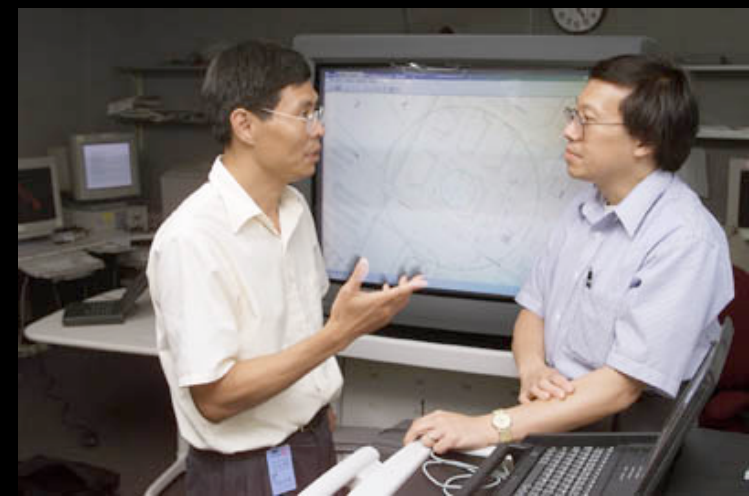
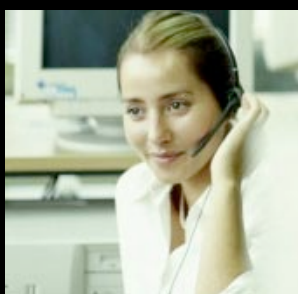
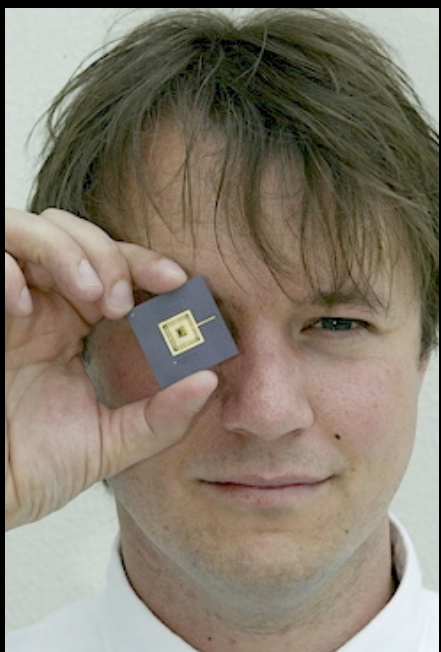



Prototyping in Interaction Design

Christine Strothotte

Institute of Industrial Design Magdeburg/Germany

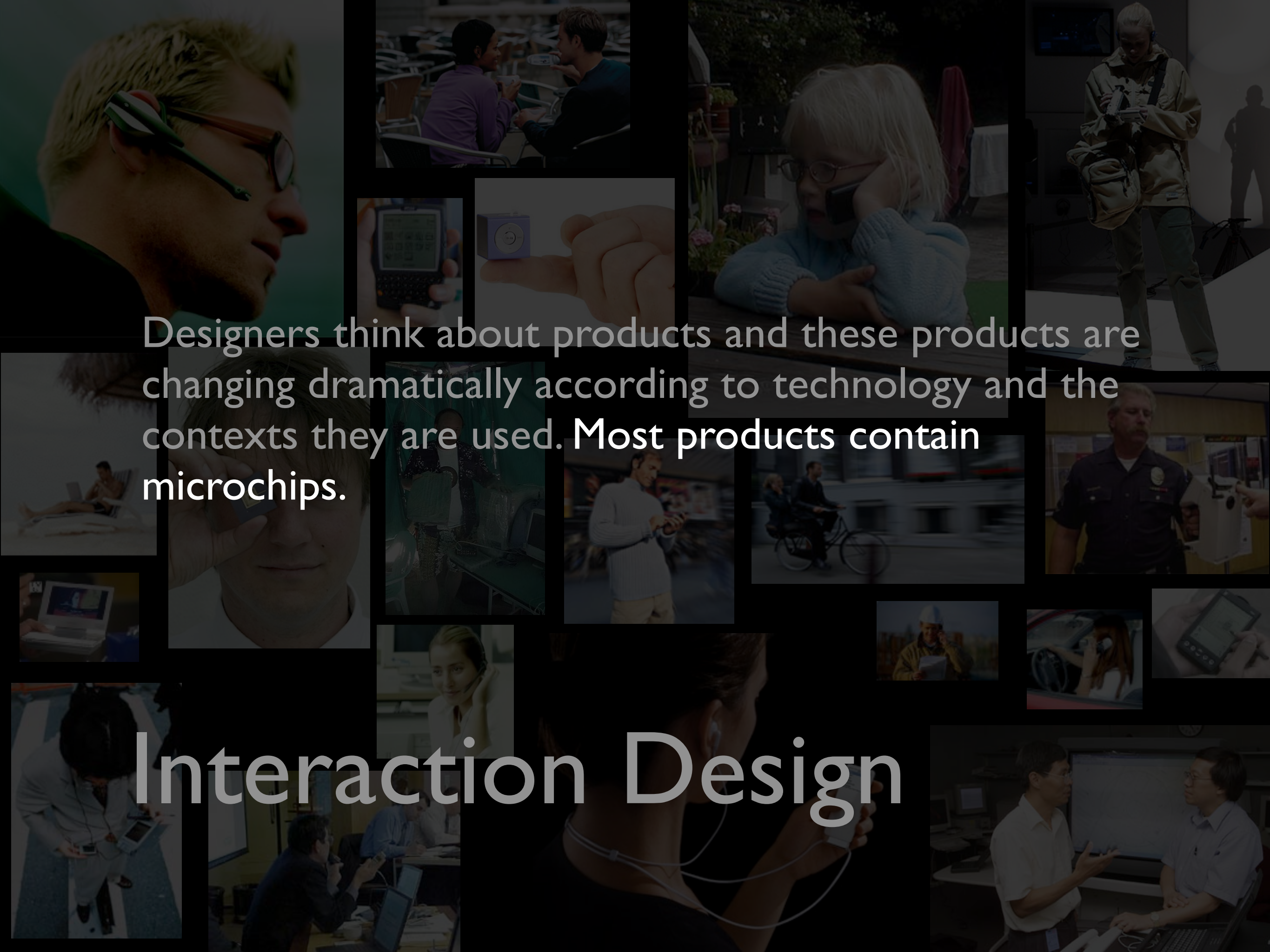
www.design.hs-magdeburg.de





Designers think about products and these products are changing dramatically according to technology and the contexts they are used.

Interaction Design

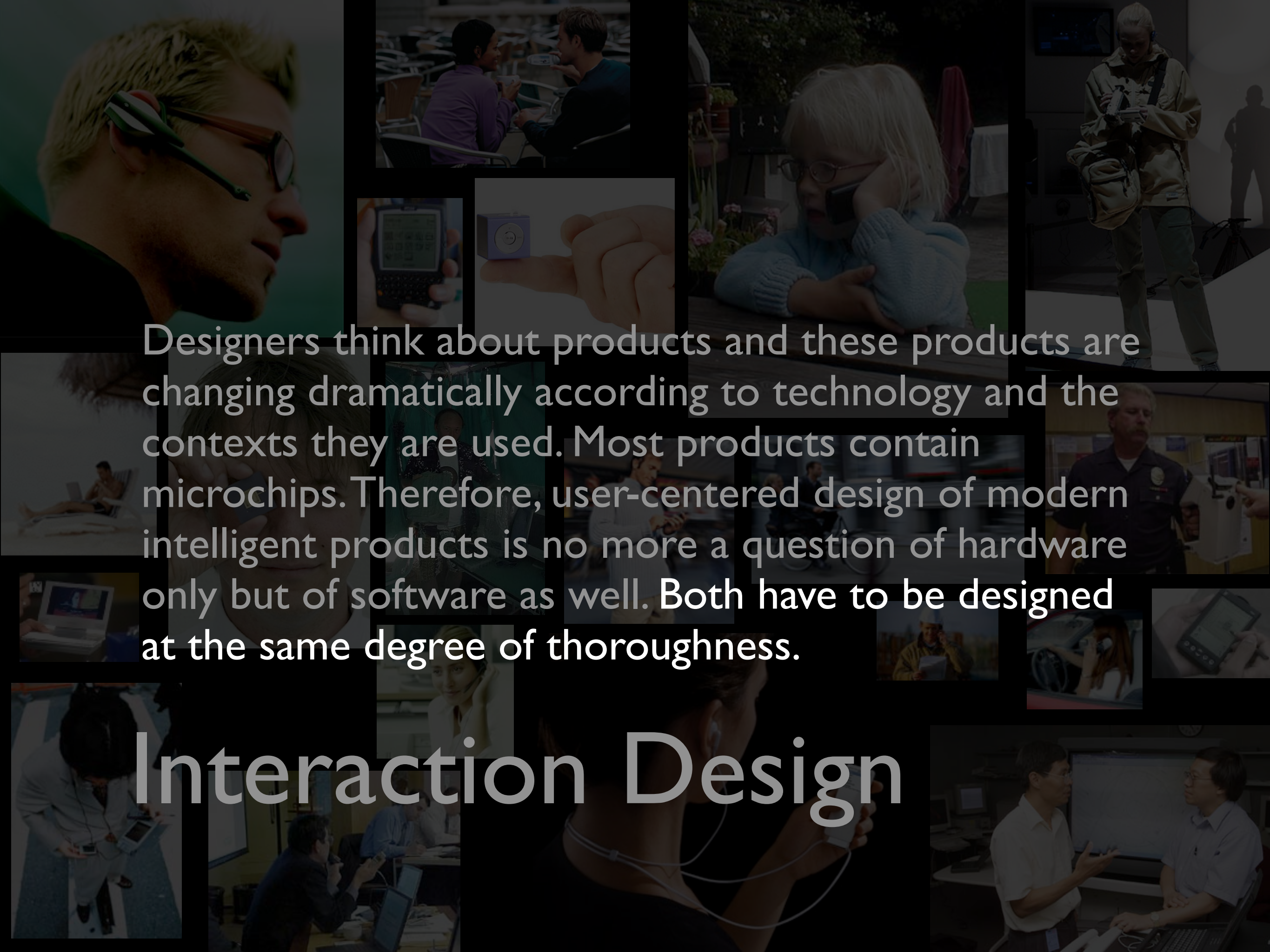


Designers think about products and these products are changing dramatically according to technology and the contexts they are used. Most products contain microchips.

Interaction Design

Designers think about products and these products are changing dramatically according to technology and the contexts they are used. Most products contain microchips. Therefore, user-centered design of modern intelligent products is no more a question of hardware only but of software as well.

Interaction Design



Designers think about products and these products are changing dramatically according to technology and the contexts they are used. Most products contain microchips. Therefore, user-centered design of modern intelligent products is no more a question of hardware only but of software as well. Both have to be designed at the same degree of thoroughness.

Interaction Design

design process

prototyping techniques

Prototyping Software

- :understand the user's experience
- :imagine new opportunities
- :developing user scenarios
- :letter of understanding
- :design solutions
- :visual language
- :prototyping
- :user evaluation
- :(implementation)

design process

:what

analysing real products on the market
users need, how users live

:how

search the web
interviewing people
organize your results: maps

: understand user's exp.

Der Inhalt eines Telefons: Nokia 6020, 1-3 Ebene



Mitteilungen

- Mitteilung verfassen
 - Kurzmitteilung
 - Multimedia-Mitteil.
 - Flash-Mitteilung
- Eingang
 - „Hallo Anna, habe...“
 - Optionen...
- Ausgang
- Gesendete Obj.
 - „Hast Du heut 16...“
 - Optionen...
- Gespeicherte Obj.
 - Kurzmitteilungen
 - Multimedia-Mitteil.
- Chat
 - Einloggen
 - Gespeich. Gespr.
 - Verbindungseinst.

Anruflisten

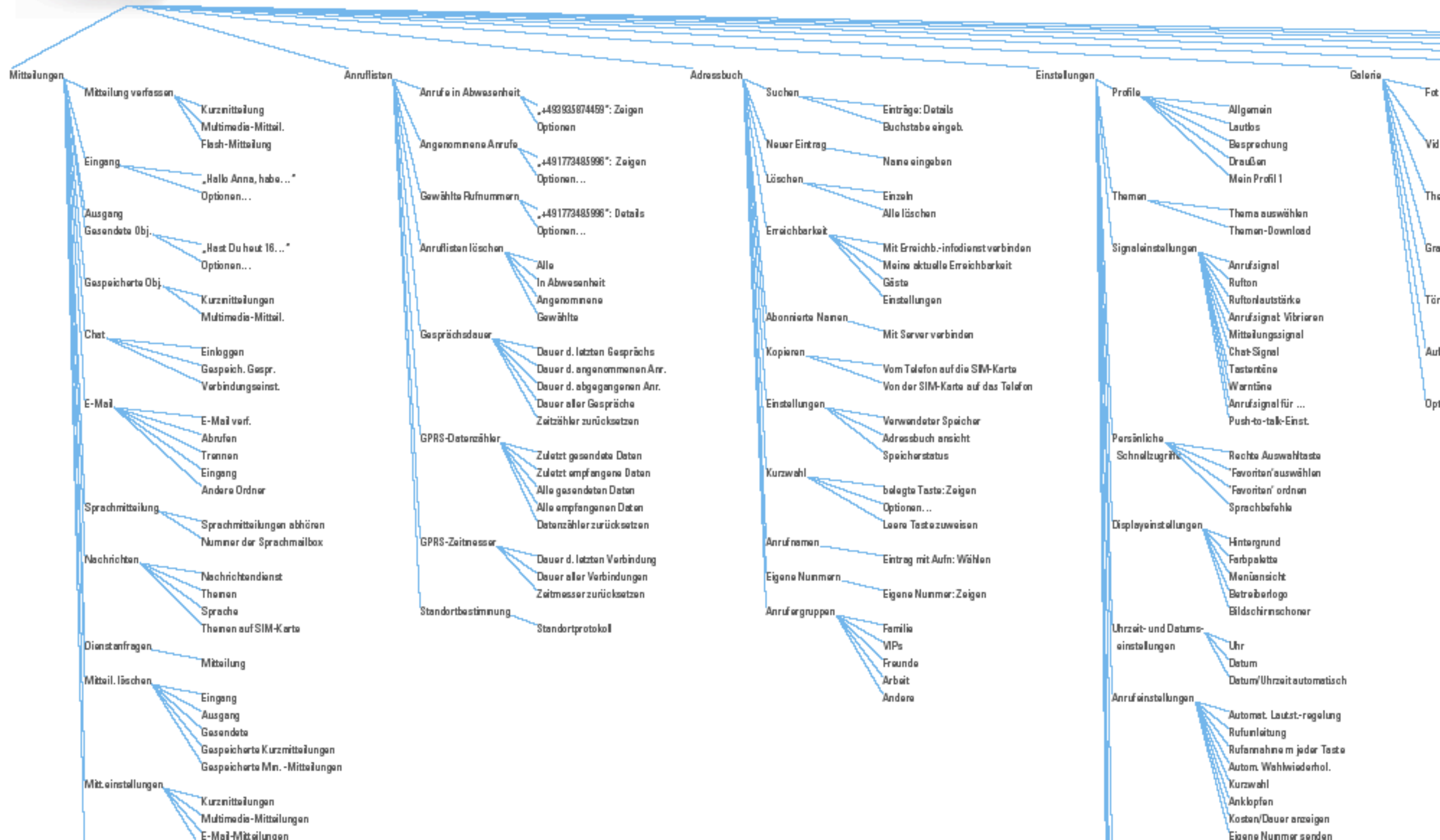
- Anrufe in Abwesenheit
 - „+493935874459“: Zeigen
 - Optionen
- Angenommene Anrufe
 - „+491773485996“: Zeigen
 - Optionen...
- Gewählte Rufnummern
 - „+491773485996“: Details
 - Optionen...
- Anruflisten löschen
 - Alle
 - In Abwesenheit
 - Angenommene
 - Gewählte
- Gesprächsdauer
 - Dauer d. letzten Gesprächs
 - Dauer d. angenommenen Anr.
 - Dauer d. abgegangenen Anr.

Adressbuch

- Suchen
- Neuer Eintrag
- Löschen
- Erreichbarkeit
- Abonnierte Namen
- Kopieren

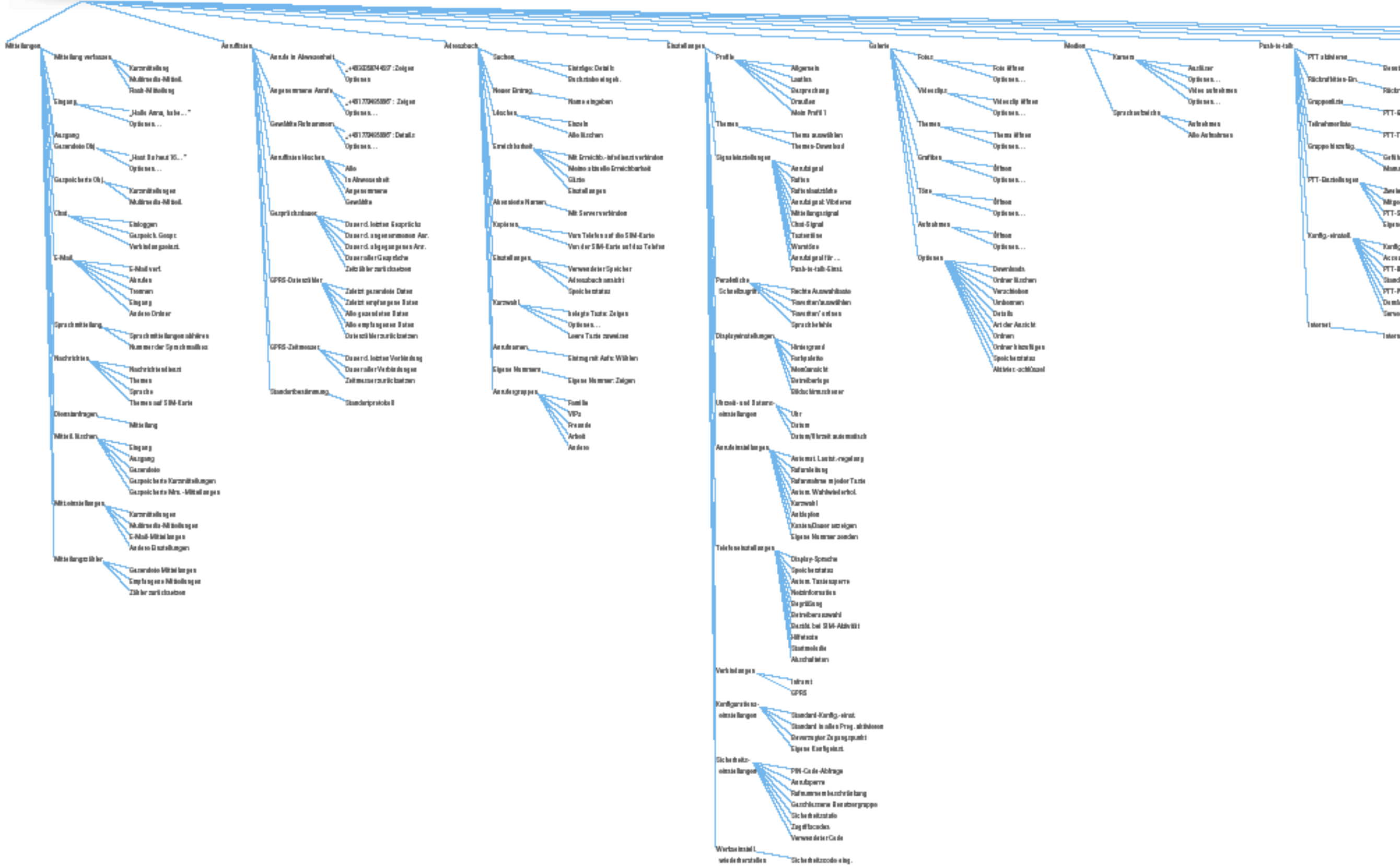


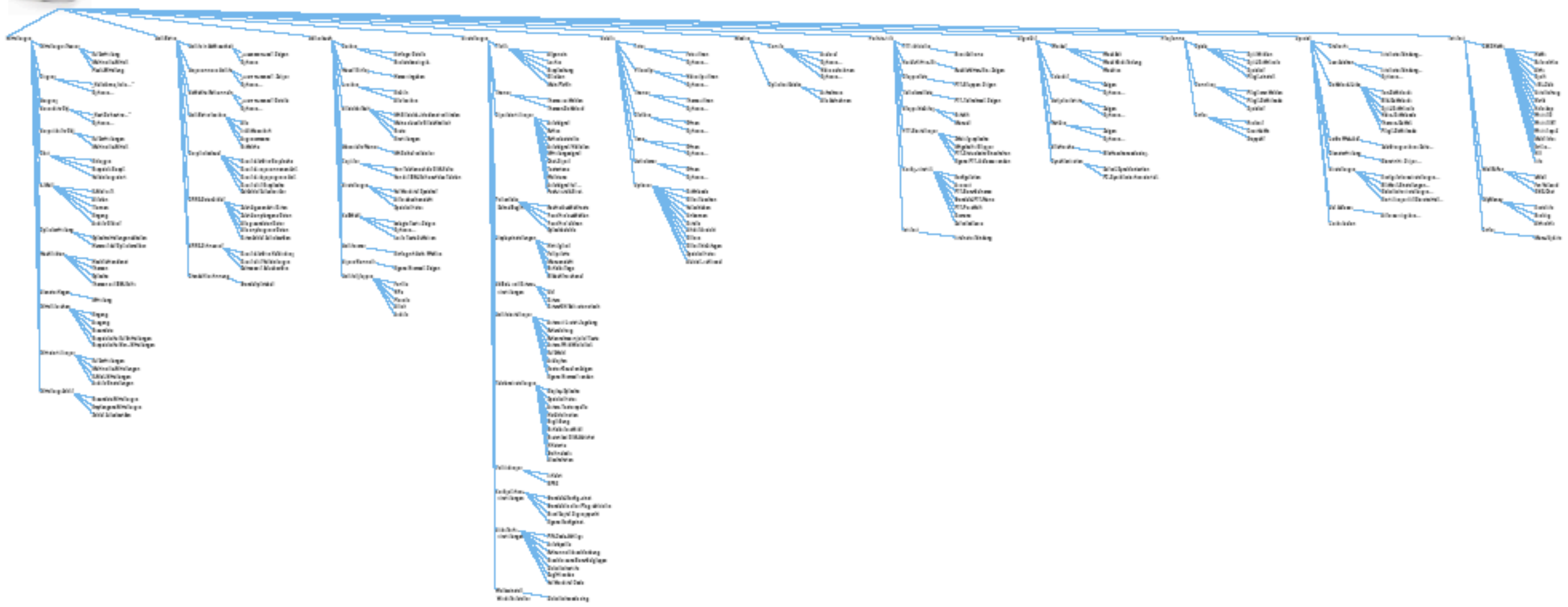
Der Inhalt eines Telefons: Nokia 6020, 1-3 Ebene



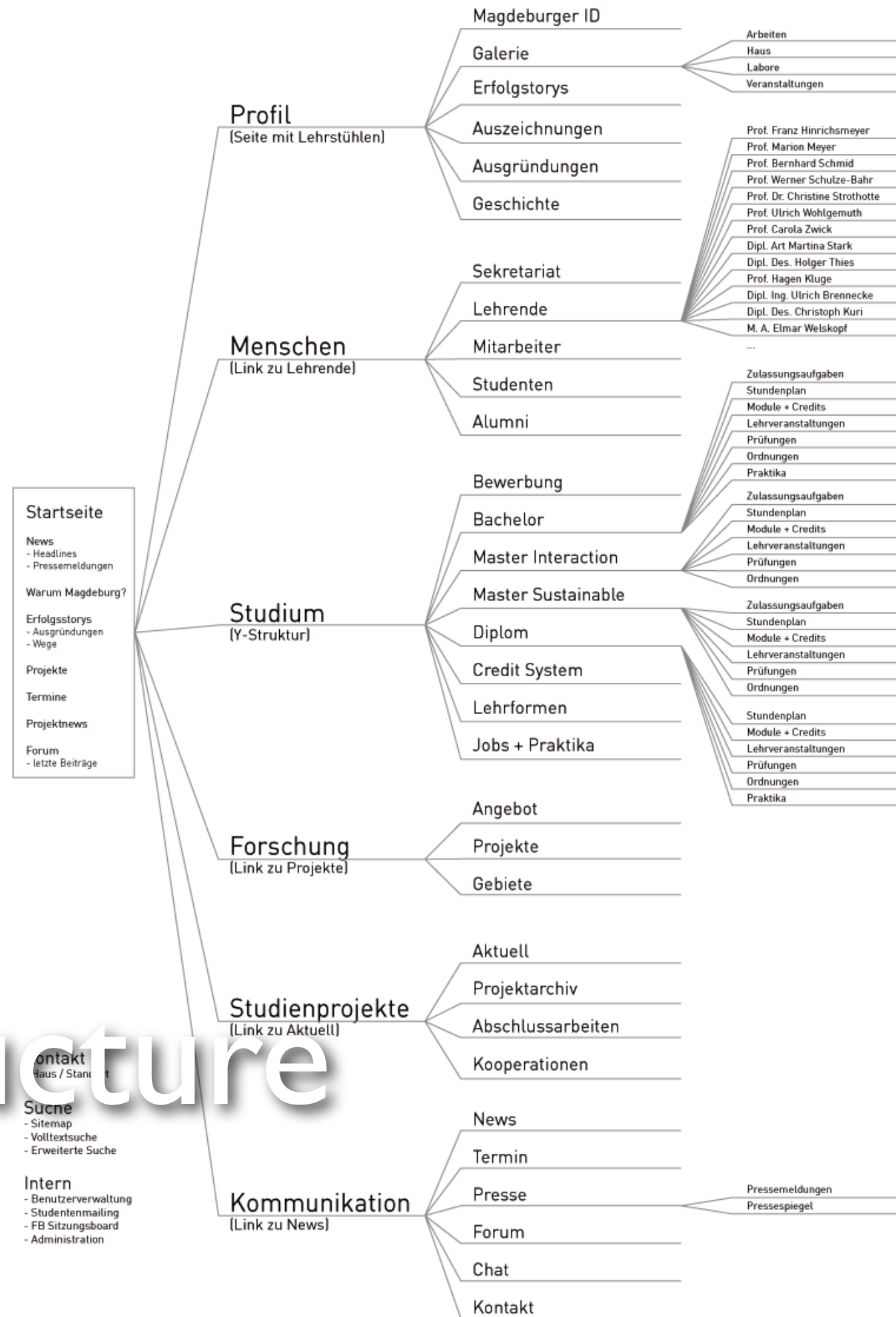


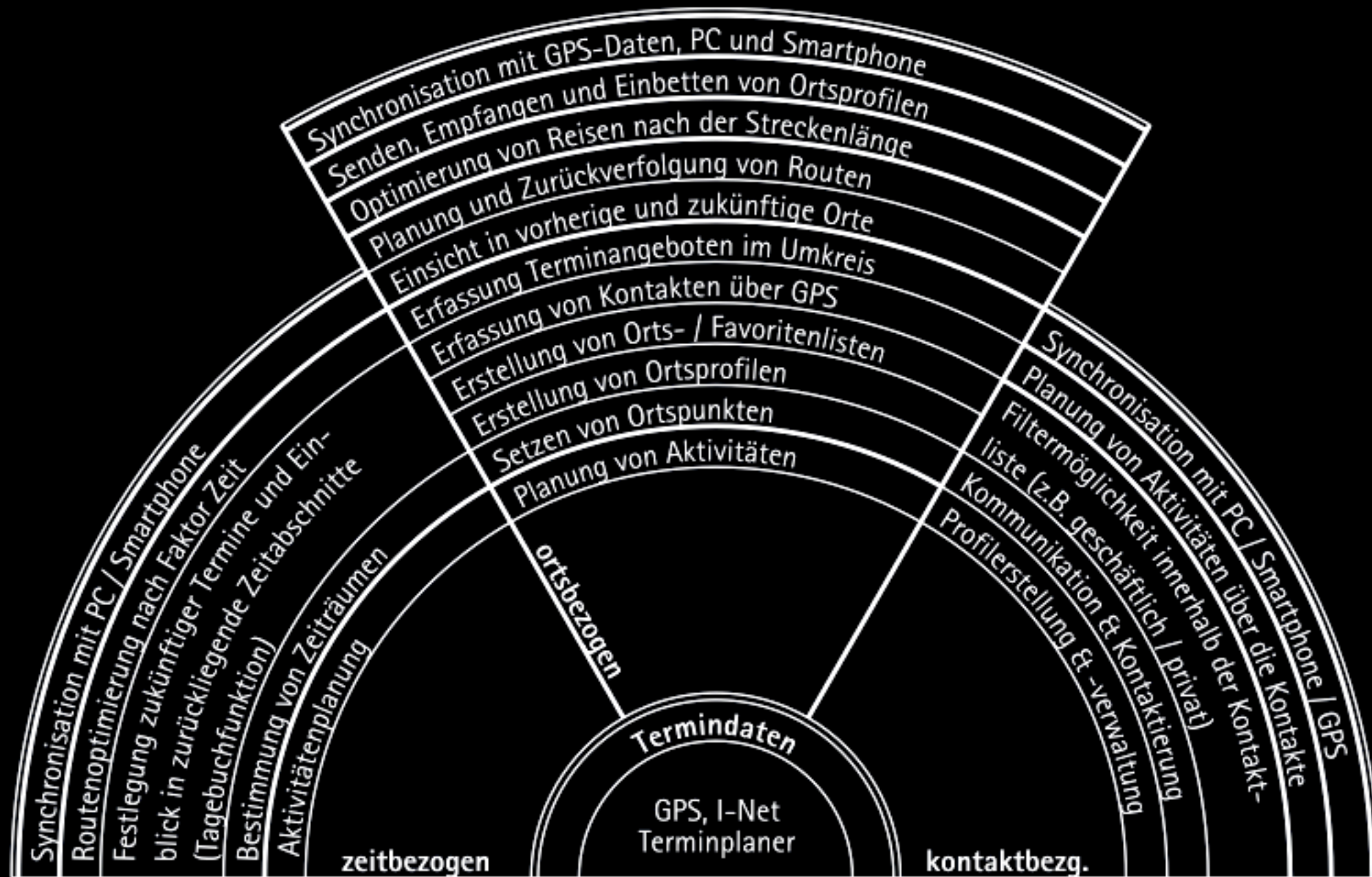
Der Inhalt einer Telefonkarte: Nokia N930, 1-3 Ebenen





website structure





analyzing user needs

:techniques
brainstorming
mind maps
contradiction tables
collages

: new opportunities

:inspiration

:mix and combine metaphors

:what transfers the spirit?

: opportunities: collage



PURE SPORTLICHKEIT.



5,4 m³ variabler Innenraum. Schienen-system für verschiebbare Sitze. Mehr Möglichkeiten. Mehr







:AUDI: shiftByWire

context of the service idea

classifying target groups

explain the process of using the upcoming product

can lead to separate designs for different types of users

: user scenarios

:communication happens at the recipient's end
avoid typical communication problems

:reformulating the task description
identified target group
wider context of the product
particular challenges

:convincing the client

: letter of understanding

variations, variations, variations

all techniques available

develop the architecture, the metaphor, the handling
process, the input and output devices

: design solutions



design variations

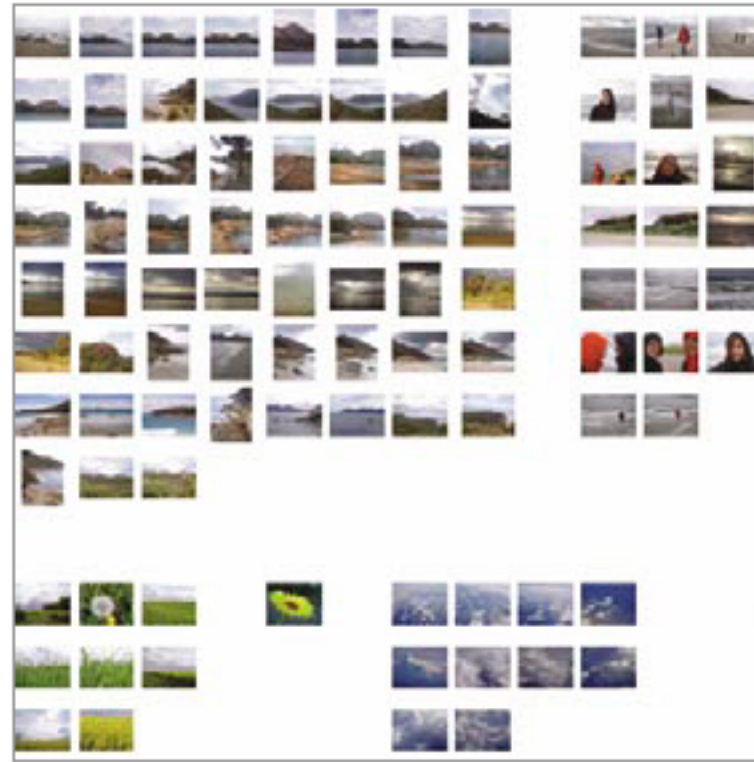
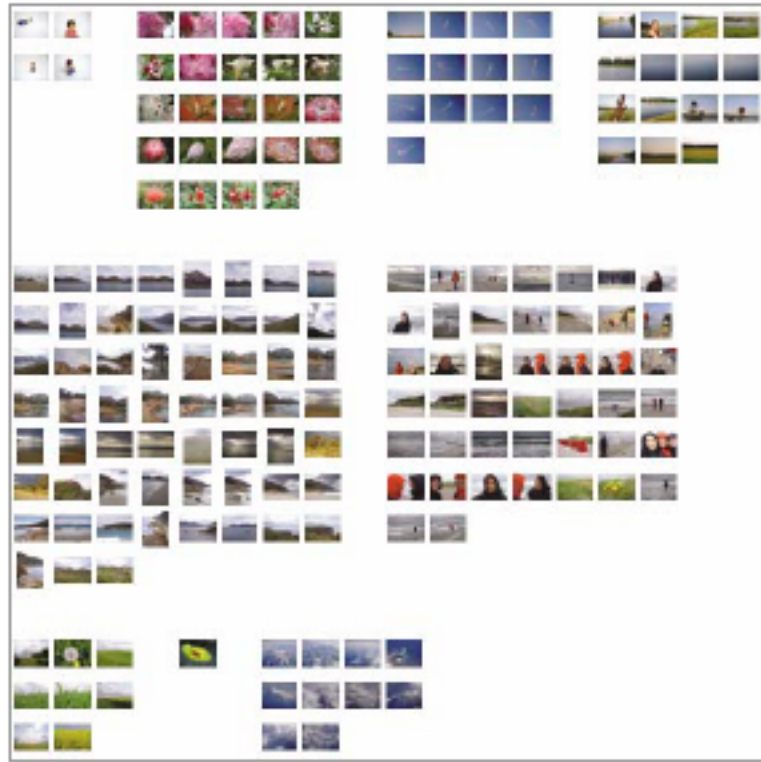
diploma thesis of Claudia Tietge

is about handling information with mobile devices.

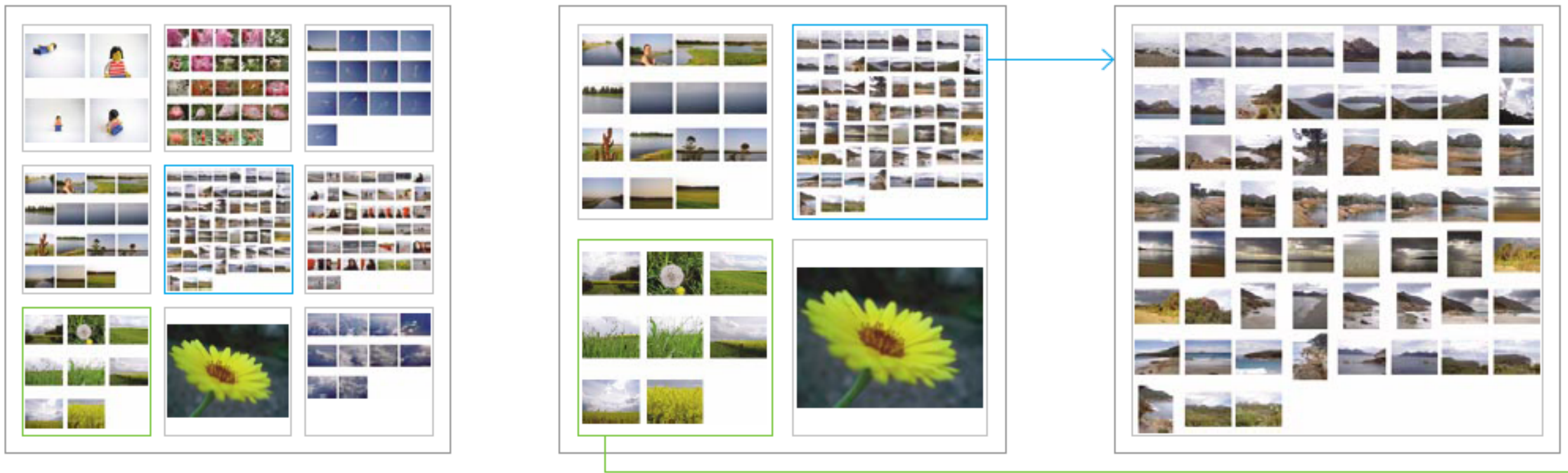
Saving, showing, transporting, organizing, finding...

Managing image files shows how to navigate in different amounts of data on small screens.

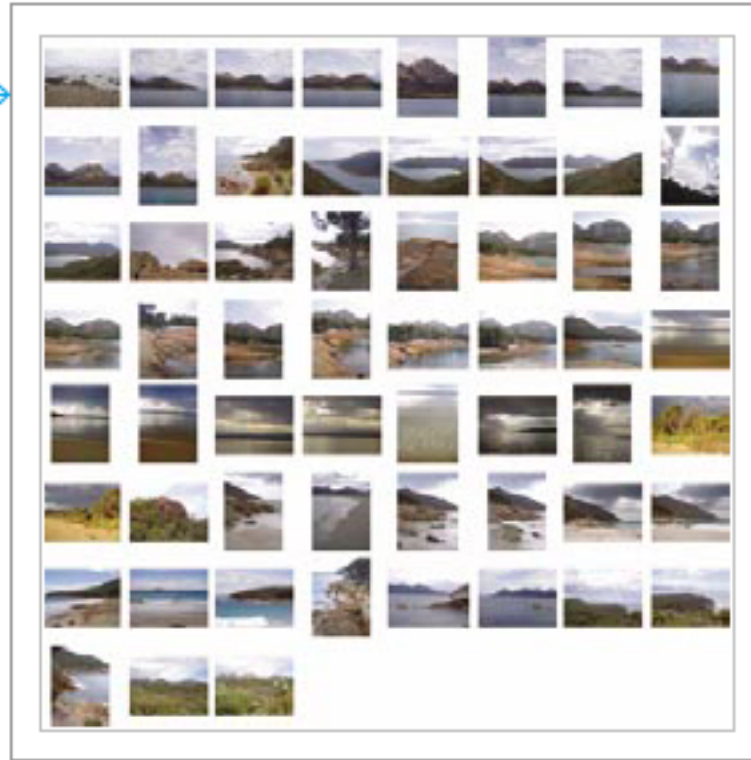
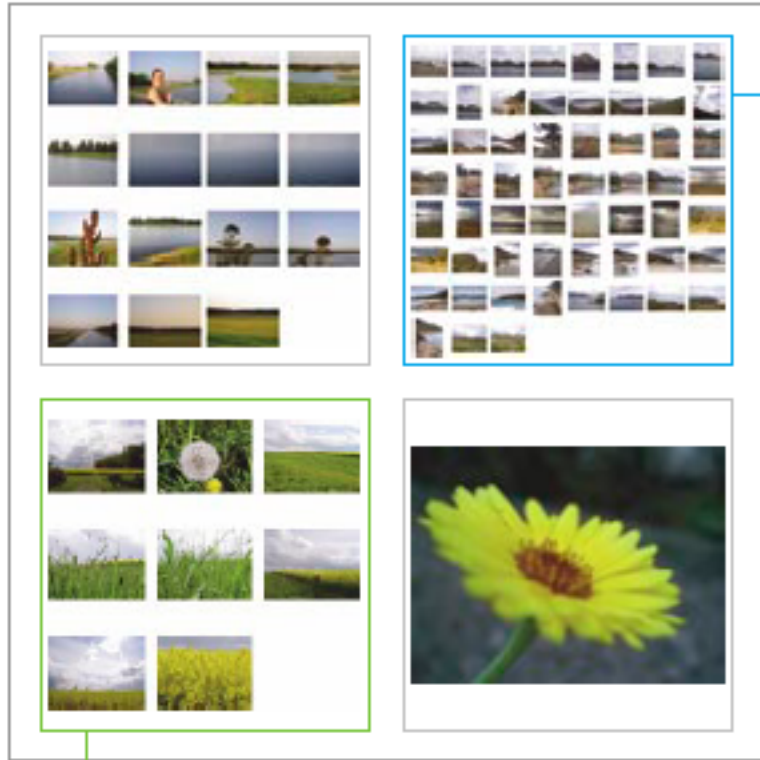
information.mobile

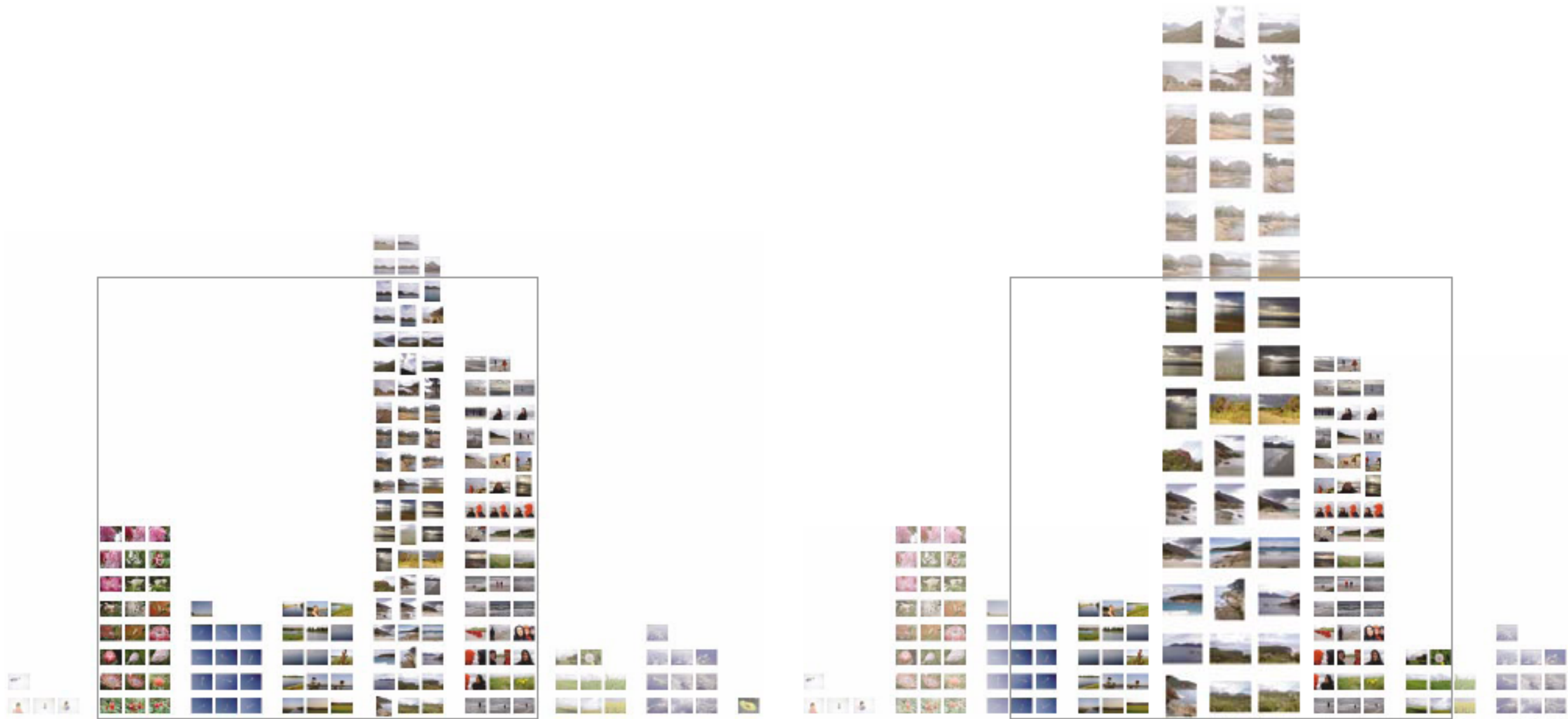


I_squares

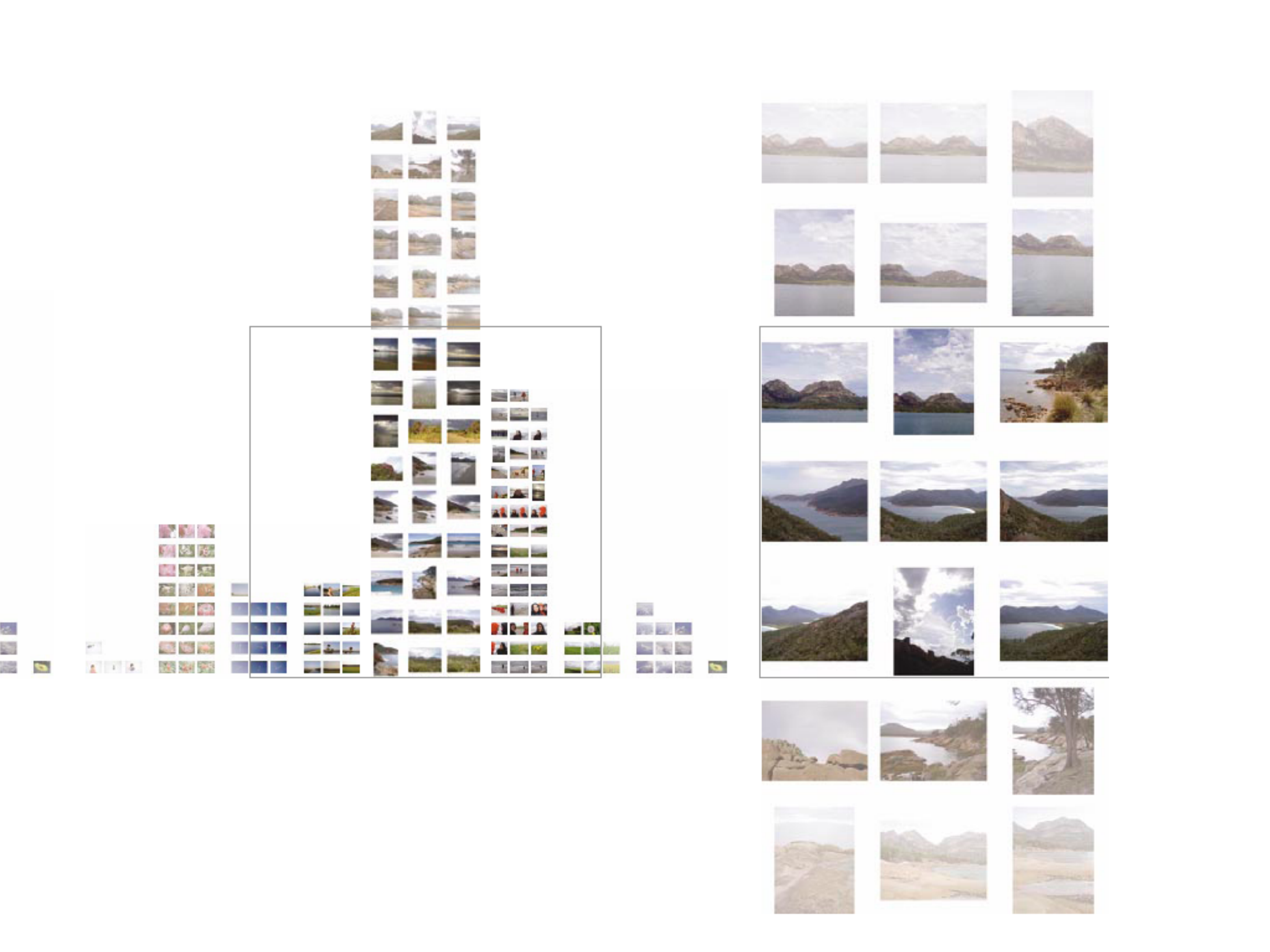


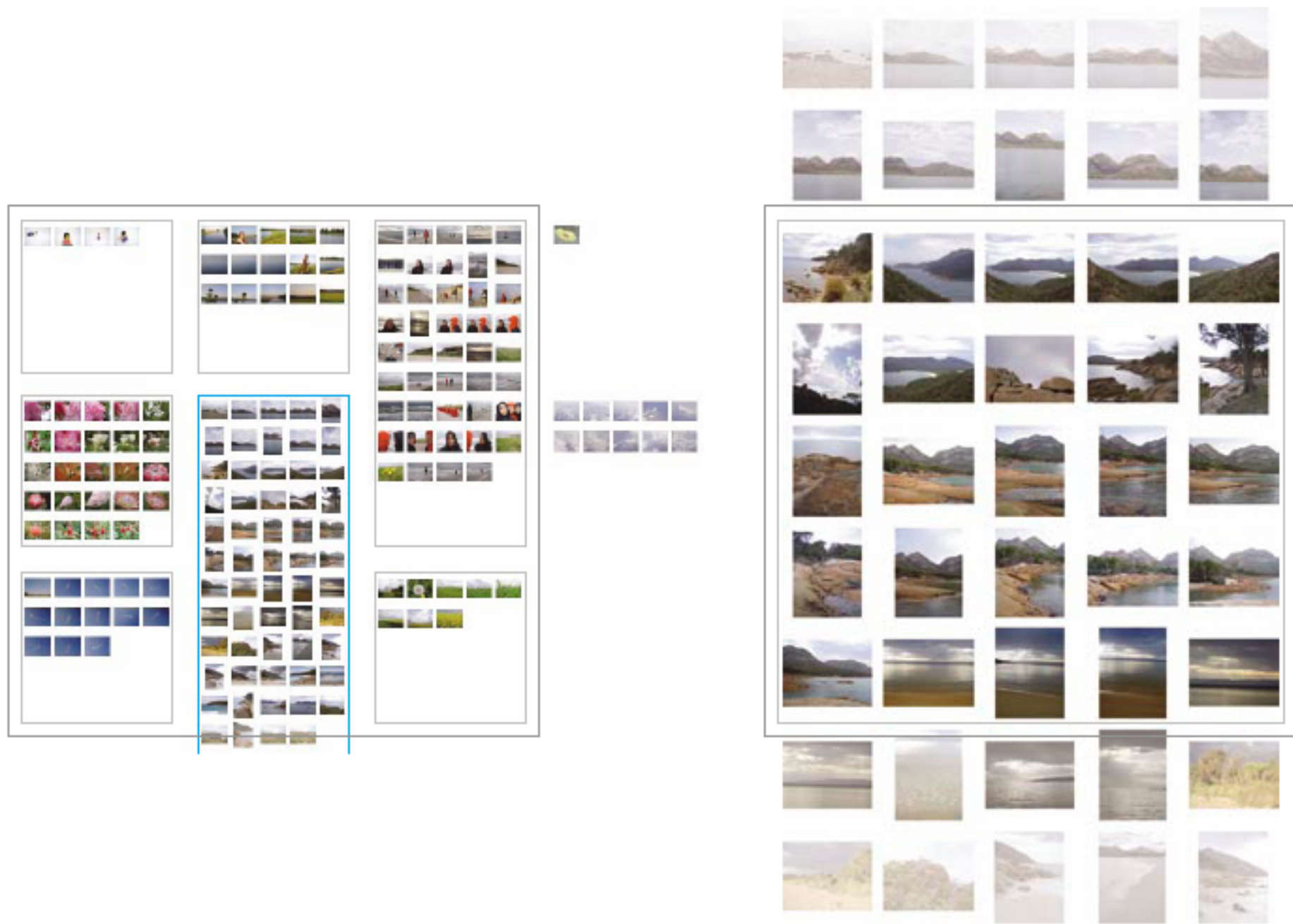
2_same sized squares



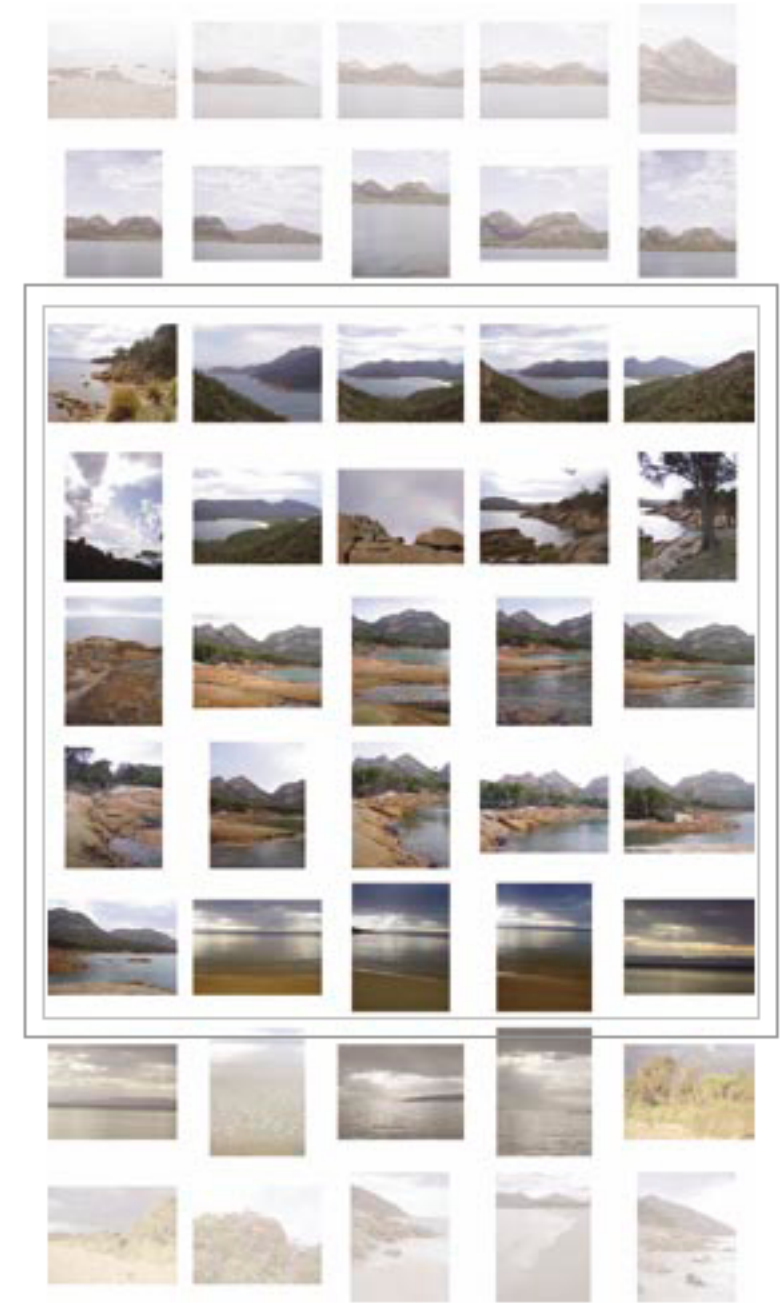
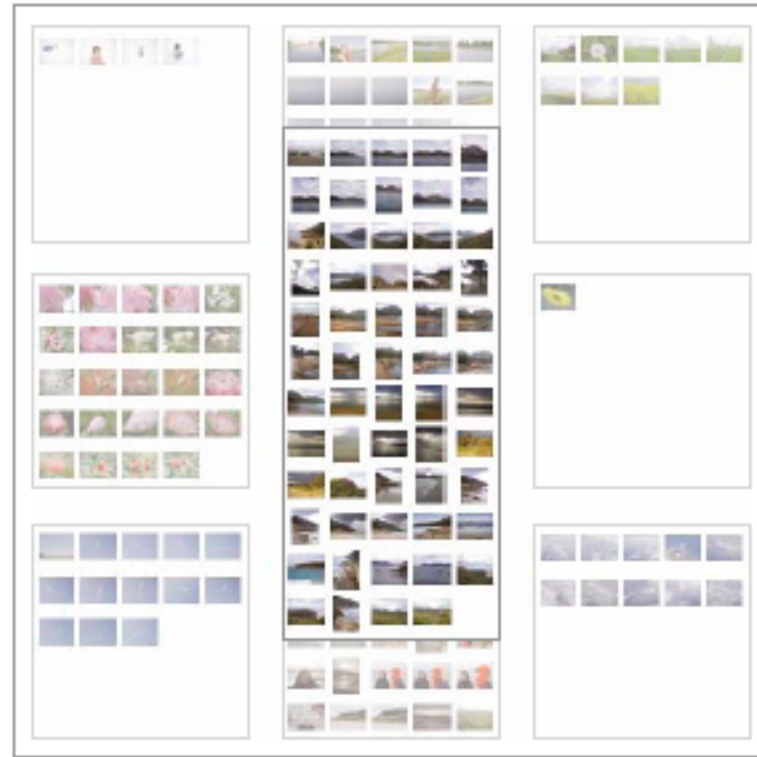
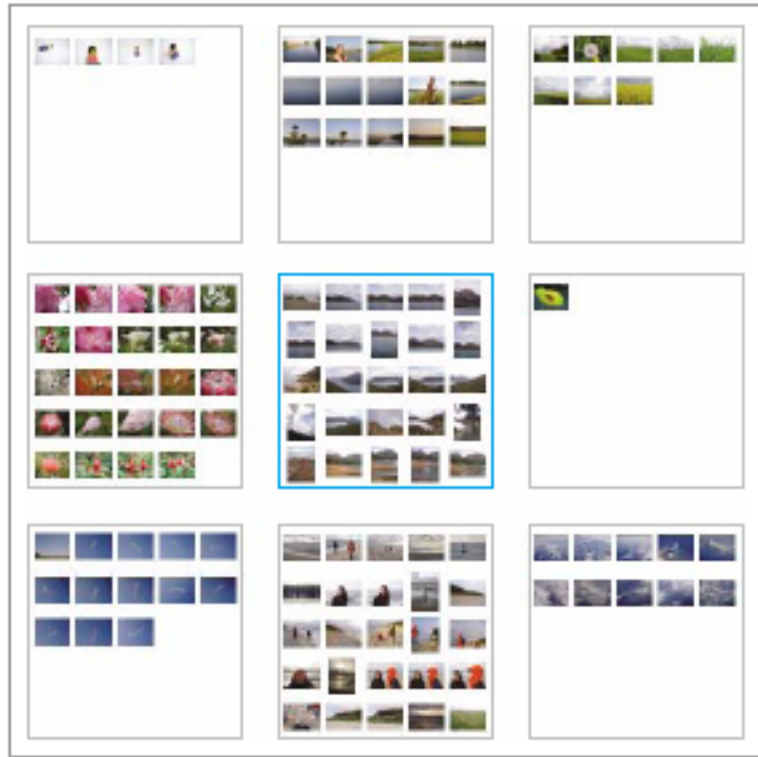


3_defined width





4_same width in a square



5_same sized pictures

:form follows function

colors

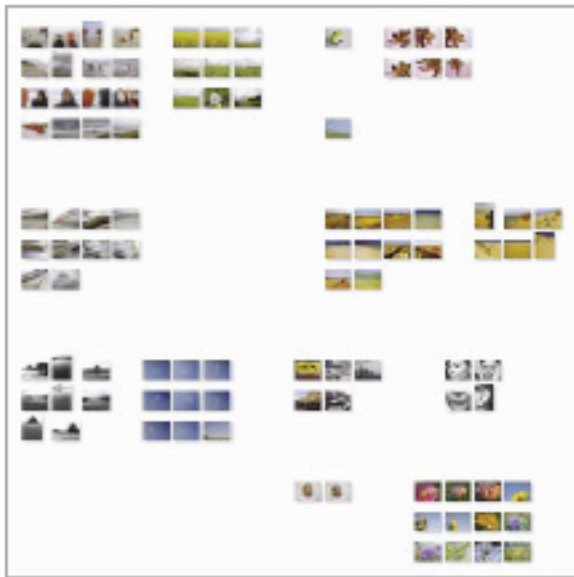
fonts

layout

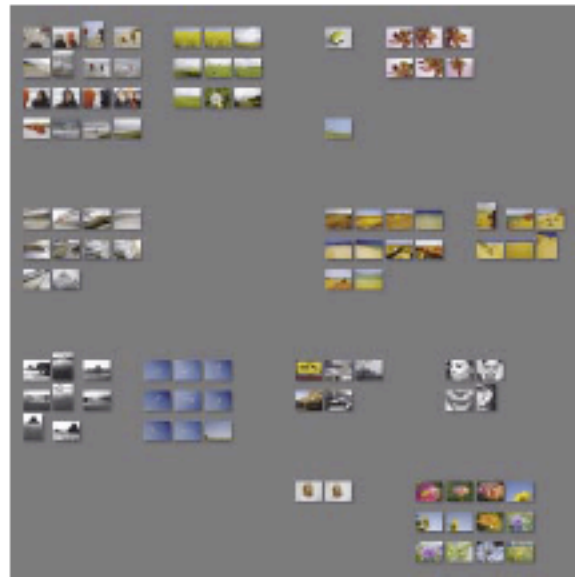
pictograms

:style guide

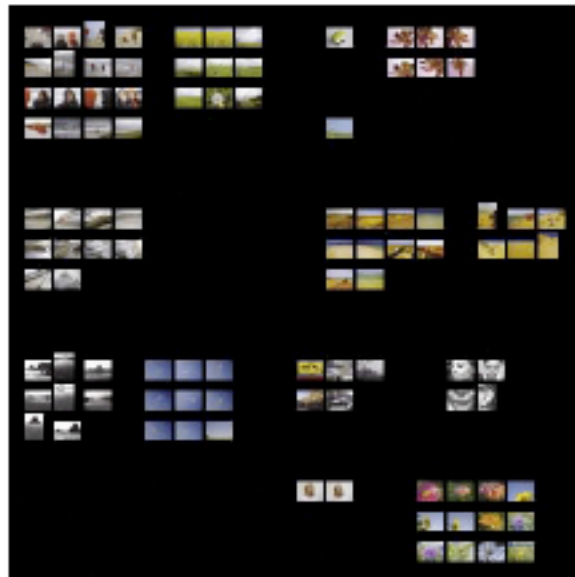
: visual language



255, 255, 255



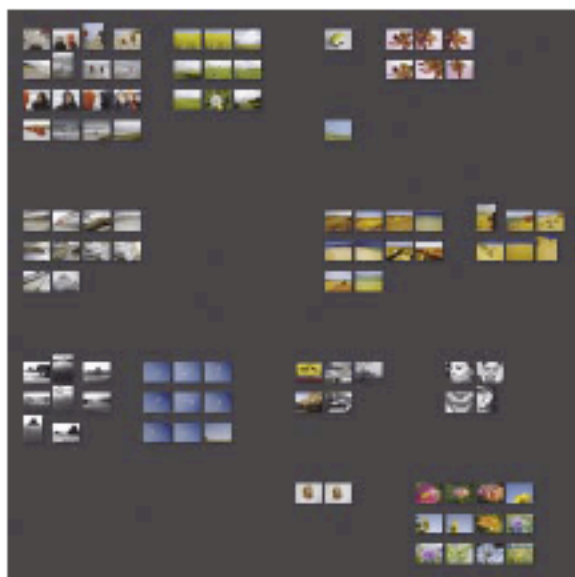
100, 100, 100



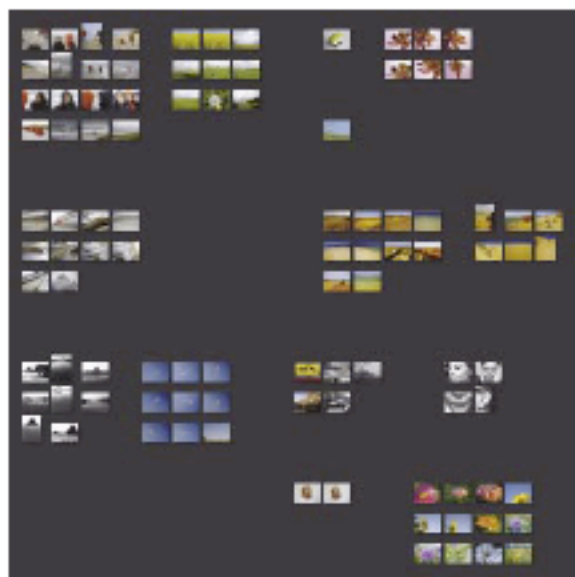
0, 0, 0



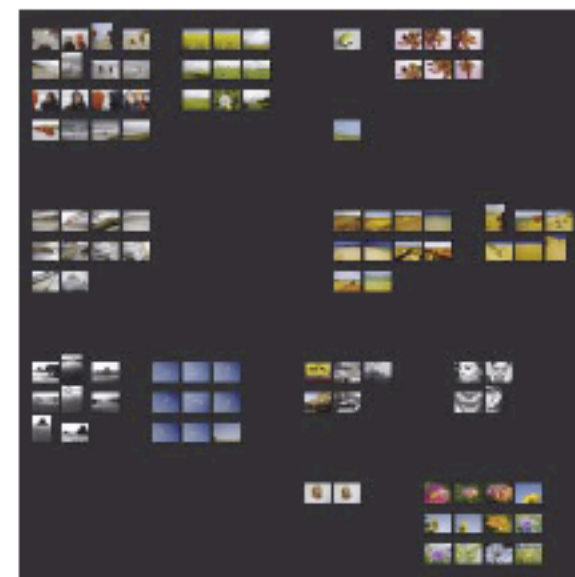
60, 60, 60



50, 50, 50



40, 40, 40



30, 30, 30

defining the background



set of icons



:just-enough

:models to reveal the quality of the experience
(it is not enough to see that the technology works)

:craft the interactive experience
what people will see, hear and feel

: prototyping

:techniques

focus groups

think aloud user testing

reviews

heuristic evaluation

questionnaire

paper prototyping

: user evaluation


```
/*
 * =====
 * Name      : CChrPlayer from CChrPlayer.h
 * Part of   : 2DExample
 * Created   : 01/01/2005 by Forum Nokia
 * Version   : 1.0
 * Copyright : Nokia Corporation
 * =====
 */
```

```
// INCLUDE FILES
#include "CChrPlayer.h"
#include "CSprite.h"
#include "MSystem.h"
#include "CTileMap.h"
```

```
const TInt KMaxSpeed = 16500;
```

```
CChrPlayer* CChrPlayer::NewL( CSprite* aSprite, MSystem* aSystem, CTileMap* aMap )
{
    CChrPlayer* self = new(ELeave )CChrPlayer( aSprite, aSystem, aMap );
    CleanupStack::PushL( self );
    self->ConstructL();
    CleanupStack::Pop( self );
    return self;
};
```

```
CChrPlayer::~CChrPlayer()
{
}
};
```

```
CChrPlayer::CChrPlayer( CSprite* aSprite, MSystem* aSystem, CTileMap* aMap )
: iSprite( aSprite )
, iSystem( aSystem )
, iTileMap( aMap )
{
}
};
```

```
void CChrPlayer::ConstructL()
{
}
};
```

example in Symbian
OS for cellphones, Nokia

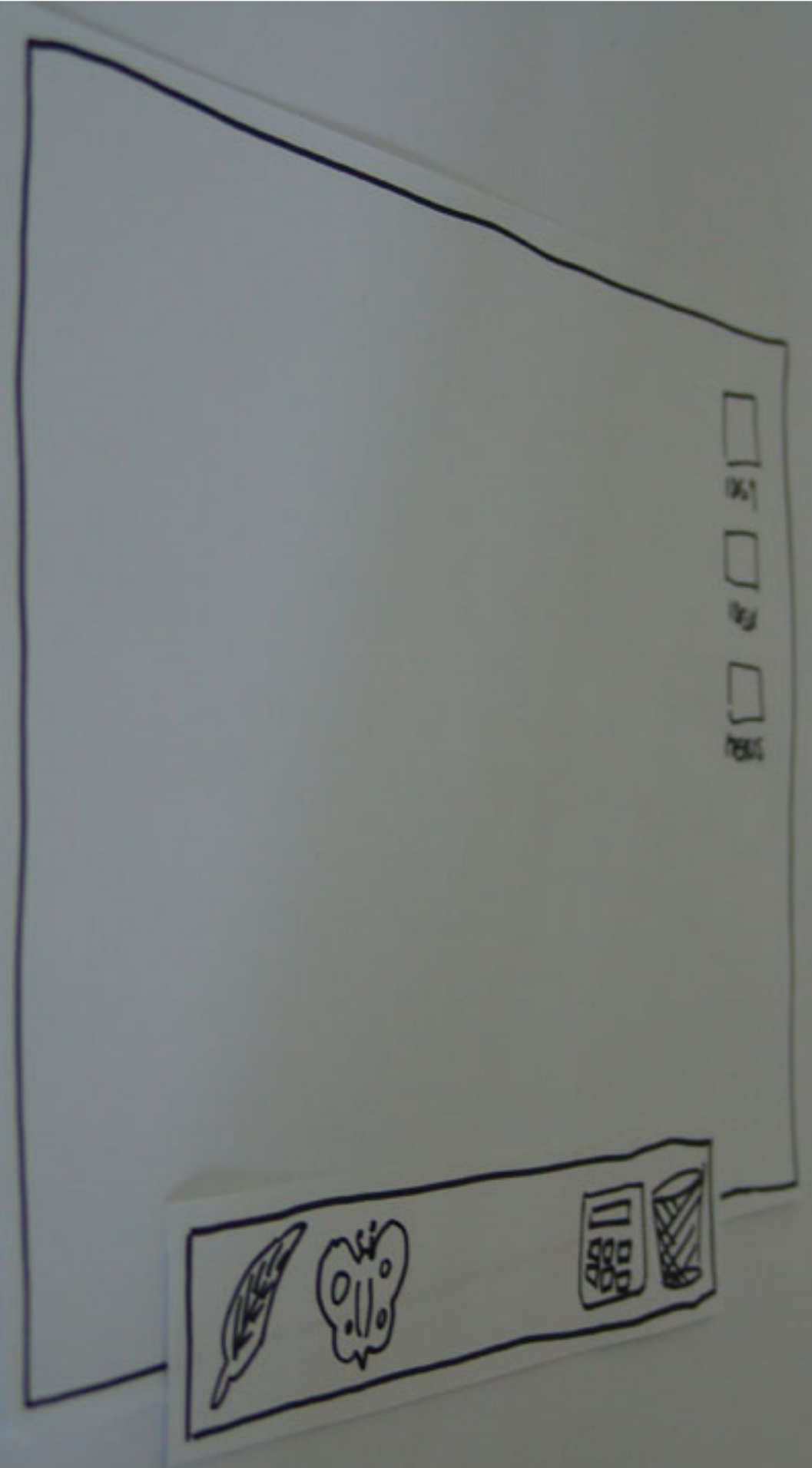
: implementation

:paper prototyping
:computer animation
:interactive simulation

: prototyping techniques

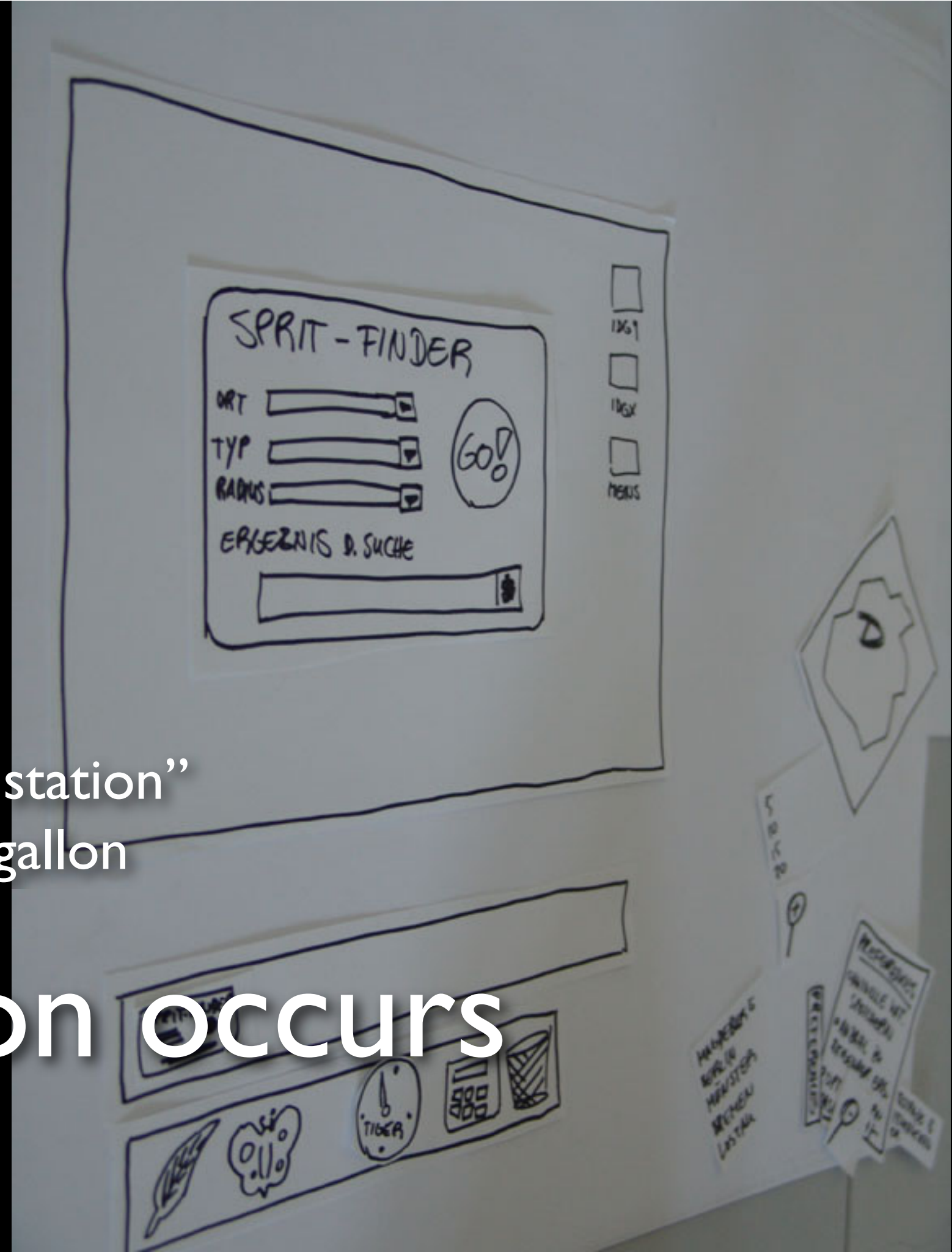
new dashboard widget

: start screen

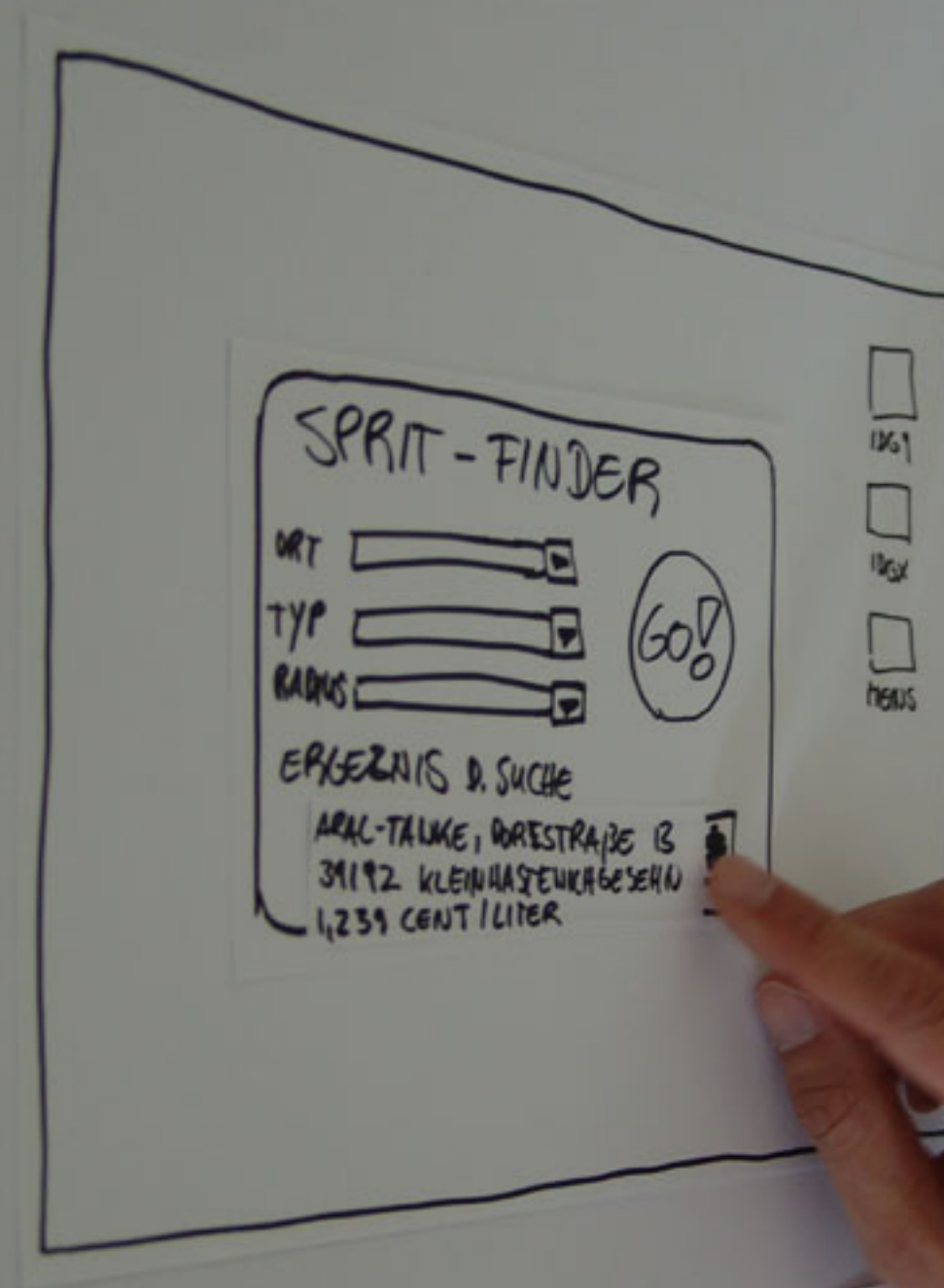


“find the cheapest gas station”
german gas prices: 9\$/gallon

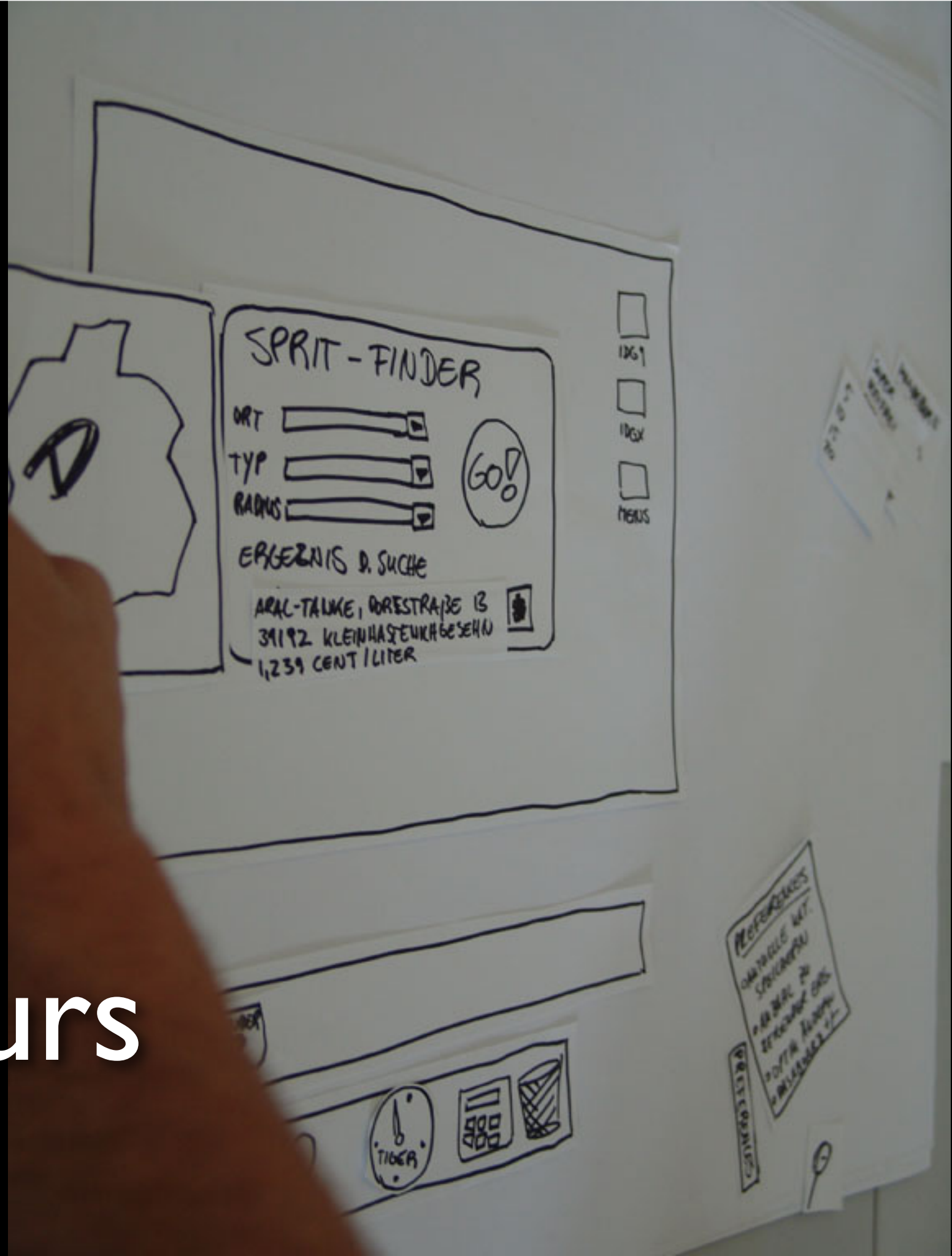
: application occurs



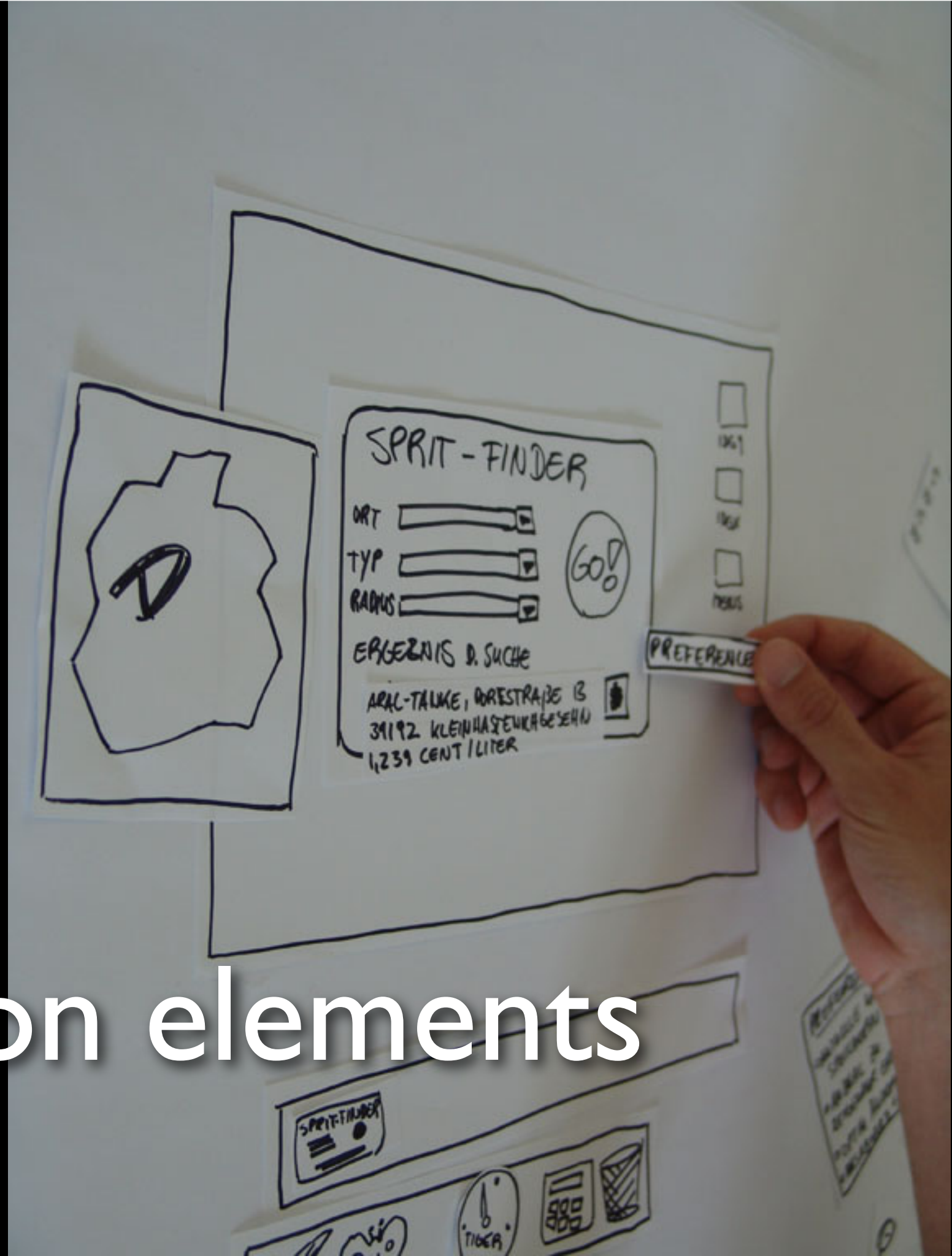
: search results appear



: map occurs



: interaction elements



:cheap and fast technique
rapid interface prototypes

:early design stages
up and running, no pre-requisites
interdisciplinary groups

:user evaluation
early usability data, enables testing with real users

: paper prototyping

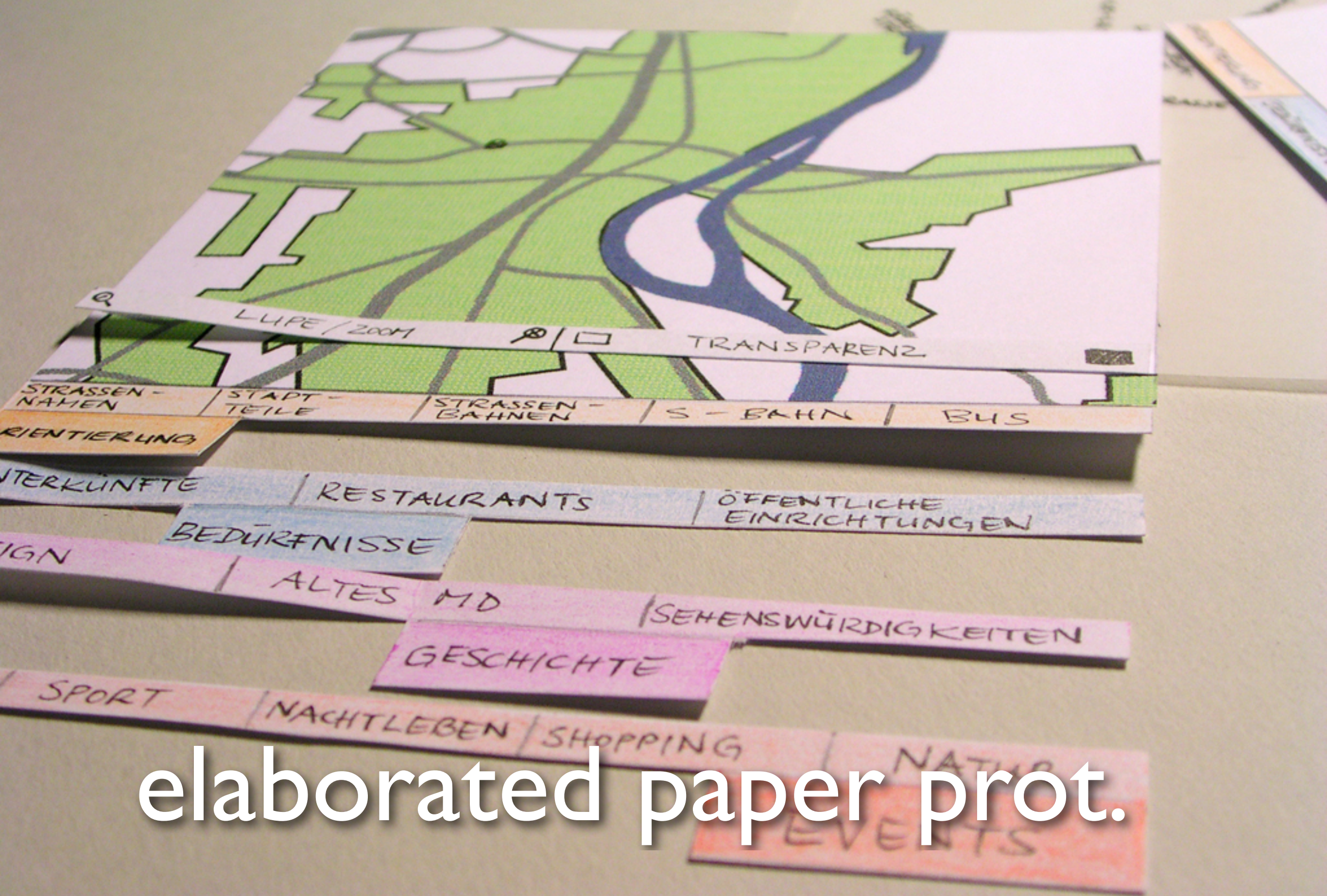
hand-drawn

encourage discussion

un-finished

room for discussion

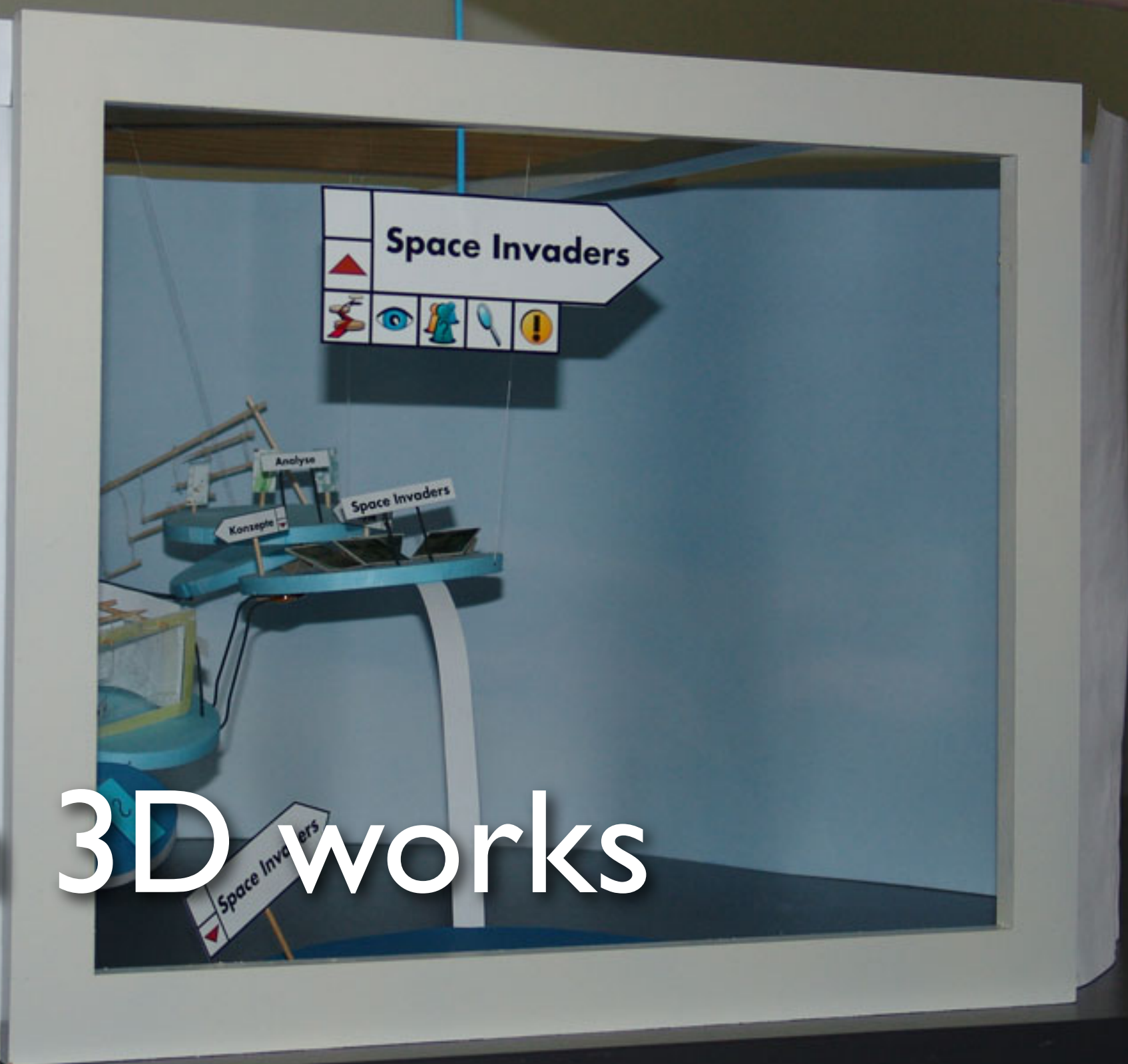
: early design paper prototyping



elaborated paper prot.



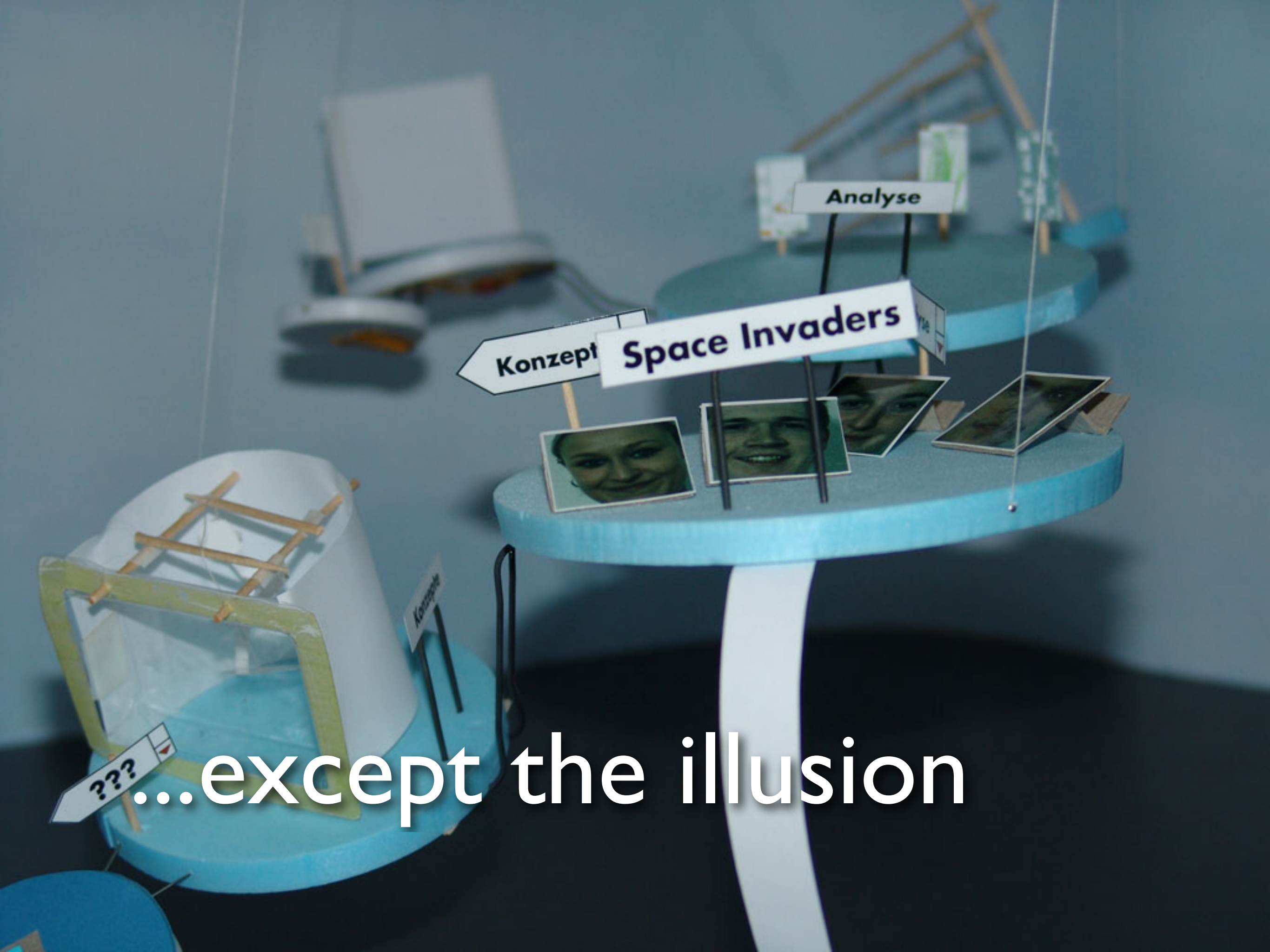
elaborated paper prot.



even 3D works



nothing has to be perfect..

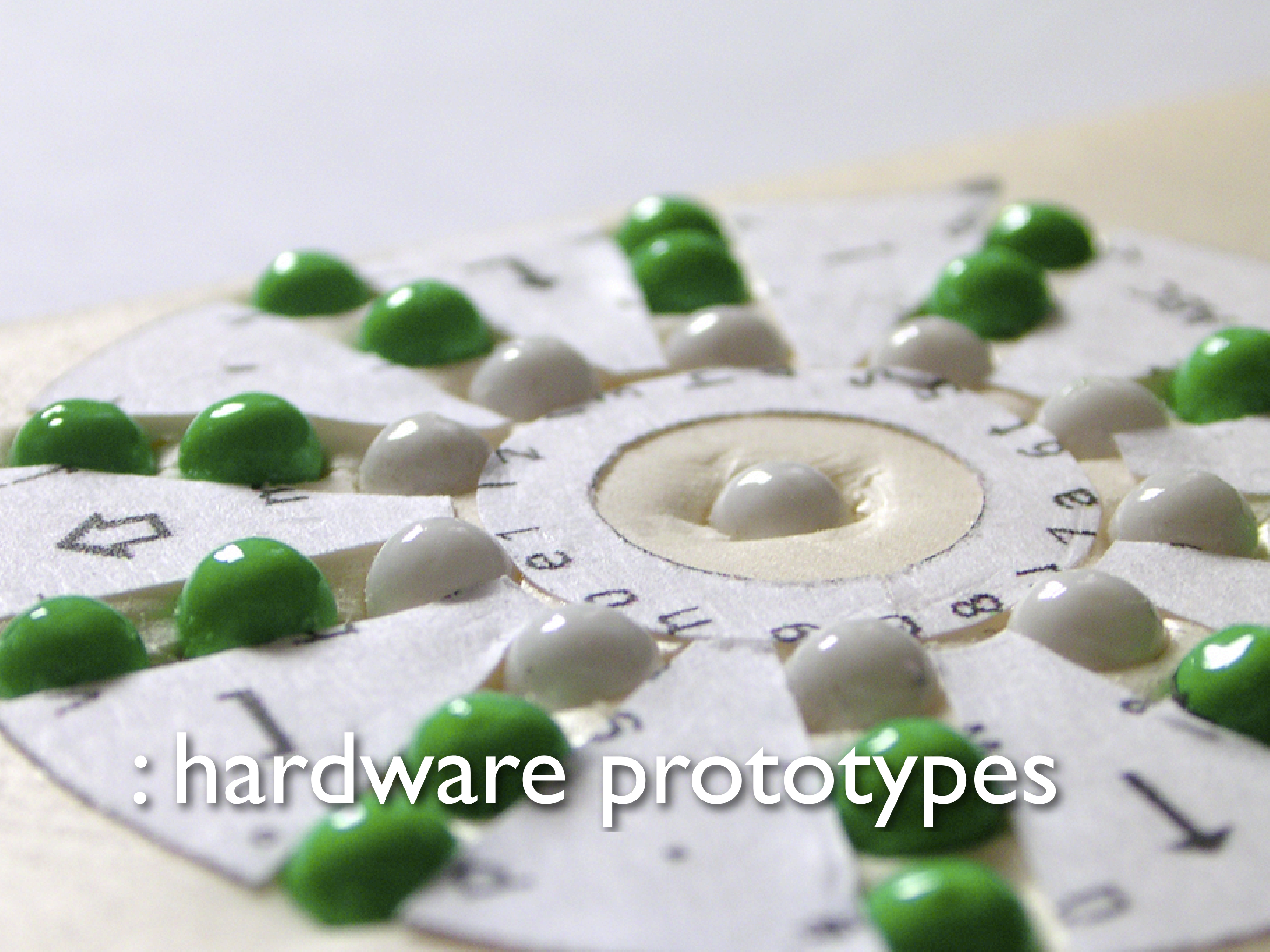


...except the illusion









: hardware prototypes

“Paper prototyping is a variation of usability testing where representative users

User evaluation paper prototyping

“Paper prototyping is a variation of usability testing where representative users perform realistic tasks by interacting with a paper version of the interface

User evaluation paper prototyping

“Paper prototyping is a variation of usability testing where representative users perform realistic tasks by interacting with a paper version of the interface that is manipulated by a person ‘playing computer,’ who doesn’t explain how the interface is intended to work.”

User evaluation paper prototyping

<http://www.paperprototyping.com/>

you cannot not communicate

User evaluation paper prototyping

:no interaction
user as passive consumer
like watching TV

:representing the dimension of time
when programming gets too hard or
when the narrative continuum is linear

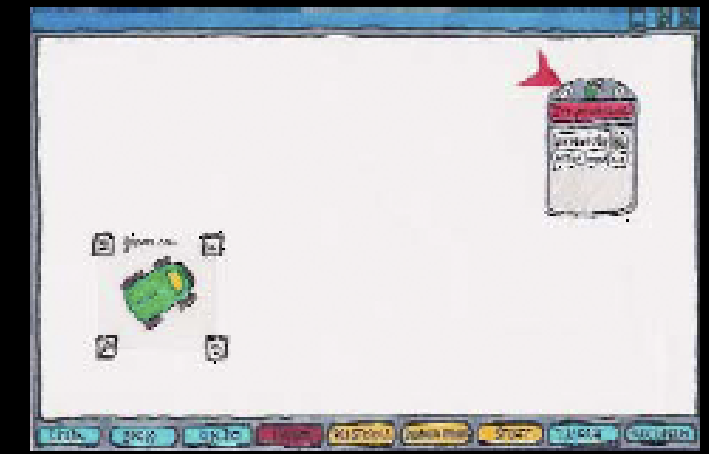
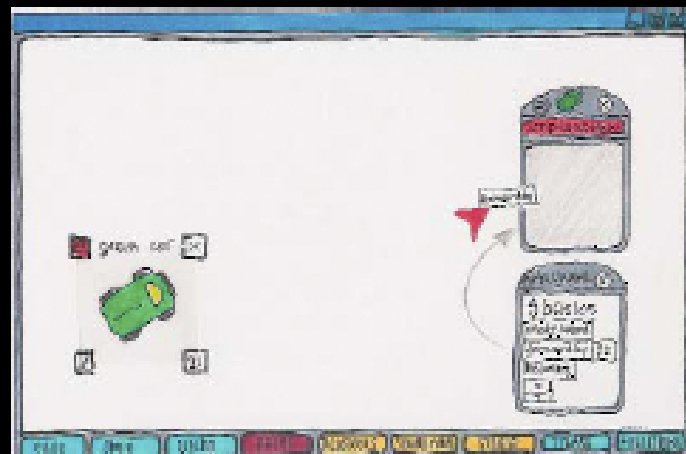
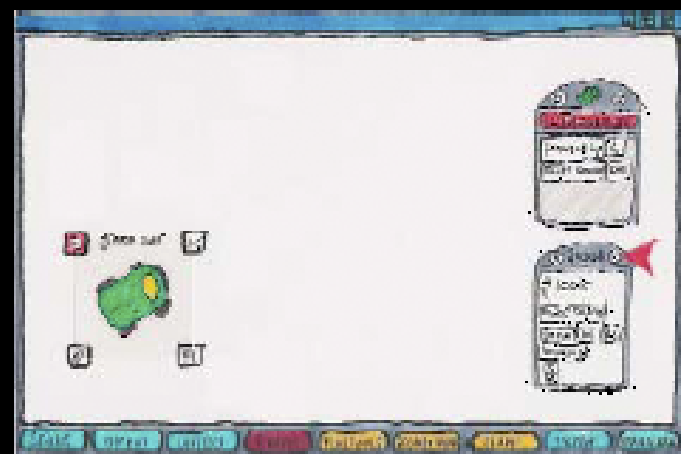
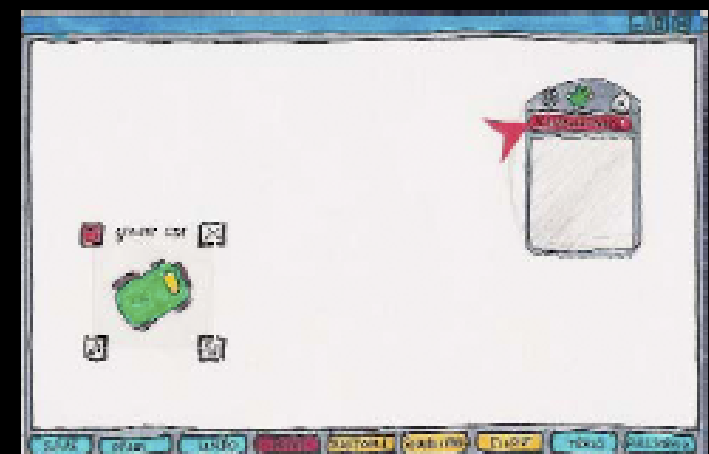
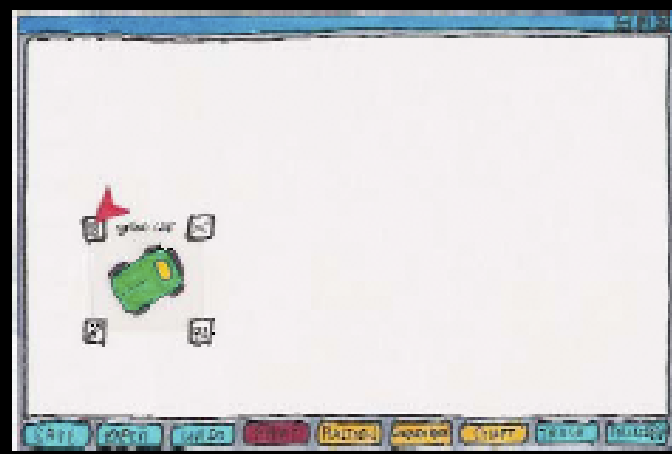
:techniques for low-level animations

Computer animation

Calvin and Hobbes by Bill Watterson



: hand-drawn: comics



: story board



: computer animation



how to use a cellphone?

:no MTV clip

:appropriate quality

:who is the audience?

: computer animation

:produce single pictures/frames

paint

snapshots from screen

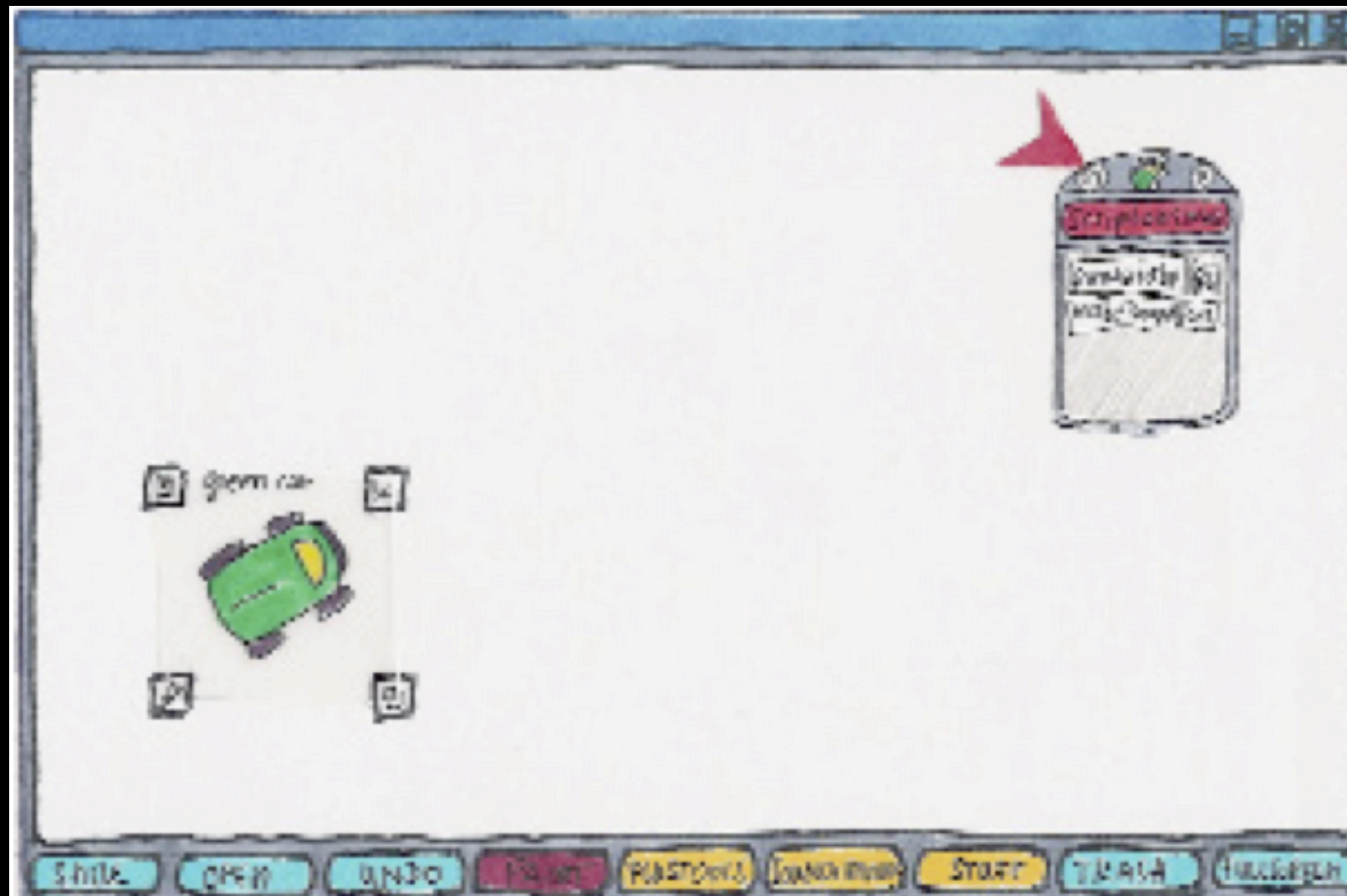
photos

:composite them

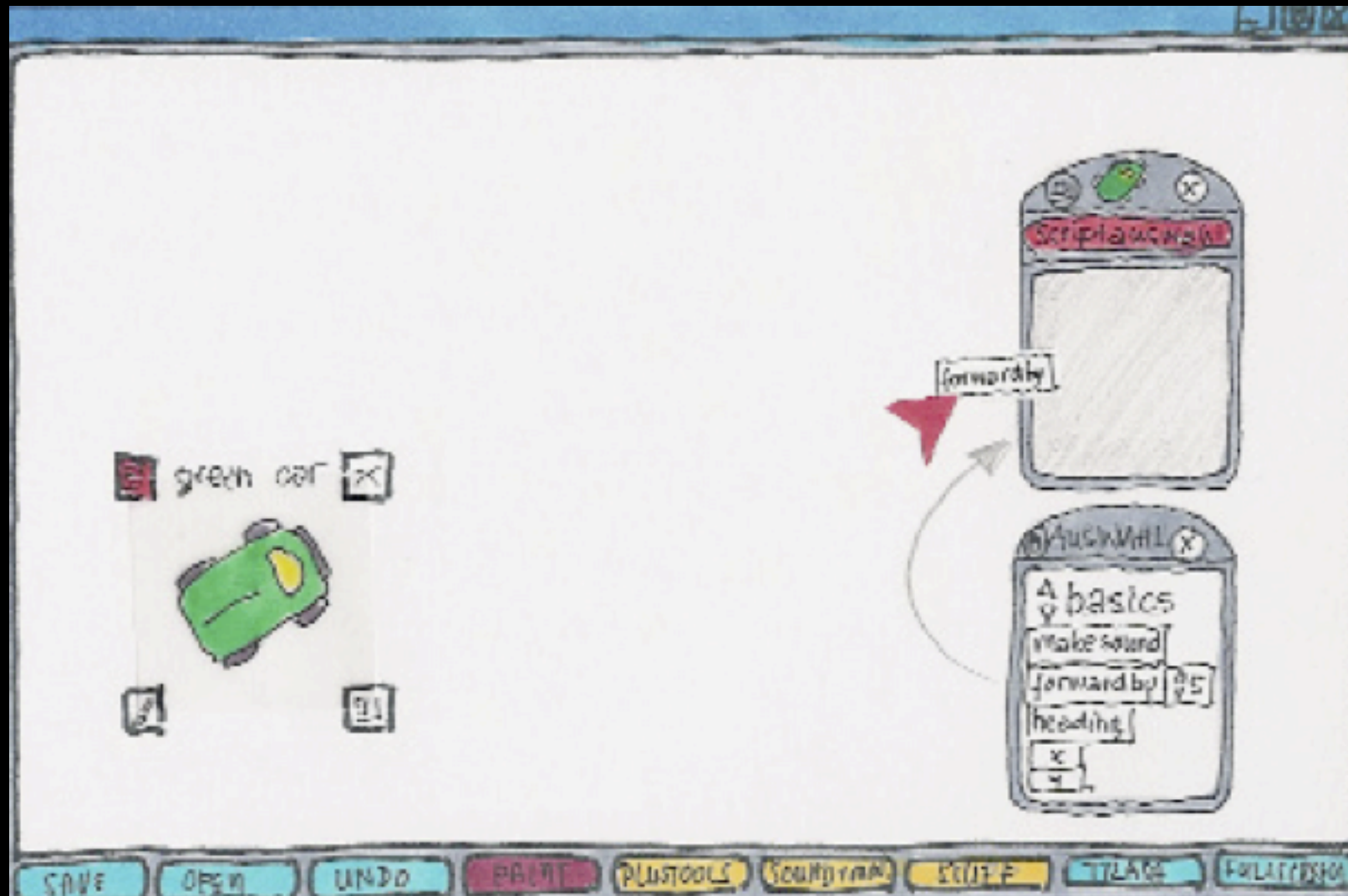
animated gif files (e.g. Adobe ImageReady)

digital video, MPEG, Quicktime (e.g. iMovie)

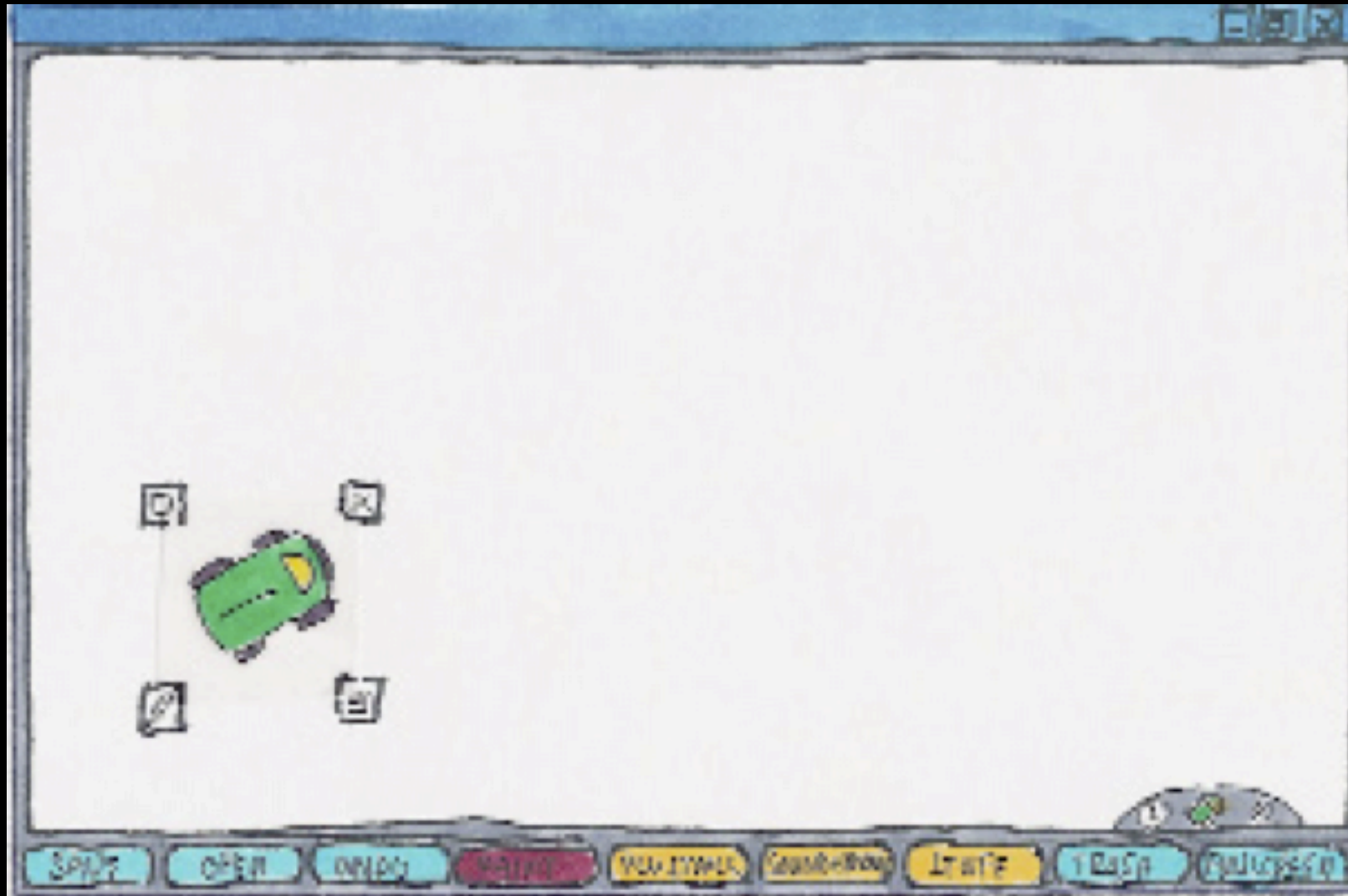
: computer animation



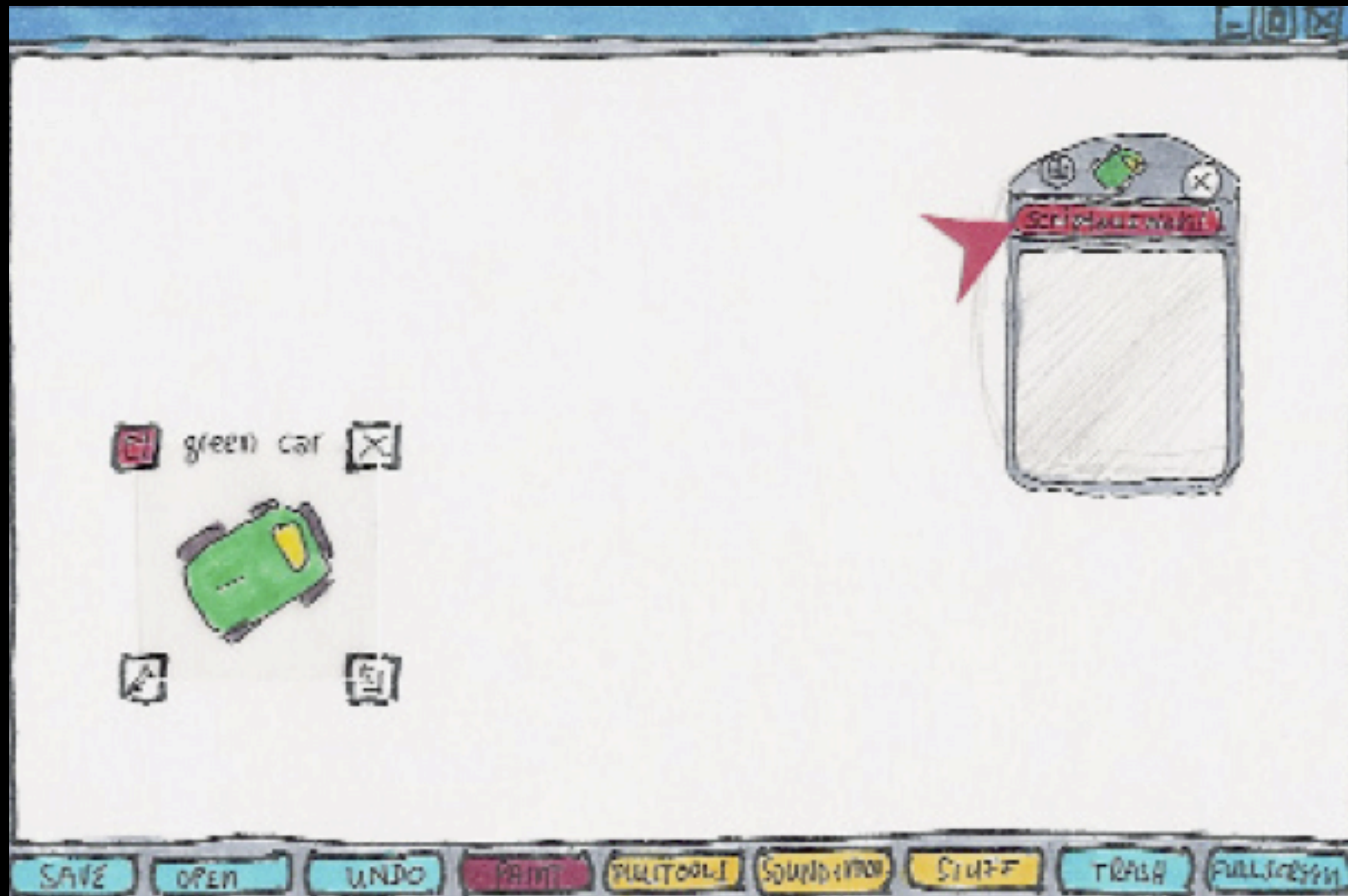
hand-drawn frames



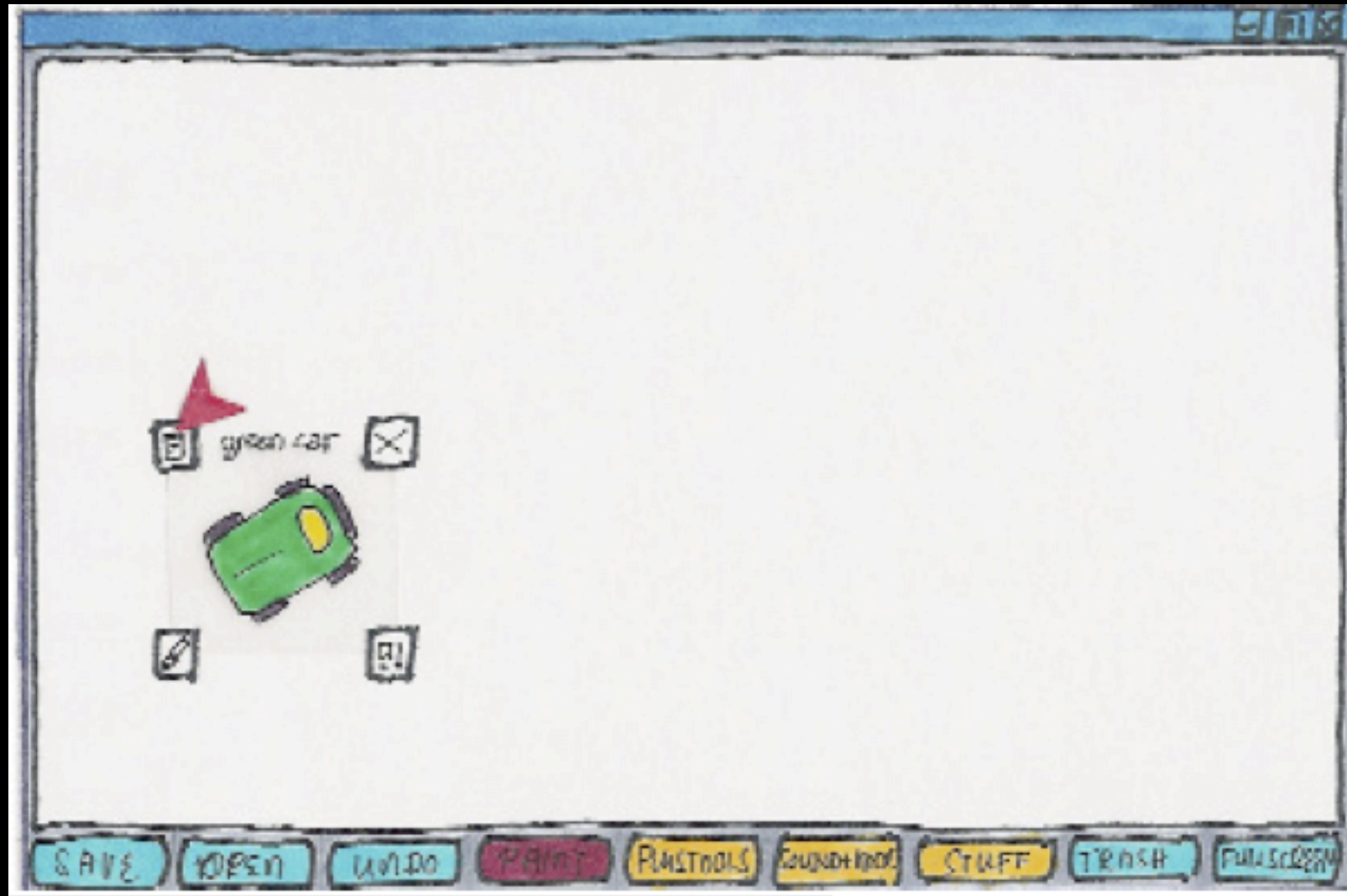
hand-drawn frames



hand-drawn frames



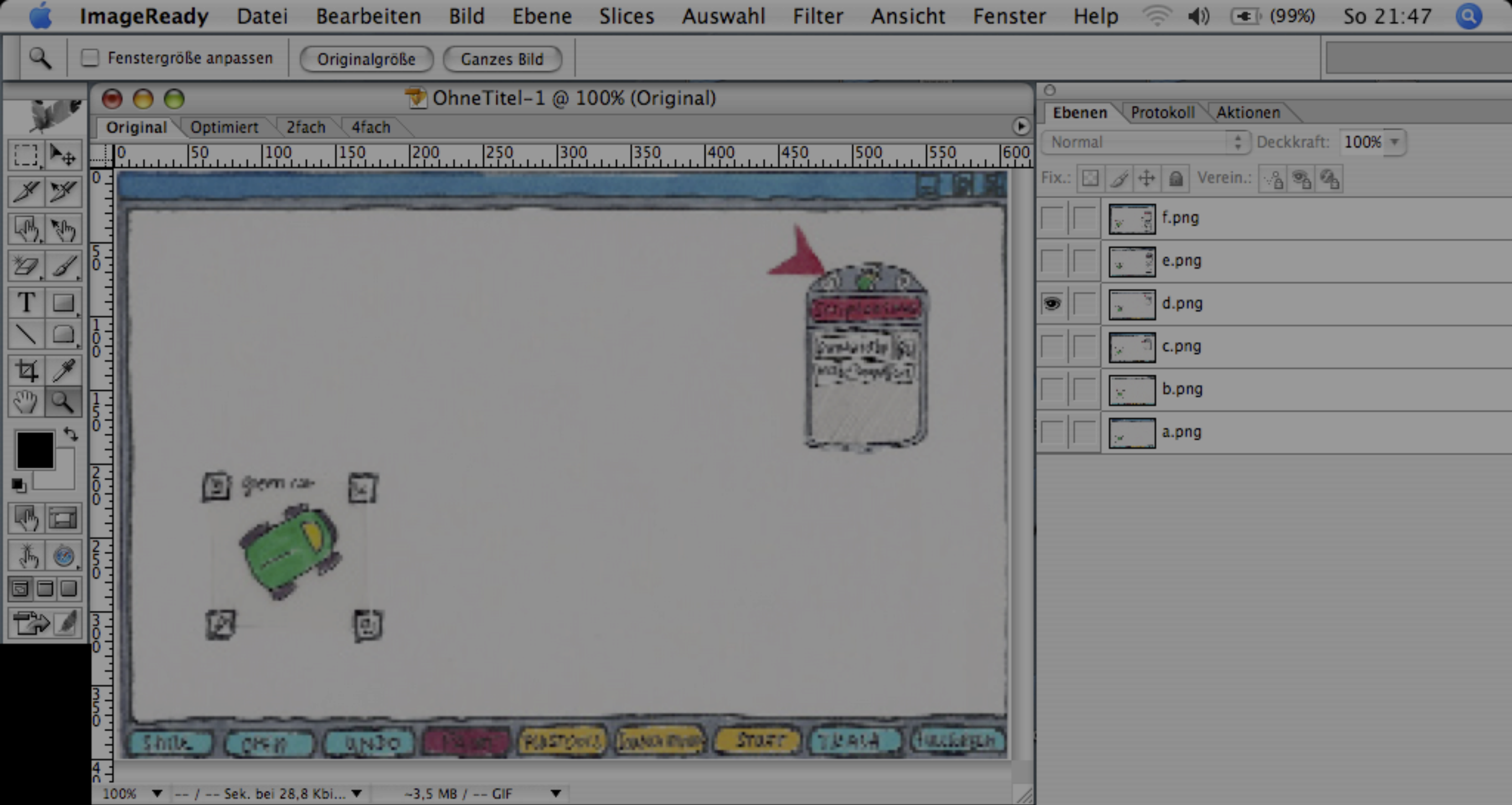
hand-drawn frames



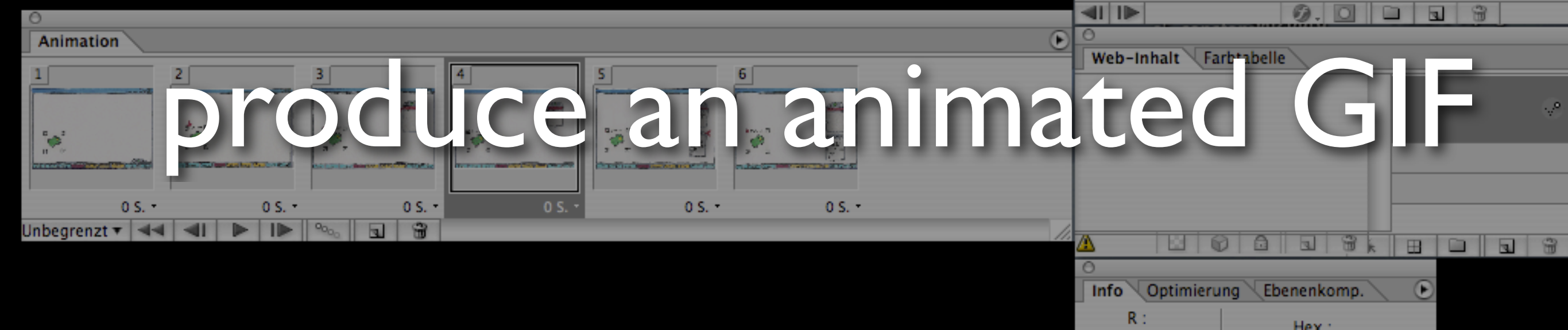
hand-drawn frames



hand-drawn frames



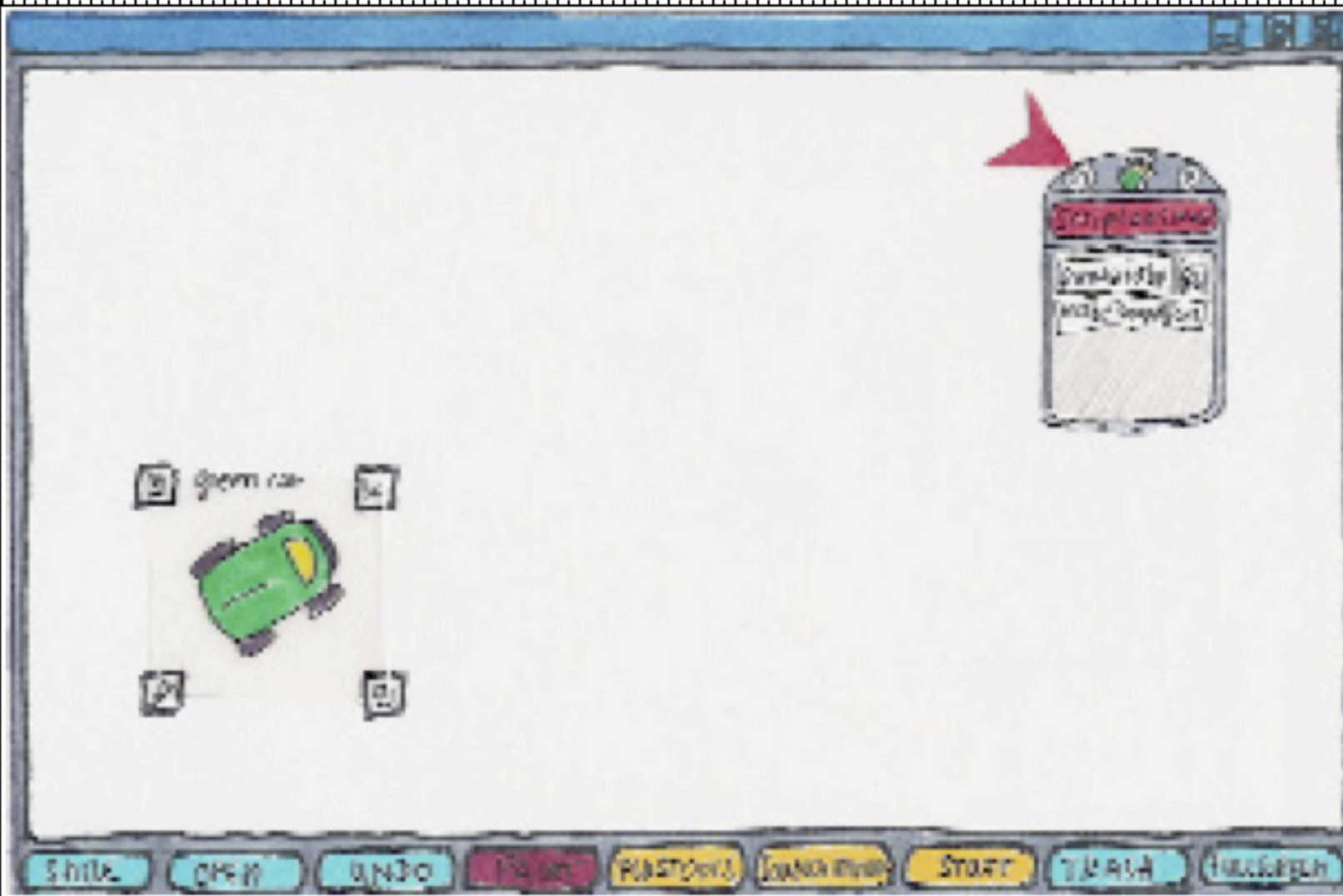
produce an animated GIF



OhneTitel-1 @ 100% (Original)

Original Optimiert 2fach 4fach

0 50 100 150 200 250 300 350 400 450 500 550 600



100% -- / -- Sek. bei 28,8 Kbi... ~3,5 MB / -- GIF

Ebenen Protokoll Aktionen

Normal Deckkraft: 100%

Fix.: Verein.:

- f.png
- e.png
- d.png
- c.png
- b.png
- a.png

Animation



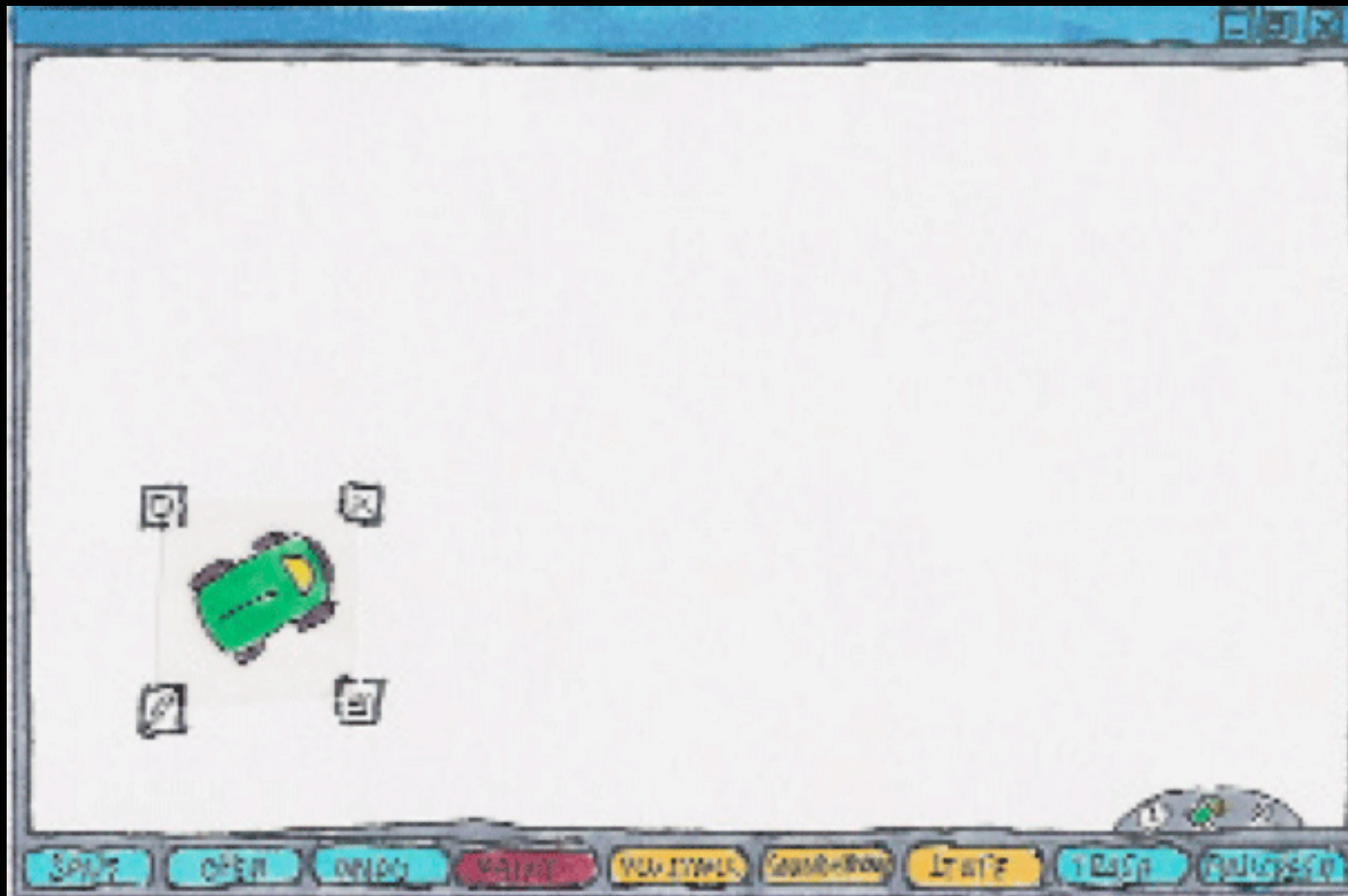
Unbegrenzt 0 S. 0 S. 0 S. 0 S. 0 S. 0 S.

Web-Inhalt Farbtabelle



Info Optimierung Ebenenkomp.

R: Hex:



the animated GIF

:produce single pictures/frames

paint

snapshots from screen

photos

:composite them

animated gif files (e.g. Adobe ImageReady)

digital video, MPEG, Quicktime (e.g. iMovie)

:computer animation

iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006	Donnerstag, 16. März
	[Blue bar]
13:00	
14:00	
15:00	
16:00	
17:00	
18:00	
19:00	
20:00	
21:00	
22:00	
23:00	

To Dos by Priority

März 2006

M	D	M	D	F	S	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Privat [Color swatch]

Description



◀ Day Week Month ▶

🔍 Events & To Dos



- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00	
14:00	
14:15	New Event
15:00	
16:00	
17:00	
18:00	
19:00	
20:00	
21:00	
22:00	
23:00	

To Dos by Priority

New Event

Location

all-day

from 16/03/2006 at 14:15
to 16/03/2006 at 15:15

repeat None

attendees None

calendar Privat

alarm None

url None

Notes

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00

14:00

14:15
New Event

15:00

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

To Dos by Priority

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

New Event

Location

all-day

from 16/03/2006 at 14:15
to 16/03/2006 at 16:00

repeat None

attendees None

calendar Privat

alarm None

url None

Notes

iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00

14:00

14:15 meeting

15:00

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

To Dos by Priority

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Büro ■ ↕

Description



◀ Day Week Month ▶

🔍 Events & To Dos



iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00

14:00

14:15 meeting

15:00

15:15 New Event

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

To Dos by Priority

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

New Event

Location

all-day

from 16/03/2006 at 15:15
to 16/03/2006 at 17:15

repeat None

attendees None

calendar Büro

alarm None

url None

Notes

iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00

14:00

14:15 meeting

15:00

15:15 kids pick-up

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

To Dos by Priority

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

New Event

Location

all-day

from 16/03/2006 at 15:15
to 16/03/2006 at 17:15

repeat None

attendees None

calendar Büro

alarm None

url None

Notes

iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00

14:00 13:45 meeting

15:00 15:15 kids pick-up

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

To Dos by Priority

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

meeting

Location

all-day

from 16/03/2006 at 13:45
to 16/03/2006 at 15:30

repeat None

attendees None

calendar Privat

alarm None

url None

Notes

iCal

- Calendars
- Privat
 - Büro
 - Untitled

2006 Donnerstag, 16. März

13:00

13:30 meeting

14:00

15:00

15:15 kids pick-up

16:00

17:00

18:00

19:00

20:00

21:00

22:00

23:00

To Dos by Priority

März 2006

M	D	M	D	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

meeting

Location

all-day

from 16/03/2006 at 13:30
to 16/03/2006 at 15:15

repeat None

attendees None

calendar Privat

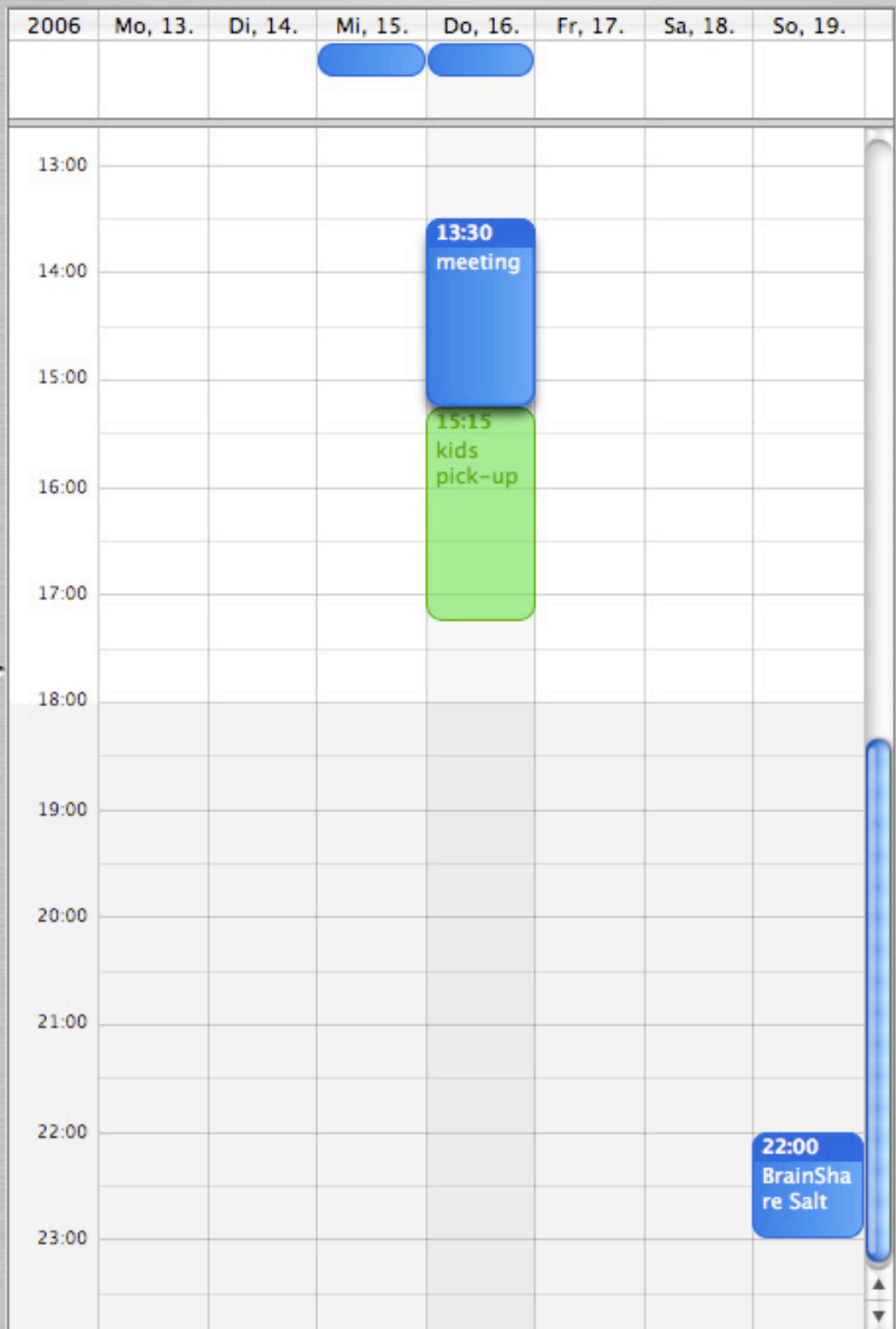
alarm None

url None

Notes

Calendars

- Privat
- Büro
- Untitled



März 2006

M	D	M	D	F	S	S
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

To Dos by Priority

meeting

Location

all-day

from 16/03/2006 at 13:00
to 16/03/2006 at 15:00

repeat None

attendees None

calendar Privat

alarm None

url None

Notes

⌘+ ⌘+ ⌘+

◀ Day **Week** Month ▶

🔍 Events & To Dos

☰ 📌 ⓘ

iCal

- Calendars
- Privat
 - Büro
 - Untitled

März 2006

Mo	Di	Mi	Do	Fr	Sa	So
27	28	1	2	3	4	5
6 • Phoenix	7	8 • El Paso	9	10	11	12
13	14	15	16 • meeting • kids pick-up	17	18	19 • BrainShare Salt
20	21	22 • >Berkel	23	24	25	26
27 • Abreise 14:15	28 • >Magdeburg	29	30 • Gabriele	31 • Hauskre	1 • Marburg • George Rostock	2

To Dos by Priority

--

meeting

Location

all-day

from 16/03/2006 at 13:30
to 16/03/2006 at 15:15

repeat None

attendees None

calendar Privat

alarm None

url None

Notes

März 2006

M	D	M	D	F	S	S
1	2	3	4	5		
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



composite in iMovie

iCal File Edit Calendar View Window Help

2006 Donnerstag, 16. März

To Dos by Priority

New Event
 Location
 all-day
 from 16/03/2006 at 15:15
 to 16/03/2006 at 17:15
 repeat None
 attendees None
 calendar Büro
 alarm None
 url None
 Notes

14:15 meeting
 15:15 New Event

März 2006
 M D M D F S S
 1 2 3 4 5
 6 7 8 9 10 11 12
 13 14 15 16 17 18 19
 20 21 22 23 24 25 26
 27 28 29 30 31

Day Week Month

Events & To Dos

0:00:20 Picture 13
 0:00:20 Picture 10
 0:00:20 Picture 20
 0:00:20 Picture 18
 0:00:20 Picture 16
 0:00:20 Picture 14
 0:00:20 Picture 12
 0:00:20 Picture 19
 0:00:20 Picture 15
 0:00:20 Picture 21
 0:00:20 Picture 11

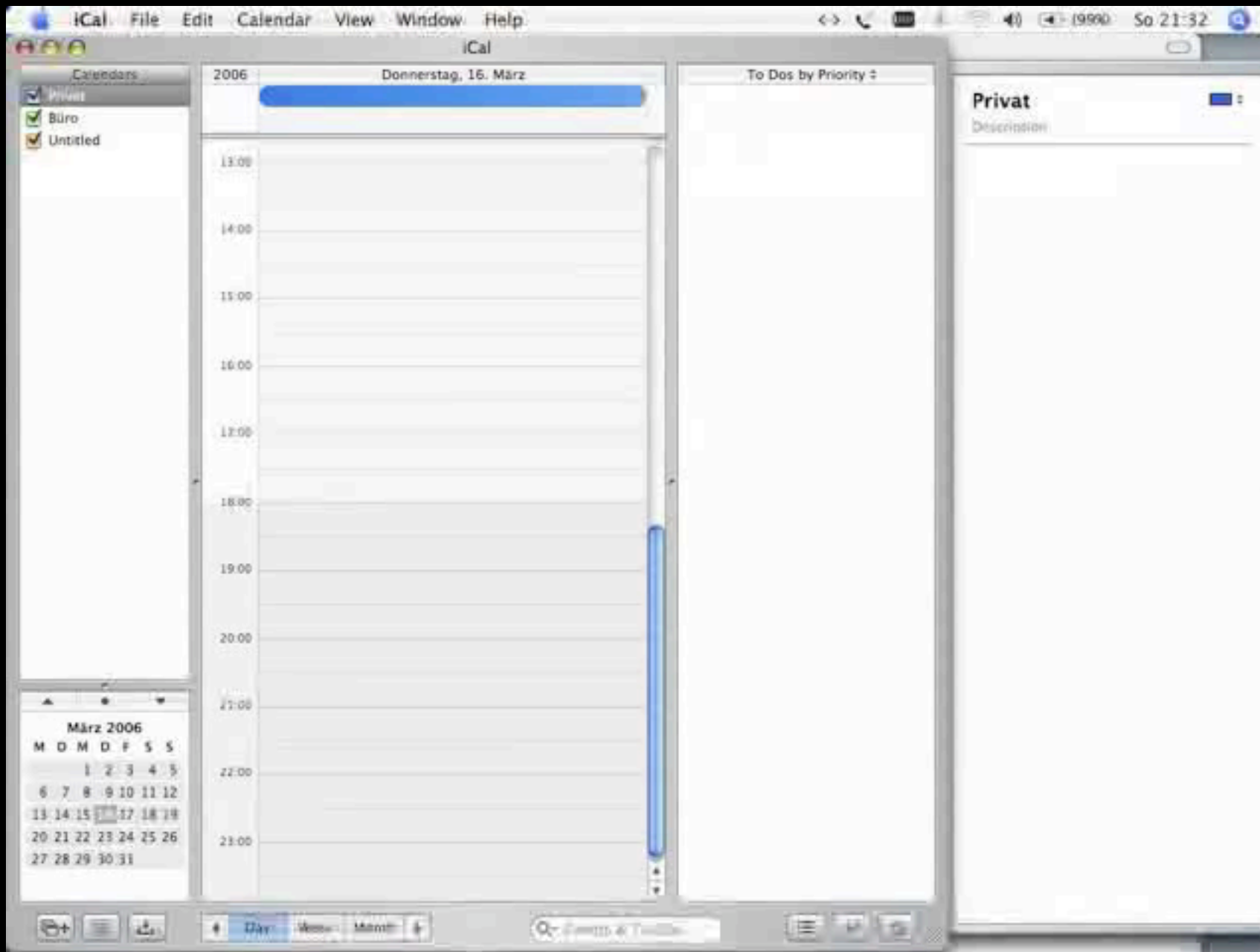
0:03:10

Clips Photos Audio Titles Trans Effects iDVD

0:03:10

Picture 15 0:00:20 of 0:08:03 total

54,5 GB available 3,3 MB



:Merriam-Webster

:interactive

being a two-way electronic communication system
(as a telephone, cable television, or a computer)
that involves a user's orders or responses

:simulation

the imitative representation of the functioning of one
system or process by means of the functioning of another

Interactive Simulation

:simulating software

:user becomes an active participant
feels almost like real

:non-linear structure

how does the computer react to the user's input?

Interactive Simulation

:designer has to start programming
Macromedia Director, Macromedia Flash, ...

:complex interaction structures

:combination with animation helps

Interactive Simulation