chapter 5

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
- iteration and prototypes
  - never get it right first time!

interactions and interventions

design interactions not just interfaces

not just the immediate interaction

e.g. stapler in office – technology changes interaction style

- manual: write, print, staple, write, print, staple, …
- electric: write, print, write, print, …, staple

designing 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 is design?

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 …

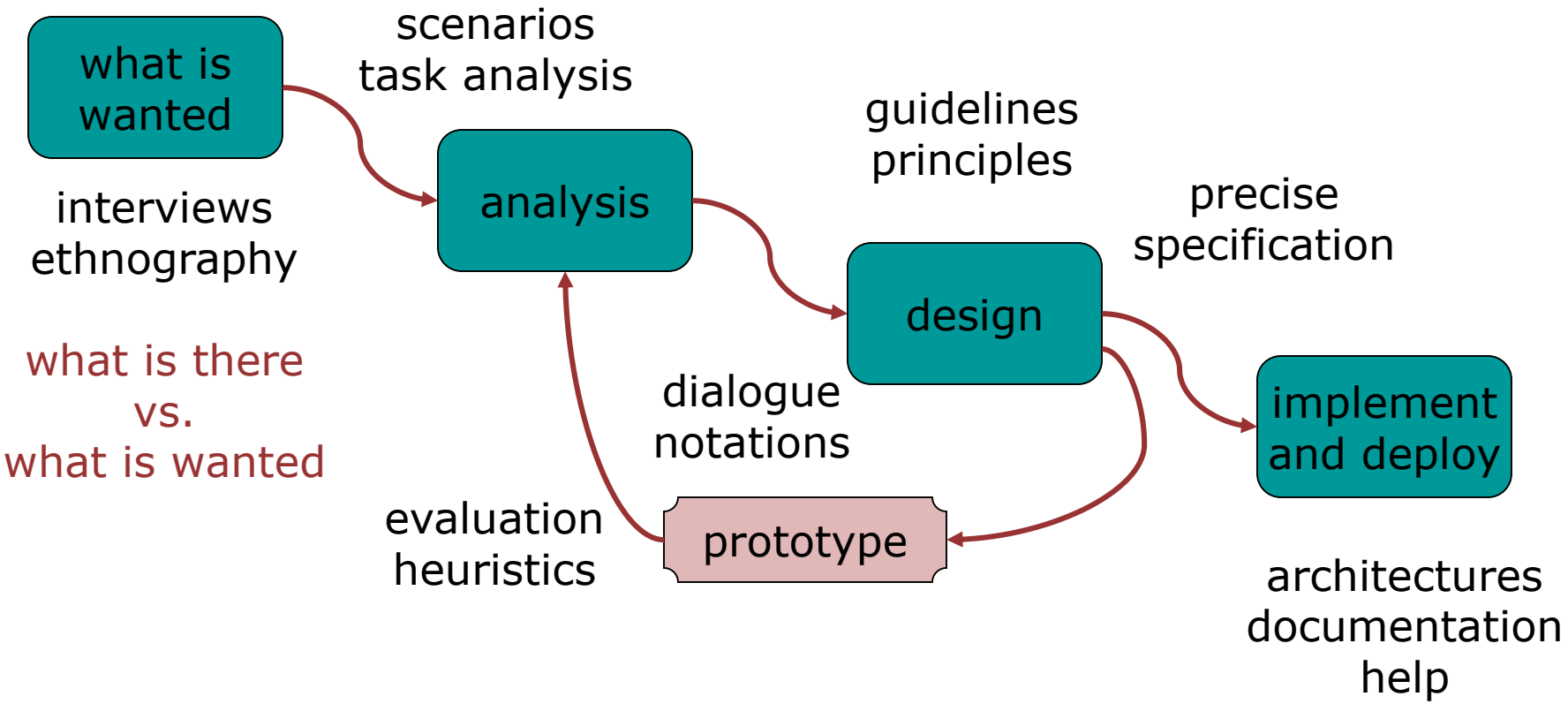
To err is human

- 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



Steps …

- requirements
  - what is there and what is wanted …
- analysis
  - ordering and understanding
- design
  - what to do and how to decide
- iteration and prototyping
  - getting it right … and finding what is really needed!
- implementation and deployment
  - making it and getting it out there

… but how can I do it all ! !

- limited time ⇒ design trade-off
- usability?
  - finding problems and fixing them?
  - deciding what to fix?

- a perfect system is badly designed
  - too good ⇒ too much effort in design

user focus

know your user

personae

cultural probes

know your user

- who are they?
- probably not like you!
- talk to them
- watch them
- use your imagination

scenarios

stories for design
use and reuse

scenarios

- stories for design
  - communicate with others
  - validate other models
  - understand dynamics
- linearity
  - time is linear - our lives are linear
  - but don’t show alternatives

scenarios …

- what will users want to do?
- step-by-step walkthrough
  - what can they see (sketches, screen shots)
  - what do they do (keyboard, mouse etc.)
  - what are they thinking?
- use and reuse throughout design

use scenarios to ..

- communicate with others
  - designers, clients, users
- validate other models
  - 'play' it against other models
- express dynamics
  - screenshots – appearance
  - scenario – behaviour

linearity

Scenarios – one linear path through system

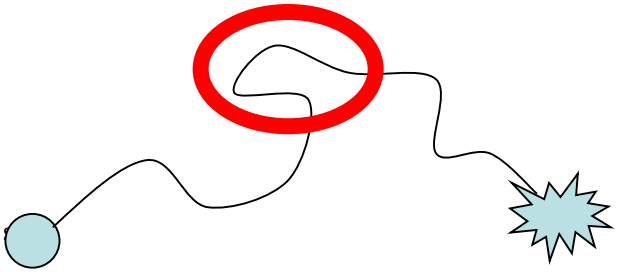
Pros:

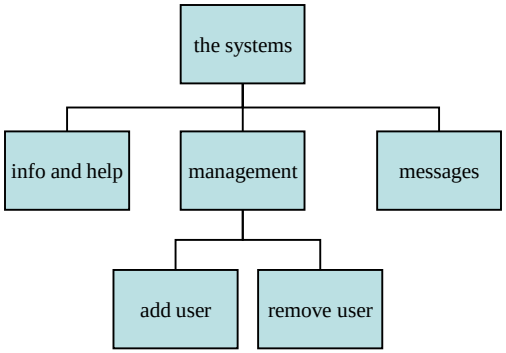
- life and time are linear
- easy to understand (stories and narrative are natural)
- concrete (errors less likely)

Cons:

- no choice, no branches, no special conditions
- miss the unintended

- So:
  - use several scenarios
  - use several methods

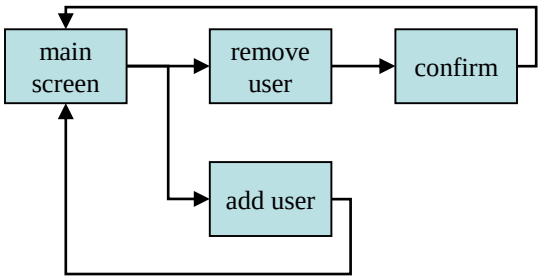




navigation design

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
  - later ...
- local
  - looking from this screen out
- global
  - structure of site, movement between screens
- wider still
  - relationship with other applications

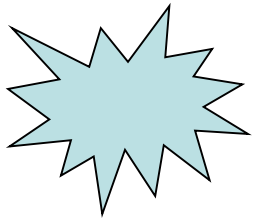
local

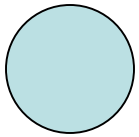
from one screen looking out

goal seeking

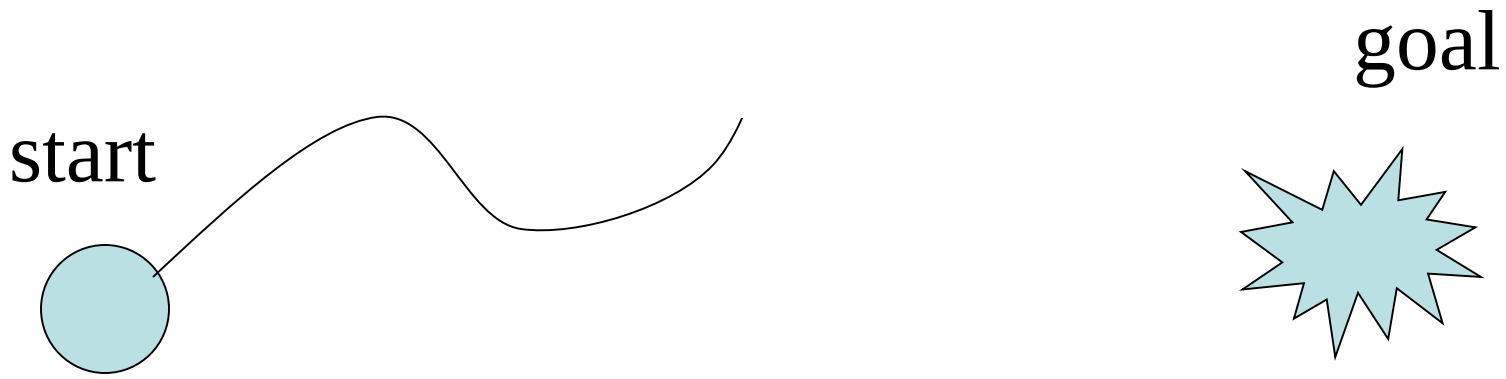
goal

start



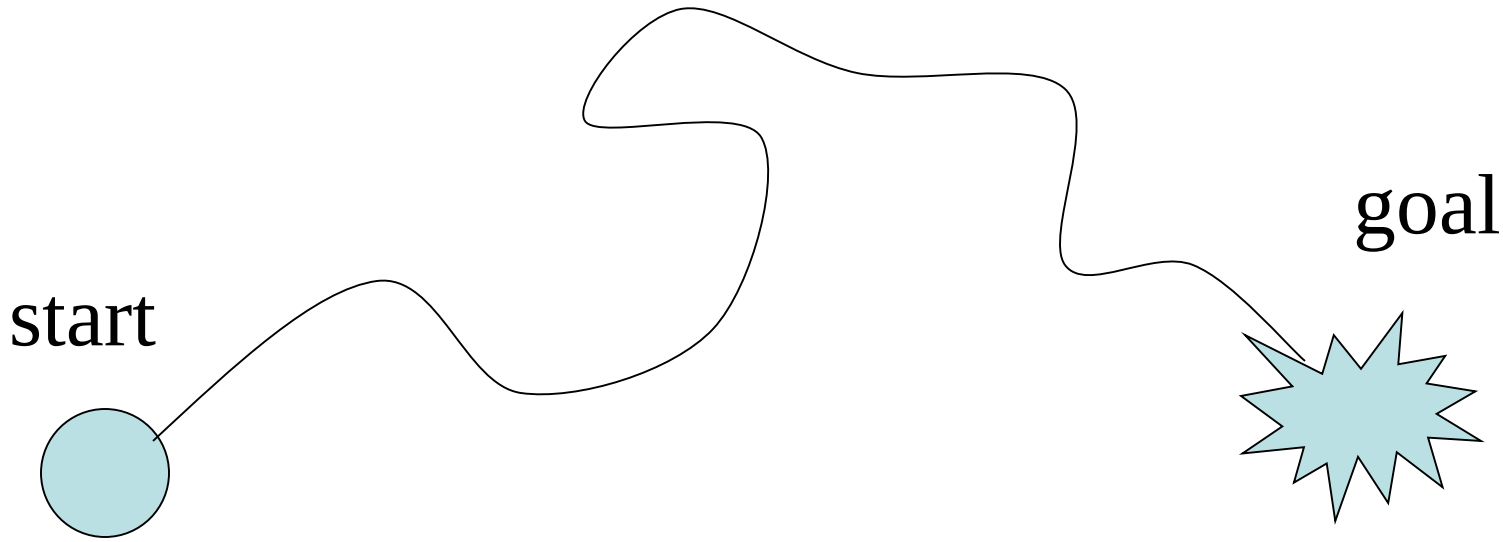


goal seeking



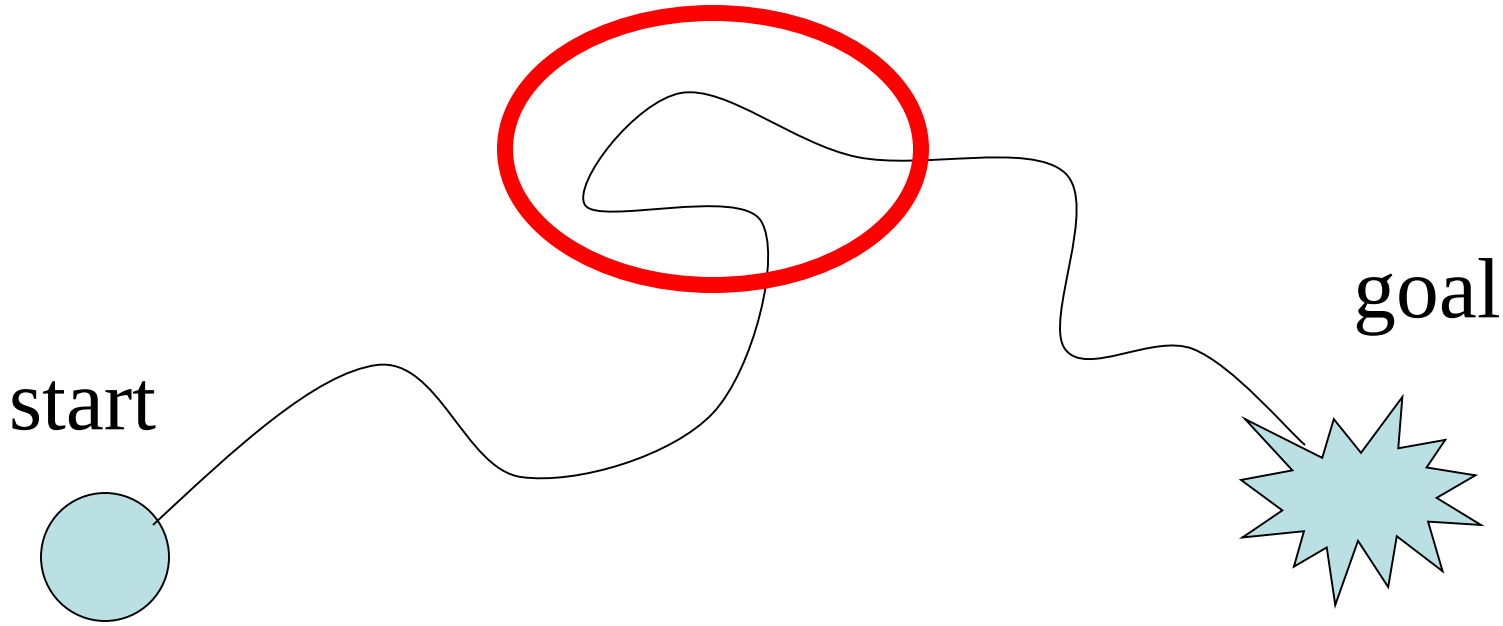
progress with local knowledge only ...

goal seeking



… but can get to the goal

goal seeking



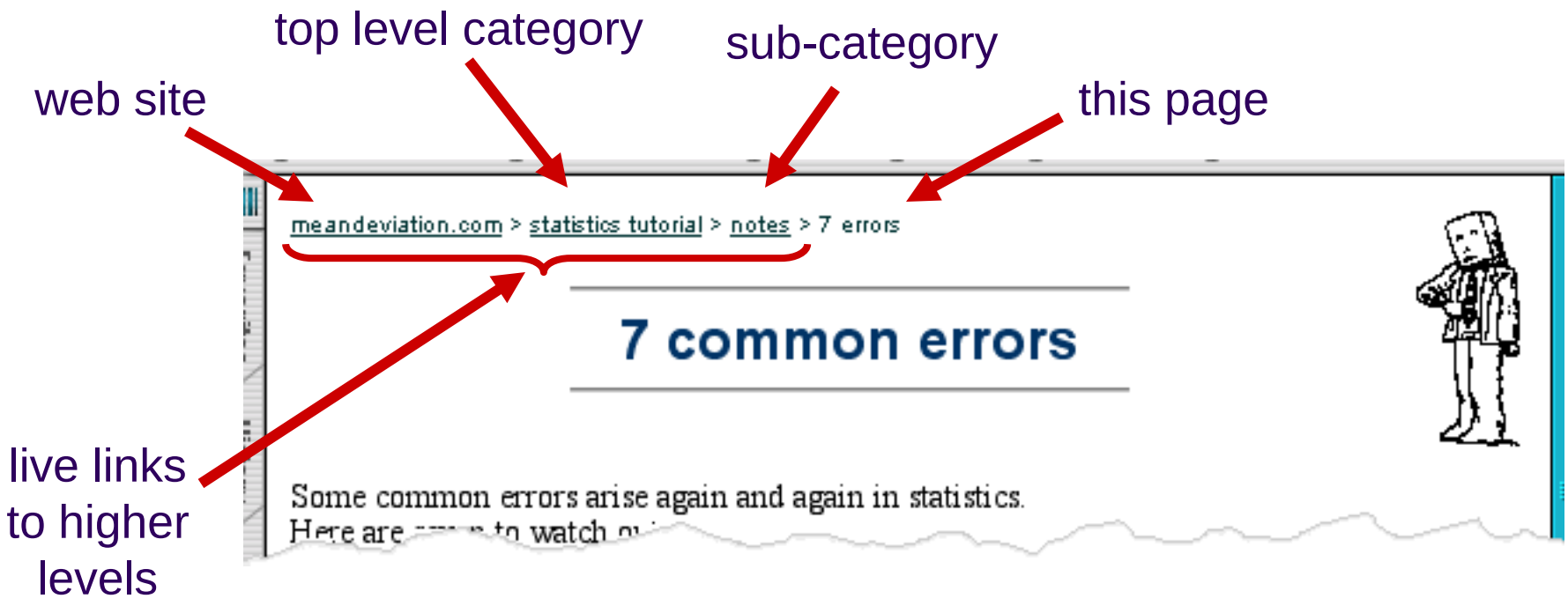
… try to avoid these bits!

four golden rules

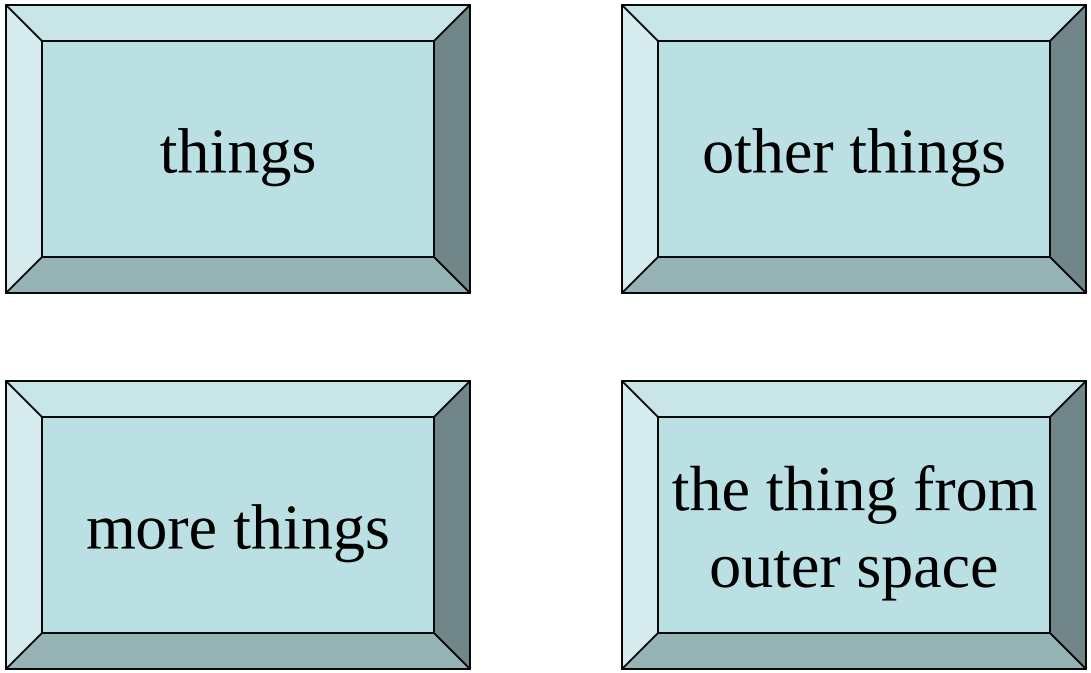
- knowing where you are
- knowing what you can do
- knowing where you are going
  - or what will happen
- knowing where you've been
  - or what you've done

where you are – breadcrumbs

shows path through web site hierarchy



beware the big button trap



- where do they go?
  - lots of room for extra text!

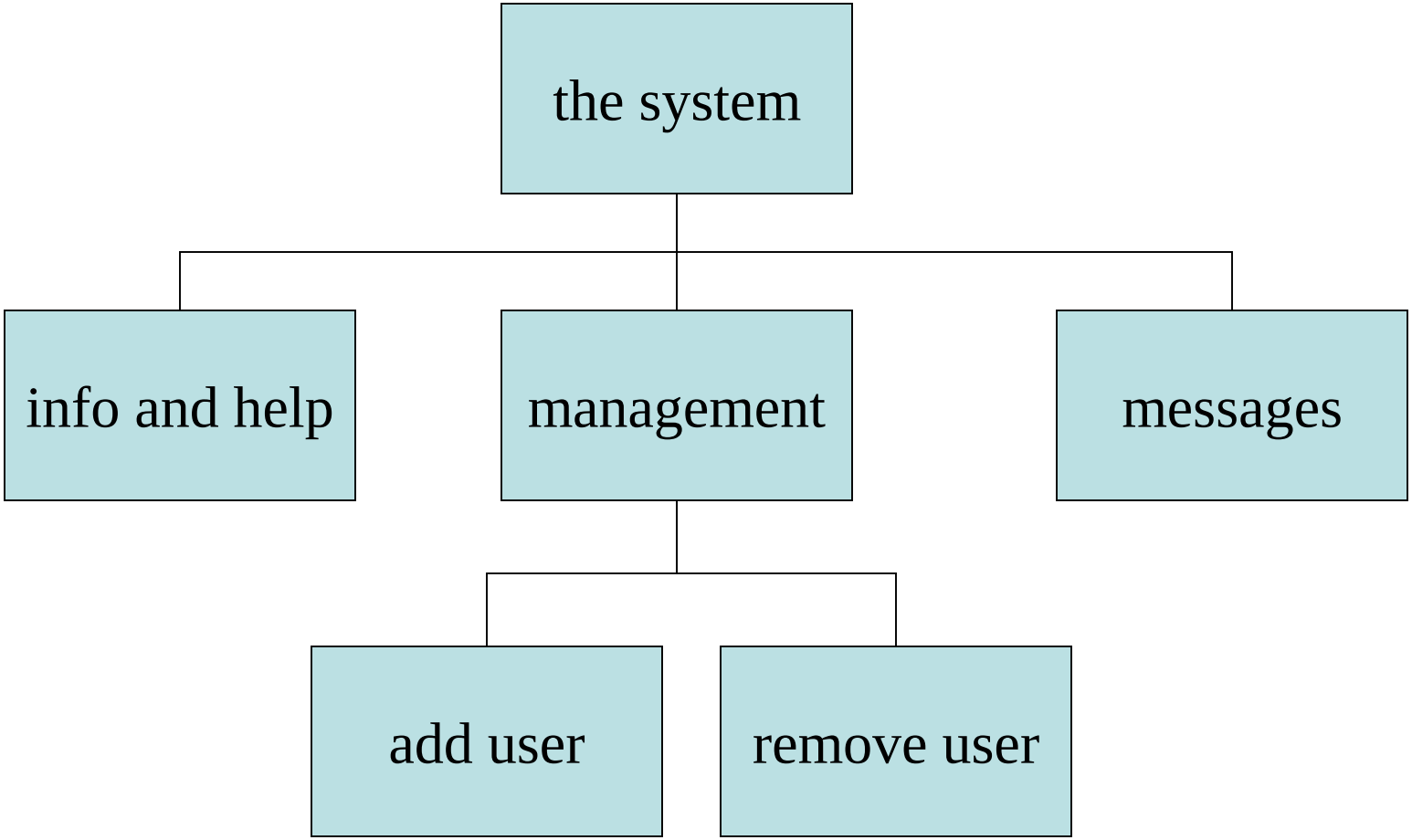
modes

- lock to prevent accidental use …
  - remove lock - ‘c’ + ‘yes’ to confirm
  - frequent practiced action
- if lock forgotten
  - in pocket ‘yes’ gets pressed
  - goes to phone book
  - in phone book …
    ‘c’ – delete entry
    ‘yes’ – confirm
    … oops !

global

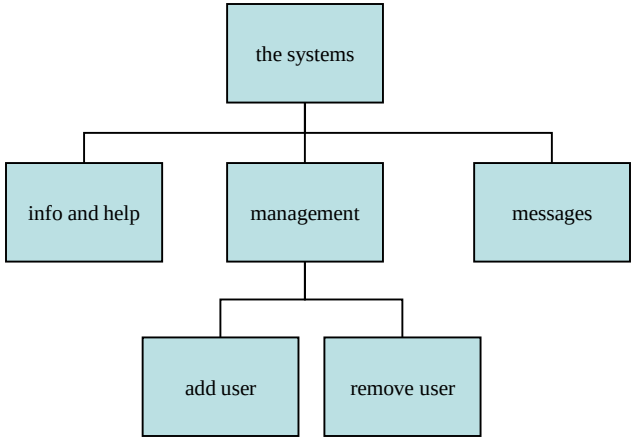
between screens
within the application

hierarchical diagrams



hierarchical diagrams ctd.

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



navigating hierarchies

- deep is difficult!
- misuse of Miller's 7 ± 2
  - short term memory, not menu size
- optimal?
  - many items on each screen
  - but structured within screen

see /e3/online/menu-breadth/

think about dialogue

what does it mean in UI design?

Minister: do you *name* take this woman …
Man: I do
Minister: do you *name* take this man …
Woman: I do
Minister: I now pronounce you man and wife

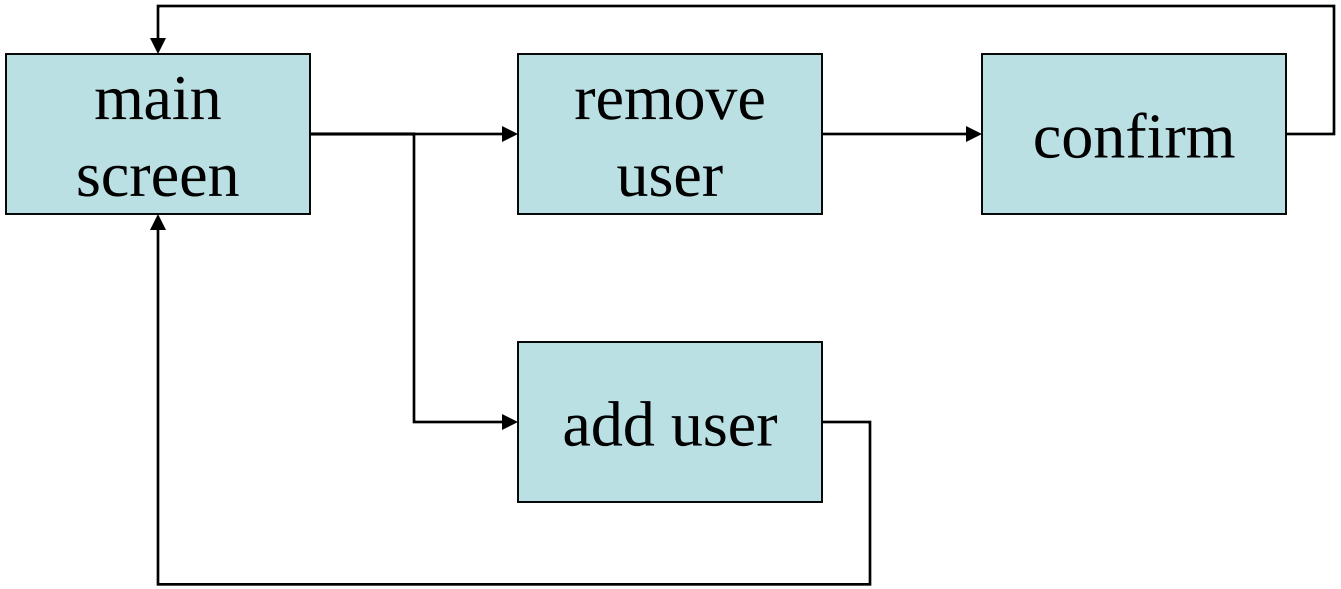
think about dialogue

what does it mean in UI design?

Minister: do you *name* take this woman …

- marriage service
  - general flow, generic – blanks for names
  - pattern of interaction between people
- computer dialogue
  - pattern of interaction between users and system
  - but details differ each time

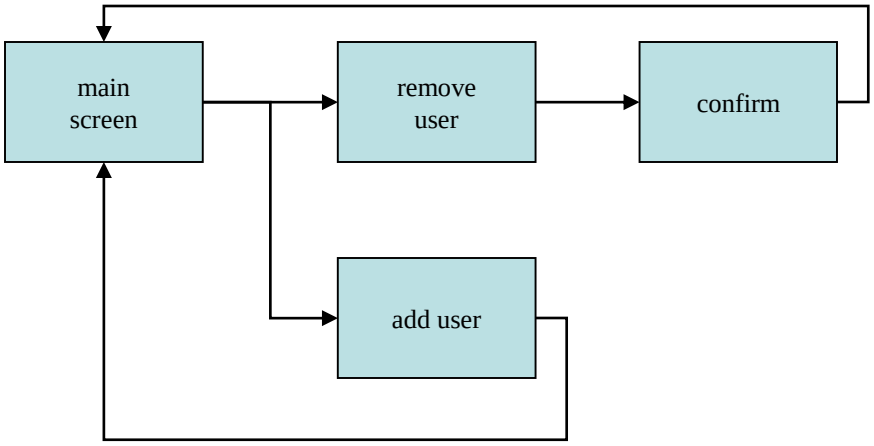
network diagrams



- show different paths through system

network diagrams ctd.

- what leads to what
- what happens when
- including branches
- more task oriented then hierarchy



wider still

between applications
and beyond ...

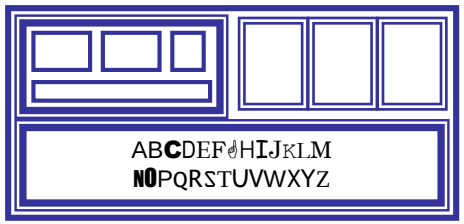
wider still …

- style issues:
  - platform standards, consistency
- functional issues
  - cut and paste
- navigation issues
  - embedded applications
  - links to other apps … the web

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

screen design and layout

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



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 etc.
- alignment of items
- white space between items

grouping and structure

logically together $\Rightarrow$ physically together

Billing details:
Name
Address: …
Credit card no

Delivery details:
Name
Address: …
Delivery time

Order details:

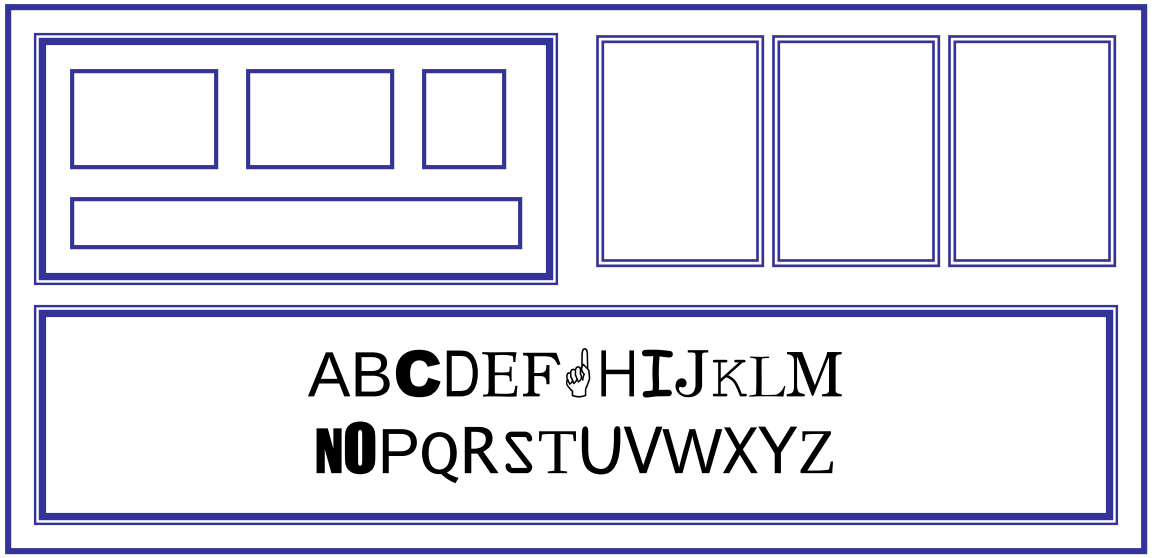
item	quantity	cost/item	cost
size 10 screws (boxes)	7	3.71	25.97
……	…	…	…

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 recipie syndrome!
    ... mix milk and flour, add the fruit
    after beating them

decoration

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

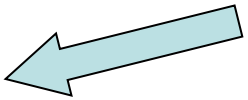


alignment - text

- you read from left to right (English and European)

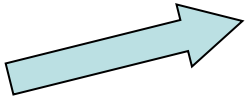
⇒ align left hand side

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!

Alan Dix
Janet Finlay
Gregory Abowd
Russell Beale

Alan Dix
Janet Finlay
Gregory Abowd
Russell Beale

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

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

white space - the counter

WHAT YOU SEE

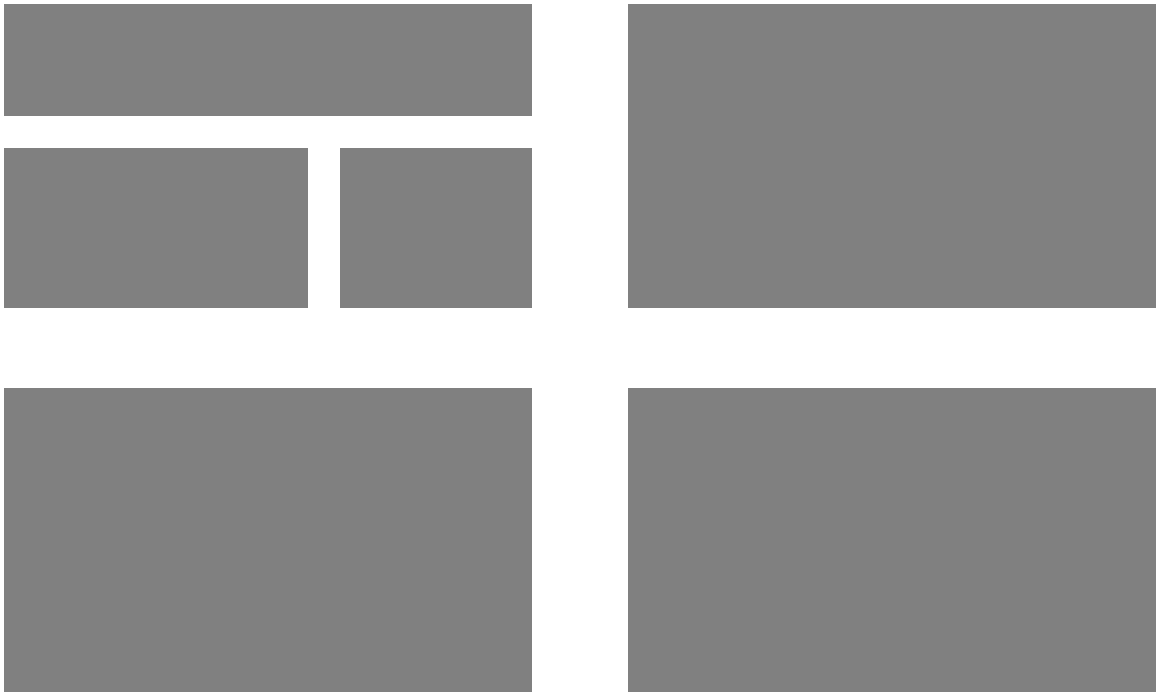
white space - the counter

WHAT YOU SEE

THE GAPS BETWEEN

space to separate

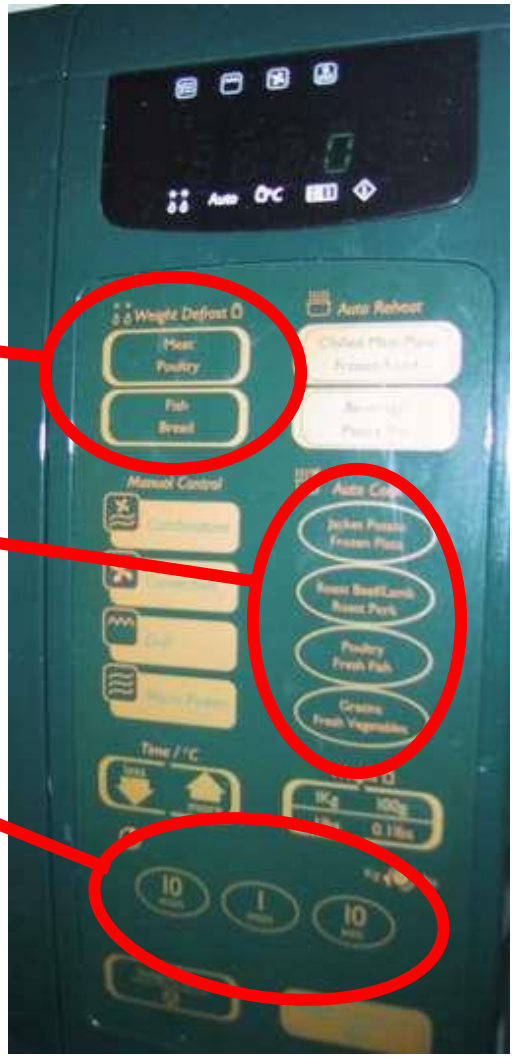
space to structure



space to highlight

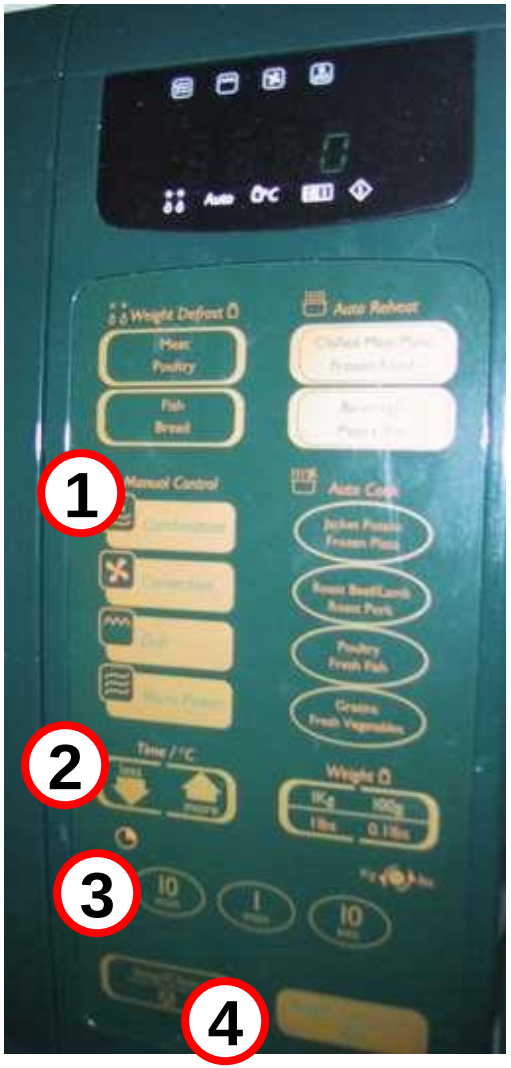
physical controls

- 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

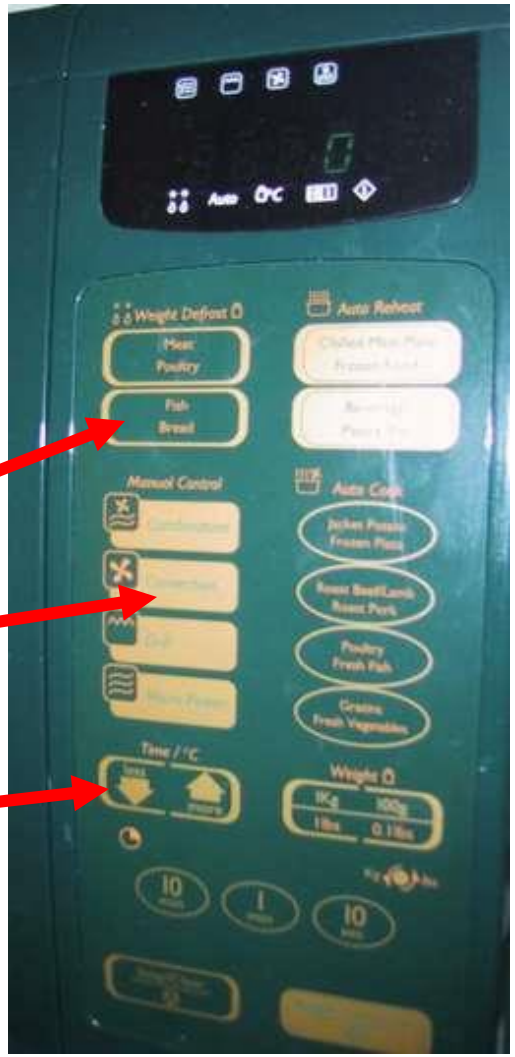


physical controls

- grouping of items
- order of items
- decoration

  different colours for different functions

  lines around related buttons (temp up/down)

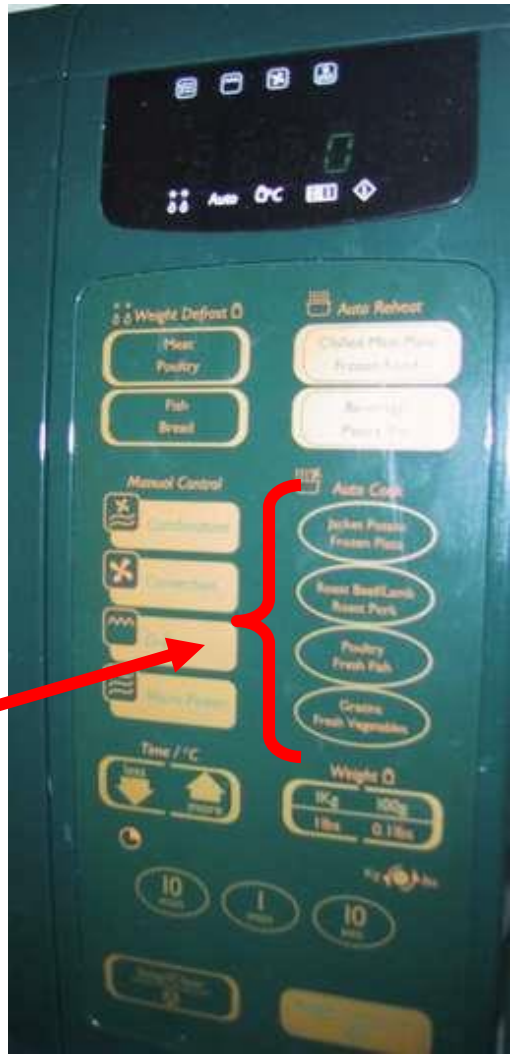


physical controls

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

centred text in buttons

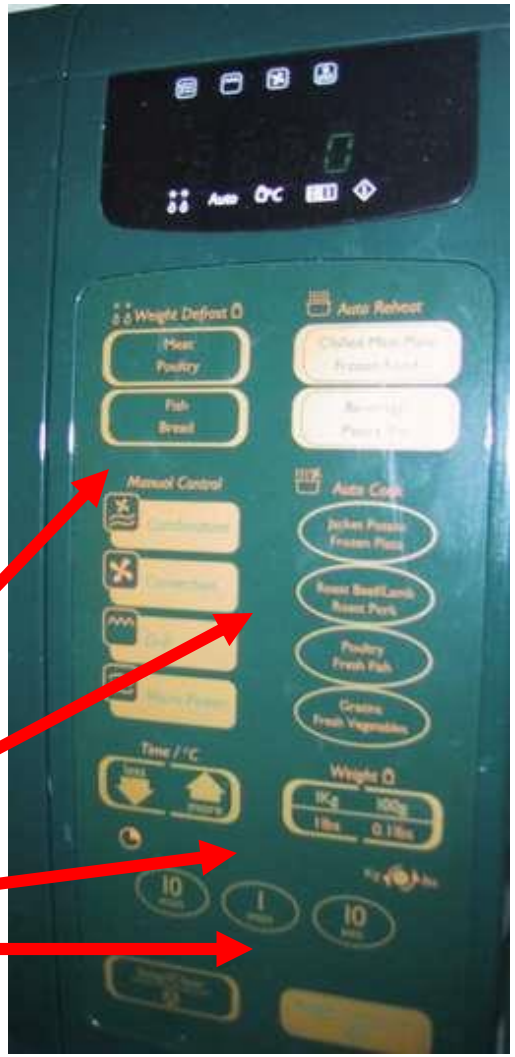
? easy to scan ?



physical controls

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

gaps to aid grouping

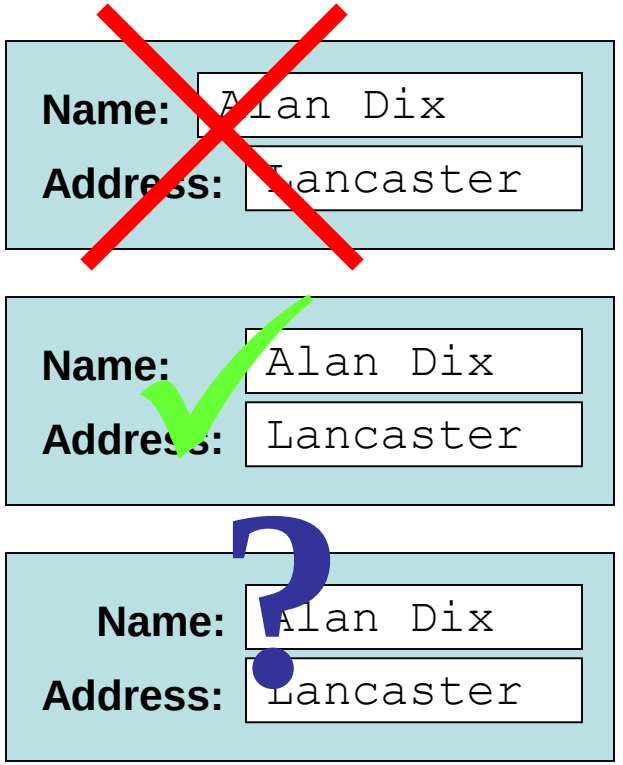


user action and control

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 task analysis (ch15)
  - 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

mug handle

'affords' grasping

- 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!

appropriate appearance

presenting information

aesthetics and utility

colour and 3D

localisation & internationalisation

presenting information

- 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' (chap 21)

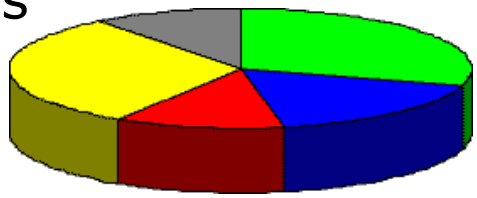
name	size
chap10	12
chap5	16
chap1	17
chap14	22
chap20	27
chap8	32
...	...

aesthetics and utility

- aesthetically pleasing designs
  - increase user satisfaction and improve productivity
- beauty and utility may conflict
  - mixed up visual styles ⇒ easy to distinguish
  - clean design – little differentiation ⇒ 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. iMac)

colour and 3D

- both often used very badly!
- colour
  - older monitors limited palette
  - colour over used because ‘it is there’
  - beware colour blind!
  - 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 monitor to greys only
  - can you still read your screen?

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

prototyping

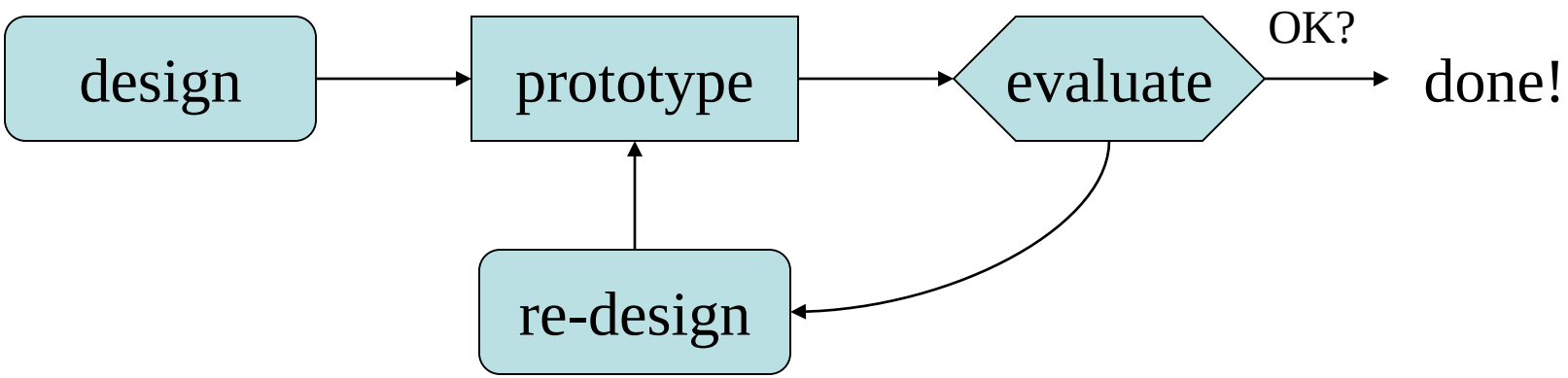
iteration and prototyping

getting better …

… and starting well

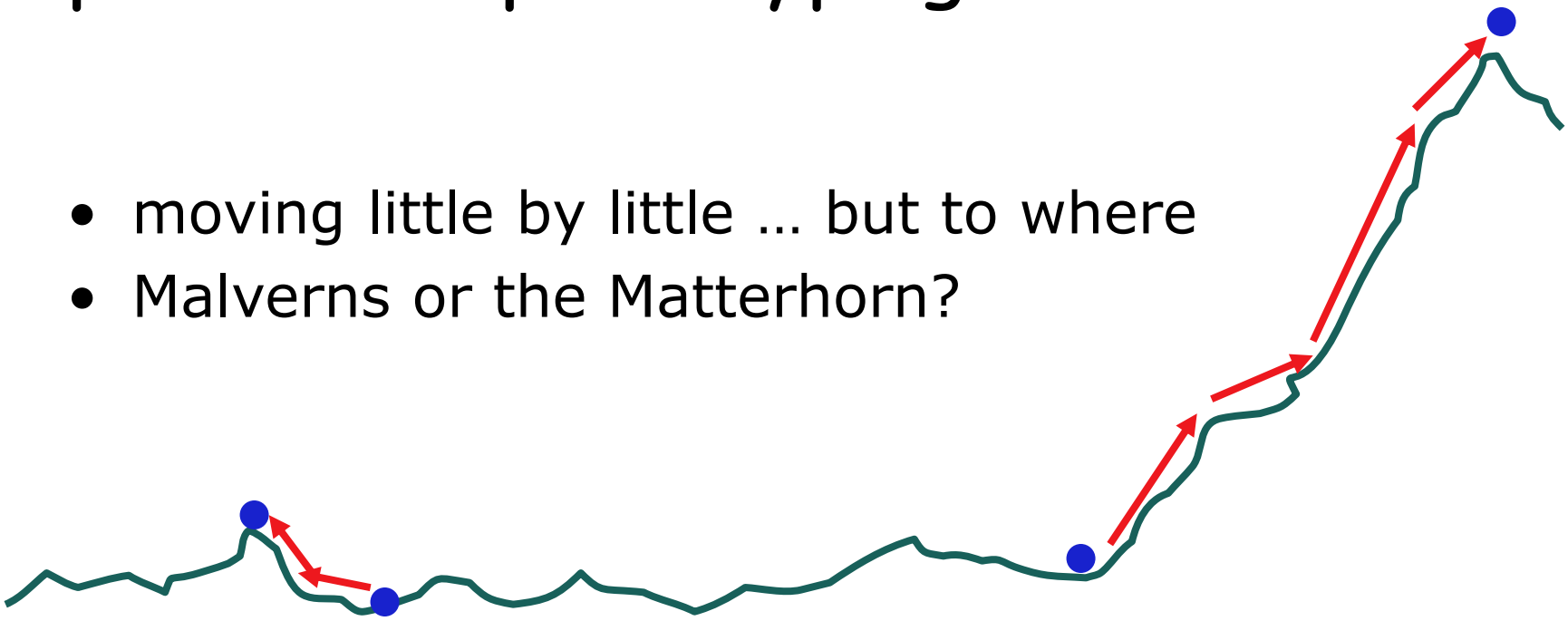
prototyping

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



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