

# *Usability & Evaluation*

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## ***Recap: What you've learned in the last session***

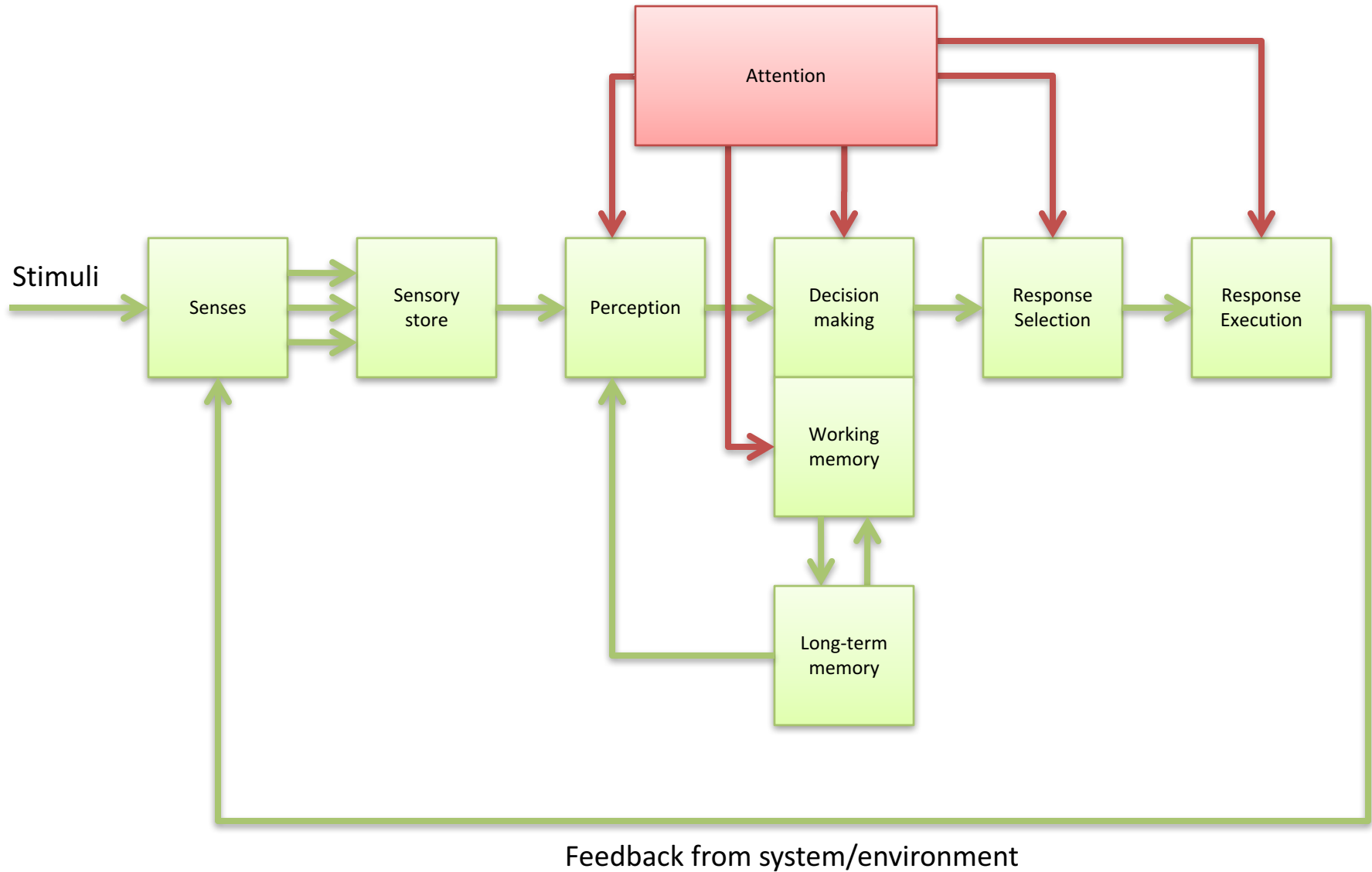
- Translating user research and business requirements into **conceptual solutions**
- Prototyping at the right level of fidelity – **storyboards, sketches and wireframes**
- **Classifying and structuring information** in a way **meaningful to users**
- Creating navigation systems – **showing users where they are, where they can go, where they have been**
- Creating content that is **relevant, succinct, scannable, legible and credible**
- Homepages that **explain proposition, create clear entrypoints & CTA's and give examples of content**

# *Psychological basis of usability*

# **We need to design for limited cognitive hardware**



## A model of human information processing (Wickens, 1992)



# Sensation & Perception

**Sensation:** Stimuli impinge on the senses and give rise to neural events.

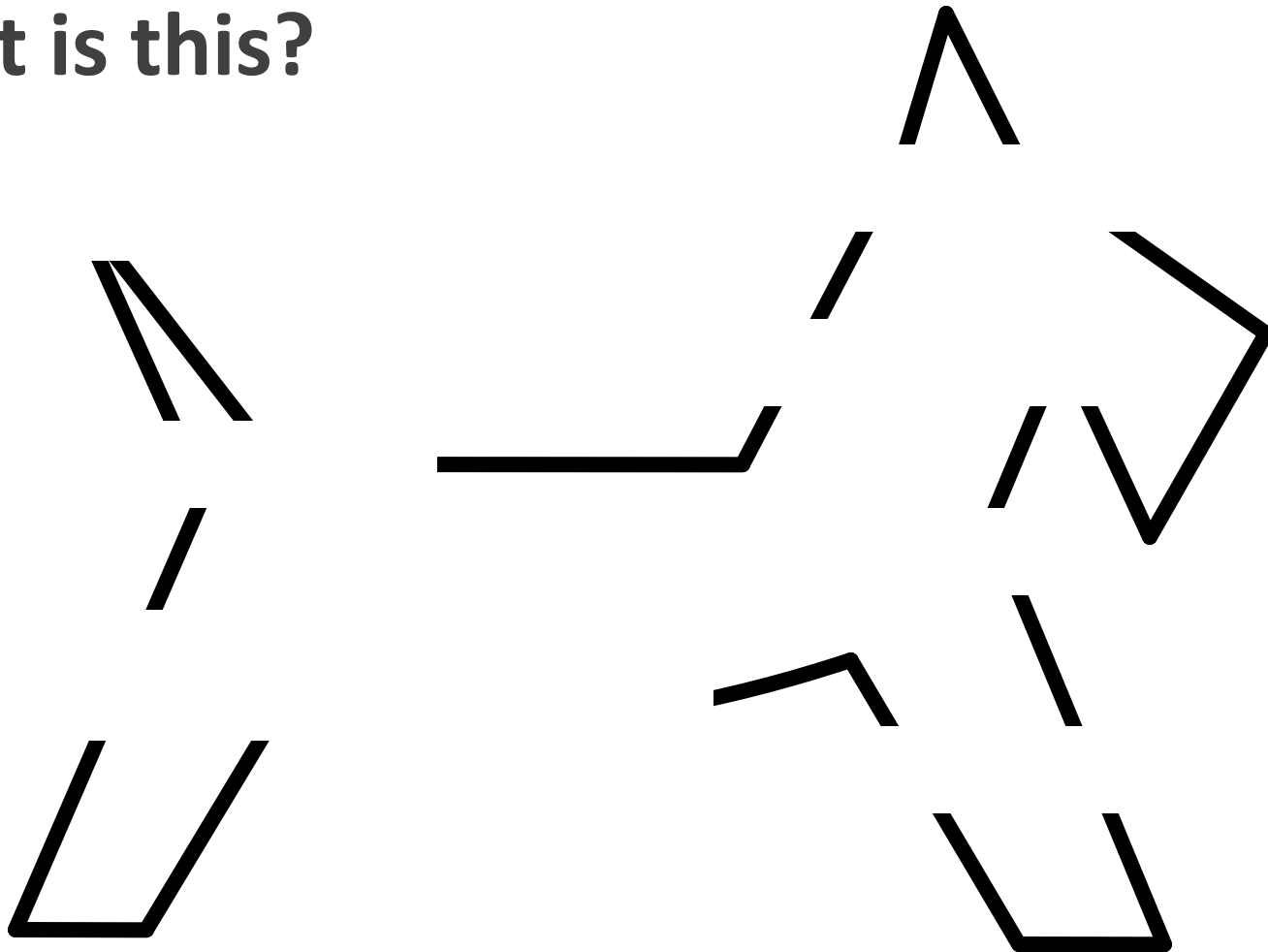
- **Sensory memory** holds stimulus for a very brief period of time.

**Perception:** Giving meaning to the event that produced the sensation.

- **Automatic, rapid and requires little attention** unlike cognitive processes that start when perceived information is processed.
- **Bottom-up processing** is driven by incoming data/stimuli
- **Top-down processing** is driven by prior knowledge



# What is this?

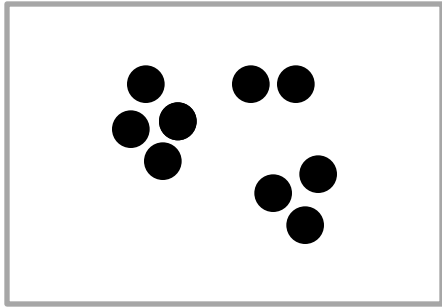




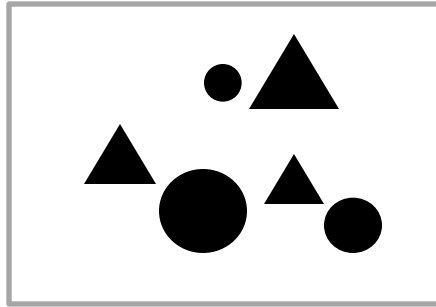
What does this say?

**THE CAT**

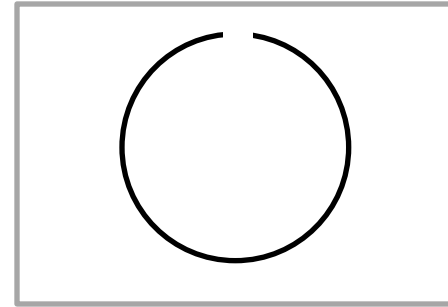
# Gestalt principles



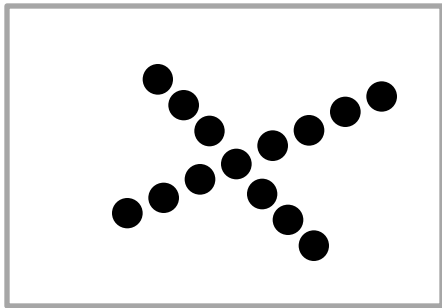
Proximity



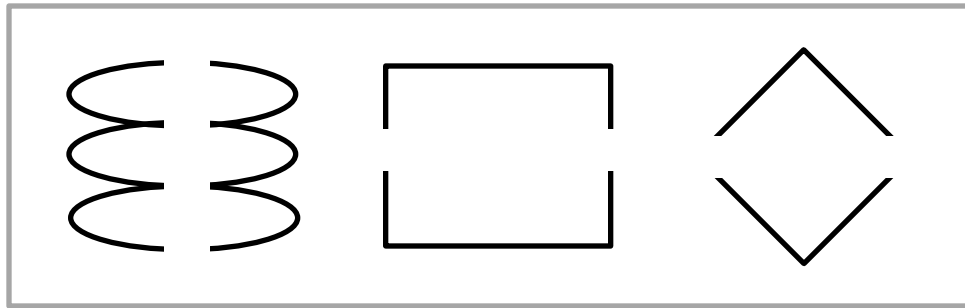
Similarity



Closure



Continuity



Symmetry

**It's important to be aware of these principles and to consider them in your design!**

# Design implications

- **Structure:** Help users understand what belongs together by chunking similar and separating different items
- **Consistency:** Help users apply previously acquired knowledge from LTM. (consistency within the UI and consistency with the world)
- **Visibility** and **affordance:** Show all required information and use controls that are self-explanatory.
- **Feedback:** Communicate the consequence of an action

# Prominence indicates importance

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## Big things are perceived more important

T H A N   S M A L L   O N E S

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# Proximity-compatibility principle

## Things that are near each other are presumed to be similar

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# Things that are separated are presumed to be different

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## Difference can also be indicated using visual contrast i.e. colour, size, style

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# Headings summarise adjacent content

Painfully obvious isn't it?

## **But for it to work, headings must be instantly recognised as headings.**

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## **Lack of distinction or visual clutter undermines their function**

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**Try to remember this:**

**K F J A S A N I B F O T N A S P U**

**Now this:**

KFJ ASAN IBF OTNA SPU CKF

**Now this:**

JFK NASA FBI NATO UPS KFC

# Memory

## Short term (working) memory

- Size **7 ± 2 chunks** (Miller, 1956), consists of:
- **An auditory component** [the phonological loop]
- **A visual component** [the visio-spatial sketchpad]
- Each has its own store & its own rehearsal mechanism

## Long term memory

- Thought to be organised on the basis of **meaning and semantics**
- **Schemas**: Organised knowledge structure to reflect knowledge, experience, expectations. Unconscious routines for commonly performed actions
- **Activated schemas** stand ready to execute on cues from the environment

# Design implications

- **Visibility:** Minimise what users need to remember (“the knowledge in their head”) and show all required information on the page (“the knowledge in the world”)
- **Consistency:** use a language and imagery that conforms to user expectations and previously acquired knowledge; allowing users to connect existing knowledge with new one.
- **Simplicity:** avoid information overload.
- **Concrete things are easier to remember** than abstract ones.
- **Examples and mnemonic devices** help us remembering things

# Attention

## Selective Attention

- Attention can be selective (e.g. listening to a particular instrument in an orchestra)

## Divided Attention

- **Criteria:** Task difficulty, Task similarity & Practice
- Practice leads to processes becoming automatic
- Differentiate between **controlled and automatic processes**
- **Controlled:** Limited capacity, requires attention, flexible
- **Automatic:** No capacity limitation, require no attention, difficult to modify

***Check this: Card trick***

# Design implications

- We have **limited attentional resources** at our disposal. Use visibility, affordance, structure, feedback and consistency to help users shift attention between different tasks and aspects of the page and alert them of changes.
- **Simplicity:** Don't present too many things at once.
- **Tolerance:** Help users recover from slips of their attention and help avoid errors.



# In Summary

The human information processing system can be seen as:

- **A general purpose pattern recogniser**
- **With limited information processing capacity**
- **Using heuristics** (rules of thumbs) to simplify the information processing load
- **Acting as a satisficer** rather than an optimiser

Reason (1990)

# In Summary

- We make **predictions based on previous experience**, or, in other words, **we see what we expect to see**.
- We use Gestalt principles to interpret what we see, and therefore **it is easier for us to perceive a structured layout**.
- We have limited working memory, therefore **it's easier to recognise than recall** for us.
- We use **habits to help us reduce mental effort**, which means that on the web, we often do things in automatic mode rather than consciously paying attention.
- With our limited **attentional** resources we can only give real **attention to one thing at a time**.

# In Summary

## Design principles to apply:

- **Visibility** of information and controls
- **Affordance** and correct **mapping** of controls
- **Feedback** from the system
- **Structure** of the design
- **Consistency** with user expectations and the world
- **Simplicity** of the design
- **Tolerance** of the system to errors

(Norman 1988)

# *User behaviour on the web, heuristics & design principles*



# Hick's law

- **The time it takes to make a decision increases as the number of alternatives increases**
- However, if lesser options involve more work, such as reading sentences, the law may not be applicable.
- When you add page loading time, it often becomes much quicker to have more options (hence the preponderance of "information-dense" Web sites around! e.g. [www.bbc.co.uk](http://www.bbc.co.uk))
- Think of the impact of structure, typography etc when designing pages with many options

# Flexibility-Usability trade-off

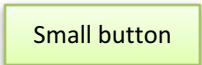
- As the flexibility of a system increases, the usability decreases
- Flexible designs that perform more functions are harder to learn because of increased complexity






# Fitt's law

- The **time required to move to a target is a function of the target size and distance to the target** e. g a smaller, more distant target is harder to acquire than a closer & larger target.
- Here's an [interactive demonstration of Fitts Law](#), and an account of how it was used to [guide some of the design of Microsoft Office 2007](#)

A small, light green rectangular button with a thin black border and a subtle drop shadow. The text "Small button" is centered inside in a black sans-serif font.

Small button

A large, light green rectangular button with a thin black border and a subtle drop shadow. The text "Large button" is centered inside in a black sans-serif font.

Large button



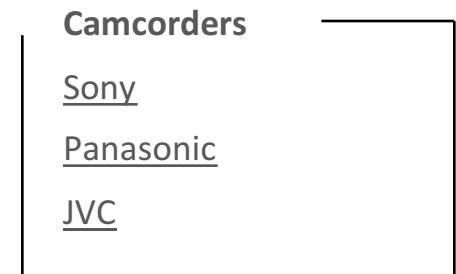
# Information scent

- Based on studies from Xerox PARC on **“information foraging”**.
- When hunting for information, people follow the **same tactics as animals hunting for food**.
- In an information-rich environment people always make **instant analyses of the cost versus the probable benefit** of following a trail.
- **Some links “smell” more strongly** of what you’re looking for than others.
- **Their benefit seems more certain**. So the effort is more worthwhile.

# Information scent

The factors that improve information scent are:

- **Straightforward** links with no puns or made up words
- **Longer link phrases:** don't be scared of using more words for clarity
- **Explanatory information associated with the link** (but be careful what form that information takes). E.g. TITLE attributes in HTML.
- **Nearby links** that have strong scent.
- **“Trigger words”:** The words people tend to think of first when doing a particular task.
- **Adding Boxes & titles** to the list:



# An information scent example

Here's a navigation bar...

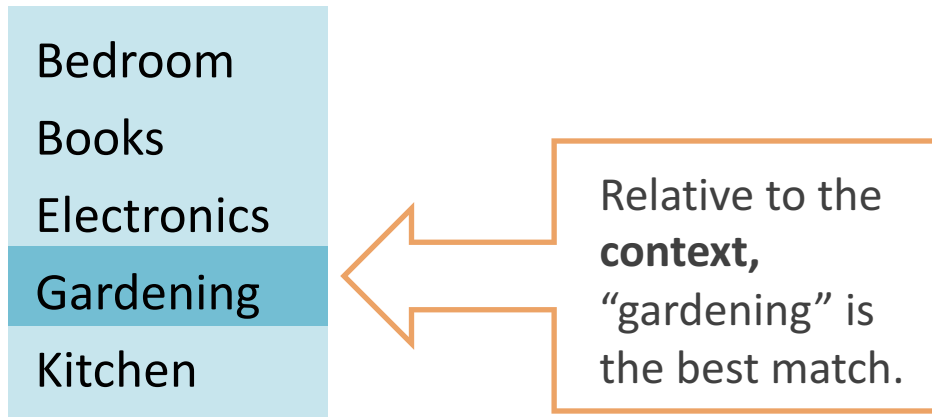


- Bedroom
- Books
- Electronics
- Gardening
- Kitchen

**Task: “Find Wellington boots”**

# An information scent example

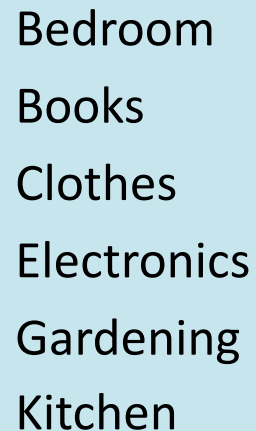
Here's a navigation bar...



**Task: “Find Wellington boots”**

# An information scent example

Here's a different navigation bar...

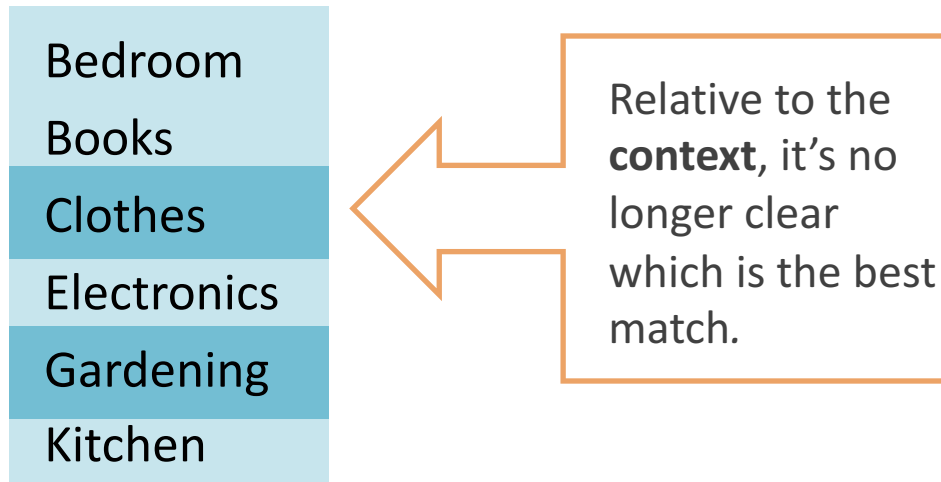


- Bedroom
- Books
- Clothes
- Electronics
- Gardening
- Kitchen

**Task: “Find Wellington boots”**

# An information scent example

Here's a different navigation bar...



**Task: “Find Wellington boots”**

# An information scent example

Here's yet another navigation bar...

**Bedroom:** Quilts, pillow, covers...

**Books:** Bestsellers, factual, education...

**Clothing:** Jumpers, coats, shoes...

**Electronics:** CD players, TVs, Hi-fi...

**Gardening:** Seeds, plants, pots...

**Kitchen:** Pots and pans, cutlery...

**Task: “Find Wellington boots”**

# An information scent example

Here's yet another navigation bar...



Task: “Find Wellington boots”



# Induction: Examples vs. descriptions

- Human brains are very good at inducing general rules from specific examples.
- We often find it easier to induct information than to read abstract descriptions.



# Induction: examples vs. descriptions

- Examples are often better than descriptions.
- If you choose good examples, you'll score direct hits (trigger words).
- But even if you don't score a direct hit, it's easier for people to induct than to read descriptions.



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## Reference

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# Scanning

**We often scan pages, picking out individual words and sentences.**

*“In a recent study John Morkes and I found that 79 percent of our test users always scanned any new page they came across; only 16 percent read word-by-word.”*

Jakob Nielsen

**Help users scan read** by using effective text hierarchy, good layout, and writing for the web guidelines.

<http://www.useit.com/alertbox/9710a.html>

# Satisficing

- It's often preferable to settle for a satisfactory solution, rather than pursue the optimal solution
- Therefore usually we don't inspect all the options. **We choose the *first* option that seems *good enough*.**

## Why?

- We're in a hurry.
- Not much penalty for guessing wrong.
- Experience on the Web teaches us that careful thought doesn't help.
- Guessing is less work.

# Muddling through

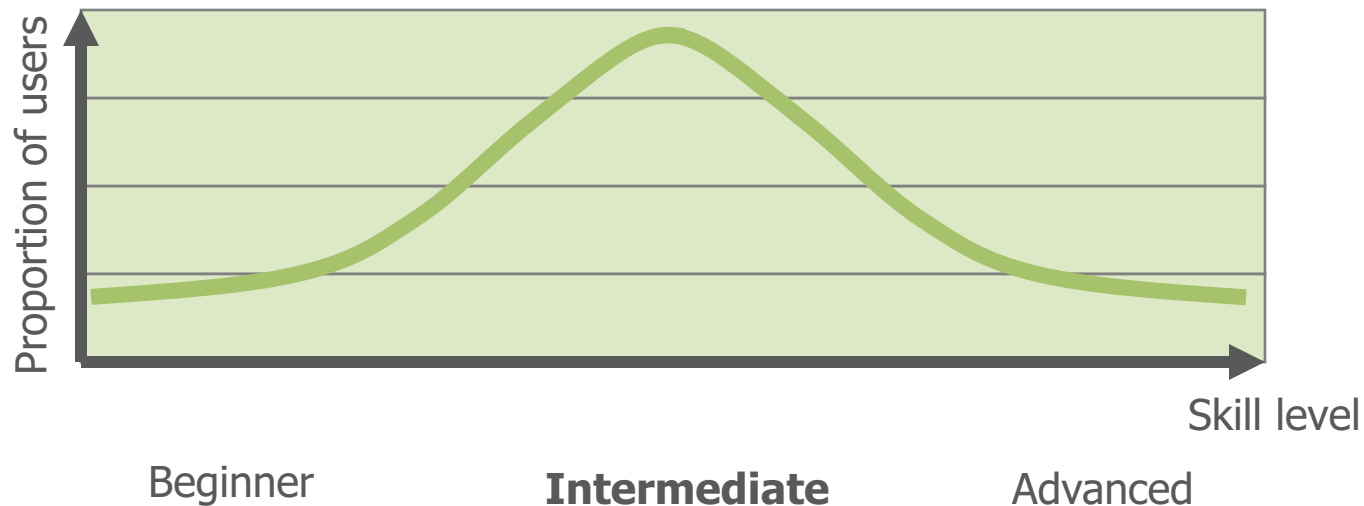
**“Paradox of the Active User”:** People rush in, then suffer productivity losses in the longer term because they don’t really know what they are doing.

## Why do we muddle through?

- People **don’t care enough** to actually go to all the effort of reading the manual.
- People stick with whatever way they first discovered of getting the job done, e.g. Google gets thousands of searches every day for full URLs like *www.bbc.co.uk*.

# The perpetuate intermediate

Because we like to muddle through, most of us stay intermediate users all our lives.



# *Layout & Typography*

# Good layout and typography matters

- We know that most of the time users **scan-read** pages
- A **well structured layout** makes web pages easier to use, design and code!



# Chunking and aligning content

- **Working to a grid** makes content easier to read (and to design)
- **Justifying items to the left** of each column enables users to scan much faster for what they are looking for
- Chunking your content and navigation into panels allows for a **modular approach** when creating content and designing functionality

# What is Lorem ipsum?

**Lorem Ipsum** is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged.

It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum.

## Where does it come from?

It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here', making it look like readable English. Many desktop publishing packages and web page editors now use Lorem Ipsum as their default model text, and a search for 'lorem ipsum' will uncover many web sites still in their infancy.

Various versions have evolved over the years, sometimes by accident, sometimes on purpose (injected humour and the like).

# What is Lorem ipsum?

**Lorem Ipsum** is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged. It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum.

## Where does it come from?

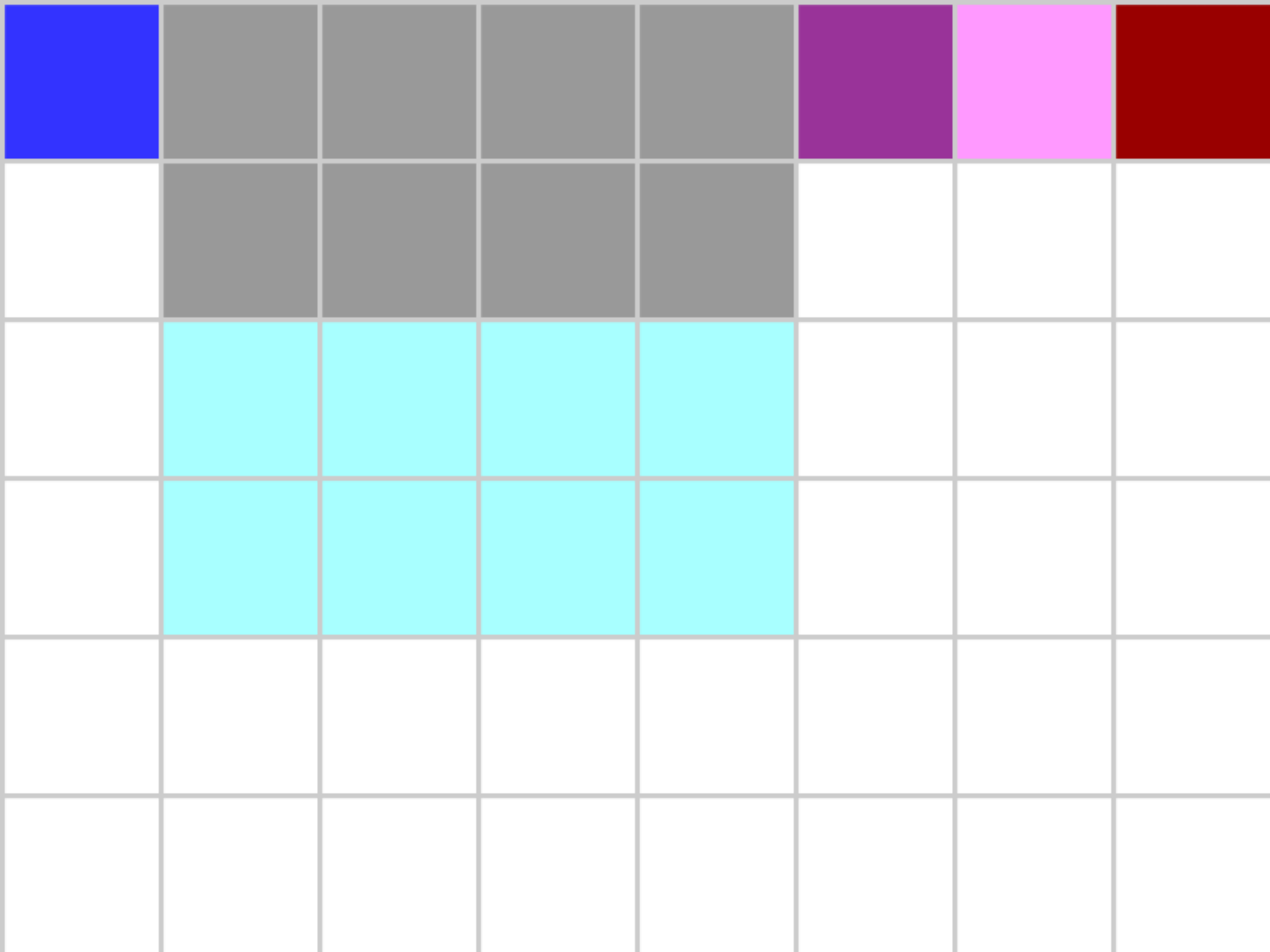
It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here', making it look like readable English. Many desktop publishing packages and web page editors now use Lorem Ipsum as their default model text, and a search for 'lorem ipsum' will uncover many web sites still in their infancy. Various versions have evolved over the years, sometimes by accident, sometimes on purpose (injected humour and the like).

# Grids

- Grids help you creating a consistent layout across pages
- Modern UI frameworks such a bootstrap are grid based and responsive
- Examples of grids:
  - [Simple grid](#)
  - [Bootstrap](#)
  - [Flexbox Grid](#)

# Leverage user expectations

- Researchers at University of Wichita (2002) ran a study where they asked people to indicate on a grid where they expected different page elements to appear.
- Lets look at one of the results for user expectations of an e-commerce site
- What do *you* think the different colours represent?



Logo /  
Back to  
home

Search engine

Account /  
Order

Shopping  
Cart

Help

Merchandise

# Long pages, short pages and scrolling

- In early days of web people often did not scroll - not realising there was more “below the fold.”
- Designers would attempt to cram content above the fold, often making a mess.
- But things have changed – scrolling is now “normal behaviour”.

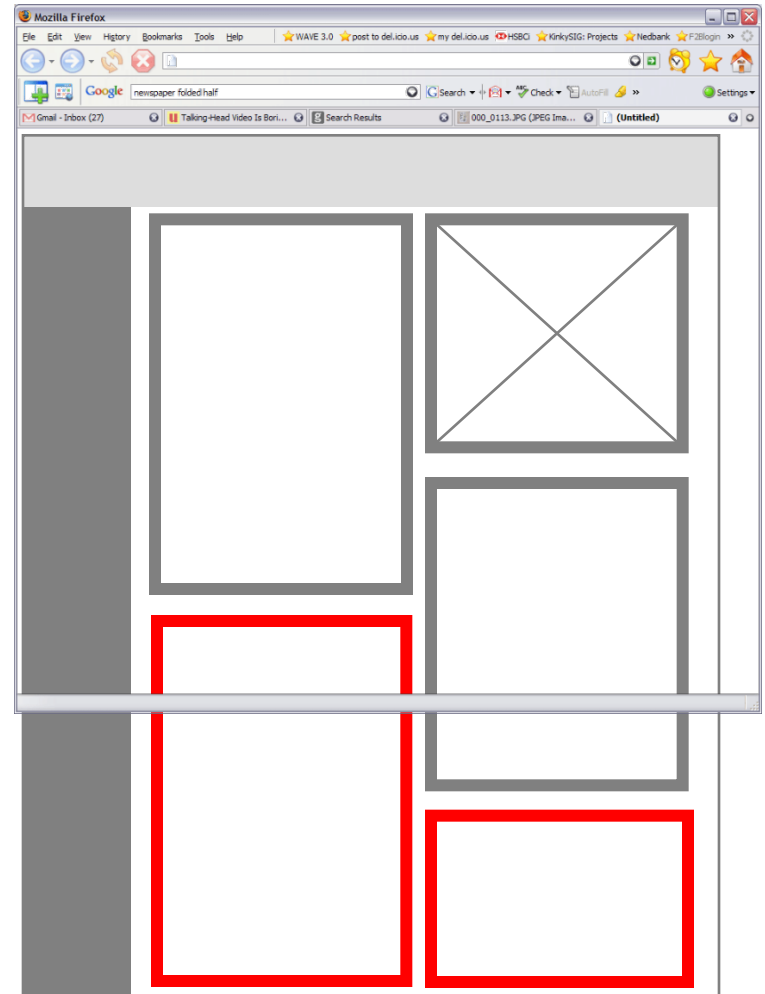
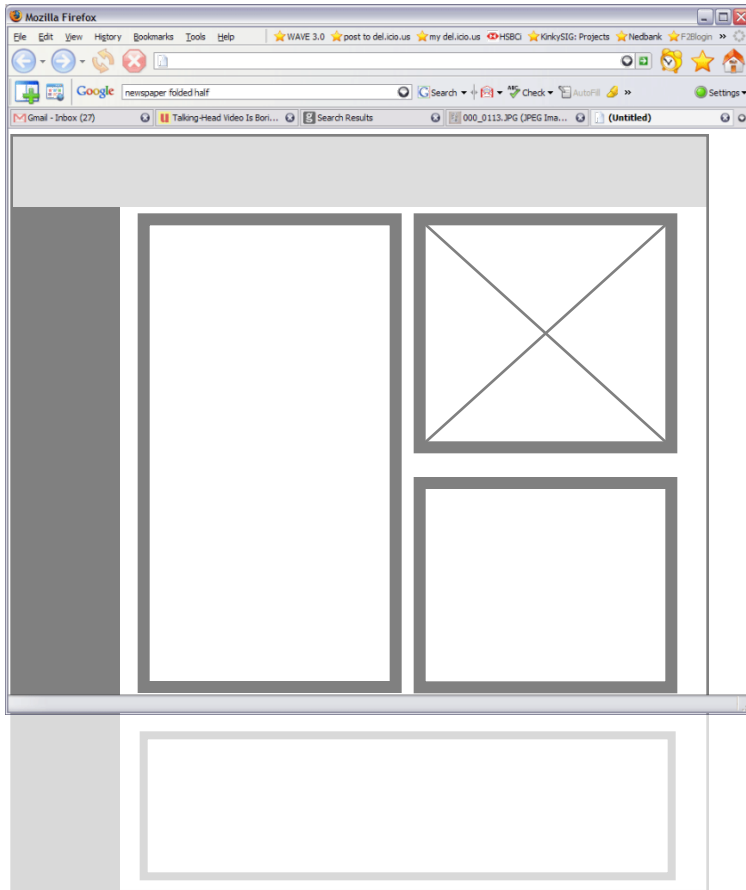




# Long pages, short pages and scrolling

- **People forget to scroll when:**
  - They don't expect to find anything lower down
  - There is a “scroll stopper” that makes it look like they have seen everything
- **Solutions:**
  - Make content extend below and peak above the fold

# Scrolling



# Text hierarchy

Having a good text hierarchy in place helps users understand the structure of the page:

## Section Heading H1

### Entries Heading H2

#### Tertiary headings H3

#### Other headed elements H4

# Further reading...

## Chapter 13: Prototyping

