quiz minutes remaining

11:00
the role of problems in design
years of refinement to solve a hard problem
applying technology that makes an old problem solvable
teflon

cell phones

camera tech?
getting lucky: hammer in search of a nail
Velcro, 1941
finding the problem
The next question was the obvious one, “Can we produce a secure encrypted message, readable by the authorised recipient without any prior secret exchange of the key etc?” This question actually occurred to me in bed one night, and the proof of the theoretical possibility took only a few minutes. We had an existence theorem. The unthinkable was actually possible. The only remaining question was “Can it be made practicable?”. This took a while to answer.

James Ellis talking about “non-secret encryption” a problem invented in 1970
reliable data over unreliable medium
shrinking a problem
old problem: distributed computing
new problem: share documents
growing a problem
Garmin: provide traffic data

Waze: provide and obtain data
find the real problem
old problem: take photo in focus
new problem: have photo that’s focused

Lytro light field camera
old problem: make an MP3 player
new problem: make a music service

iPod, 2001

iTunes, 2001
old problem: make image of whiteboard
new problem: use whiteboard to make image

Mimeo interactive whiteboard
old problem: make it hard to steal cars

new problem: reduce car theft

Vehicle Identification Number, 1954
purposes
some theory about purposes
designing for a purpose

- purpose
- justifies
- fulfills
- contrivance
- misfit
candidate contrivances

- changeable print display on wall
  - fulfills?
    - corkboard
    - magnetic paint
    - adhesive
misfits

damages prints

damages prints

changeable print display on wall

fulfills?

corkboard

magnetic paint

adhesive

✘
adding refinements

- Changeable print display on wall
- ... and no damage to prints

Options:
- Corkboard
- Magnetic paint
- Adhesive
never fully predictable

- changeable print display on wall
- ... and no damage to prints
- ... and allow wifi to pass

fulfills?

- corkboard
- magnetic paint ✘
- adhesive
Such a list of requirements is potentially endless... But if we think of the requirements from a negative point of view, as potential misfits, there is a simple way of picking a finite set. This is because it is through misfit that the problem originally brings itself to our attention. We take just those relations between form and context which obtrude most strongly, which demand attention most clearly, which seem most likely to go wrong. We cannot do better than this.
perturbing the context

purpose

fulfills

contrivance

... and change in user behavior
evaluating contextual demands

- Changeable print display on wall fulfills?
- Magnetic paint
  - ... and 6 coats
  - ... and neodymium magnets
example: the alignment problem

purpose: help align objects

a contrivance: autoalign

a better contrivance: snap align

can formalize: detailed behavior, especially objects within groups, layers, stacking etc

cannot formalize: the purpose shared by both contrivances
concepts & purposes

- purpose
  - fulfills
  - concept
    - contrivance

- purpose
  - fulfills
  - concept

- purpose
  - fulfills

- concept
  - contrivance
example: text formatting

- maintain consistent format
- bound text alignment
- provide formatting unit

style

paragraph

word processor
so what?
practical purposes
what’s a purpose?

a desired outcome
not a way to achieve an outcome
eg, “integrate with Gmail”

a requirement
not a code or design detail
eg, “use JQuery”

about the product
not about the process
eg, “deliver by 2015”

concrete & measurable
not abstract and vague
eg, “learnable interface”
MVP

“minimum viable product”
what you build first
defined by a (small!) set of purposes

purpose keeps you focused
avoid unnecessary concepts
provide maximal bang/$
distinguish from competitors
the purpose game

labels in Gmail

trashcan

color labels

friendship in FB
the purpose game, part 2

what’s the purpose of...?

Facebook
Photoshop
Acrobat
maintaining focus: dropbox

which of these is a purpose of Dropbox?
“synchronize files across machines”
“enable transfer of large files between users”
“backup files to protect against loss”
example: 6170

purposes
- develop fundamental skills
- learn how to design from start

non-purposes
- become expert in web tech
- learn “best practices”

candidates
- teach problem analysis
- open-ended problem sets
- teach test-first programming
example: 6170 platform

purposes
show small examples in class
ease the learning curve
prepare for summer jobs

non-purposes
learn “best practices”
maximize student income
ease large CRUD projects

candidates
node.js
Rails
WordPress
“essentialism” applies to everyday life the idea of finding the right purposes and focusing on them to make you happier and more productive.
interlude
“Unity of Purpose” by Mitchell & Webb, a British comedy duo
context
every app has a context

who
› will interact with the app?
› will administer it?

what
› other systems, apps & interfaces?
› physical peripherals & connections
› social connections

where
› might failures happen?
› do the responsibilities lie?
identify
› different classes of users
› and their interactions

- Course staff
  - upload materials
  - make announcements
  - approve grades

- Graders
  - enter grades

- Stellar
  - download materials
  - read grades

- Public
  - download materials

- Student
  - download materials
identify

- other systems app will interact with

- **Course staff**
  - upload materials
  - make announcements
  - approve grades

- **Graders**
  - download materials
  - enter grades

- **Registrar**
  - registration updates

- **Stellar**
  - upload materials
  - make announcements
  - approve grades

- **Student**
  - download materials
  - read grades

- **Public**
  - download materials
action at a distance

consider systems and users app interacts with
› do they interact with each other?
example: web analytics

- Analytics User
- Browser
- Other Server
- Analytics Server
- Tracked User

Connections:
- Analytics User → Browser: register site
- Analytics Server → Analytics Server: get snippet, read analytics
- Analytics Server → Tracked User: record visit
- Tracked User → Browser: get web page
- Other Server → Analytics Server: upload snippet in web page
example: online store

- Admin
- Seller
- Customer
- Shipper
- Online Store
- Warehouse

- analytics
- moderation
- listing edits
- purchases
- reviews
- listings
- account info
- tracking
- inventory
- orders
- shipment
exercise: ebay

- **Buyer**
  - item
  - tracking data

- **Ebay**
  - bids, reviews
  - item info, bid updates
  - posting

- **Paypal**
  - payment request
  - payment notification

- **Shipper**
  - item
  - tracking data

- **Seller**
  - funds

- **Bank**
  - funds
summary

two powerful tools for problem analysis
purposes & context
challenging (and fun!) if done well
huge impact on outcome

next time, a third tool
concepts: identifying essential parts