simulate a heart attack
Resolution	Level of detail or sophistication of what is manifested (corresponding to fidelity)	Accuracy of performance, e.g., feedback time responding to an input by a user (giving user feedback in a paper prototype is slower than in a computer-based one); appearance details; interactivity details; realistic versus faked data
Scope	Range of what is covered to be manifested	Level of contextualization, e.g., website color scheme testing with only color scheme charts or color schemes placed in a website layout structure; book search navigation usability testing with only the book search related interface or the whole navigation interface



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What to Prototype?

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



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Low-Fidelity 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, etc.
 - 'Post-it' notes
 - Storyboards (القصص المصورة)
 - 'Wizard-of-Oz'



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Storyboards

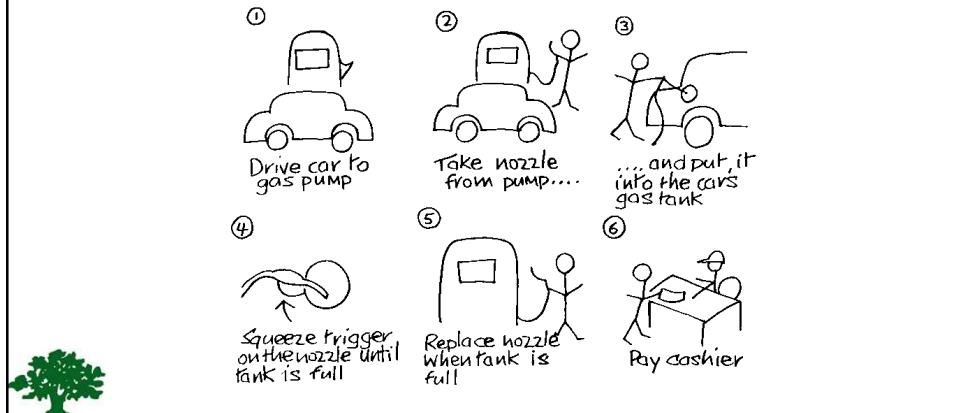
- ❖ Often used with scenarios, bringing more detail, and a chance to role play.
- ❖ It is a series of sketches showing how a user might progress through a task using the device.
- ❖ Used early in design.



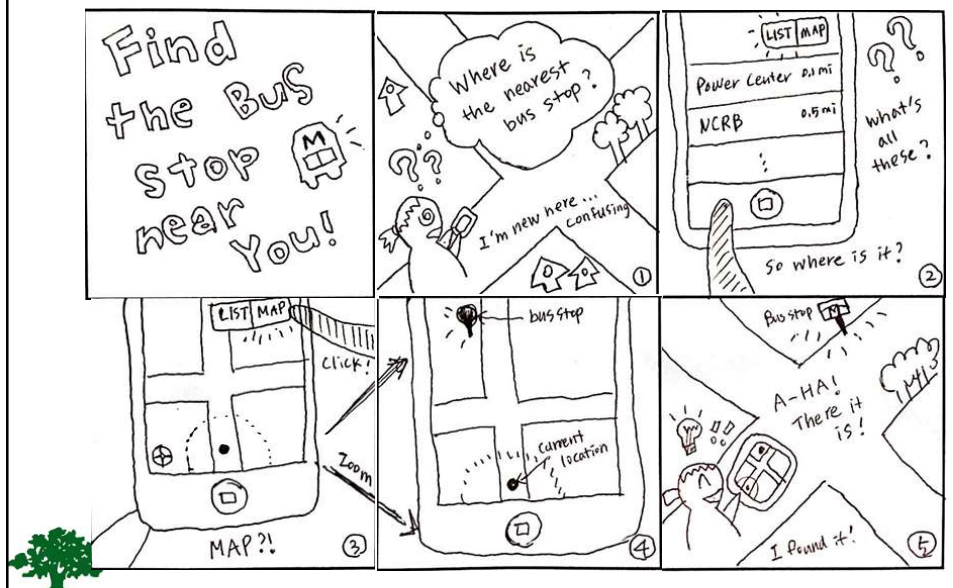
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Sketching

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

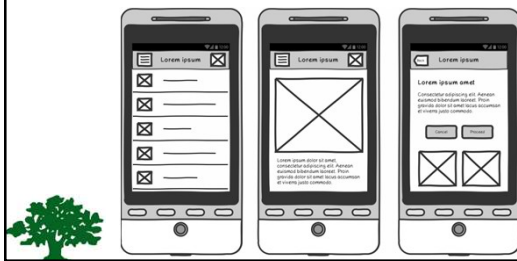


Example: Storyboards



Card-based Prototypes

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



Travel Organizer 23 August

WELCOME HELEN

Where do you want to go?

What date do you want to travel?

Which form of transport do you want?

Do you need accommodation?

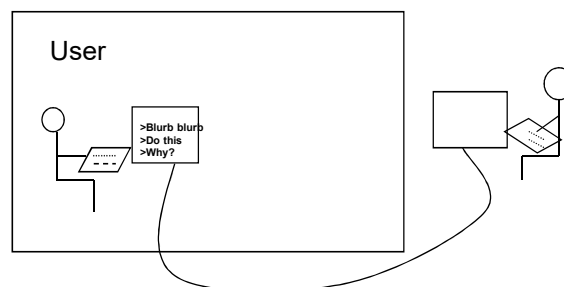
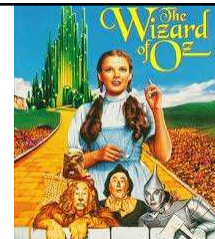
Travel Organizer 23 August

Train timetable from Milton Keynes Central to York on 16 Sept

Depart	09:09	10:09	same	22:09
Arrive	12:30	13:30	mins past hour	01:30
Accommodation	Hotel	B & B		
	£40 to £150	£20 to £60		

Wizard-of-Oz Prototyping

- ❖ 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.



High-fidelity 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.
- ❖ High-fidelity prototypes can be developed by integrating existing hardware and software components
- ❖ Danger that users think they have a full system.



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Compromises in Prototyping

- ❖ 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.



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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.



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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.



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