Interaction Design Basics

interaction design basics

- design:
  - what it is, interventions, goals, constraints
- the design process
  - what happens when
- users
  - who they are, what they are like …
- scenarios
  - rich stories of design
- navigation
  - finding your way around a system
- screen design
  - what goes where, and what it looks like
- iteration and prototypes
  - never get it right first time!

what are we designing?

what are we designing?

interactions not just interfaces

interactions
not just interfaces

not just the immediate interaction

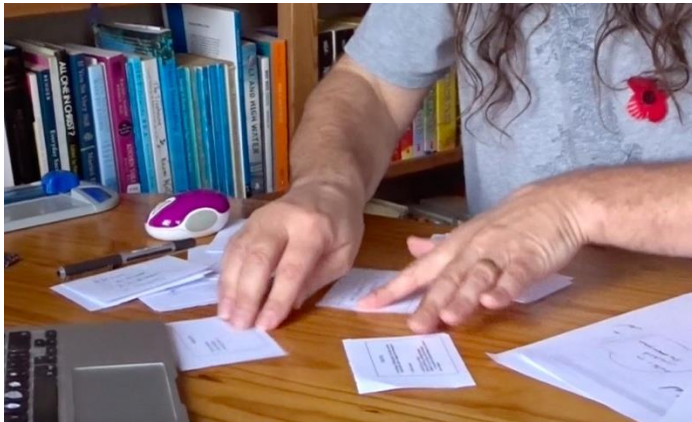
e.g. online vs face-to-face lecture

technology changes interaction style

e.g. slide sorting

paper: sort then name

outliner: name then sort



what are we designing?

interactions not just interfaces

what are we designing?

interactions not just interfaces

interventions not just artefacts

design interventions
not just artefacts

not just the system, but also …

documentation, manuals, tutorials

what we say and do as well as what we make

what are we designing?

not just interfaces

interactions and interventions

we don’t stick around
but we do make a difference

what is design?

achieving goals within constraints

- goals - purpose
  - who is it for, why do they want it
- constraints
  - materials, platforms
- trade-offs

golden rule of design

understand your materials

for Human-Computer Interaction

understand your materials

- understand computers
  - limitations, capacities, tools, platforms
- understand people
  - psychological, social aspects
  - human error
- and their interaction …

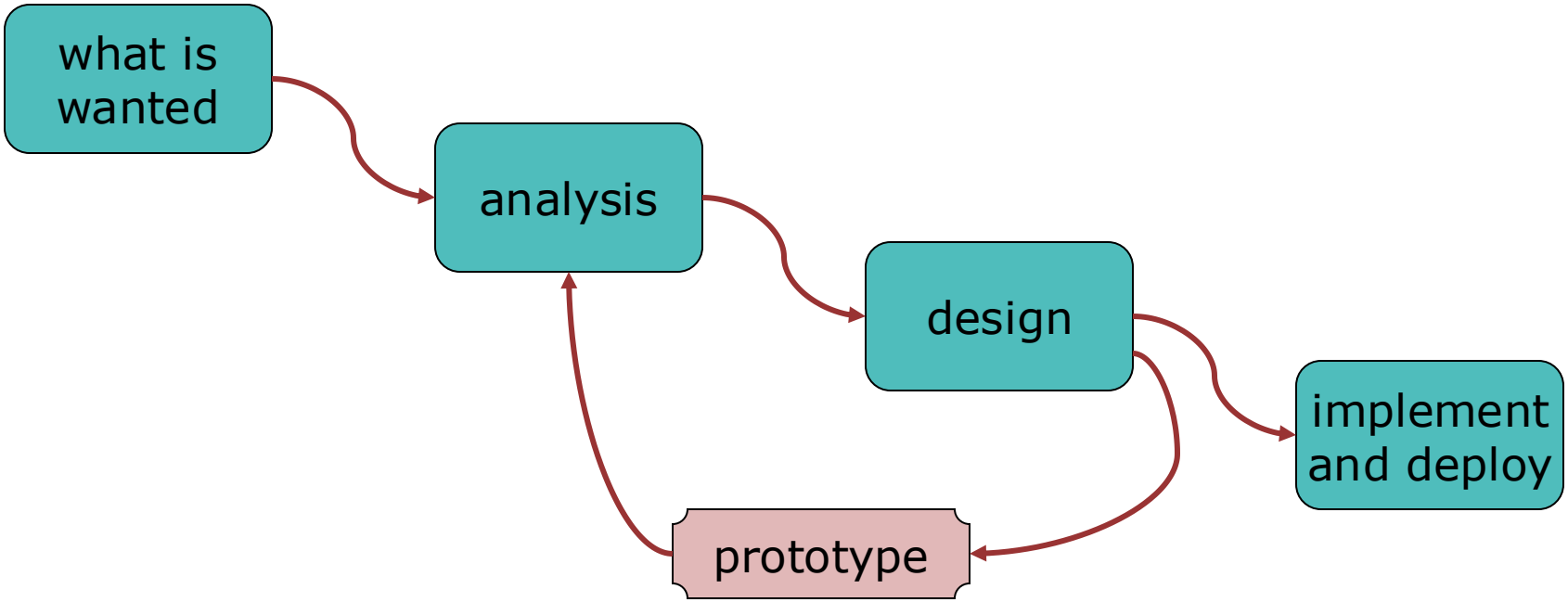
To err is human

- accident reports ..
  - aircrash, industrial accident, hospital mistake
  - enquiry … blames … 'human error'
- but …
  - concrete lintel breaks because too much weight
  - blame 'lintel error' ?
    … no – design error
    we know how concrete behaves under stress
- human 'error' is normal
  - we know how users behave under stress
  - so design for it!
- treat the user at least as well as physical materials!

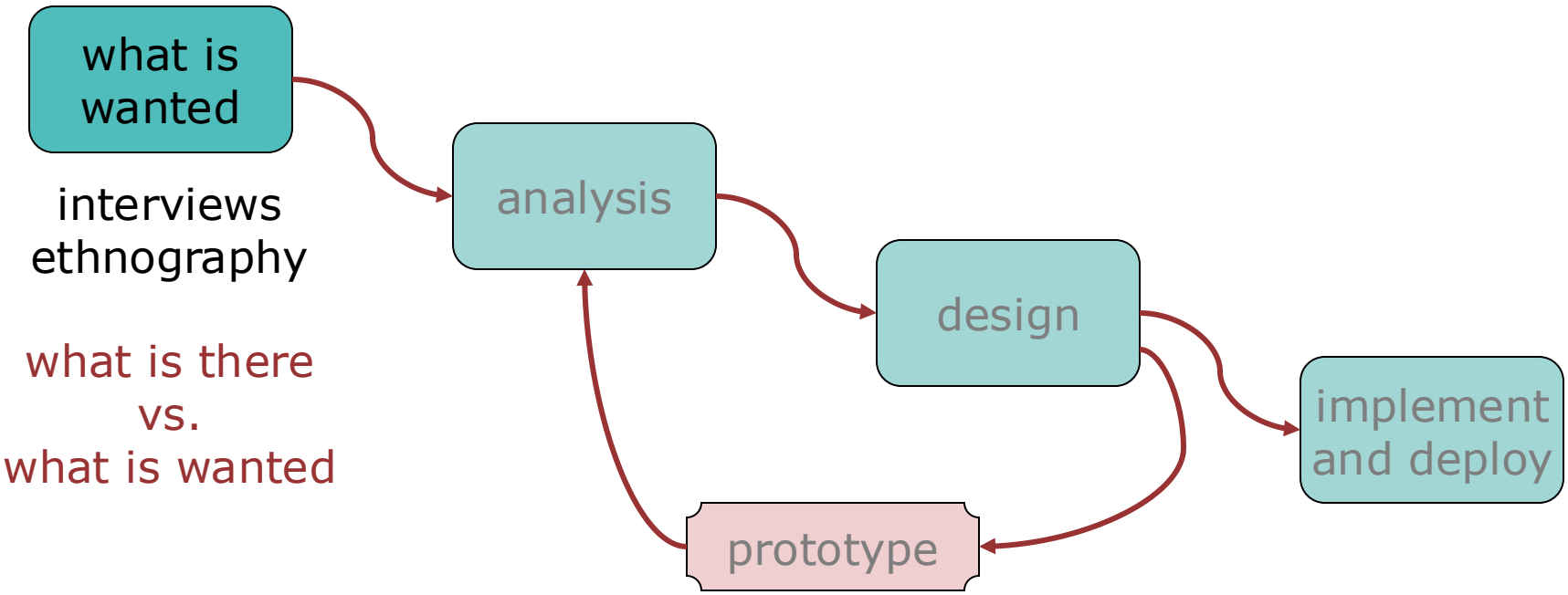
Central message …

the user

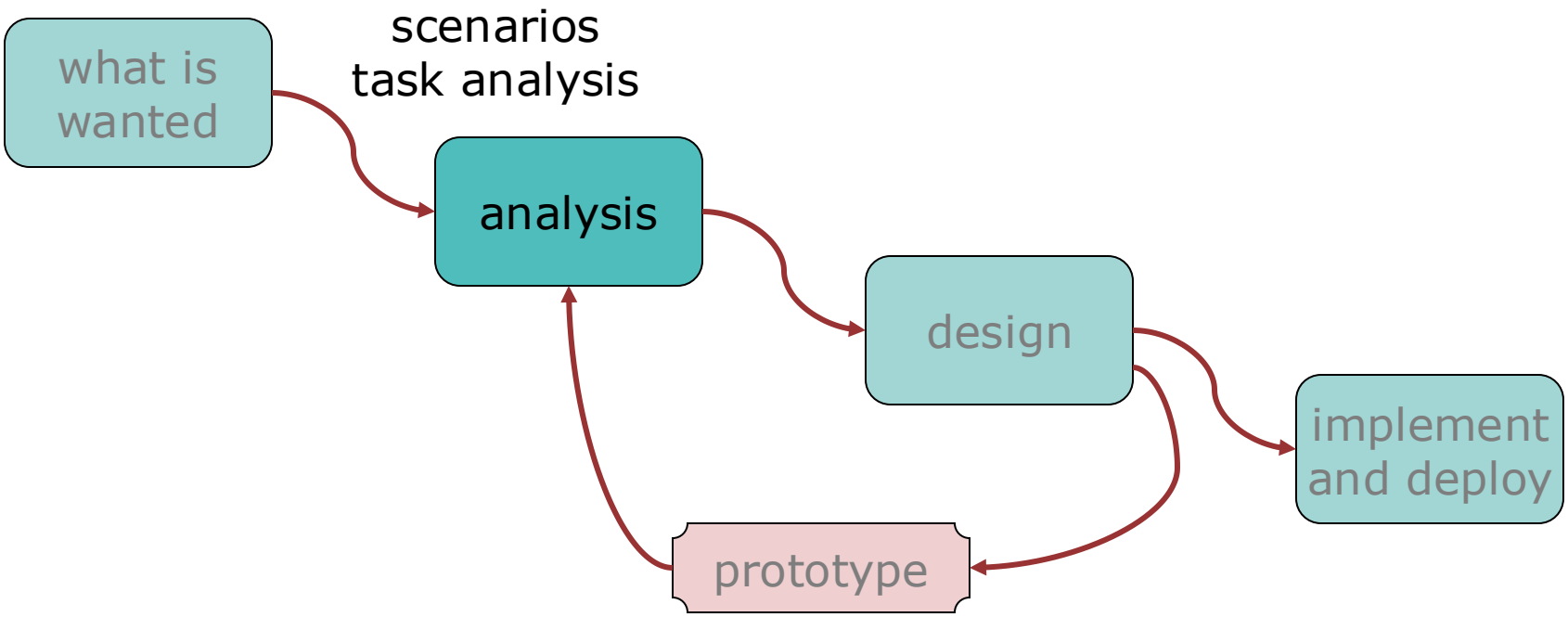
The process of design



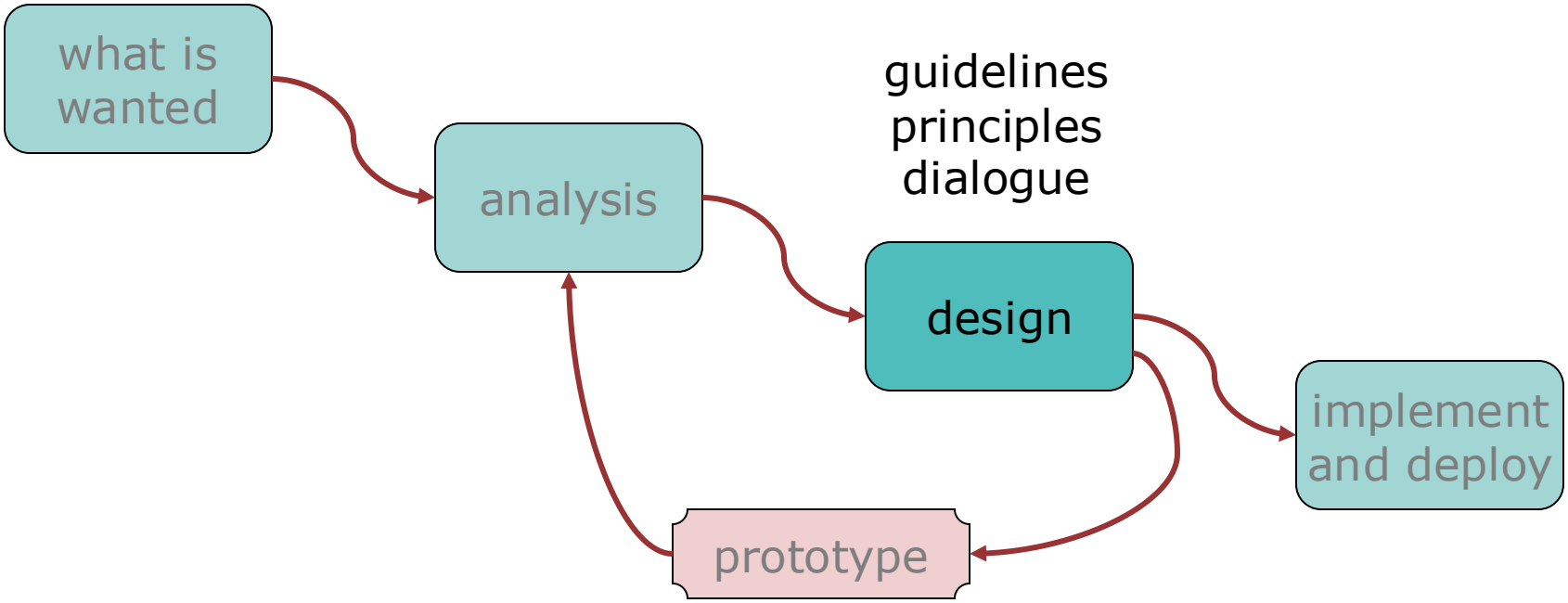
The process of design



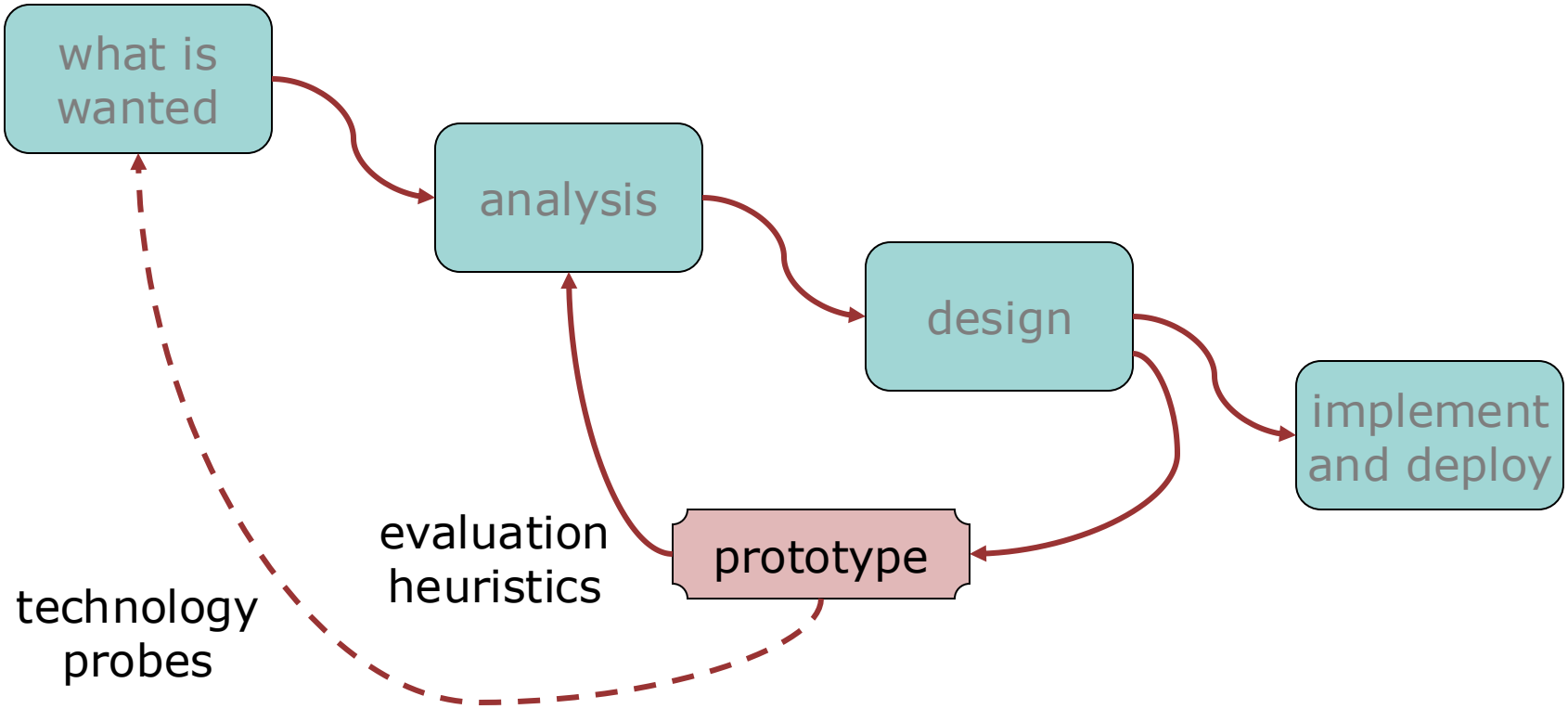
The process of design



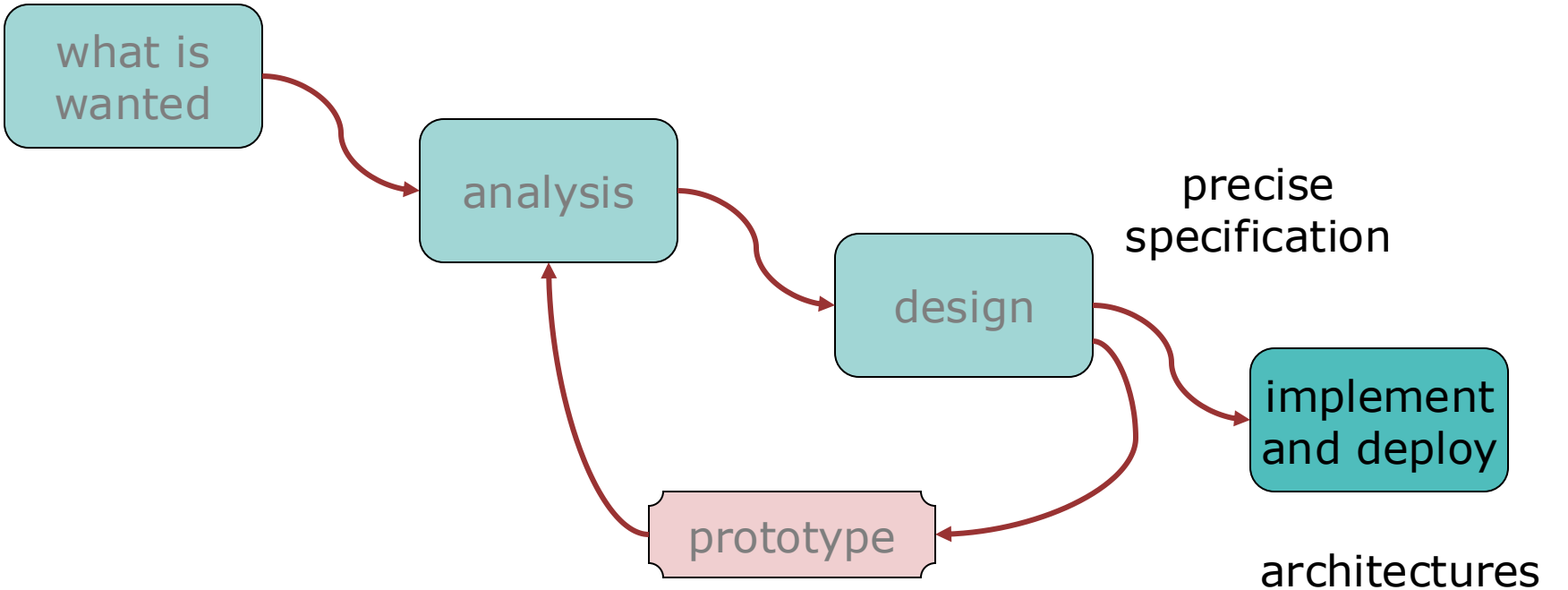
The process of design



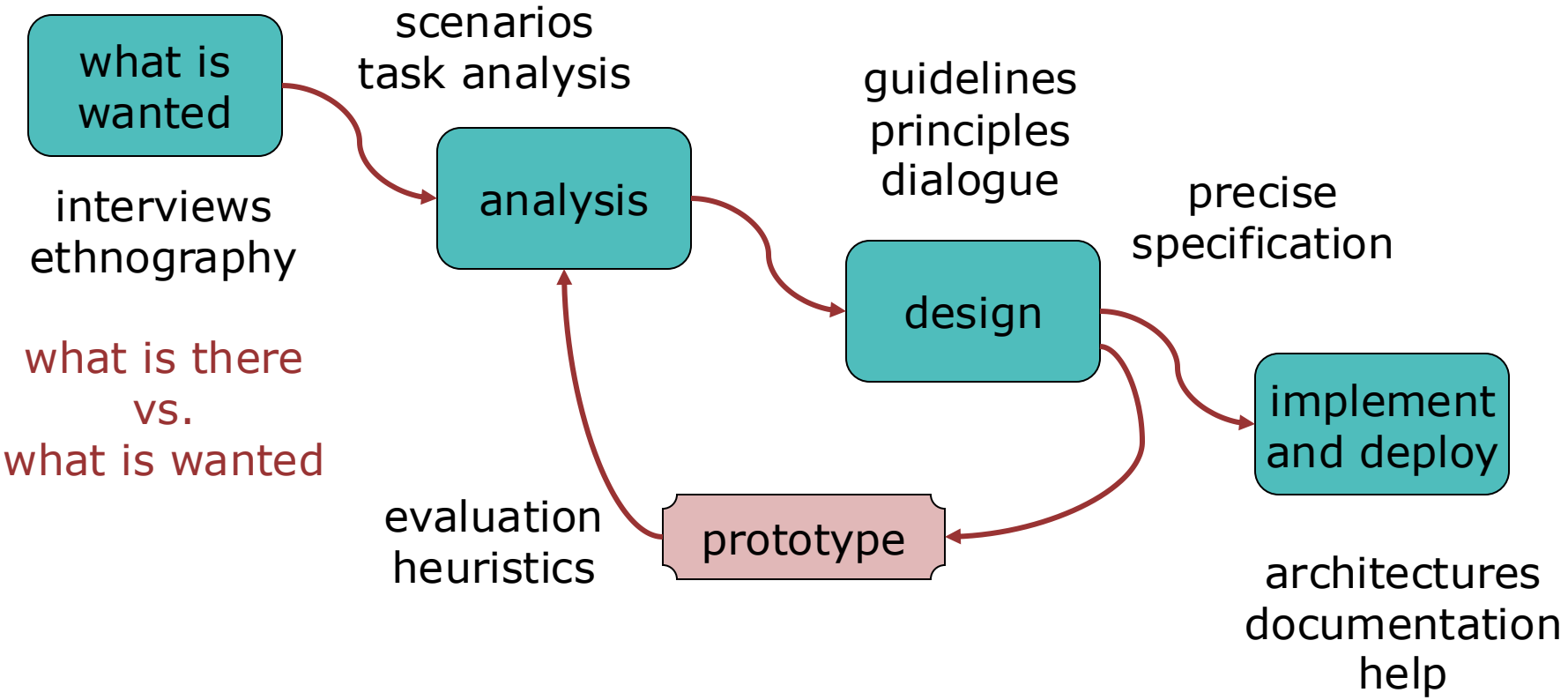
The process of design



The process of design



The process of design



… but how can I do it all ! !

… but how can I do it all ! !

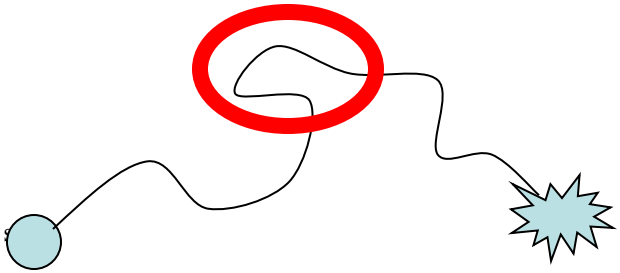
limited time $\Rightarrow$

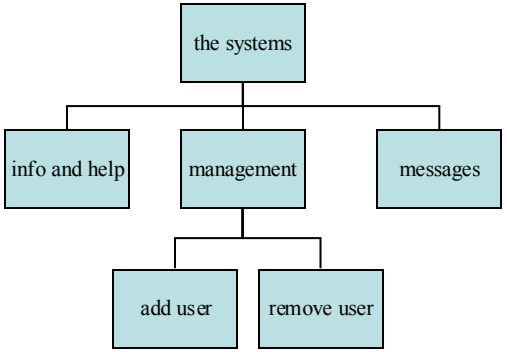
design trade-off

usability?

finding problems and fixing them? ?

deciding what to fix? ?

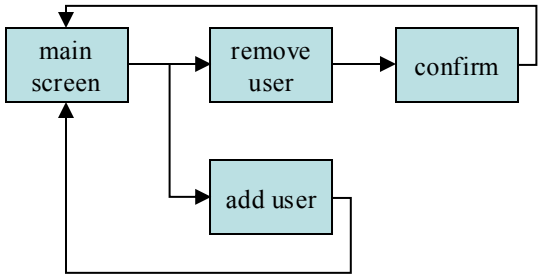




navigation design

local structure – single screen

global structure – whole site



levels

- widget choice
  - menus, buttons etc.
- screen design
- application navigation design
- environment
  - other apps, O/S

the web …

- widget choice
- screen design
- navigation design
- environment

- elements and tags
  - `<a href="...">`
- page design
- site structure
- the web, browser, external links

physical devices

- widget choice
- screen design
- navigation design
- environment
- controls
  - `buttons, knobs, dials`
- physical layout
- modes of device
- the real world

think about structure

- within a screen
  - layout and appearance
- local
  - looking from this screen out
- global
  - structure of site, movement between screens
- wider still
  - relationship with other applications

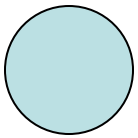
local

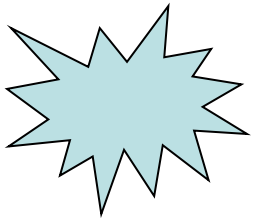
from one screen looking out

goal seeking

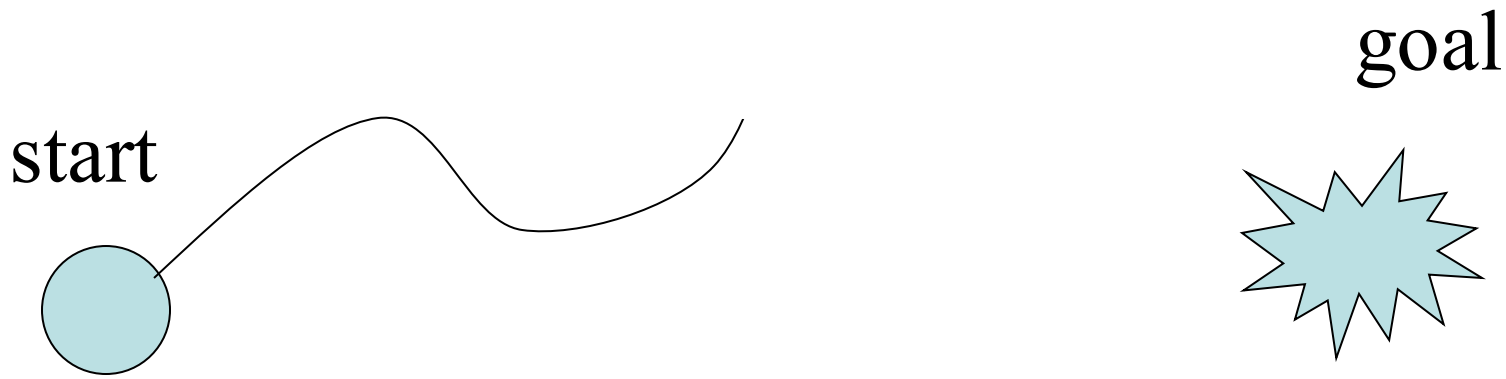
goal

start



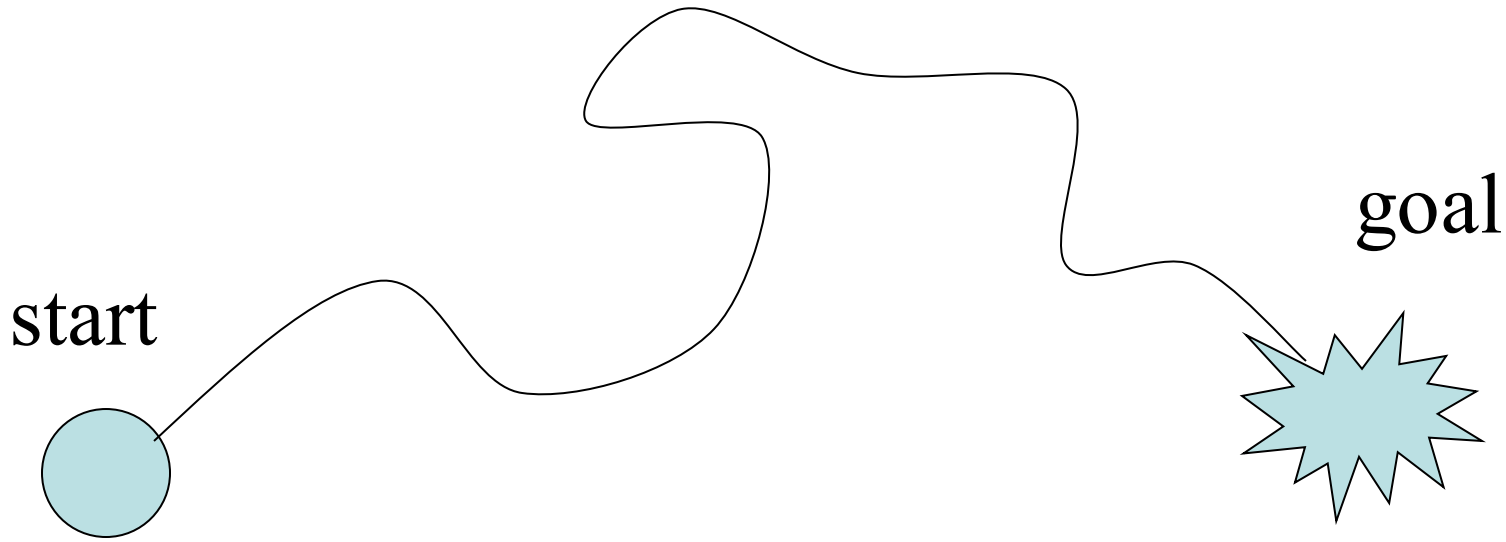


goal seeking



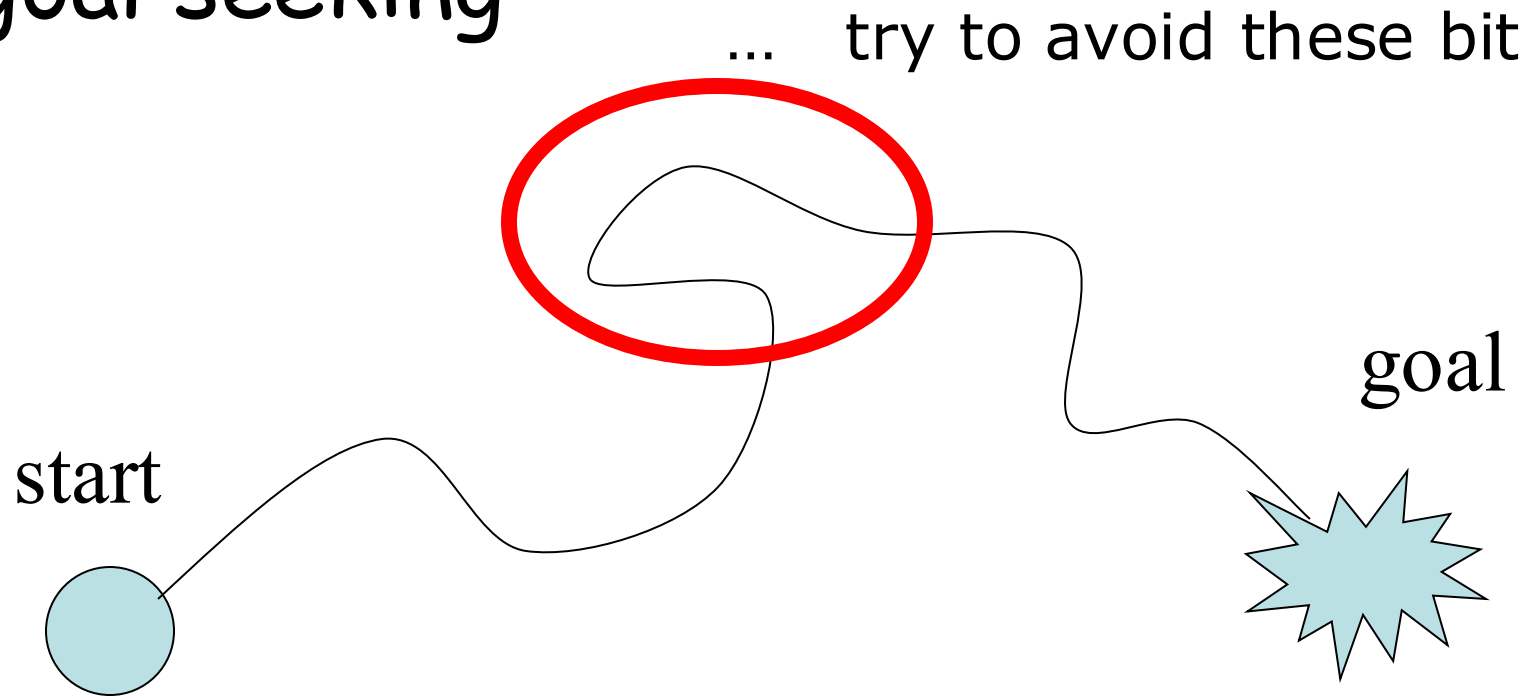
progress with local knowledge only ...

goal seeking

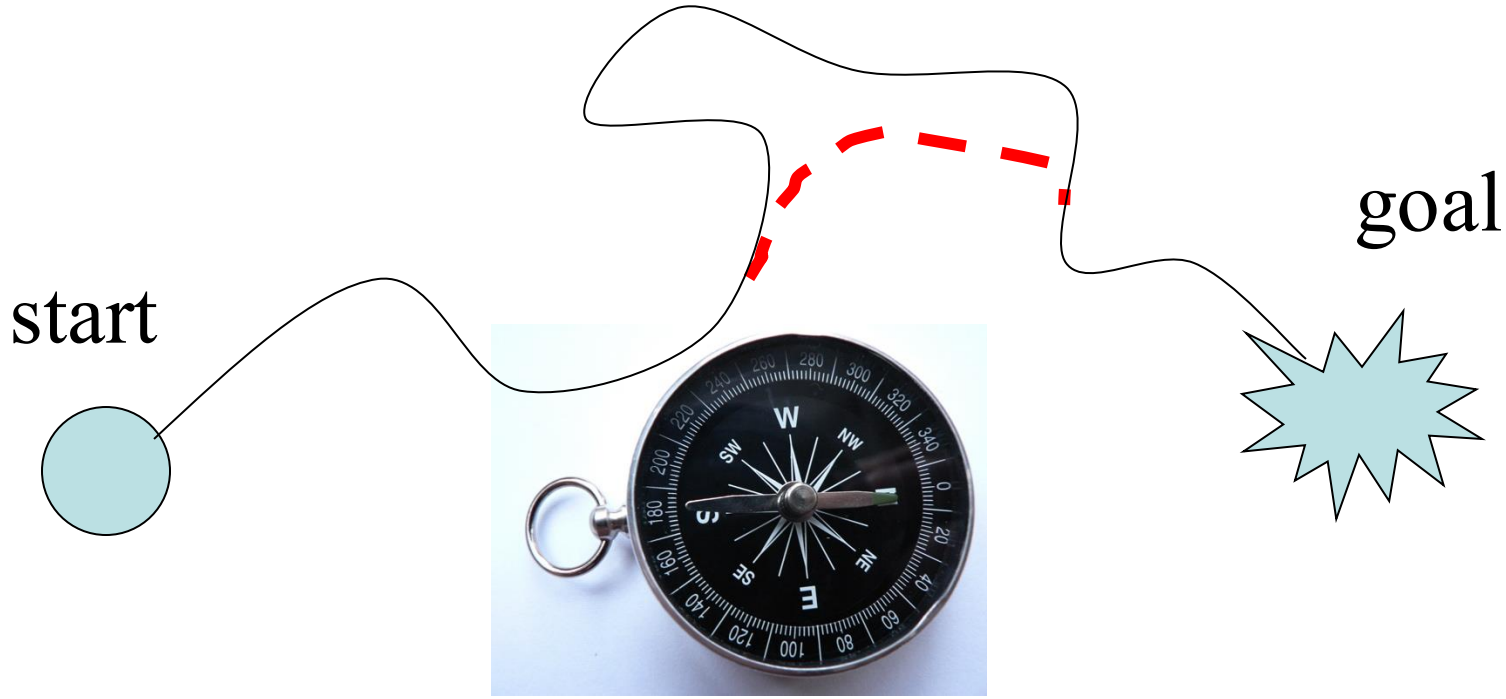


… but can get to the goal

goal seeking



goal seeking

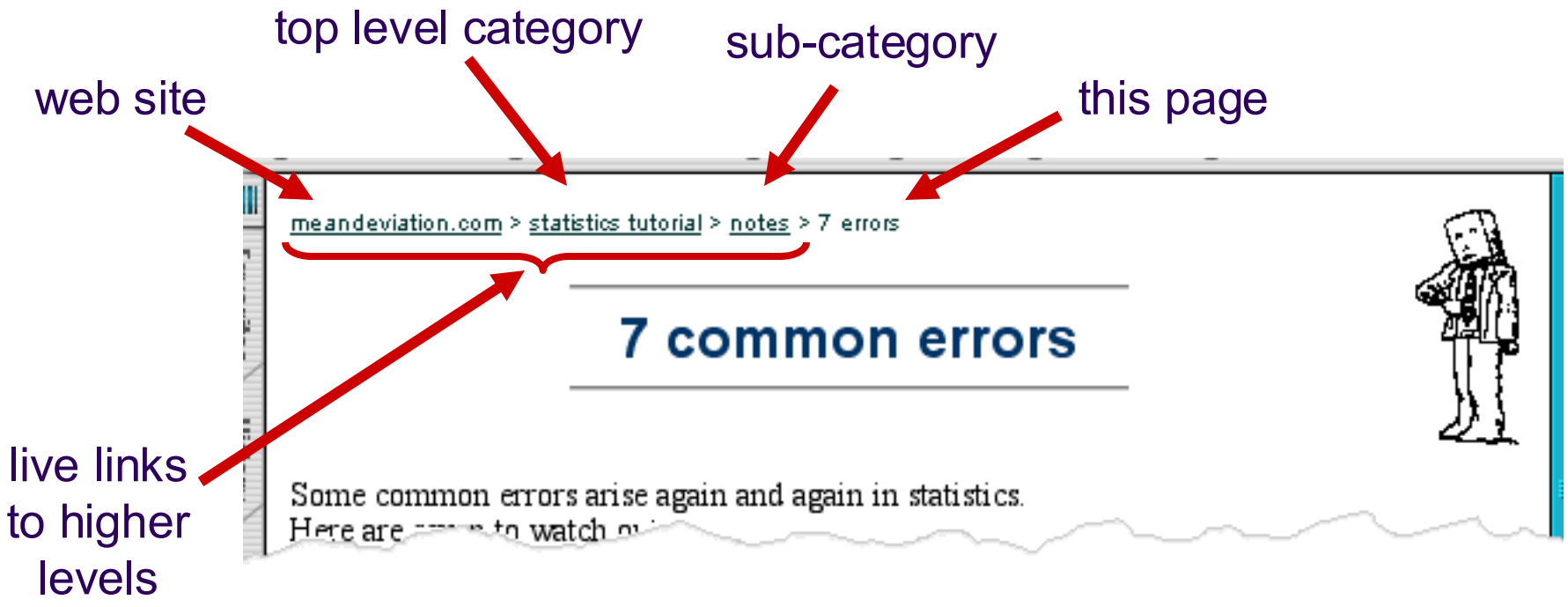


four golden rules

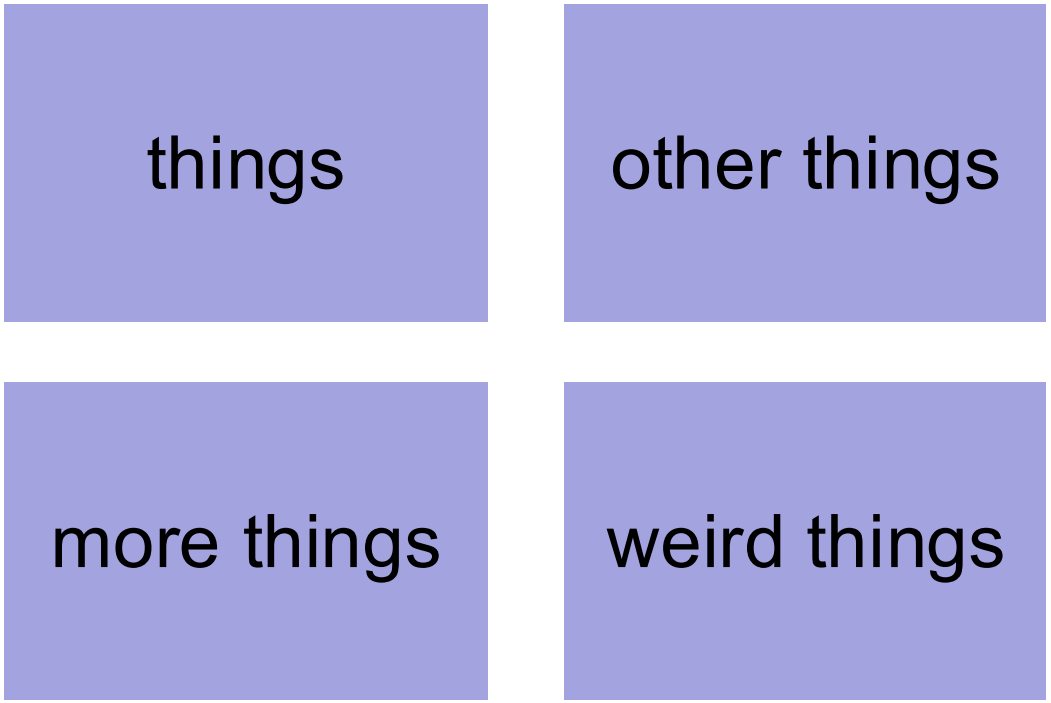
- knowing where you are
- knowing what you can do
- knowing where are you are going
  - or what will happen
- knowing where you've been
  - or what you've done

where you are – breadcrumbs

shows path through web site hierarchy



where next – the big button trap



where do they go?

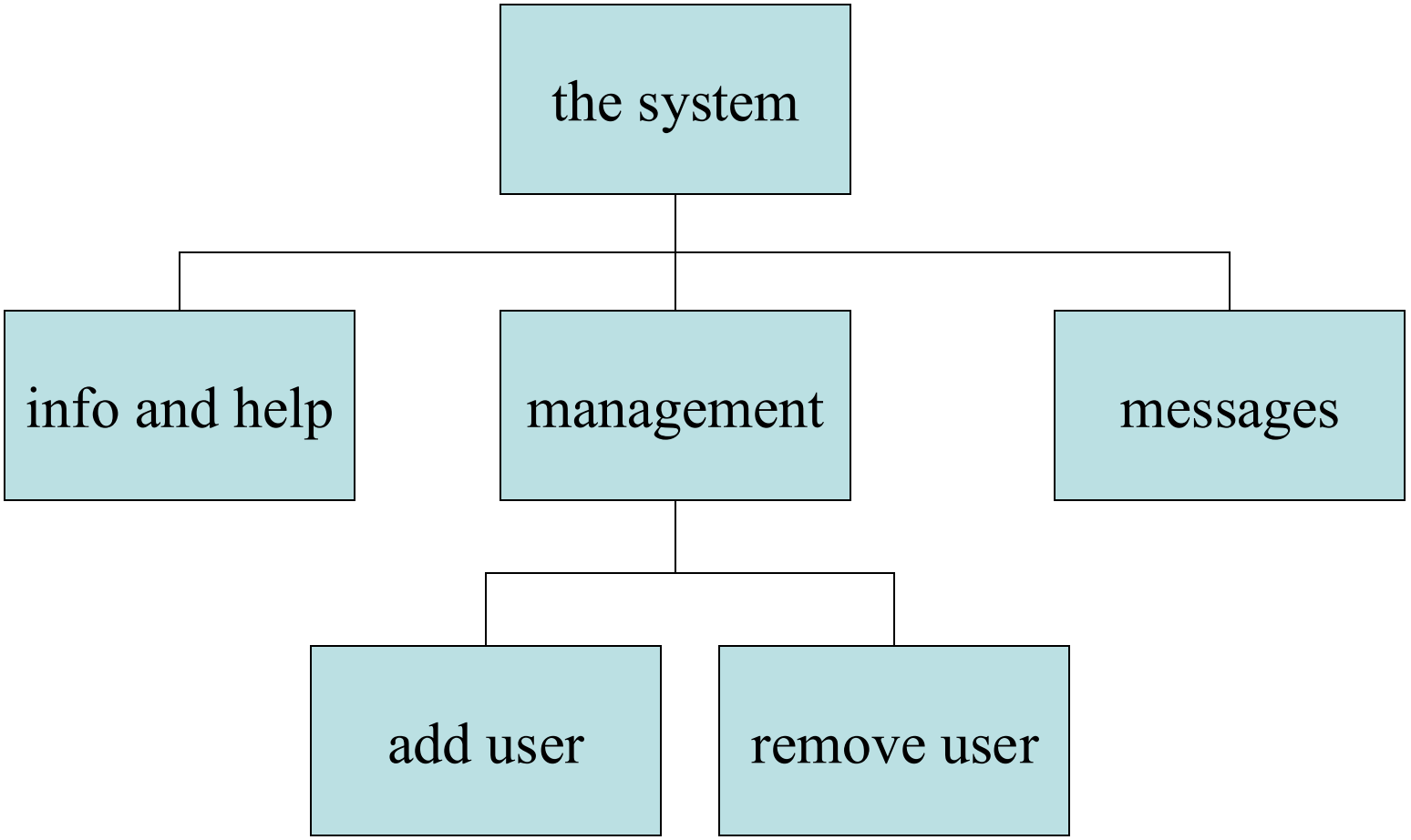
– lots of room for extra text!

global

between screens
within the application

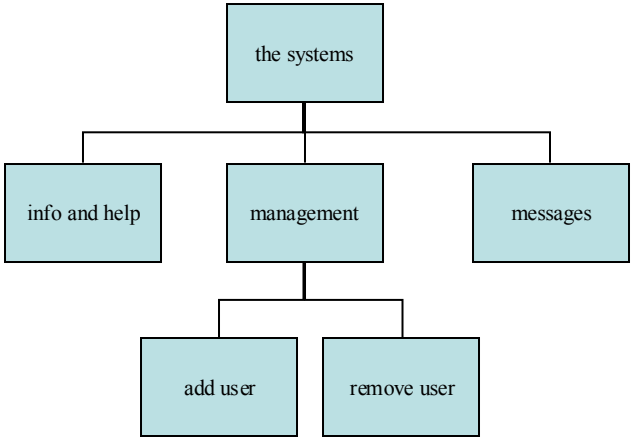
global navigation structure

hierarchical diagrams



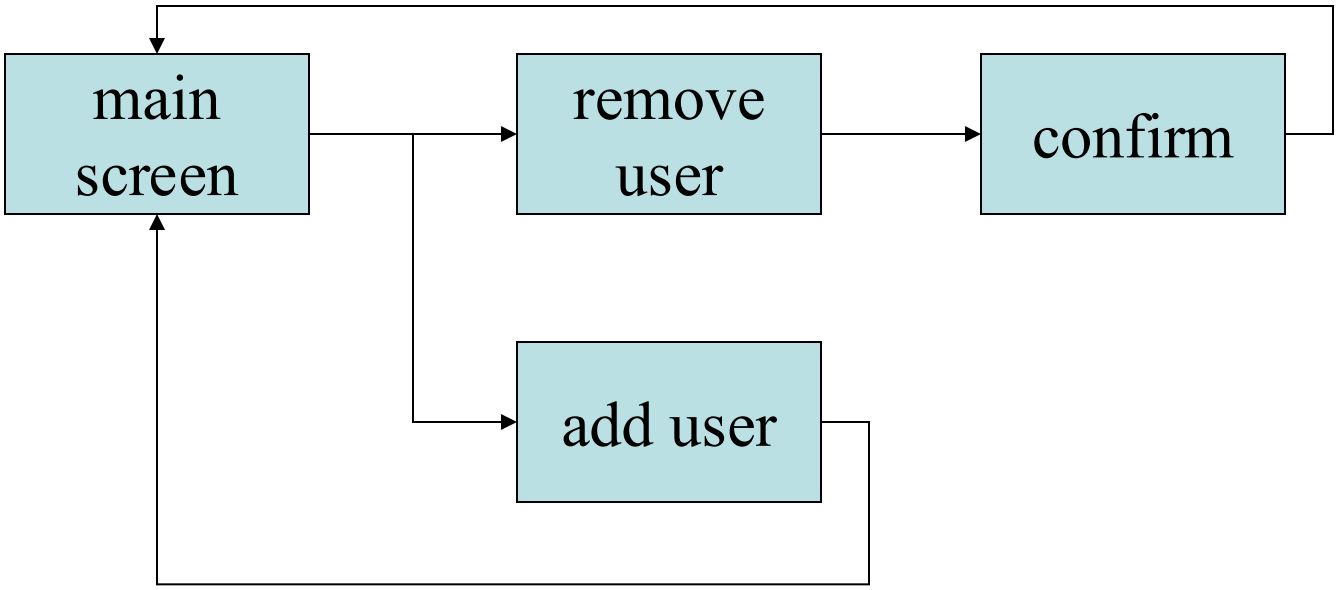
hierarchical diagrams ctd.

- parts of application
  - screens or groups of screens
- typically functional separation



global navigation network

network diagrams

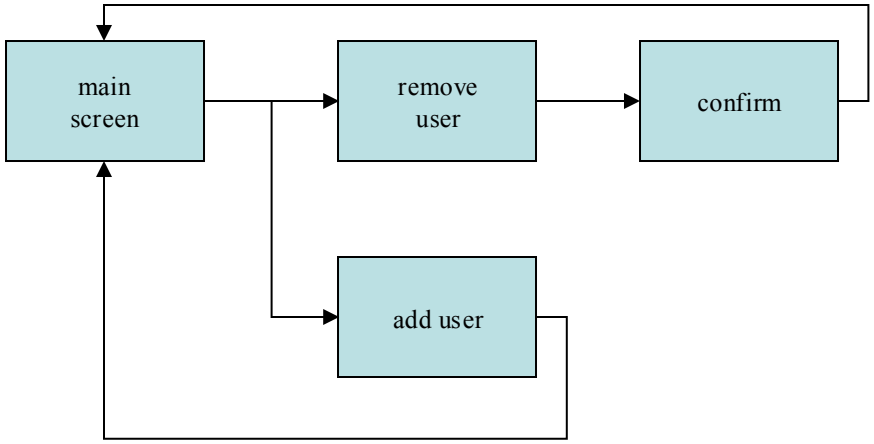


- show different paths through system

network diagrams ctd.

- what leads to what
- what happens when
- including branches

- more task oriented than hierarchy
- dialogue design



Dix , Alan
Finlay, Janet
Abowd, Gregory
Beale, Russell

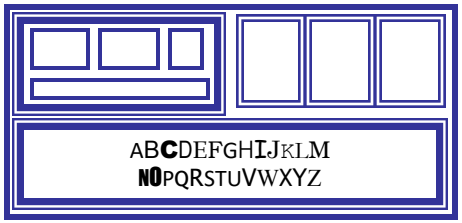
screen design and layout

basic principles

grouping, structure, order, alignment, use of white space

physical panels

action and appearance



basic principles

- ask
  - what is the user doing?
- think
  - what information, comparisons, order
- design
  - form follows function

available tools

- grouping of items
- order of items
- decoration
    - fonts, boxes, colours, lines, etc.
- alignment of items
- white space between items

screen / page grouping and structure

grouping and structure

logically together $\Rightarrow$ physically together

Billing details:
Name
Address: …
Credit card no

Delivery details:
Name
Address: …
Delivery time

Order details:

item	quantity	cost/item	cost
size 10 screws (boxes)	7	3.71	25.97
.....	...	...	...

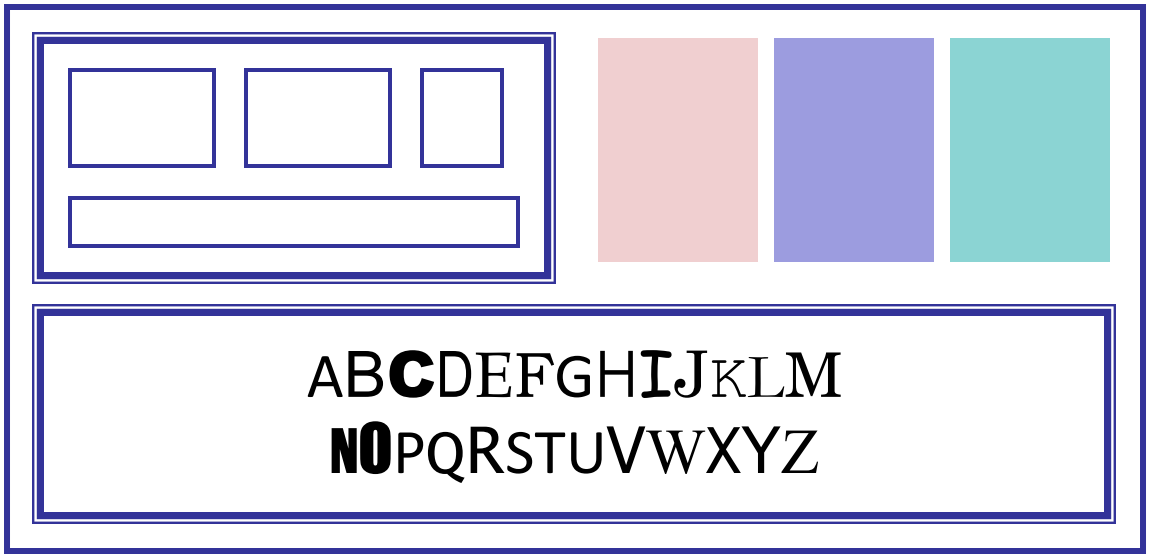
order of groups and items

- think! - what is natural order
- should match screen order!
  - use boxes, space etc.
  - set up tabbing right!
- instructions
  - beware the cake recipe syndrome!
    ... mix milk and flour, add the fruit after beating them

Exception!
off-the-bottom buttons

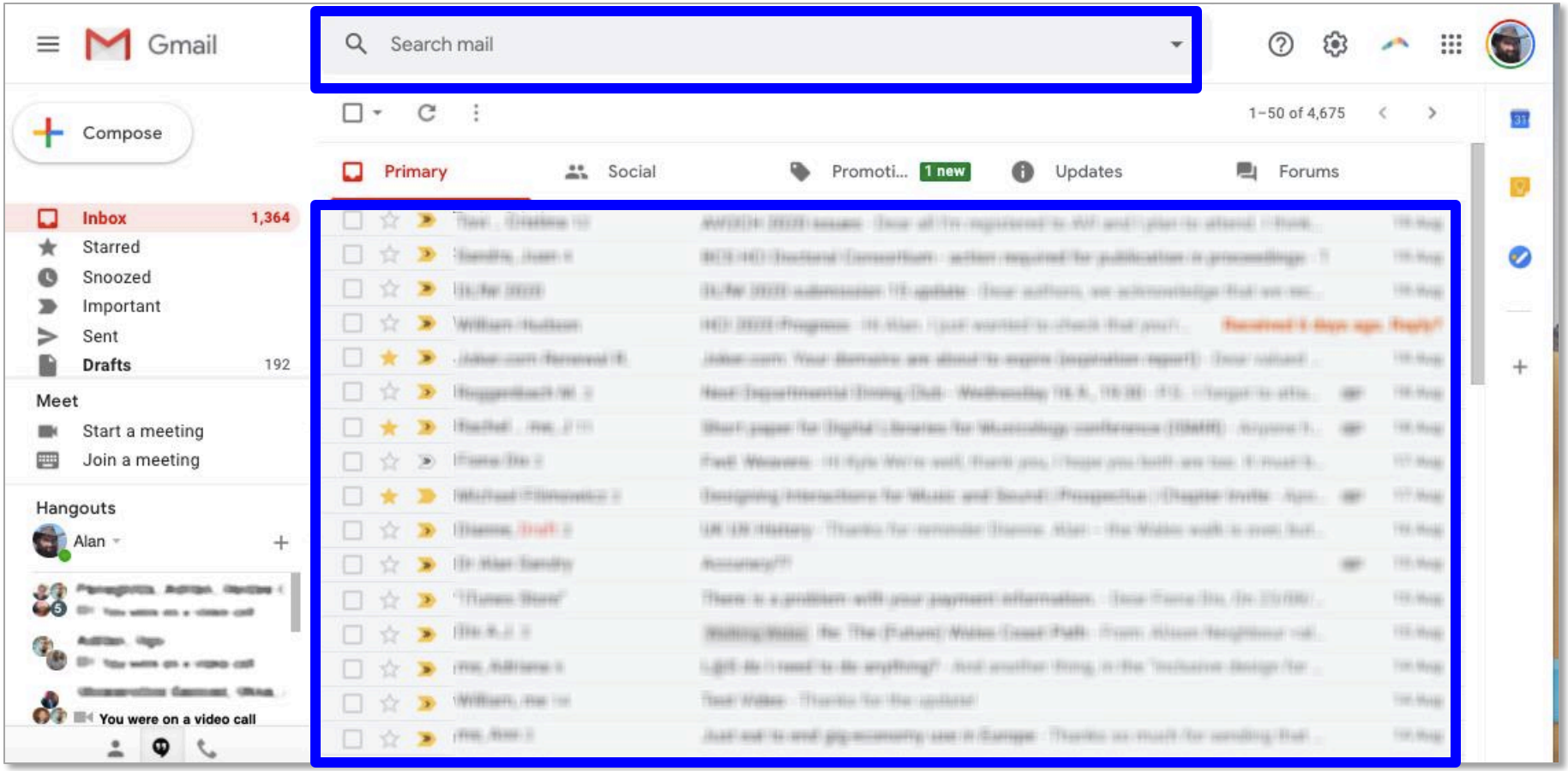
decoration

- use boxes or background to group logical items
- use fonts for emphasis, headings
- but not too many!!



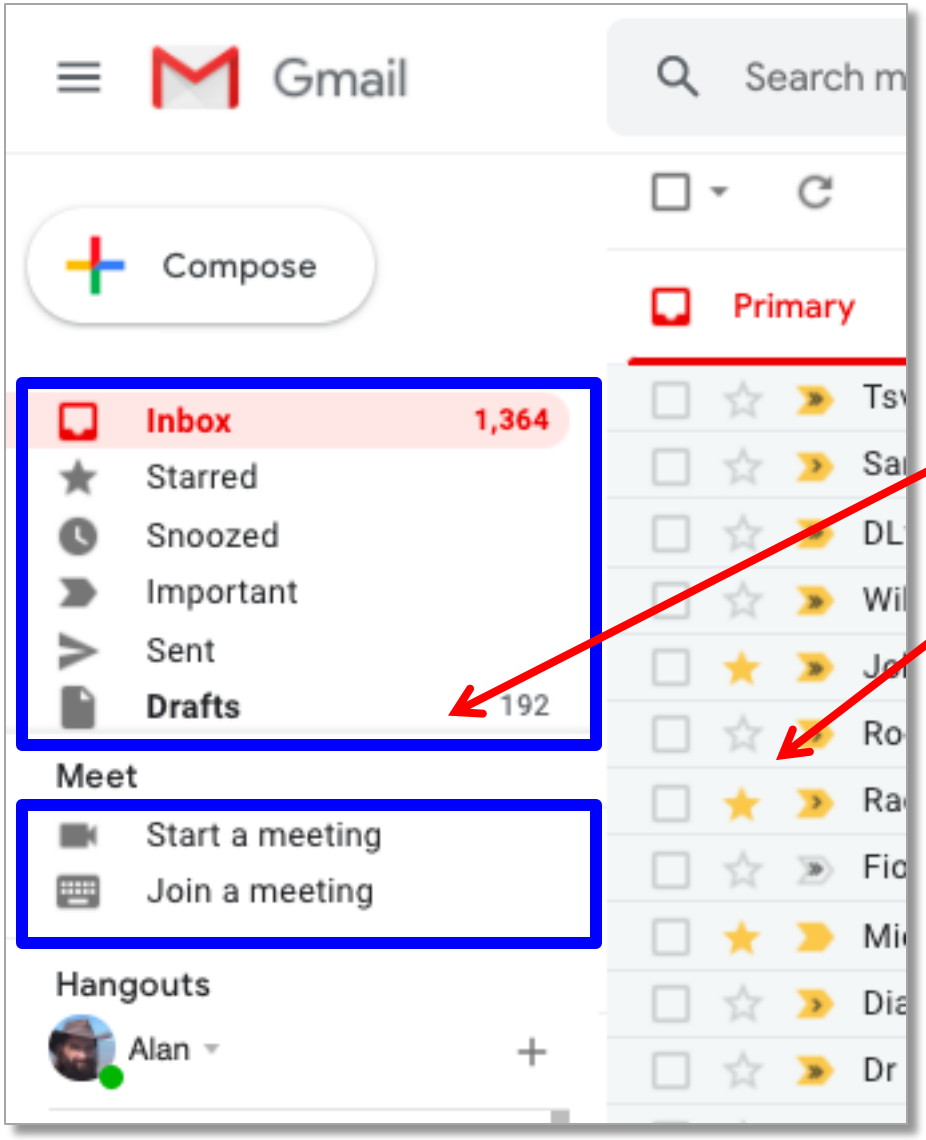
grouping- gmail

background colour for large blocks



clear functional groups

redundant coding using light lines



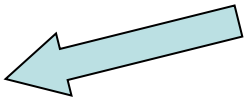
alignment

alignment - text

if the user reads left to right (e.g. English)

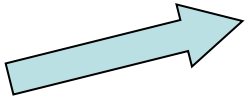
$\Rightarrow$ align left hand side

Willy Wonka and the Chocolate Factory
Winston Churchill - A Biography
Wizard of Oz
Xena - Warrior Princess



boring but readable!

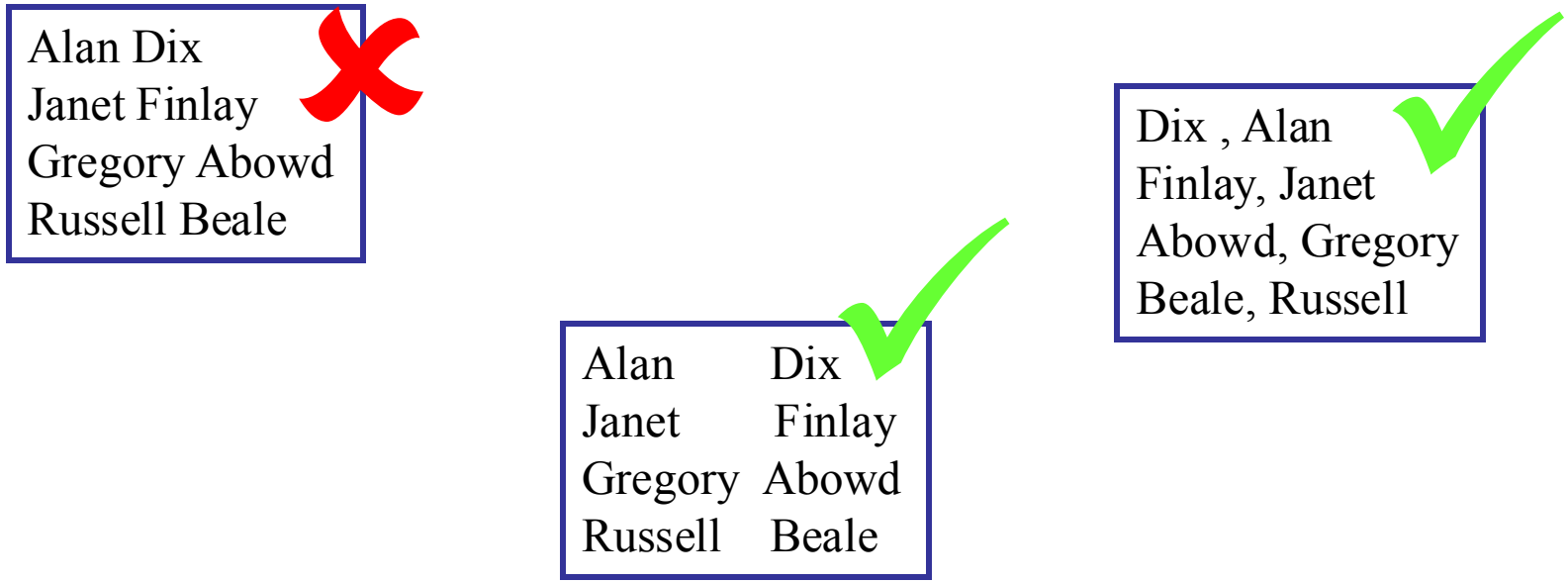
fine for special effects but hard to scan



Willy Wonka and the Chocolate Factory
Winston Churchill - A Biography
Wizard of Oz
Xena - Warrior Princess

alignment - names

- Usually scanning for surnames
  ⇒ make it easy!



alignment - numbers

think purpose!

which is biggest?

532.56
179.3
256.317
15
73.948
1035
3.142
497.6256

alignment - numbers

visually:
long number = big number

align decimal points
or right align integers

627.865
1.005763
382.583
2502.56
432.935
2.0175
652.87
56.34

multiple columns

- scanning across gaps hard:

(often hard to avoid with large data base fields)

sherbert	75
toffee	120
chocolate	35
fruit gums	27
coconut dreams	85

multiple columns - 2

- use leaders

sherbert	75
toffee	120
chocolate	35
fruit gums	27
coconut dreams	85

multiple columns - 3

- or greying (vertical too)

sherbert	75
toffee	120
chocolate	35
fruit gums	27
coconut dreams	85

multiple columns - 4

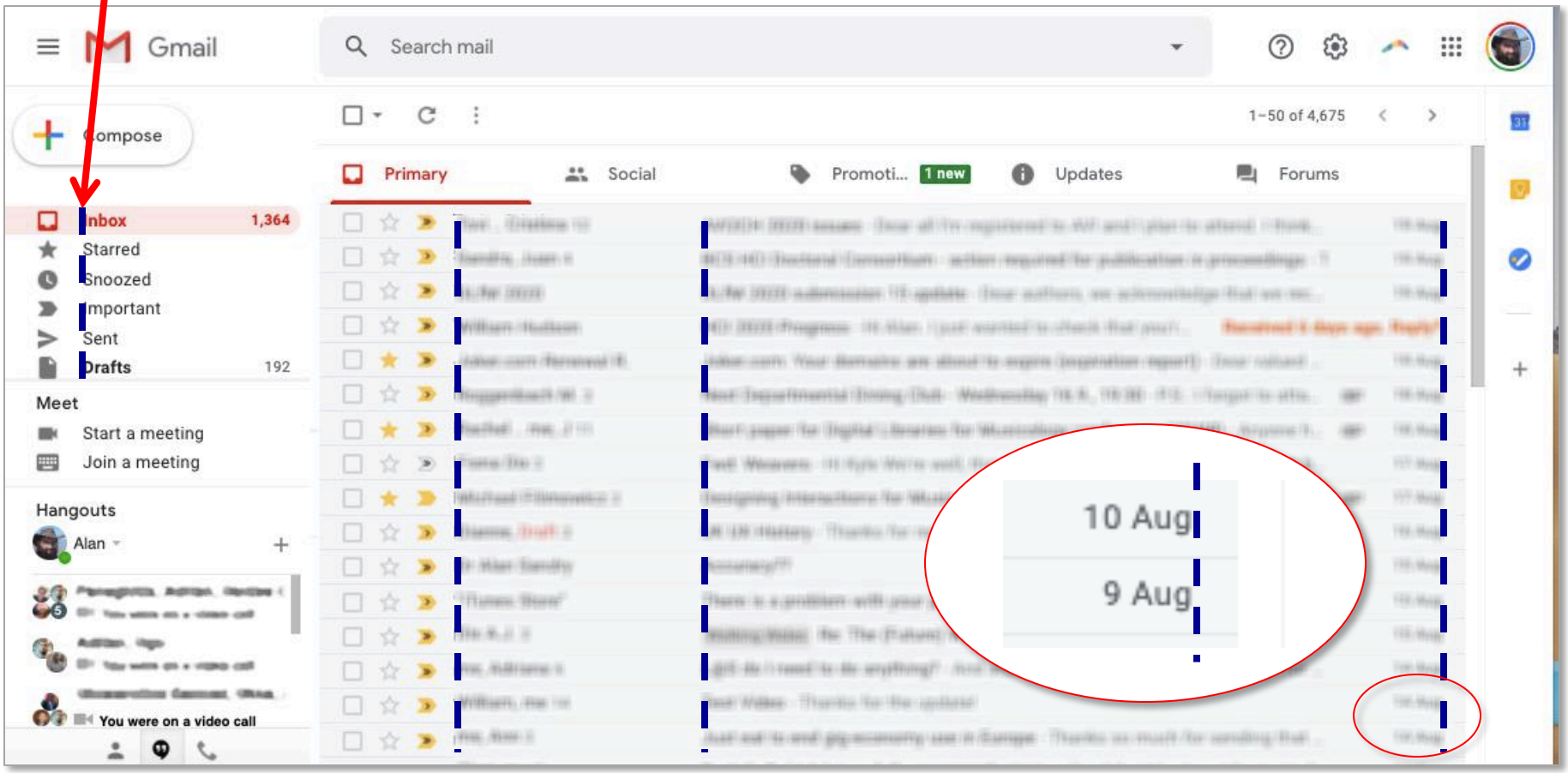
- or even (with care!) ‘bad’ alignment

sherbert	75
toffee	120
chocolate	35
fruit gums	27
coconut dreams	85

alignment- gmail

functional alignment

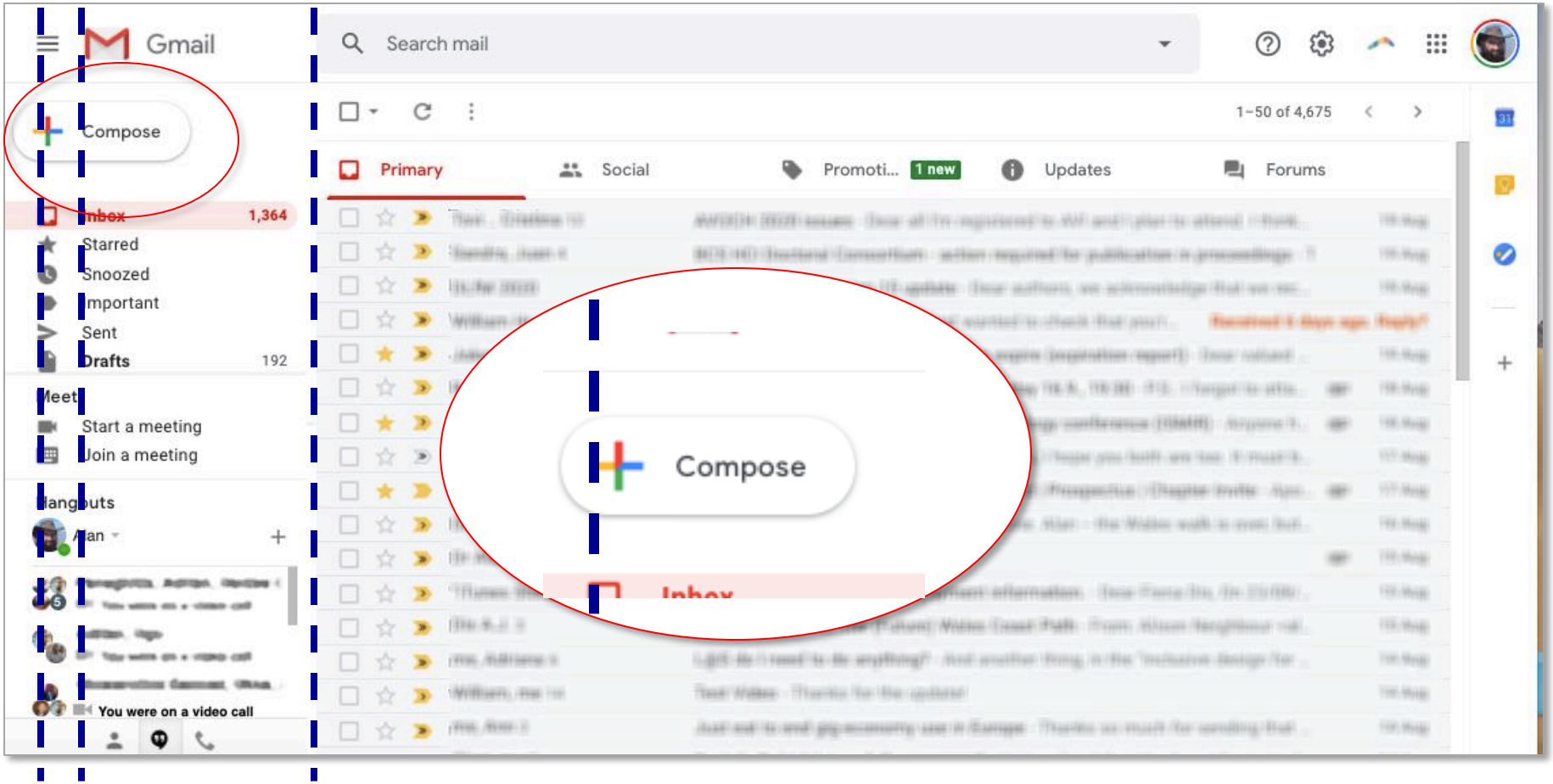
folders/tags



sender subject date

tabular layout of messages

aesthetic alignment



white space

what isn’t
is often as important
as what is

white space - the counter

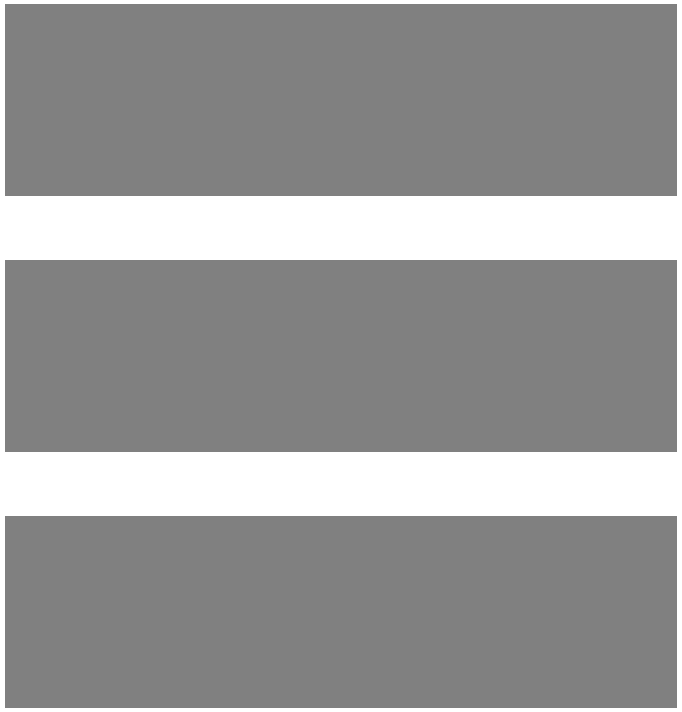
WHAT YOU SEE

white space - the counter

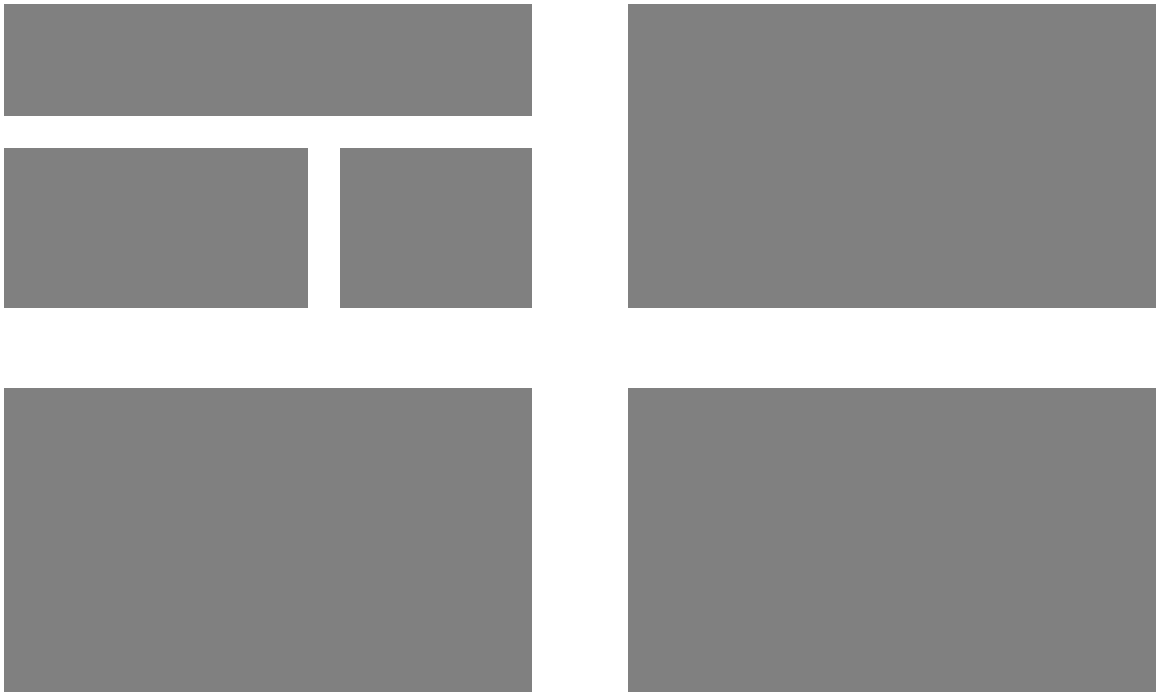
WHAT YOU SEE

THE GAPS BETWEEN

space to separate



space to structure



space to highlight

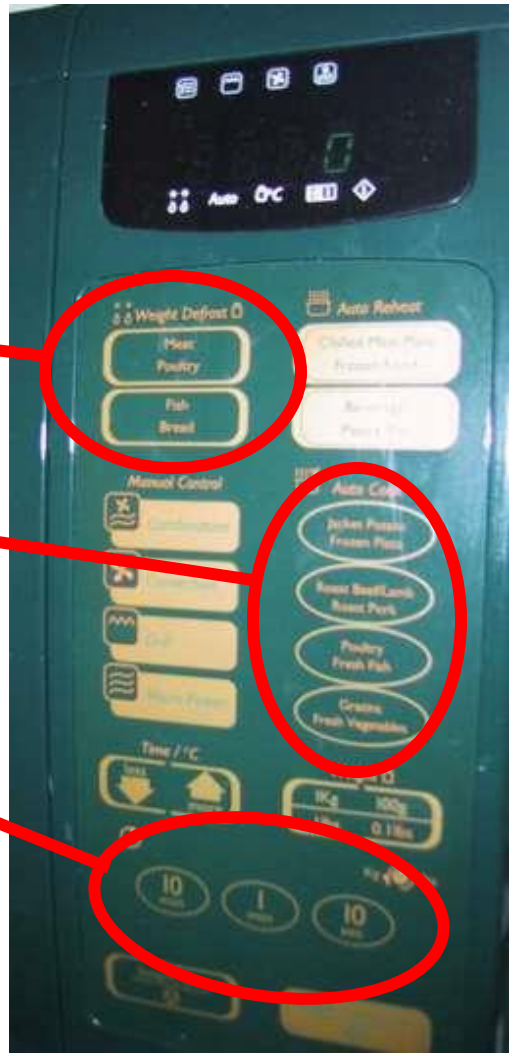
redundancy

physical devices too

different construction
similar principles

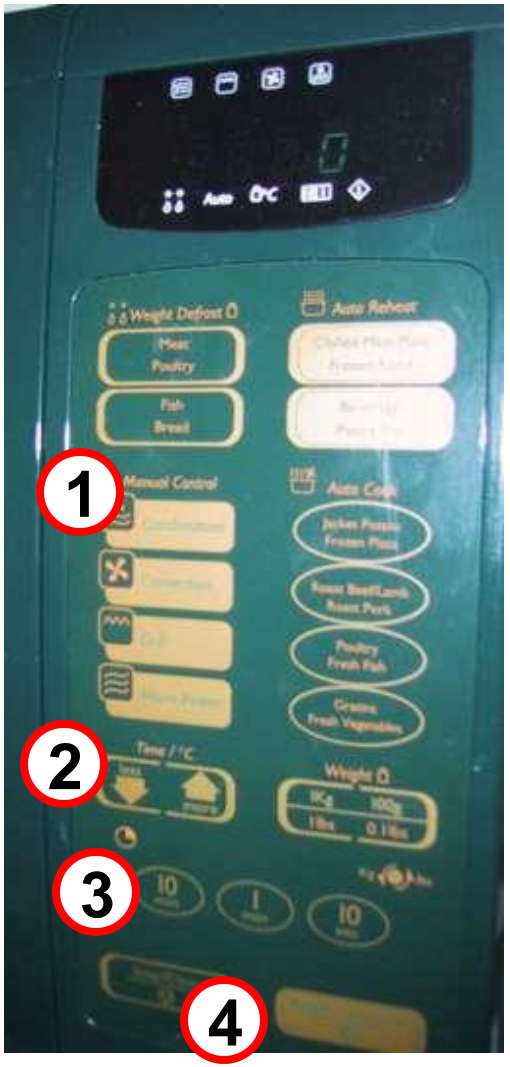
physical controls

- grouping of items
  - defrost settings
  - type of food
  - time to cook



physical controls

- grouping of items
- order of items
    1) type of heating
    2) temperature
    3) time to cook
    4) start

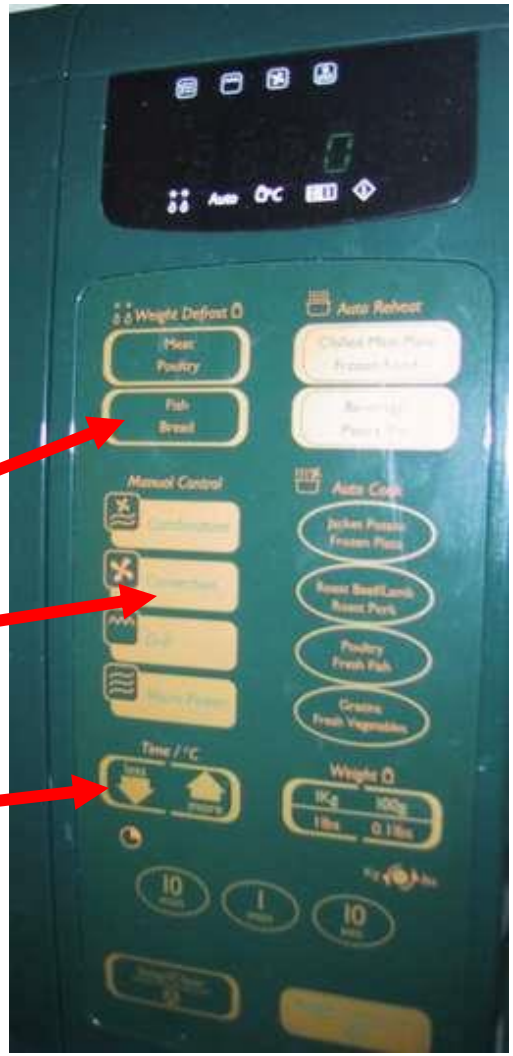


physical controls

- grouping of items
- order of items
- decoration

different colours for different functions

lines around related buttons (temp up/down)

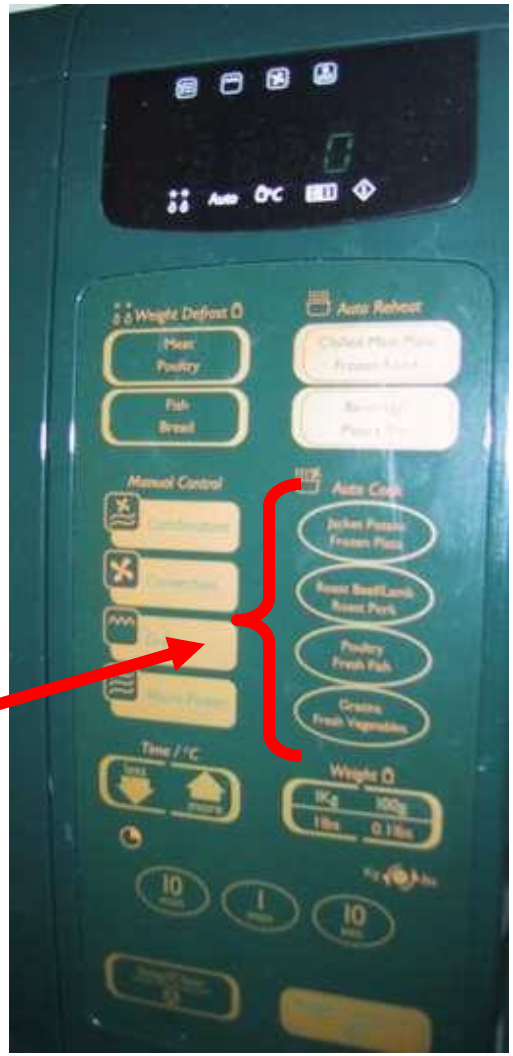


physical controls

- grouping of items
- order of items
- decoration
- alignment

centred text in buttons

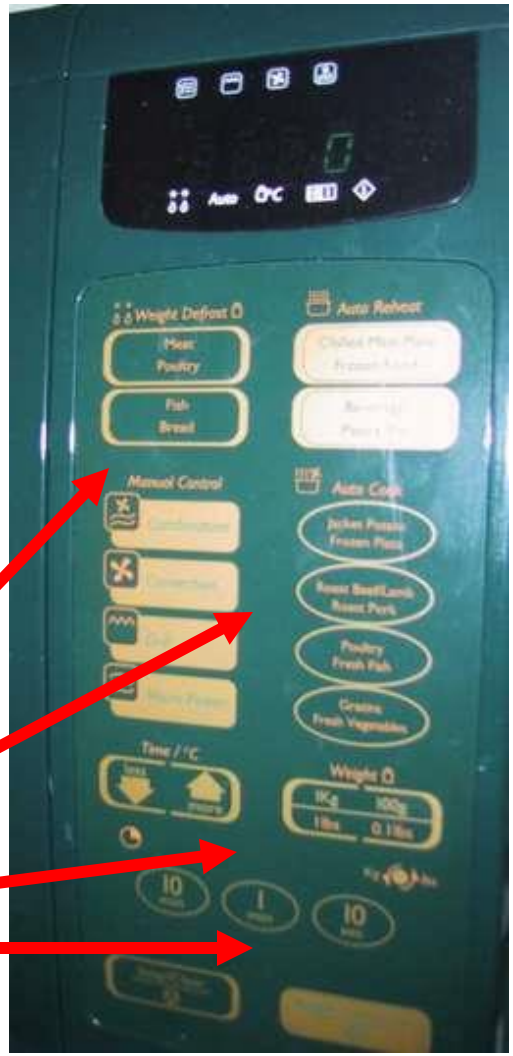
? easy to scan ?



physical controls

- grouping of items
- order of items
- decoration
- alignment
- white space

gaps to aid grouping

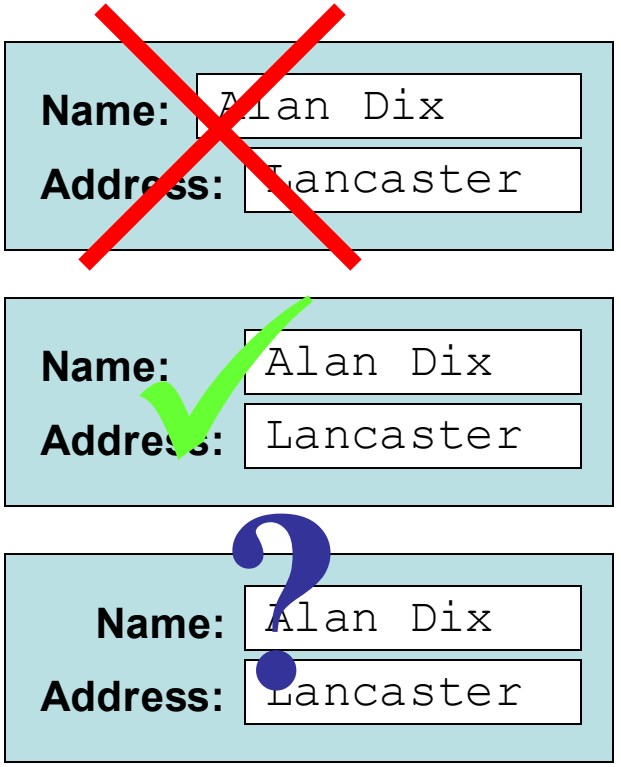


user action and control

entering information
knowing what to do
affordances

entering information

- forms, dialogue boxes
  - presentation + data input
  - similar layout issues
  - alignment - N.B. different label lengths



- logical layout
  - use scenarios or task analysis
  - groupings
  - natural order for entering information
    - top-bottom, left-right (depending on culture)
    - set tab order for keyboard entry

N.B. see extra slides for widget choice

knowing what to do

what is active what is passive

- where do you click
- where do you type

consistent style helps

- e.g. web underlined links

labels and icons

- standards for common actions
- language – bold = current state or action

affordances

- psychological term
- for physical objects
  - shape and size suggest actions
    - pick up, twist, throw
  - also cultural – buttons 'afford' pushing
- for screen objects
  - button–like object 'affords' mouse click
  - physical-like objects suggest use
- culture of computer use
  - icons 'afford' clicking
  - or even double clicking … not like real buttons!

presenting interactively

purpose matters

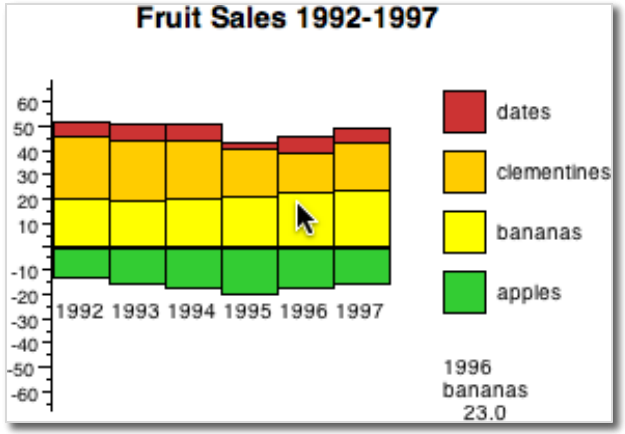
- sort order (which column, numeric alphabetic)
- text vs. diagram
- scatter graph vs. histogram

use paper presentation principles!

but add interactivity

- softens design choices
  - e.g. re-ordering columns
  - ‘dancing histograms’

name	size
chap10	12
chap5	16
chap1	17
chap14	22
chap20	27
chap8	32
...	...



appropriate appearance

aesthetics and utility
colour and 3D
localisation & internationalisation

aesthetics and utility

aesthetically pleasing designs

- increase user satisfaction and improve productivity

beauty and utility may conflict

- mixed up visual styles $\Rightarrow$ easy to distinguish
- clean design – little differentiation $\Rightarrow$ confusing
- backgrounds behind text
  … good to look at, but hard to read

but can work together

- e.g. the design of the counter
- in consumer products – key differentiator (e.g. Apple)

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colour and 3D

both often used very badly!

colour

- colour over used because ‘it is there’
- beware colour blind, older users, poor lighting
- use sparingly to reinforce other information

3D effects

- good for physical information and some graphs
- but if over used …
  e.g. text in perspective!! 3D pie charts

bad use of colour

- over use - without very good reason (e.g. kids' site)
- colour blindness
- poor use of contrast
- do adjust your set!
  - adjust your image to greys only
  - can you still read your screen design?
  - web sites to help

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this does not mean

everything needs to be

in designerly

monochrome

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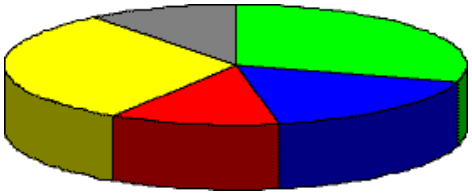


across countries and cultures

localisation & internationalisation
- changing interfaces for particular cultures/languages

globalisation
- try to choose symbols etc. that work everywhere

simply change language?
- use 'resource' database instead of literal text
  … but changes sizes, left-right order etc.

deeper issues
- cultural assumptions and values
- meanings of symbols

  e.g tick and cross … +ve and -ve in some cultures
  … but … mean the same thing (mark this) in others

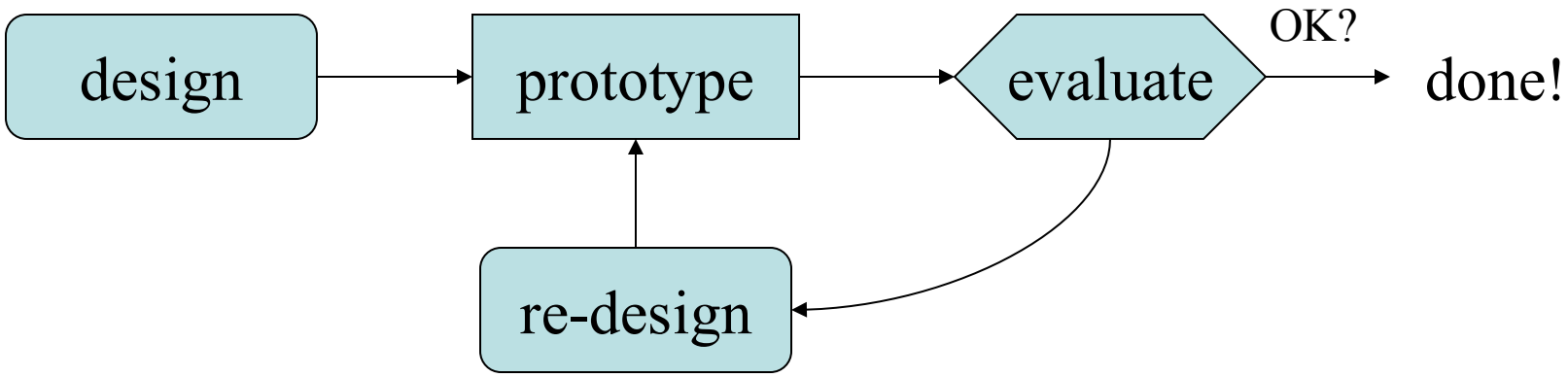
iteration and prototyping

getting better …

… and starting well

prototyping

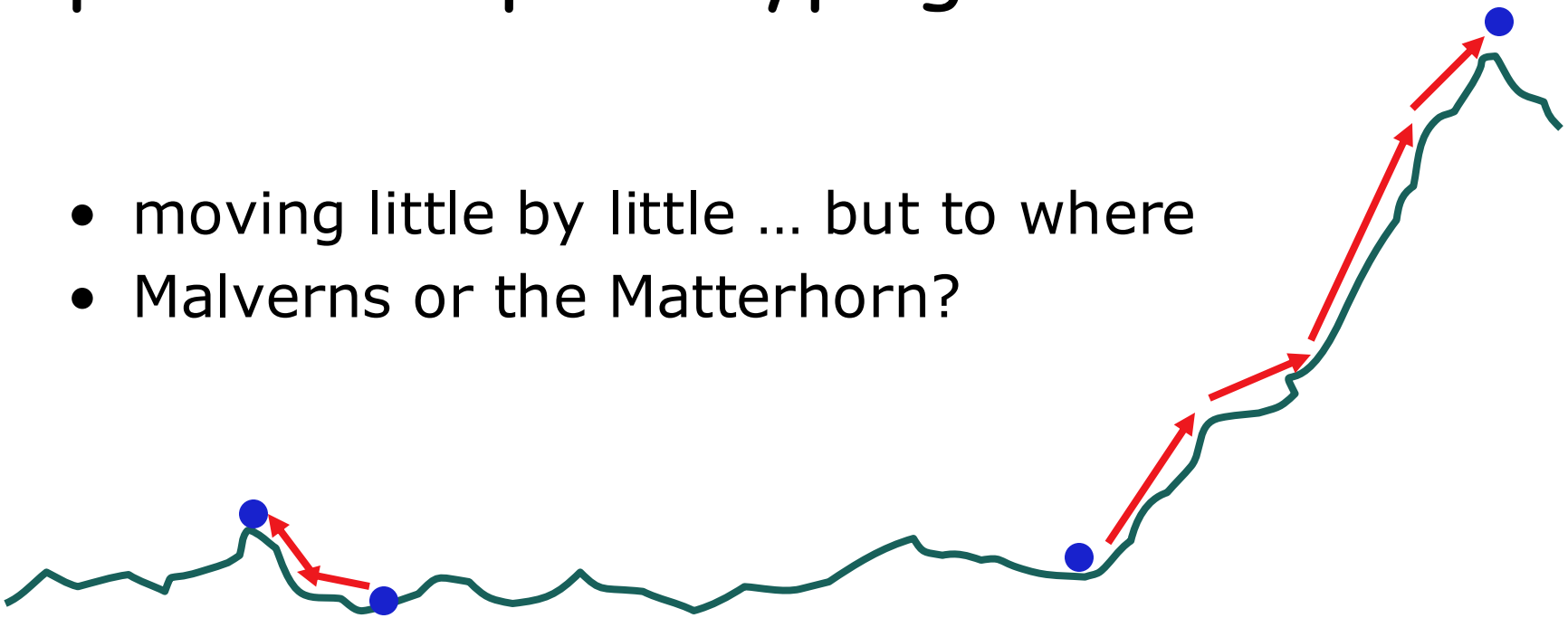
- you never get it right first time
- if at first you don't succeed …



William Edward Hickson (1803–1870)
Thomas H. Palmer, Teachers Manual 1840

pitfalls of prototyping

- moving little by little … but to where
- Malverns or the Matterhorn?



1. need a good start point
2. need to understand what is wrong

Worcestershire Beacon:	1,395’	425m
Matterhorn	14,692’	4,478m