sneak preview

what does a software designer do?
build idea structures

who designs software?
software designers
analysts and consultants
business process engineers

so what?
to get better software,
focus more on these idea structures

and it’s not just software
policy, organizational systems
a story of apps,
good and bad
Field Trip Permission Form

Dear Parents:

Ms. Frizzle will again be taking her second grade class on an exciting field trip. Please sign and return the permission slip below.

Thank you!

Yes, I give permission for my child to go on the second grade “Touch and Feel” trip on Friday February 13th to the NastyCo Nuclear Dump. I understand that my child may encounter the normal risks of childhood play, including grazed knees, hurt feelings and exposure to toxic waste.

[Signature]

Parents signature

Date

February 11, 2013
Parents:

Frizzle will again be taking her second grade class on a field trip. Please sign and return the permission form by Friday.

---

how to add a signature in acrobat
-- open document in acrobat
-- Tools → Advanced Editing → Touchup Object Tool
-- right click at desired point | Place Image...
then select jpg

how to add date
-- Tools → Typewriter
need a friendlier interface?
or a helping hand?

It looks like you're writing a letter.

Would you like help?
- Get help with writing the letter
- Just type the letter without help
- Don't show me this tip again

Clippy
2003-2008
RIP
no: can be complicated & usable
i’m not alone

from http://amplicate.com
so what makes things easy to use?
James Gibson (1977): “action possibilities” latent in environment
Donald Norman (1988): action possibilities that are perceivable
a door with good affordances

“affords pushing”

“affords pulling”
unhappy doors

push or pull?
door with user manual
using more complex things
The early bird (A) arrives and catches worm (B), pulling string (C) and shooting off pistol (D). Bullet (E) busts balloon (F), dropping brick (G) on bulb (H) of atomizer (I) and shooting perfume (J) on sponge (K)—As sponge gains in weight, it lowers itself and pulls string (L), raising end of board (M)—Cannon ball (N) drops on nose of sleeping gentleman—String tied to cannon ball releases cork (O) of vacuum bottle (P) and ice water falls on sleeper's face to assist the cannon ball in its good work.

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how to use this?
it's getting harder...

Braun Clock Radio (1978)

Dieter Rams

photo by Koichi Okuwaki
Android phone app
Who Is in These Photos?

To tag your friends, review the suggested names and click Save Tags at the bottom of this page. If a name is missing or incorrect, list a new name and press Enter.

Remember: If someone doesn’t like a photo, they can untag themselves or ask you to take it down.

Who is this?  Who is this?

Skip Tagging Friends  Save Tags
so how do we use these things?
conceptual models

to use a complex application
we imagine what’s inside
we form structures in our mind
we connect actions to structural changes

“abstract affordances”
opening the box

CST 4/19/13 11:30am

Clock

Alarm 4/20/13 8:00am

Alarm 4/21/13 9:00am
an infinity of abstract states
summarizing abstract states
When someone adds a tag to something you shared, it's visible to:

1. The audience you chose for the post or photo
2. The person tagged in the post and their friends
how do we learn so many conceptual models?
Why, a four-year-old child could understand this!

Run out and get me a four-year-old child! I can’t make head or tail out of it.
conceptual idioms

Applications:
- Lightroom
- Powerpoint
- Word
- Gmail
- Amazon

Idioms:
- Tagging
- Style
- Selection
- Presets
an idiom: selection

slides in Keynote
photos in Adobe Lightroom
messages in Apple Mail
an idiom: directory

mailboxes in Apple Mail

files and folder in Unix/OS X

domain names in DNS
an idiom: tagging

twitter hashtags

photo keywords

Gmail labels
Search finds Object contains Smart Collection

Object has tags defined by

Tag for tags
an idiom: upvoting

questions on Stack Overflow

recommending comments on NY Times

posts on reddit
Carolyn Egel • Valley Lee, Md.

As always, the battle is set between the haves, and the rest. The haves have just lost out, and the movement back towards the greater good has begun. Let's hope the American public sees the sense in what the French and Greeks have done yesterday, by reclaiming their governments to represent the people for a change. The stock markets will likely be unhappy.

May 7, 2012 at 3:23 p.m. • RECOMMEND 8

This is homework and I'm having a lot of trouble with it. I am using Alloy to model a library. Here are the definitions of the objects:

```
sig Library {
  patrons : set Person,
  on_shelves : set Book,
}
sig Book {
  authors : set Person,
  loaned_to : set Person,
}
sig Person{
```

Then we need to have a fact that states, every book is either on the shelf, or taken out by a patron. However, they cannot be in both places.

My cat was sick and got meds. Now my cat is high as a kite.

submitted 3 hours ago by ogden24 to funny

146 comments share
an idiom: presets

printer settings

exporting PDF

Amazon’s one-click settings
an idiom: styles

color schemes in Powerpoint

swatches in Indesign

paragraph styles in Word
There is no problem in computer science that cannot be solved by introducing another level of indirection.

--David Wheeler
so is it a good conceptual model?
| ✔️ | are the concepts rich enough? |
| ✔️ | are the concepts simple enough? |
| ✔️ | are the concepts consistent? |
| ✔️ | are idioms & conventions leveraged? |
| ✔️ | are suitable generalizations introduced? |
| ✗ | are concepts decoupled? |
example: macintosh trash

deleting from external drive (eg USB)
› can’t reuse space until trash emptied

retrieving accidentally deleted files
› no date of deletion

partial emptying
› not possible
what exists

Machine

Drives

Trash

files

deleted files

Drive

files

deleted files

File

mod date

del date

Machine

Trash

File

what we need

Drive

files

deleted files

File

mod date

del date

Machine

Trash

File
example: *photoshop cropping*
Photoshop 5 and before

Photoshop 6 and Lightroom

Resolution

Photo

Crop

Pixel

Aspect Ratio

Dimensions

new resolution

optional ratio

selected pixels

physical dimensions

Pixel

optional dimension

selected pixels

Aspect Ratio

Physical Dimensions

Crop & Straighten

Tool:

Aspect:

Angle

Original

0.00
example: Apple Mail conversations

- Grey background means conversation is not selected
- Blue border means message is selected
- Number of messages in conversation
- Sent message not included in message count
some questions
› does a mailbox contain all the messages its conversations involve? no.
› do move, delete, etc apply to conversations? yes.
› when you move a conversation to another mailbox, do all messages move with it? no.
closing thoughts
it’s not just about usability

<table>
<thead>
<tr>
<th>weak concepts</th>
<th>strong concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>hard to use</td>
<td>intuitive, predictable</td>
</tr>
<tr>
<td>a mess to maintain</td>
<td>decoupling &amp; localization</td>
</tr>
<tr>
<td>unreliable &amp; buggy</td>
<td>more dependable</td>
</tr>
</tbody>
</table>
Conceptual integrity is the most important consideration in system design.

—Fred Brooks, 1975

I am more convinced than ever. Conceptual integrity is central to product quality.

—Fred Brooks, 1995

Because ease of use is the purpose, this ratio of function to conceptual complexity is the ultimate test of system design. Neither function alone nor simplicity alone defines a good design.
building a method of conceptual design

- analysis tools
- design criteria
- modeling notations
- idioms & patterns
- underlying theory
- case studies
alloy: a language & tool for relational models

about alloy

Alloy is a language for describing structures and a tool for exploring them. It has been used in a wide range of applications from finding holes in security mechanisms to designing telephone switching networks.

An Alloy model is a collection of constraints that describes (implicitly) a set of structures, for example: all the possible security configurations of a web application, or all the possible topologies of a switching network. Alloy’s tool, the Alloy Analyzer, is a solver that takes the constraints of a model and finds structures that satisfy them. It can be used both to explore the model by generating sample structures, and to check properties of the model by generating counterexamples. Structures are displayed graphically, and their appearance can be customized for the domain at hand.

At its core, the Alloy language is a simple but expressive logic based on the notion of relations, and was inspired by the Z specification language and Tarski’s relational calculus. Alloy’s syntax is designed to make it easy to build models incrementally, and was influenced by modeling languages (such as the object models of OMT and UML). Novel features of Alloy include a rich subtype facility for factoring out common features and a uniform and powerful syntax for navigation expressions.

The Alloy Analyzer works by reduction to SAT. Version 4 was a complete rewrite that included Kodkod, a new model finding engine that optimizes the reduction, and a new front end.
the heart of software

code

interface

user's model

conceptual model
takeaway

contextual design is
at the heart of the design of software
and many other complex systems

it’s what you do
if you’re an analysis, consultant, programmer...

focusing on concept structure
low cost, potentially high gain
To design something really well, you have to get it. You have to really grok what it’s all about. It takes a passionate commitment to really thoroughly understand something, chew it up, not just quickly swallow it. Most people don’t take the time to do that.