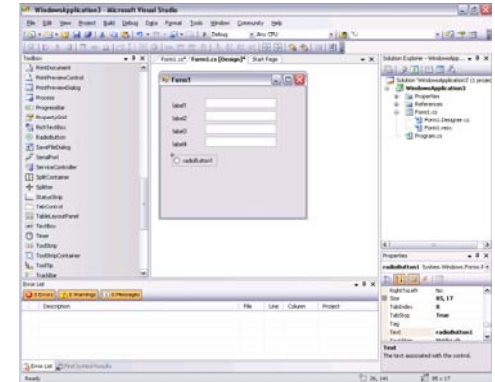


Sketch Tools

L3
Advanced HCI

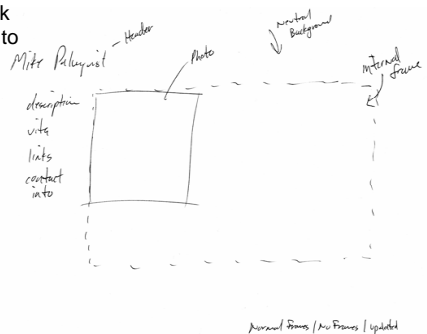
Agenda

- What is the problem with computer-based design tools?
- Why a toolkit?
- Framework
- Implementation
- Does it work?
- What next?



What is the problem with computer design tools?

- Hand drawing a design is a form of back talk
- Our short term memory is too limited for us to hold complex design in our heads
- We tend to iterate around the design and design ideas
 - Sometimes starting again
- This is a very rapid process!
- Computer based tools are too constraining
 - Attention should be on the big picture
 - But it gets diverted to the detail
- Designers (nearly) always use a pen and paper/whiteboard first.
- This is independent of the discipline!



Other domains

- We know this for sure for designing things like User interfaces
- We don't know if it is true for more abstract models such as uml models
- What about planning an
 - Essay
 - Algorithm
- What do you do?

But

- Computers are much better for
 - Editing
 - Archiving
 - Versioning
 - Remote collaboration

And

- Interpreted sketches can be
 - Animated/Executed
 - Beautified
 - Translated

Framework

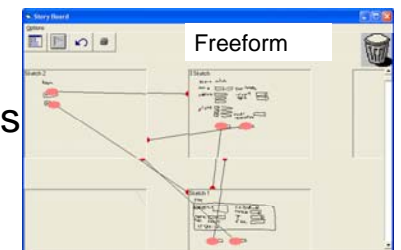
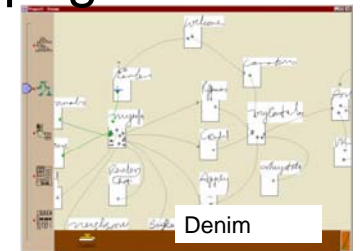
- Sketch spaces
 - Generic (paper like)
 - Flexible
- Recognition
 - Smart
 - Trainable
 - Overridable
- Extensible
 - For domain specifics

Why a toolkit?

- There are quite a number of sketch tools around
 - including Freeform
- There is a lot of commonality
- Progress at exploring the more interesting issues is slow because of the effort required to get to first base.
- Cross-domain studies better if the variables are more controlled

Framework - Sketch pages

- One big page or lots of little ones?
- Usual computer editing (copy, paste, undo redo)!
- Flexible arrangement
- Connections between parts of pages and pages



Framework - Recognition

- Drawing and handwriting – modeless

name

- Not very many basic shapes



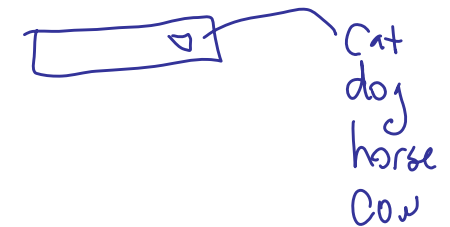
- Syntax of specific diagram components
- Discernable relationships between shapes



- Semantics of diagram notation

Framework - Extensibility

- Semantics



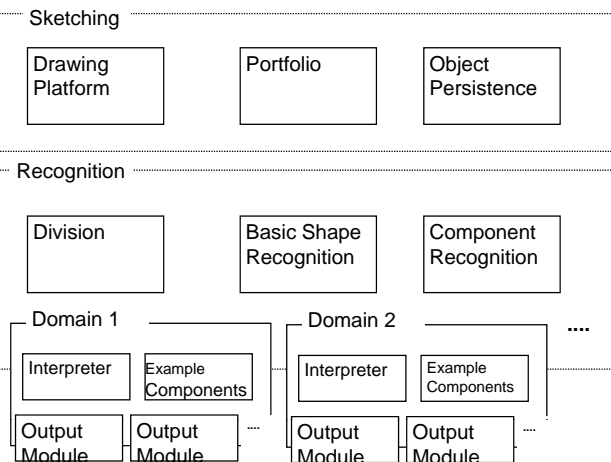
- Translation

- Execution

Implementation

- Environment
- User interface
- Recognition
- Extensibility

InkKit Architecture



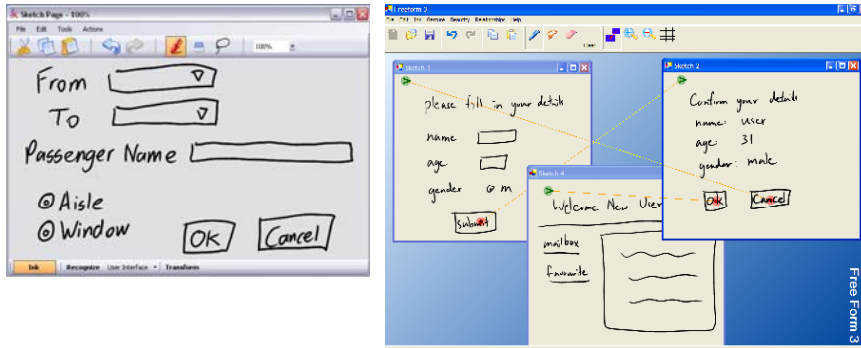
Implementation - environment

- Tablet PC
 - Nice hardware interface (though rather small)
 - OS support for inking and character recognition
- C#

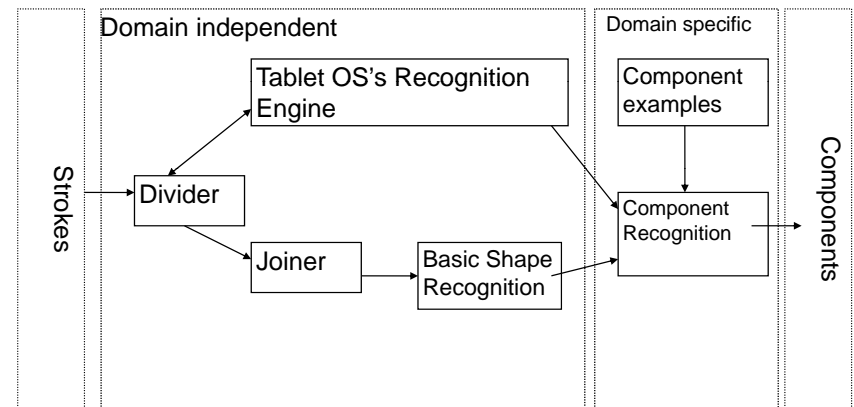


Implementation – User Interface

- Pages
- Portfolio

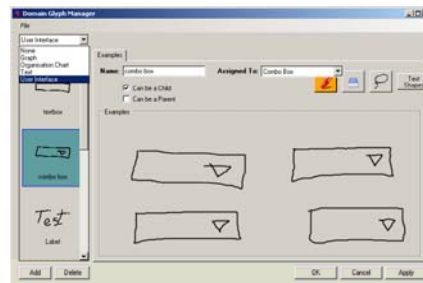


Implementation – recognition

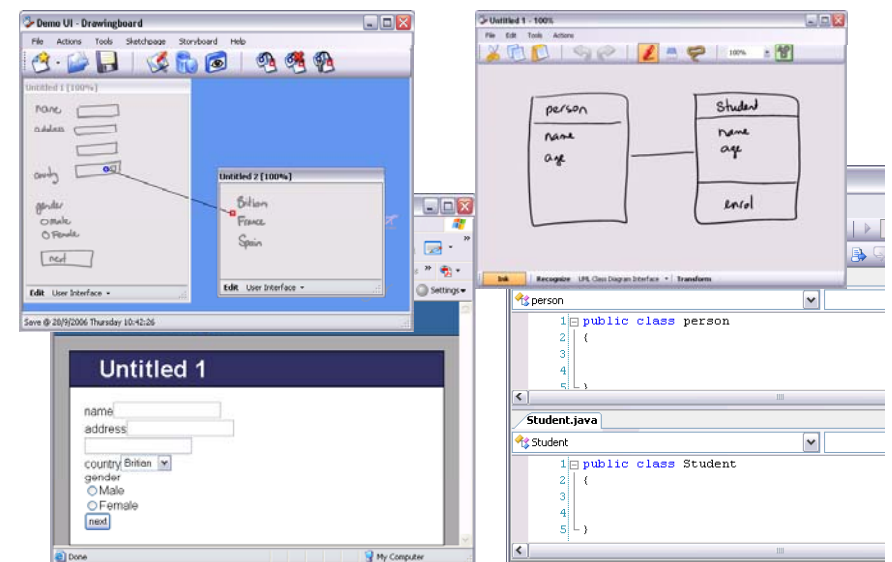


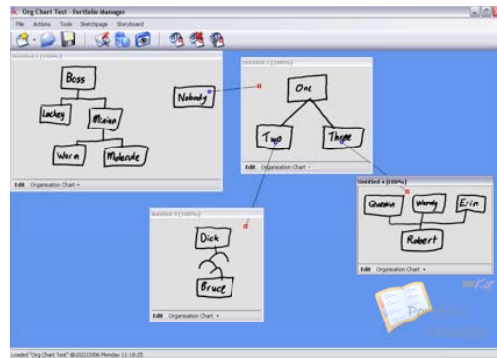
Implementation – Extensibility

- Interpreter
 - ~ 200 – 300 lines
 - Basic info about diagram (has connectors)
 - defines all the components – names and containment (parent/child)
 - Domain specific rules – like fill list box
- Examples
- Translator
 - ~ 300+ lines
 - Takes recognized sketch
 - Generates output data
- Other
 - execution

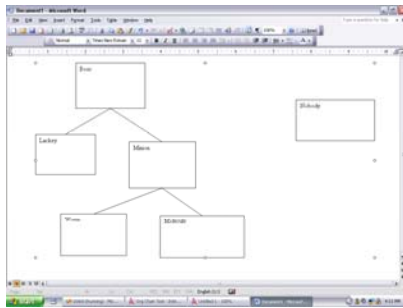


Does it work? - Demo

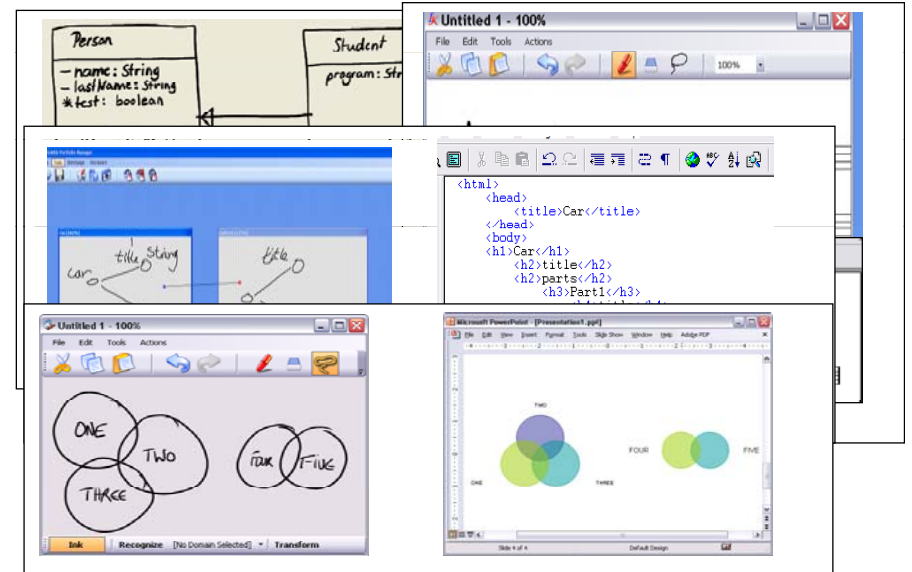




Organization Chart Contents
 Person "boss" is a superior of "Lackey"
 is a superior of "Minion"
 has no superiors
 Person "Lackey" has no inferiors
 is an inferior of "boss"
 Person "Minion" is a superior of "Worm"
 is a superior of "Molecule"
 is an inferior of "boss"
 Person "Worm" has no inferiors
 is an inferior of "Minion"
 Person "Molecule" has no inferiors
 is an inferior of "Minion"
 Person "Nobody" has no inferiors
 has no superiors



Student add-ins



Lines of Code

Domain	Interpreter	To	Output
Venn Diagram	102	Powerpoint	293
UML Class Diagram	264	Java	830
UML Activity Diagram	281	Visio	
Hierarchical Visual Modeling	275	HTML	255
Music	459	Lilypond	510

Other sketch tools

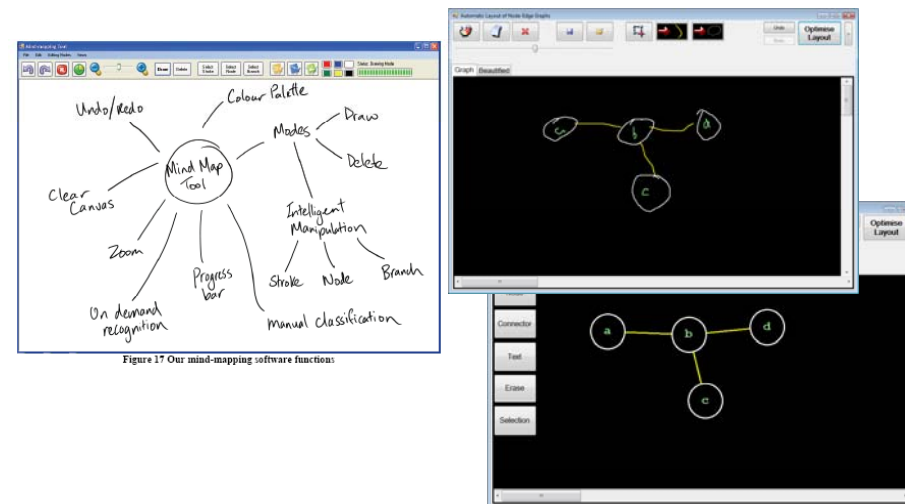


Figure 17 Our mind-mapping software functions

What next?

- Recognition engine
 - Permanent work-in-progress
 - Currently working on the divider
- Comparative studies
 - Idea creation in IMM vrs Mindmanager
 - Graph construction process with sketch/widgets
 - Multiple types of models in inkkkit
 - Effects of animation/execution