THE VISUAL INTERFACE

Human Visual Perception

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Includes material from
Dix et al, 2006, Human Computer Interaction, Chapter 1

LEARNING OUTCOMES

- What are the two stages of the visual system?
- How do luminance and colour effect visual perception?
- What is the difference between central and peripheral vision?
- How do we read?

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- How do we realize design?
- What should we consider?
  - Technical
  - Visual
  - Interaction
  - Search
  - Context of use
    - Information
    - Interacting/ transacting

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REALIZING THE VISUAL INTERFACE

- Human visual systems
- Visual aesthetics
- Grouping
- Lines Borders & Tables
- Text
- Colour and Images
- Forms and Controls

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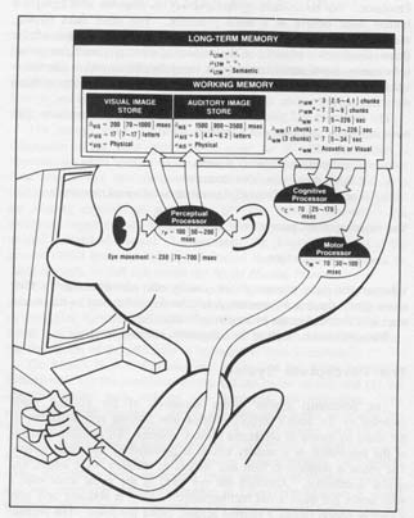
THE HUMAN PROCESSOR

- Input
  - senses
- Process
  - Cognition
    - Knowledge
    - Skills
    - Reasoning
- Storage
  - Memory
- Output
  - Actions
  - Speech



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SENSES

Human

- Vision
- Hearing
- Smell
- Taste
- Touch
- Kinaesthetic / proprioception

Computer devices

Input output

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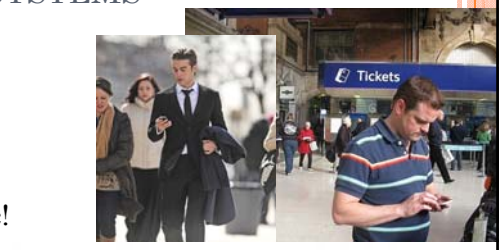
Current computer systems

- Mostly output is to a visual display.
  - And the display is also the input medium on phones etc!
- Exceptions
  - Sound
  - Vibrate



Vision

Two stages in vision

- physical reception of stimulus
- processing and interpretation of stimulus

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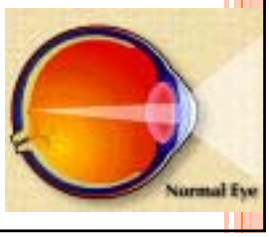
The Eye - physical reception

- mechanism for receiving light and transforming it into electrical energy
- light
  - Reflects from objects (e.g. paper)
  - Or is produced from a light source (e.g. a display)
- images are focused upside-down on retina
- retina contains rods for low light vision and cones for colour vision
- ganglion cells (brain!) detect pattern and movement
- Interesting web site http://www.hhmi.org/senses



Interpreting the signal (cont)

- Luminance (Brightness)
  - subjective reaction to levels of light
  - affected by luminance of object
  - visual acuity increases with luminance as does flicker
- Colour
  - made up of hue, intensity, saturation
  - cones sensitive to colour wavelengths
  - blue acuity is lowest
  - 8% males and 1% females colour blind are severely colour blind

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Luminance (Brightness)

- Rods provide low-light monotone (grey scale) vision. Rods are saturated in bright light and contribute little or nothing to what you see.
- However the principles of brightness and contrast are equally important with colour vision.

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Half Time Entertainment

- https://www.youtube.com/watch?v=DCu1G2rxj5c
- There are a few naughty words in this clip so if you are easily offended don't watch.

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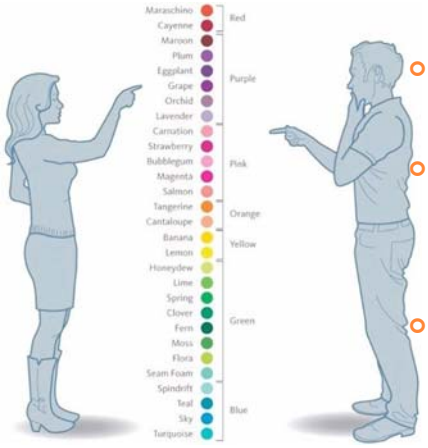
Colour and gender



- Women see more colours than men (on average)
- Perhaps 80% of men are colour blind .. depending on how you measure it. ☺
- There is a difference between seeing the colours on a chart and seeing them in isolation

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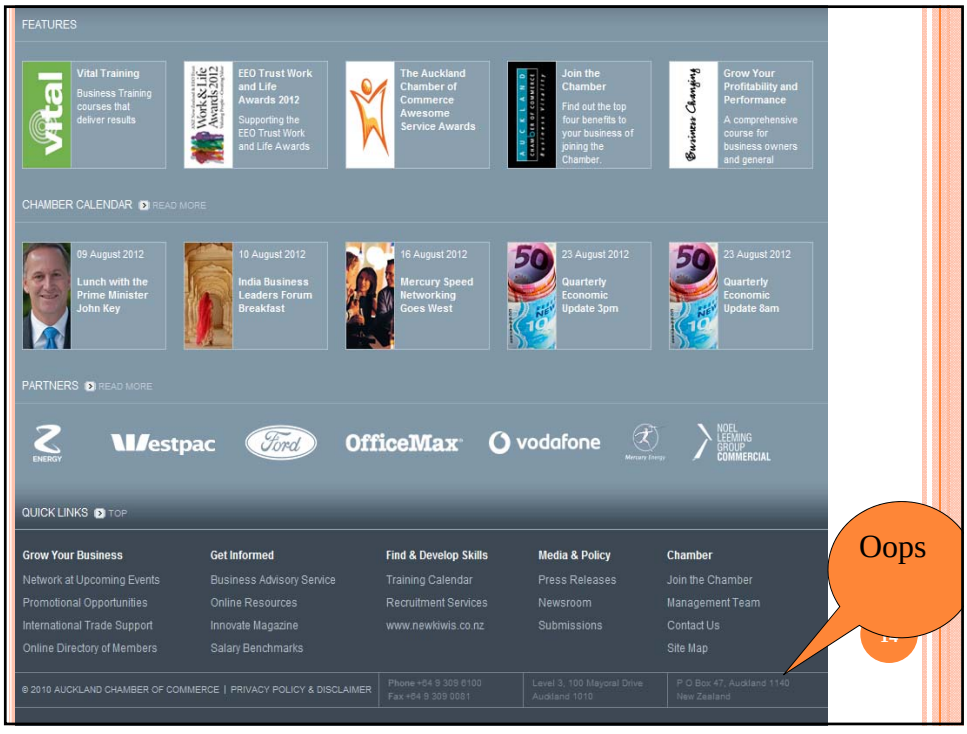

Oops

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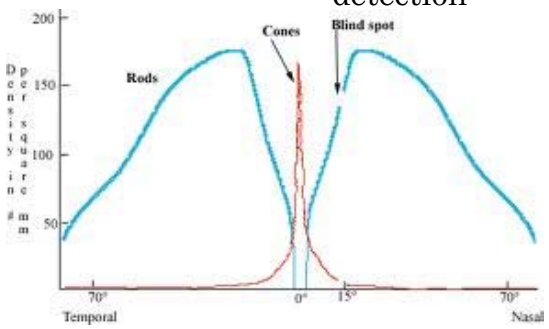
Central versus peripheral vision

Central

- More cone cells
- Better detail and focus

Peripheral

- Less cells in general and more rod cells
- Good movement detection



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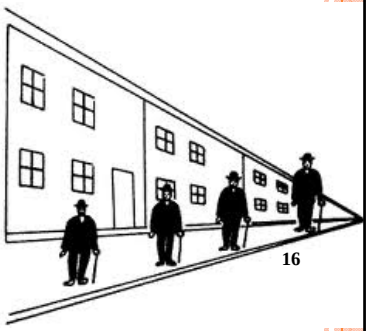
Interpreting the signal

- Size and depth
  - visual angle indicates how much of view object occupies (relates to size and distance from eye)
  - visual acuity is ability to perceive detail (limited)
  - familiar objects perceived as constant size in spite of changes in visual angle when far away)
  - cues like overlapping help perception of size and depth
- What does this mean for items on the screen periphery?



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Interpreting the signal (cont)

- The visual system compensates (to some degree) for:
  - movement
  - changes in luminance.
- Context is used to resolve ambiguity
- Optical illusions sometimes occur due to over compensation

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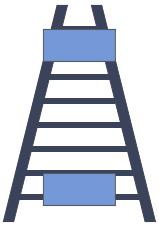
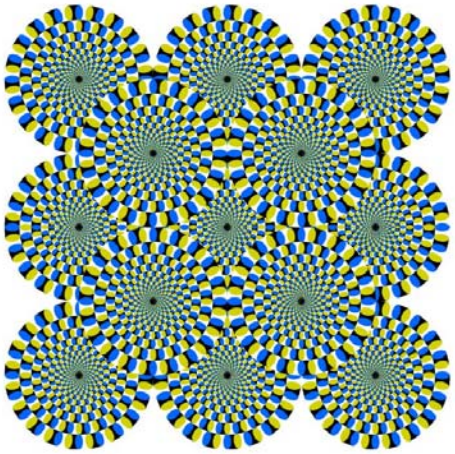
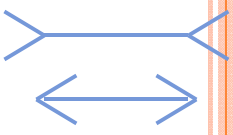
Optical Illusions







http://michaelbach.de/ot/

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READING

- Several stages:
  - visual pattern perceived
  - decoded using internal representation of language
  - interpreted using knowledge of syntax, semantics, pragmatics
- Reading involves saccades and fixations
- Perception occurs during fixations
- Word shape is very important to recognition
  - There are two main theories about how we read, one from psychology and one from typography… suffice to say, that either way the same things are important

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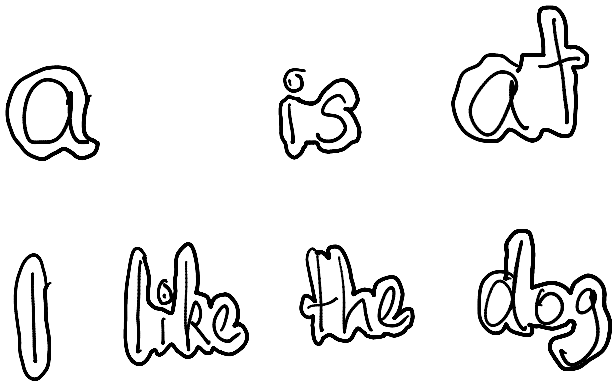
WORD SHAPES



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When you are surfing the web this week

- If you have trouble finding something you know must be on a page
- Look to see why that is
  - Is it on an edge?
  - Is the colour wrong?
  - Is the font too small?
- Put some examples up on the class forum – link and your comment as to what was good/bad about the visual layout
- We will come back to the details for design over the next few lectures.

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What if ….

- Your visual attention is need for another activity
  - Driving & cell phone / gpa navigation….
- Are colour blind?
- Needed reading glasses?
- Have really poor eye sight that cannot be corrected by glasses?
- You are blind?

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To be continued

- Next lecture we'll move from perception to aesthetics,
- But don't forget aesthetics is all based on our perception

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